

ITRC's TPH Risk Evaluation at Petroleum Contaminated Sites guidance - preview

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What is ITRC?

- ▶ ITRC is a state-led coalition working to advance the use of innovative environmental technologies and approaches.
- ▶ ITRC's work translates good science into better decision making.



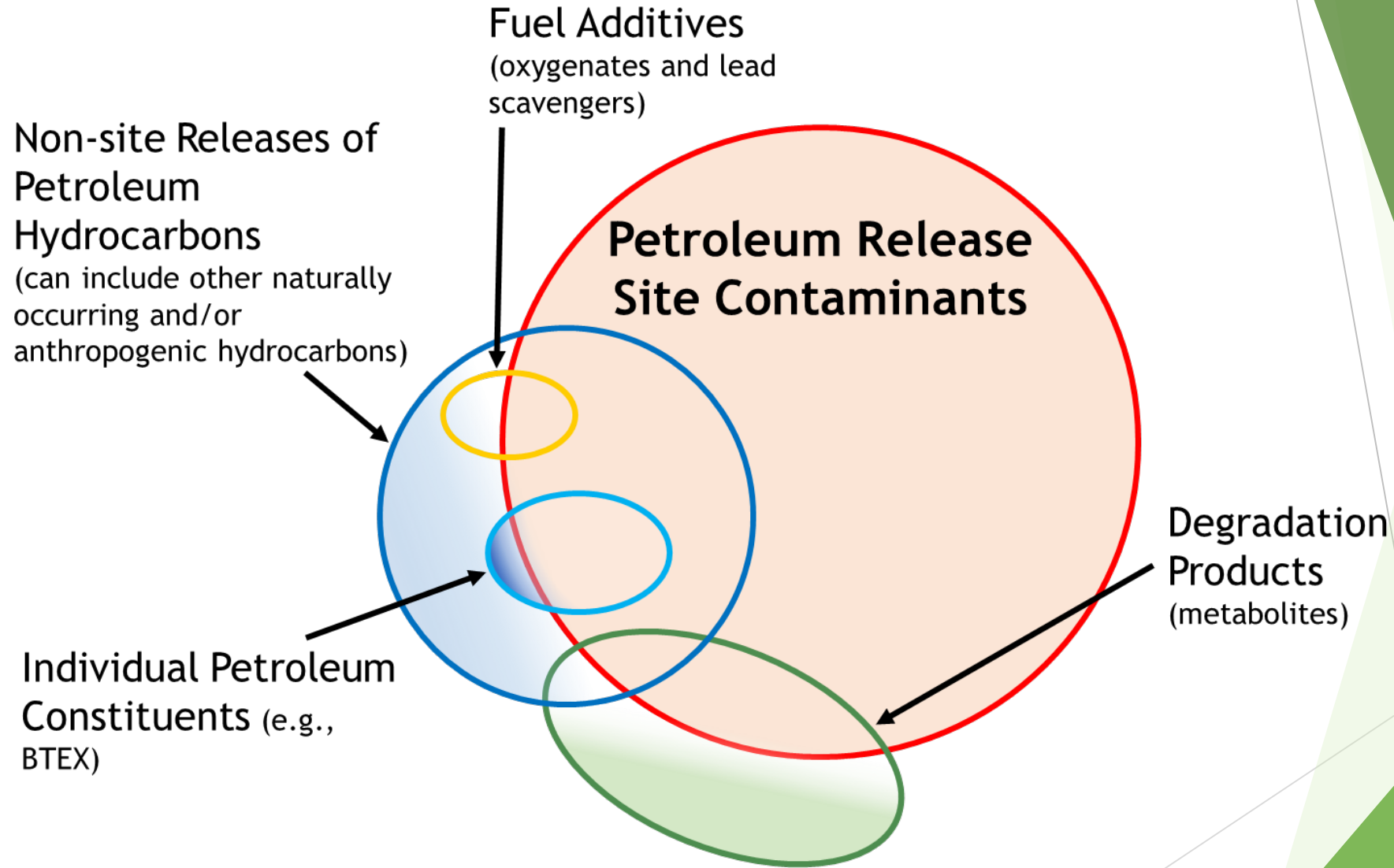
What ITRC Does



ITRC TPH Risk Team Stats

- ▶ 235 members
 - 130 Private Sector (industry & consultants)
 - 56 State (25+ states)
 - 21 Federal (DOD, DOE, EPA, USGS)
 - 15 Academia
 - 5 Public Stakeholder
 - 5 International
 - 2 City Government
 - 1 Tribal Stakeholder

