Report:

Technical Evaluation of the JBPHH Interagency Team Memorandum on TPH Detections During the Long-Term Monitoring Program

PRESENTED TO:
HONOLULU BOARD OF WATER SUPPLY (BWS)

PRESENTED BY:
PAUL C. WINKLER, PH.D.

Interagency Team (Navy) LTM Observations

- In period six, July-December 2023, frequency of Total Petroleum Hydrocarbon (TPH) detections increased.
- Navy team concluded:
  - The increased frequency of detections was associated with laboratory contamination.
  - The increased frequency of detections was associated with chlorine in the water.

What did the Interagency Team (Navy) Use to Make a Conclusion?

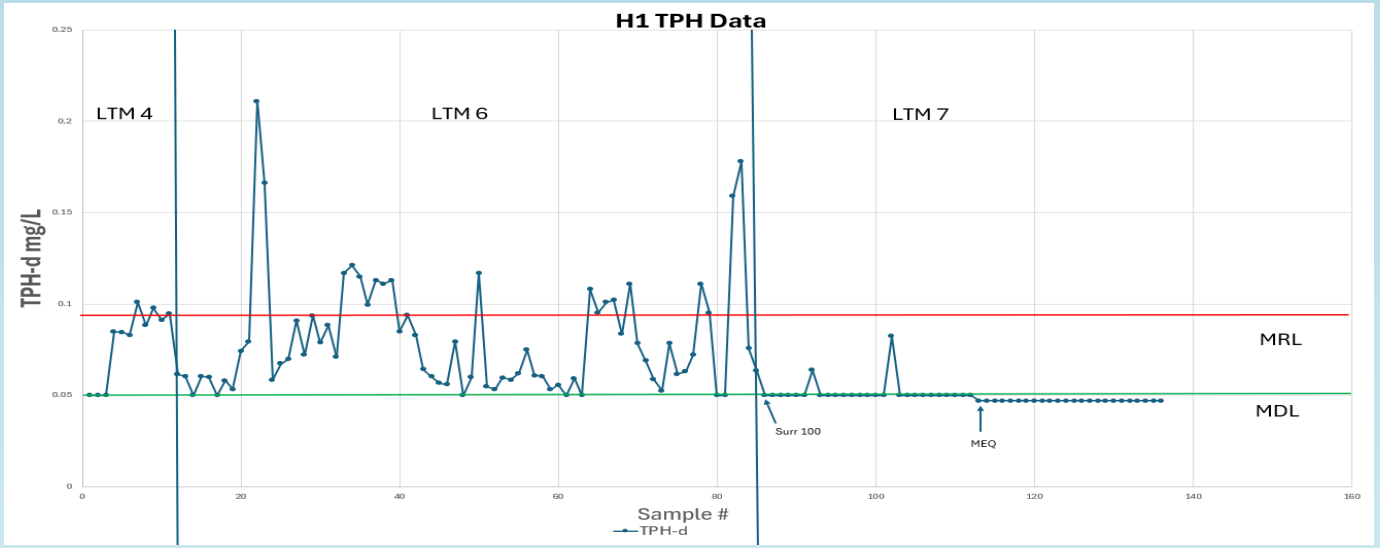
- Increased frequency had the same pattern for all zones – Indicates a Lab Problem
- Reviewed the laboratory method for deficiencies
- Statistical analysis to correlate issue to residual chlorine

