



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105-3901

June 28, 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: Request for Analysis of Fuel in Tanks at Red Hill Bulk Fuel Storage Facility**

Dear Rear Admiral Barnett:

On April 14 through 19, 2023, the Navy sampled the fuel that remained in tanks at the Red Hill Bulk Fuel Storage Facility (RHBFSF). Samples were collected at multiple depth intervals within each tank to account for stratification. US Environmental Protection Agency (EPA) requested copies of the data so that we can better understand potential risk and contaminant migration pathways, should there be a future release. During a May 8, 2023, meeting the Navy explained that it completes its fuel sampling locally in accordance with military standards. They test the fuel for physical parameters like flashpoint and specific gravity. The Navy shared the enclosed inventory of the samples collected from each tank and a subset of the Navy's results for each fuel type.

EPA needs additional information to understand risk and fate and transport, and the Navy asked EPA to specify additional analytical methods to meet those objectives. On May 8, 2023, EPA requested that all the Navy's April 2023 samples be analyzed for the following:

- Saturated Hydrocarbons (EPA Method 8015M via GC/FID)
  - Analysis should include nAlkanes C9-C40, pristane, phytane, and other selected isoprenoids.
  - These data are useful for basic characterization and fingerprinting.
- Alkylated PAHs (EPA Method 8270M via GC/MS-SIM)
  - Analysis should include parent and alkyl PAHs including naphthalenes.
  - These data are useful for characterization and fingerprinting
- SVOCs (Method SW8270 via GC/MS)
  - Analysis should include 2-(2-methoxyethoxy)-ethanol and phenol.
  - These data are useful for detecting fuel additives.
- VOCs w/ methylbenzenes (Method SW8260 via GC/MS)
  - Analysis should include methylbenzenes.
  - These data are useful for detecting tri- and tetra-methylbenzenes

Additionally, EPA requested that one representative sample of each fuel type be analyzed for petroleum biomarkers including sesquiterpenes and diamondoids via EPA Method 8270-SIM. Although diagnostic

biomarkers like terpenes and steranes are typically removed during the refinement process, the fuel may still contain sesquiterpenes and diamondoids. These biomarkers can be very useful for fuel characterization and fingerprinting.

EPA's May 8 email also requested the Navy to consider using normal-phase high-performance liquid chromatography (HPLC) followed by gas chromatography to fractionate the RHBFSF fuel samples and isolate fractions that are components of fuel additives.

During the June 8, 2023, Red Hill Remediation Roundtable, the Navy stated that a contract is in place to analyze the samples. However, the Navy indicated that the samples will be analyzed via the PIANO (n-paraffins [P], iso-paraffins [I], aromatics [A], naphthenes [N] and olefins [O]) method, rather than the analytical methods requested by EPA. Although the PIANO method can detect methylbenzenes and some components of fuels, it may cut off some of the heavier fuel constituents (C15+) present in the fuel at RHBFSF. Adding Saturated Hydrocarbon Analysis (SW-846 8015 forensic method) and Alkylated PAHs (SW-846 8270 SIM) to PIANO is necessary to capture some of the heavier hydrocarbons that aren't detected using PIANO alone.

EPA has also reached out to the Navy verbally and via email to express concerns that storing samples at room temperature and delaying sample analysis may result in the loss of light-end fuel constituents that may pose the most risk to receptors and/or migrate more quickly through the environment. To provide assurance that the RHBFSF fuel sample data will provide an accurate representation of the fuel that is currently in the tanks, please provide the following information:

- Clarify at what temperature the Navy's fuel samples have been stored since they were collected in April.
- Specify how the samples have been stored to minimize headspace and reduce the volatilization of light-end fuel constituents.
- Verify that all samples collected in April 2023 will be analyzed (please see enclosed inventory provided by the Navy on May 8, 2023).
- Confirm which analyses will be completed.
- Provide a schedule for actual or anticipated:
  - Sample transport to a laboratory
  - Sample extraction
  - Sample analysis
  - Preliminary results submittal to EPA

Should you have any questions regarding this letter, please contact Lynn Bailey, EPA's Red Hill Environmental Lead at [bailey.lynn@epa.gov](mailto:bailey.lynn@epa.gov) or (808) 539-0541.

Sincerely,

/s/ June 28, 2023

Alison Fong  
Assistant Director, RCRA Branch  
Land, Chemicals & Redevelopment Division  
U.S. Environmental Protection Agency, Region 9

cc: VADM John Wade, Joint Task Force Red Hill  
RDML Jeffrey Kilian, Naval Facilities Engineering Systems Command (NAVFAC) Pacific  
David Kless, Defense Logistics Agency  
Donald Panthen, Red Hill Program Management Office (PMO) Navy Region Hawai'i  
Josh Stout, Red Hill PMO, Navy Region Hawai'i  
Sherri Eng, Navy Region Hawai'i  
CAPT C. J. Geertsema, NAVFAC Hawai'i  
CAPT James Sullivan, NAVFAC Hawai'i  
LCDR Travis Myers, NAVFAC Hawai'i  
Kelly Ann Lee, Red Hill Project Coordinator, Hawaii State Department of Health (HDOH)  
Grace Simmons, Manager, HDOH Hazard Evaluation and Emergency Response Office  
Anay Shende, Geologist, HDOH Solid and Hazardous Waste Branch