ITRC TPH RISK EVALUATION AT PETROLEUM-CONTAMINATED SITES

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THE TPH RISK EVALUATION PROJECT

The Interstate Technology and Regulatory Council (ITRC) total petroleum hydrocarbons (TPH) Risk Evaluation team is developing guidance to assist state regulators and practitioners with evaluating risk and establishing cleanup requirements at petroleum release sites.

This guidance will help practitioners in the following ways:

- Assist with TPH characterization (e.g., contaminant delineation and sample location selection) for petroleum release sites
- Understand and evaluate non-petroleum TPH constituents
- Identify stakeholders and prepare for community engagement

This guidance will help regulators in the following ways:

- Understand which analyses are appropriate for which situations
- Know the tools that can be used to develop site-specific target levels/cleanup goals
- Know how to use TPH data for mass-based cleanups
- Know how to use TPH data to evaluate risk
- independent of indicator compounds (e.g., BTEXN)
- Know when the use of Silica Gel Cleanup (SGC) is appropriate
- Be able to communicate the risk of TPH to the public

Uncharacterized TPH contamination can result in exposure to soil, groundwater and vapor containing elevated TPH levels. This can lead to public and ecological health concerns, work stoppages, temporary losses of jobs and disruptions to small businesses, and it can impose economic hardships on communities. A process that allows a more informed understanding of TPH chemistry and use of TPH data to identify potential risks ahead of time is an important part of the solution.

Methods and techniques for characterizing the risk from petroleum mixtures has improved through a variety of methods, which has led to a wide range of cleanup values. Updated guidance is now needed to help states understand and evaluate the unique properties of TPH. This improved understanding of TPH will assist the development of a consistent methodology for establishing risk-based cleanup levels and for establishing and approving methods for risk-based corrective actions at petroleum contaminated sites.

WHAT IS TPH?

The term "TPH" is often used to refer to the broad range of chemicals comprising petroleum hydrocarbons. TPH is defined as the measurable amount of petroleum-based hydrocarbon in an environmental media, and it is dependent on analysis of the medium in which it is found (Gustafson 1997).

TPH REGULATORY & DECISION FRAMEWORKS



FIGURE 1: TPH Guidance Decision Framework

ABOUT THE TPH RISK EVALUATION TEAM

This project began in 2016 and is in its third year. The project team consists of a consortium of over 130 state regulators, scientists, academics, public stakeholders and industry representatives. The project team's goal is to develop guidance to improve regulators and project managers understanding of the current methods and procedures used for evaluating total petroleum hydrocarbon (TPH) risks at petroleum-contaminated sites.

REGULATORY FRAMEWORK OVERVIEW

Approaches for the remediation and risk management of TPH contamination are not consistent across the United States, and they may not consistently address both short- and long-term environmental concerns associated with petroleum contaminant mass. As shown in Figure 2, the State Survey identified a wide range of methods used to establish screening/ cleanup levels for TPH across the country.



FIGURE 2: *Example Results from State Survey*

WHAT IS ITRC?

The Interstate Technology Regulatory Council (ITRC) is a state-led, public-private coalition dedicated to reducing barriers to the use of innovative environmental technologies. ITRC represents over 900 individuals, across

50 states, working to produce guidance and training on innovative environmental solutions. Bringing together teams of state and federal regulators along with private, academic and stakeholder experts, ITRC broadens and



TPH ANALYSIS AND INTERPRETATION

There are a number of possible organic interferences that will appear in the TPH portion of the chromatogram. Two examples are shown below in Figure 3 (solvents) and Figure 4 (natural organics). Comparing the gasoline standard in the right chromatogram of Figure 3 to a site sample in the left chromatogram, the left chromatogram suggests two major compounds are responsible for the "TPH" concentration, but the two major peaks are actually TCE and PCE, not a petroleum hydrocarbon. Figure 4 demonstrates that natural organics can be mis-quantified as petroleum hydrocarbons.



FIGURE 3: *Non-petroleum-related chemicals (CVOCs) within reporting range.*

CONTAMINANTS AT PETROLEUM RELEASE SITES

As illustrated in Figure 5, petroleum products are complex mixtures. Contamination at petroleum release sites is likely to be composed of a mixture of difficult to distinguish anthropogenic and naturally occurring contaminants, including the original petroleum hydrocarbon compounds, petroleum-related degradation products, fuel additives and, to a limited extent, fuel impurities.

deepens technical knowledge and reduces barriers to expedient regulatory approval. ITRC is a program of the Environmental Research Institute of the States, managed by the Environmental Council of the States.

UPDATE STATUS

early 2019.

INTERPRETING TPH IN THE ENVIRONMENT





FIGURE 4: *Natural organic within reporting range: Forest Duff.*



FIGURE 5: *Contaminants at petroleum release sites*

The TPH Risk Evaluation at Petroleum-Contaminated Sites guidance document is expected to be released in December 2018. The first online training is scheduled for