Contaminants at Petroleum Release Sites



Understanding TPH Risk

- ▶ TPH is comprised of thousands of chemicals that are not yet well understood
- ▶ Many states' use Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) to derive cleanup standards or evaluate risk
- ▶ Use of BTEX may not accurately identify the total risk associated with TPH

Purpose and Goal of ITRC TPH Risk Guidance

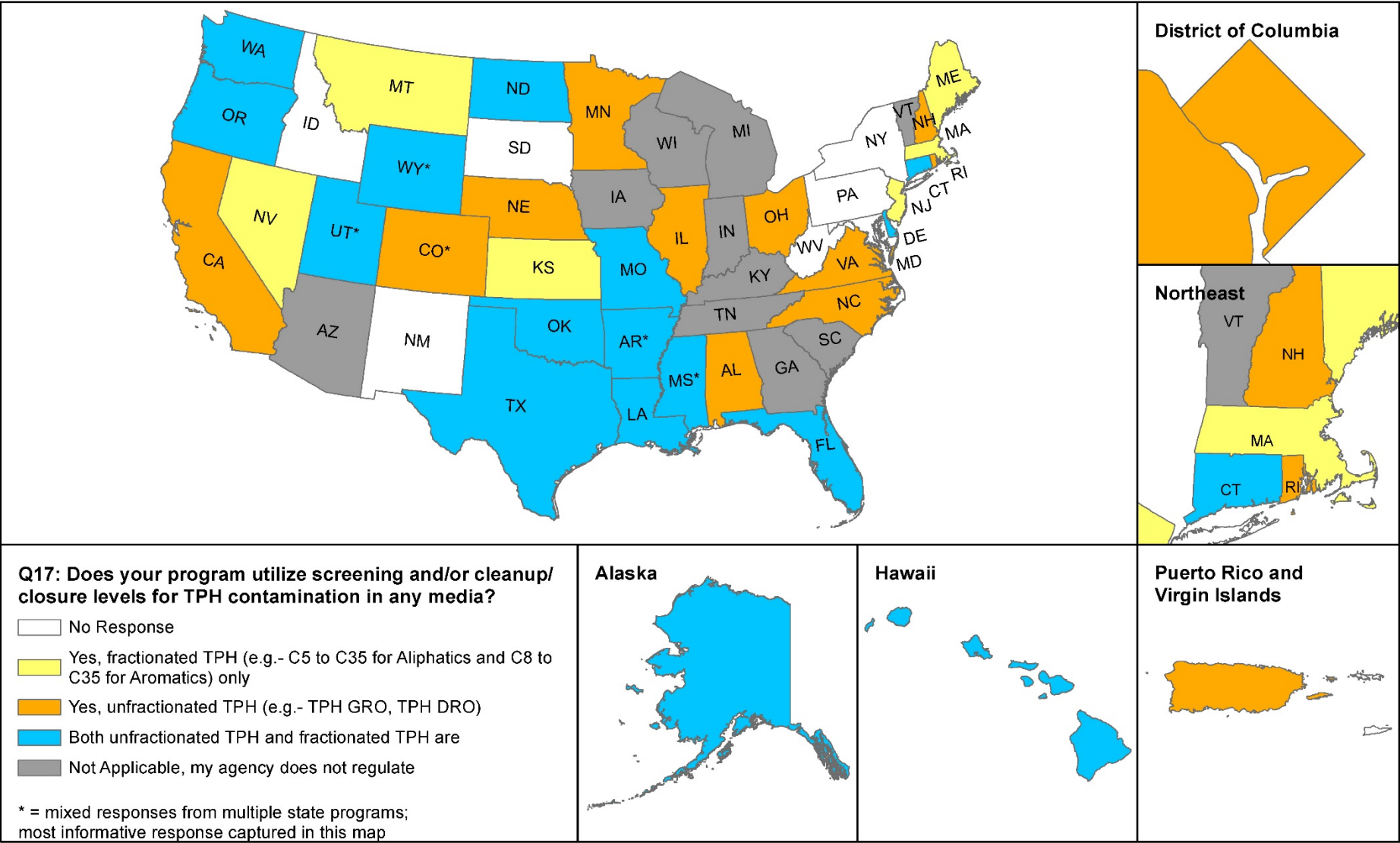
▶ Purpose

- Facilitate better informed decisions for regulators and consultant project managers, who may not be skilled in risk assessment.

▶ Goal

- Create better TPH risk guidance to help states develop consistent methodology.

TPH is treated differently between states and within states

