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In reply, please refer to:  
File:

February 27, 2026

Rear Admiral Brad Collins  
Commander, Navy Closure Task Force – Red Hill  
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[via email only: [brad.j.collins.mil@us.navy.mil](mailto:brad.j.collins.mil@us.navy.mil)]

Dear Rear Admiral Collins:

**SUBJECT: DOH Comments on *Draft Simulation of LNAPL Transport in the Vadose Zone, Red Hill Bulk Fuel Storage Facility*, dated December 2025**

On December 18, 2025, the Hawai'i Department of Health (DOH) received the Navy Closure Task Force-Red Hill's (NCTF-RH's) *Draft Simulation of LNAPL Transport in the Vadose Zone, Red Hill Bulk Fuel Storage Facility* ("Report"), dated December 2025. After reviewing the report, we have the following questions and comments.

**Release Amounts**

1. PDF page 12 of the Report states that:

The purpose of this work was to create an initial vadose zone model (VZM) that can simulate the fate and transport of light nonaqueous-phase liquid (LNAPL) from historical petroleum releases in the area of the Red Hill Bulk Fuel Storage Facility underground fuel storage tanks in Oahu, Hawaii (the 'tank farm').

However, the simulations do not reflect actual "historical petroleum releases." The initial LNAPL simulations were performed to characterize the potential distribution of LNAPL from two releases: (1) 27,000 gallons of JP-8 in January 2014 near Tank 5; and (2) a small quantity (estimated less than 100 gallons) of JP-5 in May 2021 near Tank 17. It is unclear why these particular release volumes were chosen. Provide an explanation. Does the NCTF-RH plan to simulate the larger release volumes that have historically occurred? Does the NCTF-RH plan to simulate larger release volumes entering the vadose zone from a broader area or other areas due to the influence of infrastructure? The Report states that the 2014 release rate simulated was 195 gallons over 7 days into 20 cells. How was this release rate chosen?

2. The report states that LNAPL generally flows farther in the massive 'a'ā/pāhoehoe zones than in the clinker zones because of the larger storage capacity of the clinker zones and states that the proportion of these massive zones in a region leads to greater potential for migration. Given that this conclusion is based on the particular release volumes that were used, does the NCTF-RH plan to simulate larger spill volumes to examine whether this conclusion will still hold?
3. The report states that there is significant uncertainty in the true distribution of LNAPL resulting from these two release simulations. How does the NCTF-RH plan to reduce the amount of uncertainty in these simulations?

### **Include Recharge**

4. Given that recharge infiltration causes dissolution of LNAPL, the NCTF-RH's numerical model should simulate recharge in the VZM to better understand leaching of constituents and potential aqueous transport in the horizontal and vertical directions. How does the NCTF-RH plan to accurately simulate infiltration and wetting fronts in the vadose zone from precipitation events?

### **Effects of Previous Releases**

5. PDF page 18 of the Report states that:

Although there have been many documented releases of LNAPL around the tank farm, the distribution of LNAPL from past releases is not known. Therefore, in these simulations, no LNAPL was assumed to be present in the subsurface before the releases. The effect of the prior presence of LNAPL in the subsurface could be explored with future simulations.

Previous releases are important to include in the model. How will the NCTF-RH estimate previous releases for future vadose zone modeling? Residual contamination could facilitate downward migration.

### **Sensitivity Analysis**

6. Given the significant uncertainty of the LNAPL simulations, additional sensitivity analyses are recommended to more fully examine how the uncertainty in input parameters (e.g. release volume, release rates, residual saturations, basalt anisotropy, release location, spatial variability in permeability, relative permeability, porosity, initial water saturation, and grid size) affects the spatial distribution of LNAPL.
7. Many parameters were adjusted to "facilitate model convergence" (PDF page 20). For example, the Report states that, "Simulated rock properties were the same as those used in the 2024 GWFM (DON 2024) except that clinker permeability was decreased by approximately one order of magnitude to improve model convergence" (PDF Page 12). What is the model being calibrated to? How is the model being calibrated without data? The model cannot be calibrated without data. Will the time it took for fuel to travel from release

point to infiltration gallery be used to estimate any travel behavior? How will other data be used, or developed, to constrain the model, such as the soil vapor data or cores?

8. DOH has previously provided comments on the *Groundwater Model Report Red Hill Bulk Fuel Storage Facility*, including the most recent report received September 26, 2024. DOH comments regarding geology at the site are also relevant to the VZM. The Report states that, "Fifty realizations of basalt types in grid cells near each release location were developed based on a statistical analysis of lava flow model results (DON 2024)" (PDF page 12). Are these lava flow outputs appropriate for the scale and depth needed for the VZM?

### **Multi-Phase and Dissolved Plume Modeling**

9. Given that calibration data are limited for the LNAPL simulation, does the NCTF-RH plan to use TOUGH-3 with its reactive extension TOUGHREACT (for biodegradation) to match the observed dissolved phase detections in groundwater? If not, what model would be used?

If you have any questions regarding this letter, please contact me at [KellyAnn.Lee@doh.hawaii.gov](mailto:KellyAnn.Lee@doh.hawaii.gov) or (808) 586-4226.

Sincerely,



KELLY ANN L. LEE  
Acting Red Hill Project Coordinator

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