

## RESPONSE TO COMMENTS – DOH COMMENTS ON SITE ASSESSMENT PILOT STUDY WORK PLAN (PSWP) – AUG. 8, 2024

[GENERAL COMMENTS]

***1. Throughout the Draft Technical Memorandum, Site Assessment Pilot Study Work Plan (PSWP), Red Hill Bulk Fuel Storage Facility, received August 8, 2024, there are procedures without descriptions that only refer to the Navy's internal guidance document. Add descriptions of procedures that will be used. Procedures shall be conducted according to the Hawai'i Department of Health (DOH) Hazard Evaluation and Emergency Response (HEER) Office Technical Guidance Manual (TGM). Any proposed deviation(s) from the DOH HEER Office TGM should be described, with supporting justification.***

**NCTF - RH Response** – Sections 6.1.4 (Geophysical Survey for Subsurface Utility Clearance), 6.2.4 (Borehole Sampling and Logging), and 6.2.5 (Borehole Abandonment) were modified to document that the proposed procedures are in accordance with the TGM. Section 6.3.2 (Active Soil Gas Sampling) was modified to identify proposed deviations from the TGM with supporting justification.

***2. Provide references for any literature reviewed, where these proposed methodologies were evaluated at similar sites. Key site characteristics include volcanic settings, variable fuel distributions and ages, statistical findings of the studies, and how false-negatives were addressed.***

**NCTF - RH Response** – The Navy is not aware of any sites like the Red Hill Facility where the sampling methodologies that are proposed in the Pilot Study Work Plan have been evaluated and did not identify any such sites in its literature review.

Neither the HAR nor the TGM require or recommend that a pilot study be performed prior to conducting a Site Assessment. Furthermore, it is not a common industry practice to conduct a pilot study prior to a Site Assessment. However, due to (1) the lack of precedent at sites similar to the Red Hill Facility and (2) lack of standard protocol for performing a Site Assessment at sites similar to the Red Hill Facility, the Navy and EPA agreed during the March and April 2024 scoping sessions that the Navy would perform a Site Assessment Pilot Study to verify that the sampling methodologies proposed in the Draft Site Assessment Work Plan are applicable and technically adequate for meeting the objectives of HAR §11- 280.1-71 and –72.

***3. The DOH is concerned about potential false negatives, i.e., nondetects near an actual fuel source. Therefore, the evaluation of these methods must account for rock and soil properties; ranges of chemical compositions and volatility in the various fuels historically stored in the underground storage tank (UST) system that includes the Red Hill Bulk Fuel Storage Facility; dilution of fuel vapor readings by atmospheric inputs due to barometric, ventilation, or other factors influencing vapor in the subsurface; and effects of biodegradation and other attenuation mechanisms. In the revised PSWP, explain how each of these factors was considered/addressed.***

**NCTF - RH Response** – The Navy recognizes the concern for false negatives and believes that the multiple lines of evidence sampling approach presented in the Draft SAWP has the best chance of minimizing the risk of false negatives in the unique conditions encountered at the Red

Hill Facility. That said, the SAPS is intended to evaluate the effectiveness of the passive soil vapor samplers and the potential for false negatives. Section 2 has been modified to describe how the proposed MLE approach and the various sampling methods that will be evaluated in the Site Assessment Pilot Study account for rock and soil properties; ranges of chemical compositions and volatility in the various fuels historically stored in the underground storage tank (UST) system that includes the Red Hill Bulk Fuel Storage Facility; potential dilution of fuel vapor readings by atmospheric inputs due to barometric, ventilation, or other factors influencing vapor in the subsurface; and effects of biodegradation and other attenuation mechanisms.