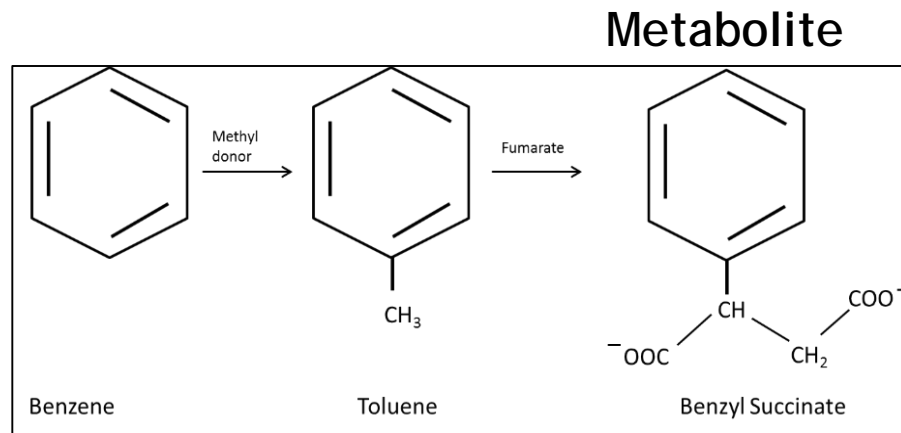


TPH Risk Guidance Table of Contents

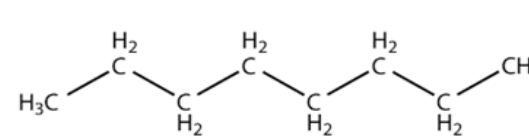
- ▶ INTRODUCTION
- ▶ REGULATORY FRAMEWORK
- ▶ TPH FUNDAMENTALS
- ▶ CONCEPTUAL SITE MODELS AND INVESTIGATIVE STRATEGIES
- ▶ HUMAN HEALTH RISK
- ▶ ECOLOGICAL RISK ASSESSMENT
- ▶ RISK CALCULATORS
- ▶ SPECIAL CONSIDERATIONS FOR MANAGING TPH-CONTAMINATED SITES
- ▶ STAKEHOLDER CONCERNS
- ▶ TPH RISK CASE STUDIES
- ▶ 6 FACT SHEETS
- ▶ APPENDICIES

TPH Fundamentals

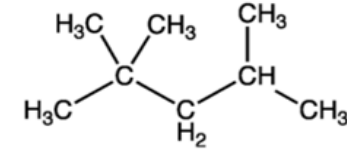
- ▶ Two main groups of petroleum hydrocarbons
- ▶ Metabolites are polar molecules with significantly different properties than hydrocarbons



