UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

STATE OF HAWAII
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
P. O. BOX 3378
HONOLULU, HI 96801-3378

March 30, 2023

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: Red Hill Shaft Flow Optimization Study

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 responses to comments and revised Red Hill Shaft Flow Optimization Work Plan (Work Plan) submitted by the U.S. Department of the Navy (Navy) on January 27, 2023 (cover letter dated January 26, 2023). These documents were submitted in response to the Regulatory Agencies' comments, dated December 15, 2022, on a draft version of the Work Plan, dated October 26, 2022.

The Navy's letter transmitting the responses to comments and revised Work Plan requests Regulatory Agency approval to re-commence the flow optimization study. The Regulatory Agencies do not object to resumption of the study. However, we have noted that robust capture is not indicated in the existing datasets to date, and it is unlikely to be established under the significantly lower pumping rates being explored in this work plan.

Dr. Donald Thomas of the University of Hawai'i is the principal investigator of an independent study funded by the Office of Naval Research (ONR) to improve our understanding of groundwater and contaminant movement through the subsurface at and near the Red Hill Bulk Fuel Storage Facility. The study will include a variety of geological and hydrological measurements, including borehole flow measurements, tracer tests, and geophysical surveys. We request the Navy work with Dr. Thomas to accommodate his interest in timing his field measurements to take advantage of the startups and shutdowns of the Red Hill Shaft groundwater pumps planned during the optimization study.

The DOH's responses to the Navy's "Response to Comments on Red Hill Shaft Flow Optimization Work Plan," received on January 27, 2023, are enclosed.

If you have any questions regarding this letter or the enclosed responses, please contact Grant Scavello, EPA Red Hill Project Coordinator, at Scavello.Grant@epa.gov or (415) 972-3556; or Kelly Ann Lee, DOH Red Hill Project Coordinator, at KellyAnn.Lee@doh.hawaii.gov or (808) 586-4226.

Sincerely,

GRANT SCAVELLO

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Date: 2023.03.30 08:57:37 -07'00'

Grant Scavello
Red Hill Project Coordinator
U.S. Environmental Protection Agency, Region 9

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

Enclosure

cc: VADM John Wade, Commander, Joint Task Force Red Hill
Donald Panthen, Red Hill Program Management Office Director, Navy Region Hawai'i
Sherri Eng, Environmental Director, Navy Region Hawai'i
RDML Jeffrey Kilian, Commander, NAVFAC Hawai'i
LCDR Travis Myers, Aquifer Recovery Team Lead, NAVFAC Hawai'i
Dr. Donald Thomas, Director, Center for the Study of Active Volcanos, UH – Hilo

1. **Navy's response on #2:** *Yes, the Navy [U.S. Department of the Navy] will continue the start and stop of the RHS [Red Hill Shaft] well pump at the end of the survey if the Regulatory Agencies [U.S. Environmental Protection Agency and Hawai'i Department of Health] agree to a reduction in the average pump rate. The Navy intends to utilize the data collected during this flow optimization trial to inform future sustained operation in reduced pumping conditions. The frequent starts and stops would return the pumps back to their intended function of being on and off for periods of time, as the pumps had operated at Red Hill Shaft (and our other water supply locations) prior to the November 2021 release. These start/stop periods also allow for opportunity to* ***balance the workload among all capable pumps*** *in the Red Hill Pump Station, vice having the work burden solely placed on one of the pumps [emphasis added].*

   The GAC [Granular Activated Carbon] vessels are designed for 125 pounds per square inch (psi). Through the hourly pressure readings during operation (and specific periods after pump restart), pressures of 25-30 psi have been observed. These real-world observed conditions, combined with the initial pressure test of 80 psi sustained for two hours in January 2022, do not lead to an assessment that frequent start/stop scenarios will adversely affect the GAC system. Shutdowns and changing treatment trains are managed by slowly opening valves to minimize hydraulic hammer effects and associated pressure spikes.

   DOH's Response: The phrase "balance the workload among all capable pumps" implies that not all of the pumps are either operational or present. After a full year of operating the GAC units, the Navy continues to rely on existing constant speed pumps, which were not designed to match the required duty point for the GAC system, and thus are relying on manual valve manipulation. The Navy has had ample time to determine a way to bring in replacement pumps and variable frequency drives into the pump room.

   In addition, the Navy is overlooking the need for continued access to maintain the pump equipment in the RHS. The makeshift bypass line going to the GAC tanks prevents the Navy from bringing in a variable frequency drive motor, booster pump, etc. The booster pumps next the RHS pump room lift the Waiawa water, transmitted through the tunnel, to Zone I (Red Hill Housing). Should those pumps fail, what is the Navy's course of action to access and install replacement booster pumps and equipment to the pump room in a timely manner? There is a potential that the Navy's Red Hill water tank will go dry. This not only impacts Red Hill Housing and Red Hill Elementary School, but also the fire suppression system for the Red Hill Bulk Fuel Storage Facility (Facility). The Hawai'i Department of Health

(DOH) discussed this issue with the Navy during the Drinking Water Long Term Monitoring meeting on March 23, 2023.

