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Technical Report for the Review of the Joint Base Pearl Harbor-Hickam (JBPHH) Interagency Team's Technical Memorandum on the Lines of Evidence Evaluation of TPH Detections Observed During Long-Term Monitoring

Prepared for the Honolulu Board of Water Supply (BWS)

The Basis of the Memorandum Conclusions

- The Memorandum conclusions were based on the following assumptions:
    1. TPH detections appeared to have a similar pattern throughout all zones, even those not apparently affected by the spill.
    2. Detections in the method blanks meant the TPH detections in the samples were due to laboratory contamination.
    3. Extraneous peaks in the samples were due to the presence of the common disinfectant chlorine in the drinking water.
    4. The low-level TPH detects were due to blank contamination and/or interference from the chlorine.
    5. Marker compounds associated with JP-5 were absent.
- **The authors proceeded from the assumption that the random detects of TPH were analytical in nature (laboratory contamination and disinfection by-products) and did not consider alternative contamination paths.**

1. **TPH detections appeared to have a similar pattern throughout all zones, even those not apparently affected by the spill.**

A. The authors assumed the flush of the Red Hill Shaft was 100% effective and based the conclusion on modeling rather than actual evidence.

B. The authors did not discuss whether the well was inspected or if the recharged water was evaluated after the flush, or if water was sampled at intermediate points such as storage tanks in the distribution system.

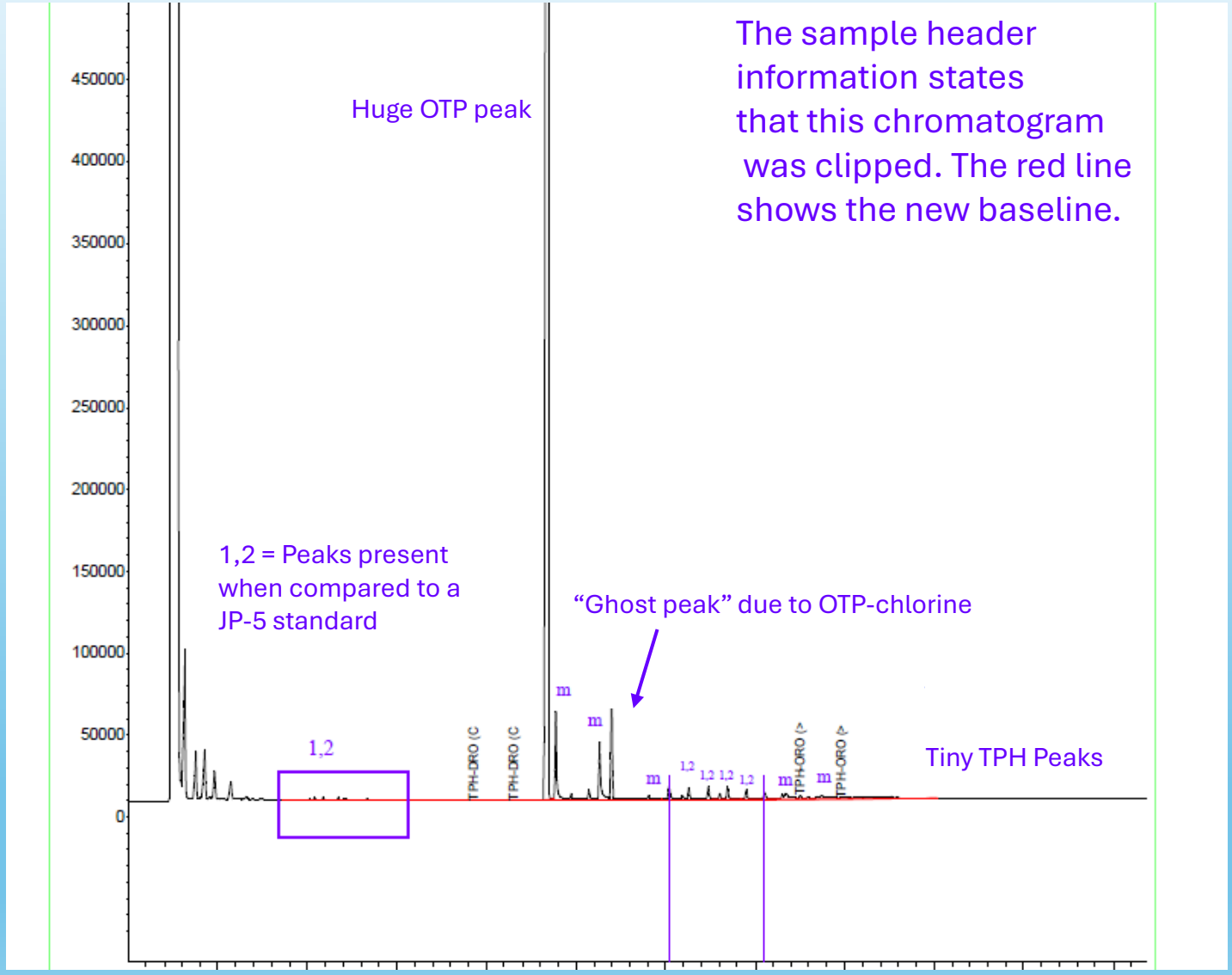
1. **TPH detections appeared to have a similar pattern throughout all zones, even those not apparently affected by the spill. (cont.)**

C. "Water in neighborhoods reporting strong fuel odors and sheens was initially discharged into the open, grassy areas untreated, impacting the soil and shallow groundwater and emitting vapors into the ambient air." The contamination pathway for the fuel spill was noted as being "through fractured basalt," which also underlies the open grassy areas.

2. Detections in the method blanks meant the TPH detections in the samples were due to laboratory contamination.

A. Method 8015, used to analyze the samples, was not adjusted for low-level analysis by using dedicated glassware and instrumentation and lower concentration standards.
B. In many instances, there was too much interference to see low-level peaks.
C. Chromatographic data (pictures of peaks) were cut off at the bottom ("clipped") because laboratory analysts judged that the peaks were noise, effectively making all peaks on the chromatogram smaller and/or cutting them out entirely.
D. The contamination in the method blanks shows that there is contamination in the blanks, but it <u>does not prove</u> that JP-5 is not present in the samples.

A picture is worth a thousand words



3. **Extraneous peaks in the samples were due to the presence of the common disinfectant chlorine in the drinking water.**

A. The sample collection method was not appropriate for the project.
   i. According to the sampling plan, hydrochloric acid was added to all samples.
   ii. Sodium thiosulfate, which would have removed the free chlorine, was not used to preserve the samples as directed in Method 8015.

B. The amount of the surrogate compound (OTP) added in the laboratory virtually guaranteed an interference or “ghost peak” from the chlorine.

C. The same peaks could also be seen in the method blanks, which were comprised of deionized water and did not contain chlorine.

4. The low-level TPH detects were due to blank contamination and/or interference from the chlorine.

A. The sporadic TPH detects in the laboratory blanks and samples do not tell us where the TPH came from. Field blanks were not collected with the samples, so field contamination could not be evaluated.

B. The amount of surrogate compound OTP added by the laboratory made pattern matching of the chromatograms for low-level detects impossible.

5. Marker compounds associated with JP-5 were absent.

A. The marker compounds may not have been detectable at the low concentrations present in the samples.
B. Marker compounds were evaluated by Method 525.2 not Method 8015.
C. Sample containers for Method 525.2 and Method 8015 were different bottles.

AQA found the existing data to be very suspect and, thus, would qualify it as unusable for the purpose of proving the absence of jet fuel in the drinking water system.

Questions?