

Project Title: Draft Natural Source Zone Depletion Work Plan  
 Red Hill Bulk Fuel Storage Facility  
 Joint Base Pearl Harbor-Hickam, Pearl Harbor Oahu, Hawaii  
 Reviewer: USEPA and HDOH  
 Date: April 15, 2024

Comment No.	Comment Type & Section No.	Comment
1	General	The Work Plan appears to cover only Adit 3, which is a small portion of the overall site, and conditions in Adit 3 are unlikely to be representative of conditions throughout other portions of the site. Consequently, data gathered, and conclusions drawn as part of the proposed natural source zone depletion (NSZD) study are likely not applicable to the site as a whole.

Response: The data collection proposed in this NSZD Work Plan will further enhance the conceptual site model (CSM) for the November 20, 2021 JP-5 release in Adit 3. Historical releases in the Red Hill tank farm are being addressed separately from the November 20, 2021 JP-5 release. As noted in the comment, the conditions at Adit 3 are unique to the overall site, therefore data collection specific to Adit 3 is necessary to understand NSZD processes that have been depleting JP-5 since the 2021 JP-5 release within Adit 3.

While the NSZD study may not be directly applicable to the site as a whole, the findings may be useful to selecting methods to evaluate NSZD at other areas within the Red Hill UST system.

2	General	The RAs believe that conducting a NSZD study prior to defining the location of the principal mass of contamination, as well as its nature and extent, is premature. As the source zone within the Adit 3 location has not been adequately characterized, the usefulness of data collected under this Work Plan is questionable. In addition, the Navy is currently in the process of conducting a soil vapor extraction pilot study, which would likely confound the results of a NSZD study in this area.
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Response: The Navy believes that NSZD data is valuable to a CSM at any stage of site investigation. Collecting NSZD data early in the site investigation process, particularly the petroleum hydrocarbon composition in soil gas, will provide additional understanding of microbial processes at Adit 3. The Work Plan noted that site characterization is not complete and provides a framework for data collection and analysis that can be conducted at future monitoring locations. Additionally, petroleum hydrocarbon composition in soil gas collected early in the investigation process is invaluable for understanding composition changes over time.

The NSZD Work Plan describes data collection at the intermediate and deep soil vapor monitoring points (SVMPs), which are not expected to be influenced by the shallow soil vapor extraction (SVE) pilot study started in April 2024 (and preliminary data collection supports this conclusion). Regarding the deep SVE pilot study, data collected as part of the NSZD study (soil gas composition and temperature) will also be collected during the deep SVE pilot study to evaluate SVE performance. Collecting these data prior to the deep SVE pilot study will baseline the biodegradation occurring under natural conditions, quantitatively and/or qualitatively, to understand how SVE may enhance biodegradation (Smith et al., 2023) and better evaluate the remedial performance and mechanics of SVE remediation.

3	General	As conducting a NSZD study now does not provide an avenue for the Navy to eliminate active remediation from consideration, the RAs recommend the Navy focus its efforts on assessing and investigation releases from the Red Hill UST system at this time.
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Response: Understanding NSZD mechanisms is a key component of the light nonaqueous-phase liquid (LNAPL) CSM and valuable in selecting and designing appropriate data-driven remedial technologies. Collecting NSZD data is not intended to eliminate active remediation from consideration. Rather, the intent is to establish an NSZD baseline before remediation for comparison to active remediation and post-active-remediation conditions. As noted in response to Comment Number 1, the historical releases in the Red Hill tank farm are being addressed separately from the November 20, 2021 JP-5 release.

4	General	Please note, the RAs may provide additional technical comments that are beyond the scope of this letter. For a preliminary technical evaluation of conducting NSZD studies at the Red Hill site, we suggest that the Navy review the assessment of the Navy’s previous NSZD study by Beckett et al., 2022.
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Response: The article was reviewed and the RAs technical comments on NSZD in other areas of the Red Hill Facility are noted. The Work Plan referenced the previous study and has adjusted methods to account for some of the challenges identified in Beckett et al., 2022. However, this NSZD study goes beyond just quantification of NSZD, including:

- Support understanding of NSZD processes over time;
- Determine changes in LNAPL composition over time (evidence by soil gas composition); and,
- Support effectiveness of the deep SVE pilot study.

The Navy understands that the RAs question quantification of NSZD rates in the complex lithology of Adit 3. However, the data will be collected to understand petroleum vapor-phase distribution (and changes over time), baseline SVE pilot studies, and inform the LNAPL CSM. The interpretation of this data will be conducted as described in the Work Plan.