



Joint Base Pearl Harbor-Hickam Drinking Water Quality Monitoring

Summary of Technical Memorandum Regarding Low-Level Hydrocarbon Detections Observed During Long-Term Monitoring

April 25, 2024

Low-Level Hydrocarbon Detections Result of Test Method Interferences in Total Petroleum Hydrocarbon (TPH) Analysis of Chlorinated Drinking Water

Introduction

In November 2021, a release of jet propellant (JP-5) fuel from the Red Hill Bulk Fuel Storage Facility contaminated portions of Joint Base Pearl Harbor Hickam's (JBPHH) drinking water system. The Navy took emergency actions and initiated recovery actions to bring the drinking water system back to meeting federal and state regulatory requirements. In addition, in March 2022 the Navy initiated a two-year Long-Term Monitoring (LTM) program to validate the Hawai'i Department of Health's (DOH) declaration that the water is safe to drink, and to continue to ensure drinking water meets all federal and state drinking water standards. During LTM, the Navy observed an increase in low-level detections, all below the state action levels, of total petroleum hydrocarbons (TPH) beginning in the summer of 2023. When these TPH detections were analyzed, they did not match JP-5 (jet fuel) or other fuel-related compounds. The Navy assembled an interagency team of experts from across the Navy, private industry, and in conjunction with the U.S. Environmental Protection Agency (EPA) and DOH to evaluate potential causes for these low-level TPH detections. The Navy prepared a technical memorandum explaining the team's evaluation, actions taken, and results found from its analysis.

Assessment

The interagency team of experts evaluated potential causes for low-level TPH detections and concluded that low-level detections of TPH in the JBPHH drinking water system are (1) not associated with the release of JP-5 or other fuel, and (2) are the result of interferences from chlorine in the drinking water reacting with other compounds required in the method for TPH analysis that is not designed to evaluate drinking water.

The following list are potential factors evaluated:

- Considerations with the required test method for TPH analysis (a method designed to evaluate soils and wastewaters high in contaminants, not chlorinated drinking water)

- Microbial or bacterial growth (i.e. biofilm activity) in distribution system
- Premise Plumbing (e.g. plumbing systems within a home)
- Pipe erosion and/or mineral buildup in drinking water system
- Changes in levels of disinfection treatment (e.g. addition of chlorine) in drinking water system
- Hydrocarbons in source water at Waiawa Well (Navy's only drinking water source since December 2021, located over 6 miles from Red Hill)
- Changes in water quality of JBPHH source water
- Residual JP-5 or fuel additives distributed or accumulated in JBPHH drinking water system
- Pesticides leaching from external sources
- Changes in operation of the JBPHH drinking water system
- Contaminant/debris introduced into drinking water system during water main breaks

Evidence Considered

The team evaluated multiple lines of evidence to provide insight into how the low-level TPH detections are not JP-5 or any other fuel-related product. These lines of evidence include:

- Evaluation of data trends across geographic zones over the course of the two-year LTM program
- Simulation of water flow in the JBPHH drinking water system
- Evaluation of EPA-approved methods used by the laboratory to test for TPH
- Side-by-side comparison of TPH test results using different sample preparation methods
- Evaluation of the presence/absence of other compounds that indicate the presence of JP-5 or other fuel-related products
- Statistical analysis of TPH data, chlorine in drinking water, and standards added for quality control in the testing method

When considered together, all lines of evidence support the conclusion that the low-level detections of TPH observed during LTM are not associated with the release of JP-5 or any other fuel-related product. A chemical in the required test method was found to interact with chlorine present in the drinking water samples, producing an increased frequency of TPH readings in the sample results. These readings have unique chemical signatures that do not match the signature of JP-5 or any other fuel-related products. Additionally, pushing testing to such sensitive levels (trying to find any signature even at low concentrations) is challenging based on the design and intent of the method.

Path Forward

The Navy is voluntarily continuing enhanced water quality monitoring through March 2025. Under this "Extended Drinking Water Monitoring" program, the laboratories will continue to use the same approved testing method, but with an EPA approved alternative sample processing method to reduce sensitivities of sample method procedure.

A copy of the technical memorandum is available at <https://jbphh-safewaters.org>.