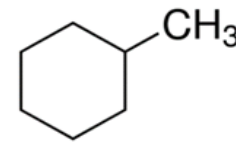
Aliphatic Hydrocarbons



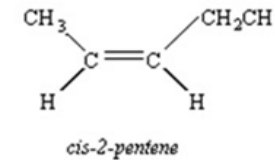
n-paraffins/normal-alkanes



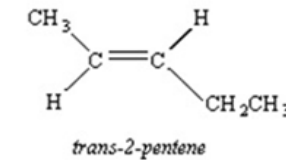
iso-paraffins/i-alkanes



naphthenes/
cycloalkanes



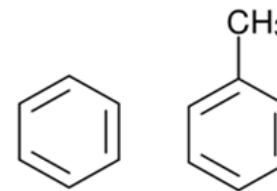
cis-2-pentene



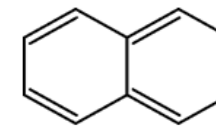
trans-2-pentene

olefins/alkenes
(not in crude)

Aromatic Hydrocarbons



benzenes



polyaromatic hydrocarbons
(PAHs)

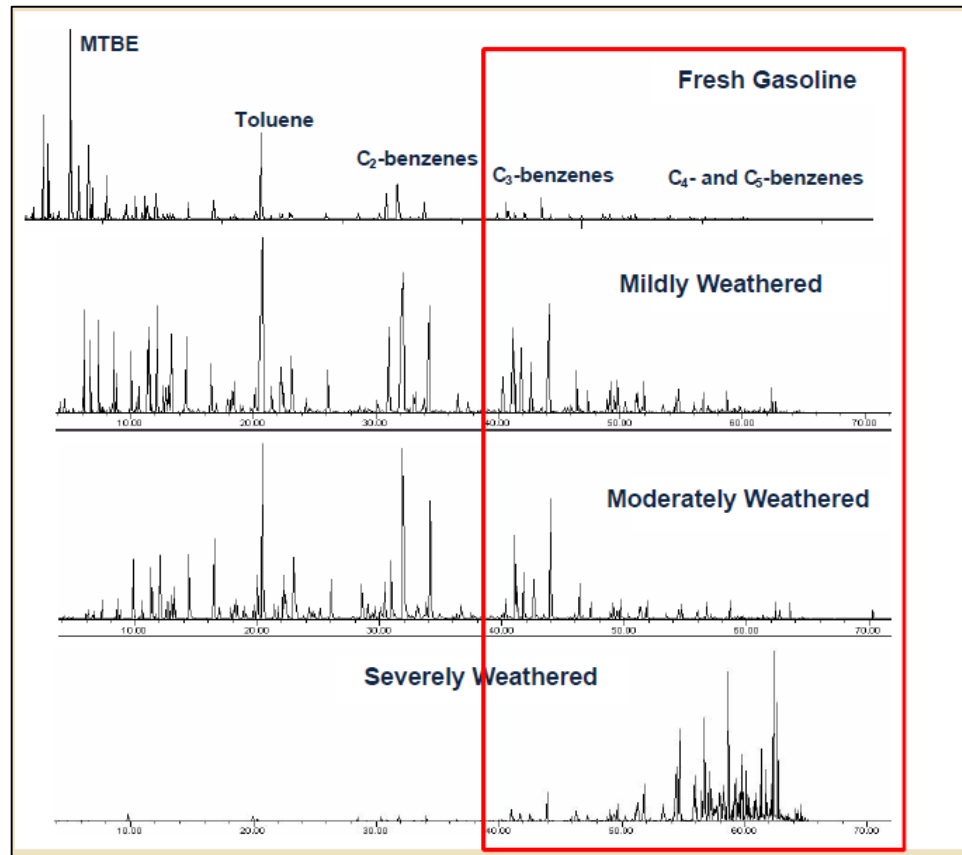
TPH - Defined

- ▶ *TPH is defined as the known or assumed aliphatic and aromatic hydrocarbon mixture (e.g., crude oil, fuel type, mixture of fuel types) originally released to the environment, or the remaining aliphatic and aromatic hydrocarbon mixture after weathering thereof, for LNAPL in soil, and sediment sample matrices, and the dissolved hydrocarbons that have partitioned from the hydrocarbon mixture into groundwater or surface water for the water matrix, and the volatilized hydrocarbons that have partitioned from the hydrocarbon mixture or the dissolved phase to the soil vapor for the air matrix.*

