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In reply, please refer to:
File:

November 6, 2024

Rear Admiral Stephen Barnett
Navy Closure Task Force – Red Hill
850 Ticonderoga Street, Suite 110
Joint Base Pearl Harbor Hickam, Hawaii'i 96860
[via email only: stephen.d.barnett.mil@us.navy.mil]

Dear Rear Admiral Barnett:

SUBJECT: **DOH Response to:**

- 1. Draft Deep Soil Vapor Extraction Pilot Study Work Plan, Red Hill Bulk Fuel Storage Facility, dated July 2024; and**
- 2. Draft Soil Vapor Extraction System Step and Constant Rate Testing Technical Memorandum, Red Hill Bulk Fuel Storage Facility, dated July 2024**

On August 2, 2024, the Hawaii'i Department of Health (DOH) received the U.S. Department of the Navy's (Navy's) revised *Draft Deep Soil Vapor Extraction Pilot Study Work Plan, Red Hill Bulk Fuel Storage Facility* (Deep SVE Pilot Study WP), dated July 2024, and responses to our comments on the original Deep SVE Pilot Study WP. On August 2, 2024, we also received the preliminary results of the shallow soil vapor extraction (SVE) pilot study in the *Draft Soil Vapor Extraction System Step and Constant Rate Testing Technical Memorandum, Red Hill Bulk Fuel Storage Facility* (Shallow SVE Tech Memo), dated July 2024.

The Navy and U.S. Defense Logistics Agency (DLA) submitted these documents in support of closure of the underground storage tank (UST) system that includes the Red Hill Facility (Facility), in accordance with the DOH's 2022 Emergency Order and Hawaii'i Administrative Rules Chapter 11-280.1. The purpose of the shallow and deep SVE pilot studies is to evaluate the effectiveness of SVE as a potential remedial option for releases from the Facility. After review of the subject documents, we have the following general comments.

Deep SVE Pilot Study WP

1. Just like aquifer drawdown, vacuum transmittance indicates some level of connection but does not identify compartmentalization that is likely present based on aquifer tests conducted to date.

2. Provide a copy of *Benchscale JP-5 Evaporation Study* to the DOH.
3. Based on the Navy's initial evaluation of the effectiveness of SVE at this site in the Shallow SVE Tech Memo, we are uncertain of the value of conducting the deep SVE pilot study.

Shallow SVE Tech Memo

4. The estimated hydrocarbon stripping rate was determined to be very low and is expected to decrease further over time as volatiles are removed. The measured rates and other test elements indicate a very low mass recovery efficiency and suggest the method is unlikely to be a viable remedy as applied.
5. The vacuum decay with distance is highly pronounced relative to the vacuum at the test well, particularly in the higher test vacuum cases. This indicates a strong component of vapor "leakage" from the atmosphere, which is consistent with the fixed and biogas readings that approach atmospheric conditions.
6. The estimated aerobic biodegradation rates were reported to be up to 5 kilograms per day, which is far greater than the hydrocarbon stripping rate reported in the Shallow SVE Tech Memo. The calculation for the aerobic biodegradation rate implies that the introduction of oxygen and its conversion to carbon dioxide is related to the rate of SVE, where the higher the SVE flow rate, the greater the bio-decay. However, the fixed and biogenic gas concentrations remained primarily unchanged during the step test. The Shallow SVE Tech Memo does not characterize or substantiate the ambient degradation versus any change due to SVE. Since the vacuum dissipation and stripping rates imply low induced air-flow in the subsurface, it is unlikely that there is any substantive biodegradation enhancement. The high ambient oxygen levels imply there is sufficient oxygen in the system without SVE.
7. Due to the shallow nature of the perched zone and the near-ambient oxygen levels in the targeted system, it is likely that air sparging would have a very limited effect, and as the DOH has previously mentioned, free phase fuel can be displaced by sparging if the pressures are sufficient. Instead, the Navy should focus on evaluating other potential remedial options to address the contamination present in the perched aquifer area.

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

Sincerely,



KELLY ANN L. LEE
Red Hill Project Coordinator

Rear Admiral Stephen Barnett
November 6, 2024
Page 3 of 3

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