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[SPECIFIC COMMENTS]

***4. Section 2, PDF page 7: The three analyses listed in Section 2 do not match what is proposed in the June 2023 Draft Tank Closure Plan, Supplement 3: Phase 1 Site Assessment Work Plan (SAWP), Red Hill Bulk Fuel Storage Facility. For example, the SAWP does not clearly state that active soil gas samples will be collected for laboratory analysis of biogenic gases. The SAWP instead states biogenic gases will be measured using field instruments. In addition, according to the SAWP, soil samples will be analyzed for tetraethyl lead and groundwater samples will be collected in the event that groundwater is encountered. Address the discrepancies between Section 2 and the SAWP.***

**NCTF - RH Response** – (1) The difference between sampling and analysis methods proposed in the Draft SAWP and those presented in the Draft Pilot Study Work Plan is intentional. The Draft SAWP proposes a sampling and analyses program designed to gather multiple lines of evidence (MLE) that will be evaluated to “measure for the presence of a release where contamination is most likely to be present” (HAR § 11- 280.1-72). Based on information currently available, the Navy considers the sampling and analysis program proposed in the Draft SAWP to be “applicable and technically adequate” for meeting the objectives of HAR §11- 280.1-71 and -72. However, as noted in the response to Comment No. 2, due to the unique nature of the Red Hill Facility, EPA and the Navy agreed that the Navy would conduct a Pilot Study to either (a) confirm that the proposed analyses are appropriate, or (b) inform the selection of alternative sampling methodologies. As such, the Navy is proposing to evaluate the methods proposed in the Draft SAWP as well as potential alternative methods.

***5. Section 4, PDF page 7: The pilot study should include an area outside of the tunnel because the tunnel pressurization may have an impact on the effectiveness of the proposed vapor sampling methods. Areas to consider include the former holding and leach tank area and the former oily waste disposal facility, where contamination is known.***

**NCTF - RH Response** – The Navy is conducting the Site Assessment Pilot Study inside Adit 3 because Adit 3 is affected by a known source of contamination (the November 2021 release) that has been extensively sampled, and conducting the Site Assessment Pilot Study in this area will help to verify that each of the sampling methods evaluated are suitable for implementation at the more than 650 sampling locations that are proposed inside the Red Hill Tunnel. The Navy will

review the results of the Adit 3 Site Assessment Pilot Study with DOH and EPA to determine whether a Site Assessment Pilot Study outside the tunnel is warranted.

**6. Section 5, PDF page 8**

- a. *How does the Navy Closure Task Force - Red Hill (NCTF-RH) plan to compare results from the passive soil gas samplers (PSGS) to results from the active soil gas samples collected using summa canisters, when different analytical methods will be used (i.e., TO-17 vs TO-15)?*
- b. *This page mentions testing closer spacing of 12.5 feet (ft) between five PSGS locations in the tunnel to evaluate whether the 25-ft spacing proposed in the SAWP will be adequate to detect releases from the UST system. While these locations are valuable, spacing should also be evaluated around the edge of a known source and outside of the tunnel. The five locations proposed 12.5 ft apart are in an area of known contamination. Add 12.5 foot spacing to the “edge”.*
- c. *To evaluate spacing, sampling points should become incrementally closer moving towards a known source, as contaminant transport is log normal over distance. This approach will better indicate the ideal spacing to detect a release and may reduce the potential for false negatives.*

**NCTF - RH Response:**

- a. Section 6.3 has been revised to include both active and passive soil gas collection via sorbent tube and passive sampler respectively. Both samplers (passive and sorbent tube) will be analyzed by TO-17 for the same analyte list.
- b. Section 6 and Figures 2 through 4 have been revised to indicate that certain sampling locations will be spaced every 12.5 feet at the “edge” of the study area.
- c. The proposed sample spacing allows for an evaluation of incremental spacing from the source are (12.5 feet, 25 feet, 37.5 feet and 50 feet). The text was not revised in response to this comment.

**7. Section 6, PDF page 9**

- a. *Why does the SAWP (Section 14.4.1) propose PSGS installation 2 to 3 feet below the tunnel floor, while the PSWP proposes sampling 1 to 2 feet below the tunnel floor?*
- b. *The pilot study should also evaluate different depths to determine the appropriate depth to detect releases from the UST system.*

**NCTF - RH Response:**

- a. Section 6.3.1 has been revised to specify that the boreholes will extend a minimum of 2 feet through the tunnel floor and the aggregate subbase into the underlying materials. At most locations within Adit 3 the thickness of the tunnel floor and the aggregate subbase ranges between 4 and 8 inches each. As such in most cases, a 2-foot-deep borehole will penetrate the underlying materials.