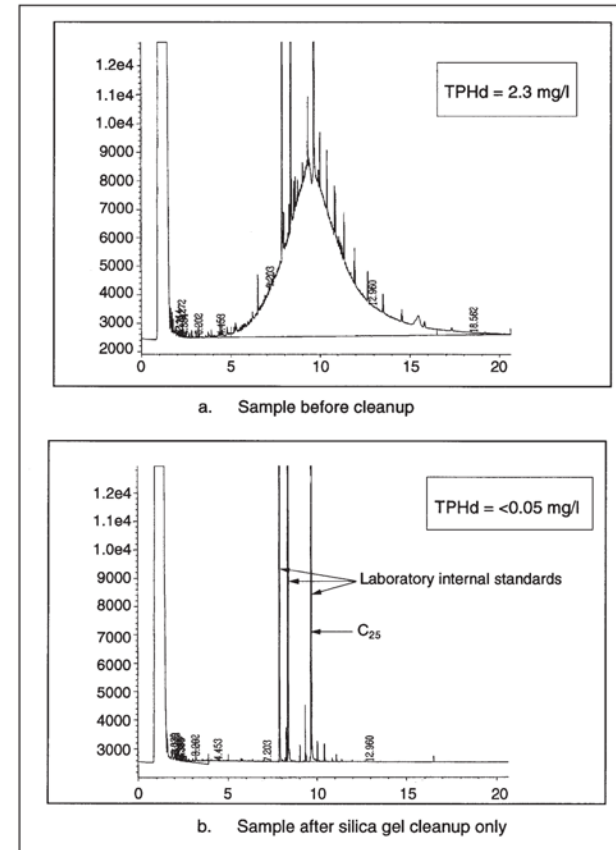
TPH - Defined

- ▶ For the purposes of this guidance TPH is defined by the analytical method used to measure it.

TPH - What's in that number?