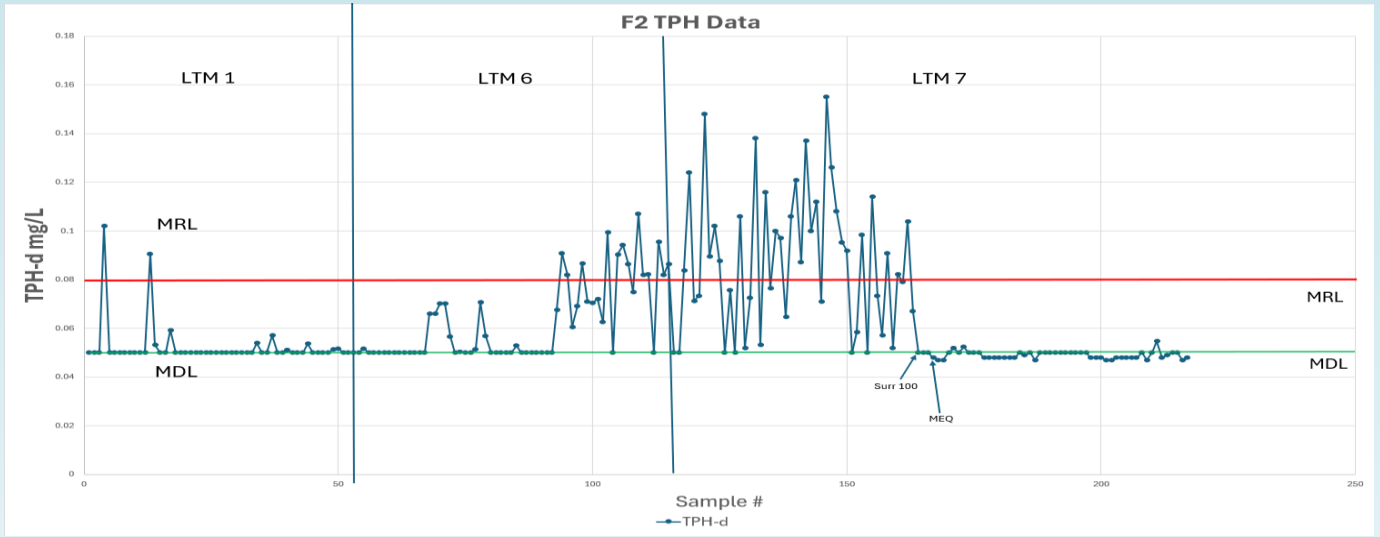
Understanding the Lab Issue

- Laboratories process samples to allow for the measurement of trace concentrations of organic chemicals.
- Laboratories analyze blank samples to monitor contamination from the process – Did the laboratory contaminate the samples during processing?