2. **Navy's response on #10:** *The Navy continues to install new monitoring wells through the area surrounding the Red Hill Bulk Fuel Storage Facility to gain greater understanding of the local groundwater conditions. The Navy has observed, based on its weekly groundwater sampling, a clear reduction and contraction of any contaminant plume back towards historical norms. The Navy will continue to use the applicable groundwater EALs [environmental action levels] for TPH [Total Petroleum Hydrocarbons]-d and TPH-o in the heat maps, along with continuing to show the applicable dashed line to represent the area that is above the EAL. Since drinking water and groundwater are different, utilization of the suggested drinking water EALs for groundwater would potentially create confusion and not a standard representation for these groundwater conditions observed. The Navy continues to utilize the 266 micrograms per liter Environmental Action Level for all drinking water testing being performed at individual residences, medical facilities and schools, as a part of the two-year drinking water long-term monitoring plan.*

   DOH's response: The incident-specific EAL for TPH is based on plume degradation scenarios in the groundwater. For example, 266 micrograms per liter (ug/L) applies to groundwater impacted by releases of fresh fuel product in the immediate vicinity of a production well with minimal degradation of JP-5-related hydrocarbons and are not just intended for tap water and/or drinking water monitoring purposes.

   After the November 20, 2021 JP-5 release, widespread contamination of JP-5 was observed in the monitoring well network. Therefore, the applied EAL of 266 ug/L for TPH is warranted for all the groundwater monitoring programs at the subject facility and supersedes the previous TPH EALs until further notice or updates.

   For further details, please refer to the revised *Recommended Risk-Based Drinking Water Action Levels for Total Petroleum Hydrocarbons (TPH) Associated with Releases of JP-5 Jet Fuel*, dated April 20, 2022, at https://health.hawaii.gov/heer/files/2022/10/JP-5TapwaterActionLevelsSignedHIDOHApril2022.pdf.

3. **Navy's response on #11:** *The Navy utilizes the Red Hill Shaft (RHMW2254-01) for its assessment of the groundwater conditions in the respective area. Pre-chlorination and post-chlorination sampling are performed for drinking water, which is why it is eliminated from*

the groundwater heat maps. The Navy understands that TPH-o was observed in consecutive pre-chlorination sampling events from July to September 2021. Due to the increased NOI [Notice of Interest] sampling at the time, which increased the number of samples taken and the backlog of mainland United States-certified laboratories, the Navy did not receive validated results for the pre-chlorination samples back until October 2021, at which time they were provided to the Regulatory Agencies. The Navy continues to install monitoring wells in the area to gain a greater understanding of the groundwater conditions in the vicinity of the Red Hill Bulk Fuel Storage Facility.

DOH's Response: In conjunction with the Facility's groundwater monitoring programs, the DOH has been monitoring the TPH at the RHS' pre-chlorination and post-chlorination points historically for drinking water until the RHS was disconnected from the Navy drinking water system. After the November 20, 2021 release, sampling at these two locations stopped. The pre-chlorination sampling taps on the RHS pumps remain functional, and the Navy has committed to re-starting groundwater sampling at the pre-chlorination taps as part of the RHS Flow Optimization Study.

Water sampling monitoring data from the above-mentioned locations are critical components of the dataset describing the temporal impacts of fuel spills at the Facility and must be considered under all the hydrogeological and environmental work for regulatory compliance studies. We note the Navy has not included detections at the pre- and post-chlorination sampling points when assessing plume delineation changes in the Red Hill groundwater system. Hence, the Navy shall assess the data pertaining to the pre-chlorination and post-chlorination points at the RHS in historic and current assessments, especially while creating the spatial-temporal plume maps.

For more details on the amalgamation of the DOH's groundwater and drinking water oversight at the RHS, please refer to *Interim Update, Red Hill Bulk Fuel Storage Facility Groundwater Protection Plan Section*, dated August 2014.

4. **Navy's response on #13:** *The Navy awarded a contract to CAPE Environmental Management, Inc in January 2022 to conduct an evaluation of potential water use courses of action (COAs) for effluent from the Red Hill Shaft GAC system.*

   The courses of action reviewed focused on various iterations of potential reuse receivers and mechanisms of water conveyance. These COAs considered public/private entity and off-base

DoD [Department of Defense] Use of Effluent Water; use by DoD users; Aquifer Recharge options; Partnership with Honolulu Board of Water Supply (BWS) to use existing non-potable pipelines; and combinations of these approaches with aquifer recharge, existing non-potable infrastructure and/or construction of new piping.

Based on the assessments provided, none of these interim COAs provided a viable solution to the water re-use problem in timelines quicker than a Military Construction project effort for a permanent Water Treatment Facility at Red Hill Shaft could provide. The Navy continues to work towards this permanent solution in an expeditious manner and continues to look at ways to reduce water usage, similar to the flow optimization work plan's intent of performing the capture zone treatment with reduced water usage.

DOH's Response: The Regulatory Agencies have considerable concerns regarding the timeline for the design and construction of the Military Construction permanent RHS drinking water treatment facility. The Navy shall seriously consider beneficial water reuse, to show their commitment to water conservation during this timeline.

Provide the Regulatory Agencies the report from the CAPE Environmental Management, Inc. January 2022 contract with the Navy. The Regulatory Agencies would like to review the COAs in the CAPE report to ascertain whether there are other possible alternatives to beneficial reuse of the discharge water.

Provide the basis for the design of the permanent drinking water treatment facility and the list of all contaminants that are being considered for treatment (e.g., JP-5, historically released fuels, weathered fuels, per- and polyfluoroalkyl substances, fuel additives, etc.).