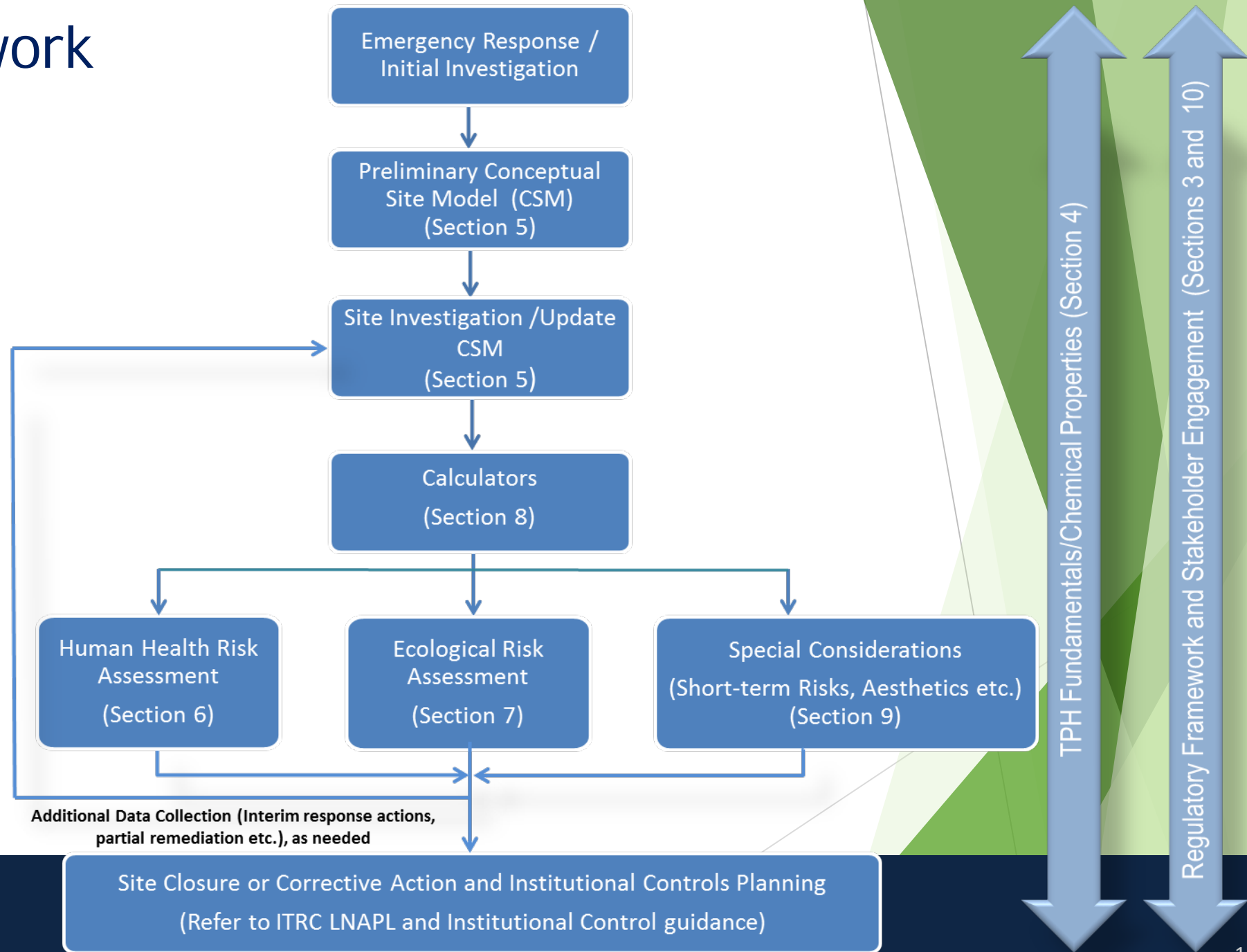


Weathering of Gasoline



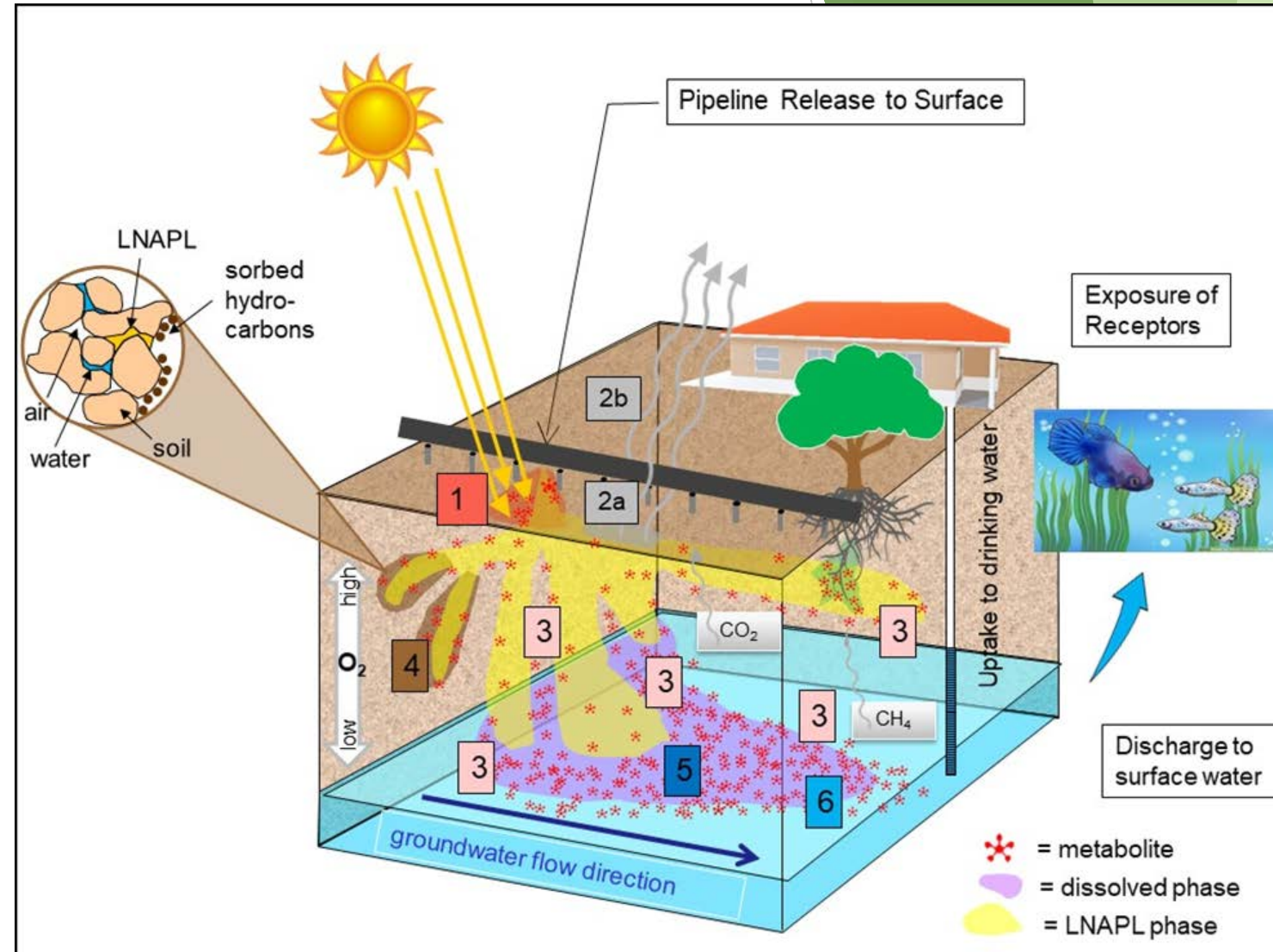
Metabolite influence

Decision Framework



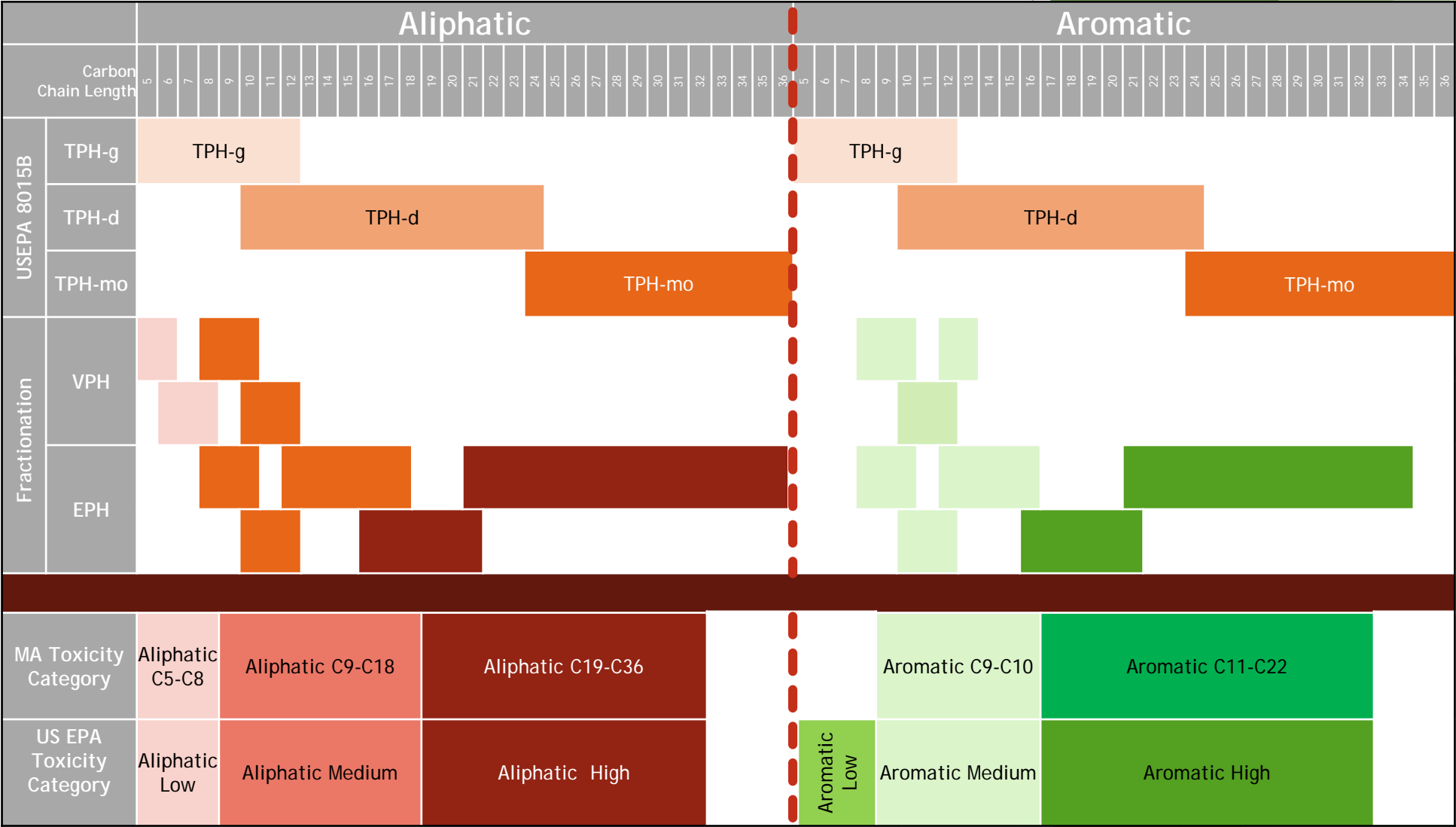
Conceptual Site Model

- ▶ TPH is a complex mixture
 - Weathering from chemical, physical and biological processes changes composition over time
 - Composition affects risk



Analytical Methods vs Toxicity Values

► Analytical fractions intervals do not coincide with TPH toxicity categories



Calculating Risk

- ▶ Discussion of calculators for assessing risk and developing screening values
- ▶ Includes a discussion and comparison of several calculators