- Surrogate – a chemical added to the sample to monitor the process – Did the surrogate react with chorine?

Did the Zones Exhibit the Same Pattern?

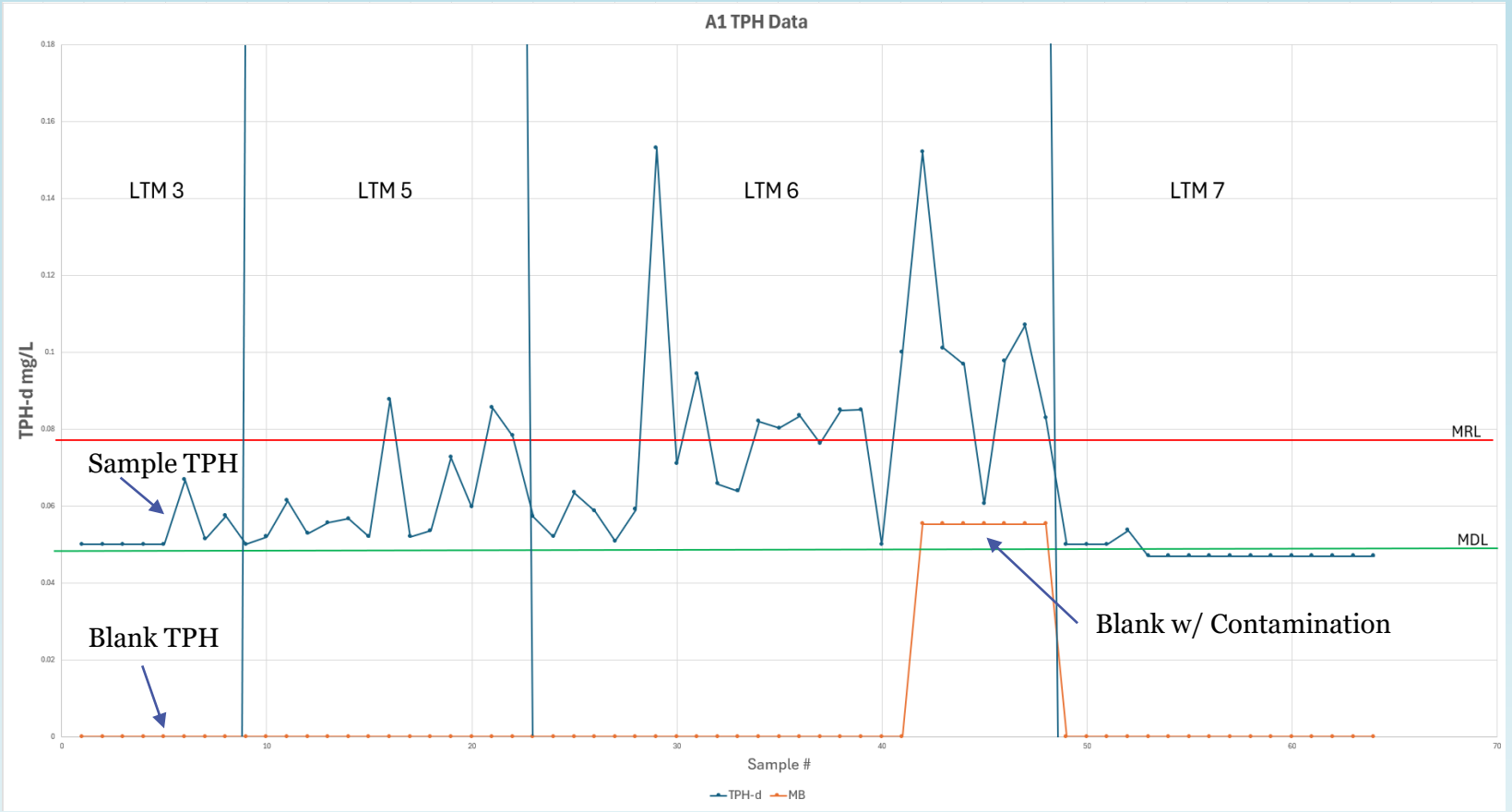
- Zones H1 and F2 do not have the same pattern for detections of TPH.
- Note LTM 6