- b. As documented in Section 6.3.1 of the PSWP, the Navy will install “deep” boreholes (4 to 5 feet below the tunnel floor (btf) adjacent to (approximately 3 feet from) to “shallow” boreholes (2 to 3 feet btf) at ten locations (approximately 20% of the shallow sampling locations to evaluate the optimal depth to detect the presence of petroleum contamination.

**8. Section 6.3, PDF page 11: The PSWP and SA WP describe different methods of measuring biogenic gases. The PSWP states biogenic gases will be measured by collecting active soil vapor samples using Summa canisters and tedlar bags, as well as carbon traps. However, the SAWP states biogenic gases will be measured after the PSGS has been removed from the borehole by inserting field instruments into the borehole to collect a reading. The SAWP mentions potential carbon trap collection, but there is no clear description of how or when this would occur. Clarify the proposal for measuring biogenic gases. The proposed method should be reflected in the PSWP and evaluated in the pilot study.**

**NCTF - RH Response** – The pilot study will evaluate the following methods for analyzing for biogenic gases:

- Collect active soil gas samples in a Summa Canister and submit the samples to a laboratory for analyses methods ASTM D 1946 (biogenic gases) and EPA 3C (methane)
- Collect active soil gas samples in Tedlar bags and utilize field instruments to analyze for biogenic gases and methane.
- Utilize field instruments to measure vapors in the open borehole for biogenic gases and methane.
- Collect passive soil gas samples with Carbon traps that will be used to analyze for CO<sub>2</sub>; their use in the pilot study is to test their effectiveness. All mentioned methods are being used in the pilot study so that a comparison of data can be made between the different methods. The SAWP will be updated, if applicable, depending on the results of the pilot study determining which methods are most effective.

**9. Section 6.3.2, PDF page 13: The level of detail provided about post processing for passive versus active sampling is significantly different. For example, for active samples, there is no description of holding time or how or where samples will be shipped. Provide the same level of detail for both sampling schemes.**

**NCTF - RH Response** – Additional details regarding the handling of the active soil vapor samples have been added to Section 6.3.3. The Summa canisters will be labeled with the sample ID. The provided chain of custody (COC) form, field form, and field logbook will be updated with the sample ID, date, start time, end time, and any other relevant information. Used equipment including nuts, ferrules, and Teflon tubing will be disposed of as municipal trash.

The Summa canisters and sampling manifolds will be placed in their original cardboard shipping box along with the completed and signed COC. The canisters will be packed with bubble wrap to minimize movement during shipping. The samples will be shipped via FedEx overnight express delivery to ALS Group USA, Corp. located in Simi Valley, California. No ice or preservatives are required for this shipment. Each Summa canister has a hold time of 30 days.

**10. Section 6.3.3.1, PDF page 13: Before conducting the pilot study, differential pressure should be measured throughout the study area so that conditions are well understood and appropriate adjustments can be made (e.g., modifying sampling locations, duration of sample collection, etc.). Differential pressure should also be measured at various areas throughout the study area during the pilot study, so that the data gathered can be accurately interpreted.**

**NCTF - RH Response** – Differential pressure, temperature and humidity measurements will be collected throughout the duration of both passive and active sampling to understand site conditions during sampling.

Section 6.4 was added to the PSWP to describe how the differential pressure measurements will be collected and recorded.

**11. Figure 2, PDF page 21**

- a. Relying only on soil vapor field screening to locate source areas is not appropriate. Soil vapor tends to migrate through the subsurface away from a source, so elevated soil vapor measurements may not necessarily indicate the actual location of petroleum in the subsurface. Thus, subsurface data, such as known areas of petroleum product on perched water and data collected during coring, should also be used to identify sources.**
- b. Clearly label the boundaries of the petroleum source area(s) in the subsurface on Figure 2.**
- c. Include a cross-sectional figure identifying the vertical and lateral location of source area(s) in the subsurface within the pilot study area.**

**NCTF - RH Response** – Response

- a. Figures 4 and 5 have been added to show known areas of petroleum product and data from prior drilling activities in Adit 3.
- b. Figures 4 and 5 show the estimated boundaries of petroleum source areas in plan view and cross-section, respectively.
- c. See response to comments 11a and 11b.