- ▶ Narrow-down Site Specific Target Levels (SSTLs) for TPH; avoid remediating to Tier 1 values

Human Health and Ecological Risk Uncertainties

- ▶ TPH risk evaluations considerate of uncertainties:
 - CSM accuracy
 - Data quality
 - Toxicity assumptions
 - Exposure assumptions

Inform public stakeholders

- ▶ Stakeholder Communication
- ▶ Tools on communicating risk issues with the public
- ▶ Provides contextual framework of risk relative to common products that contain petroleum compounds

Fact Sheets

- ▶ 6 fact sheets included in guidance
 - Definition TPH - Don't Let the Name Fool You
 - Silica Gel Cleanup (SGC)
 - TPH Analytical Methods
 - Chemistry of Weathering Processes
 - Chromatograms: A Wealth of Information
 - TPH Fractionation Methods

The “Go To” guidance for TPH Risk

▶ Regulators

- Decision-making framework specific to TPH

▶ Consultants

- Simple screening to robust TPH focused CSM

▶ Industry

- Better informed liability management

▶ Stakeholders

- Tools and communication techniques

Internet Based Training

- ▶ Learn ITRC's approach to evaluate TPH Risk
 - Select the appropriate analytical methods and recognize their pros and cons
 - Effectively develop and evaluate a TPH focused CSM
 - How to evaluate Polar Metabolites
 - Toxicity considerations for Human Health and Ecological Risk Assessments

Thank You!

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