Did Laboratory Contamination Add to the Problem?

- 66 Samples analyzed in Zone A1
- One contaminated blank – affects 6 samples
- Laboratory contamination does not appear to be a major cause for <u>increased frequency</u> of TPH detections

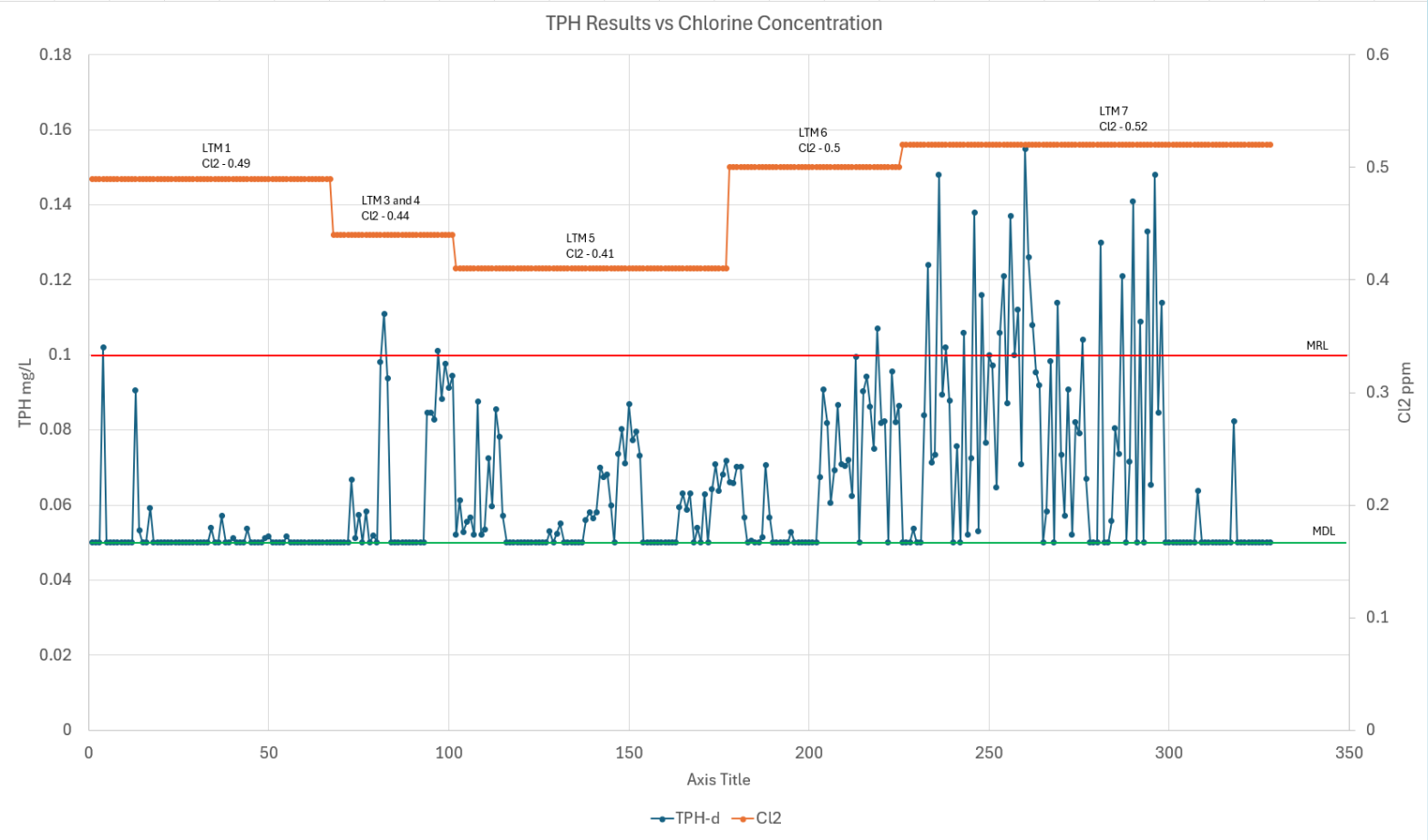


Did the Surrogate React with Chlorine?

- The surrogate does react with chlorine.
- The Surrogate concentration was constant throughout the LTM. TPM detections should have occurred throughout the sampling period.
- While the surrogate does react with chlorine, the data indicates that it does not explain why the frequency of TPH detections increased.

Does the Concentration of Residual Chlorine Change the Frequency of TPH Detection?

- Frequency of TPH detections do not change with chlorine concentration



Method Compliance and Data Defensibility

- USEPA Methods specify how to collect, preserve and handle samples

TABLE 4-1 (continued)
RECOMMENDED SAMPLE CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES[a]

		preservatives and analyze as soon as possible.	
SEMIVOLATILE ORGANICS/ORGANOCHLORINE PESTICIDES AND HERBICIDES			
Sample Matrix	Container[1]	Preservative[2]	Holding Time[3]
Concentrated waste samples	125-mL wide-mouth glass with PTFE-lined lid	Cool to 0 - 6 °C.	Samples extracted within 14 days and extracts analyzed within 40 days following extraction.
Aqueous samples with no residual chlorine present	4 x 1-L amber glass container with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis.	Cool to 0 - 6 °C.	Samples extracted within 7 days and extracts analyzed within 40 days following extraction.
Aqueous samples WITH residual chlorine present	4 x 1-L amber glass container with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis.	Add 3 mL 10% sodium thiosulfate solution per gallon (or 0.008%). Addition of sodium thiosulfate solution to sample container may be performed in the laboratory prior to field use. Cool to 0 - 6 °C.	Samples extracted within 7 days and extracts analyzed within 40 days following extraction.

Method Compliance and Data Defensibility

- Samples were not collected in compliance with EPA recommendations.
- The data is technically not compliant or defensible.
- Data would be qualified by validation procedures.
- Why? - Data on how chlorine reacts with fuel is limited - difficult to know how the lack of dechlorination may affect low TPH concentrations.

Evaluation of Conclusions

- The increased frequency of detections was associated with laboratory contamination.
  - **Large majority of laboratory blanks were acceptable. The data does not support this conclusion.**
- The increased frequency of detections was associated with chlorination of the surrogate.
  - **Surrogate concentration same during LTM – expect no change in TPH frequency**
  - **Changes in chlorine concentration did not correlate with more frequent TPH detections.**