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- ❖ Not a simple or universal answer
- ❖ Performance standard:
  - Determine concentrations of contaminants moving through an aquifer, and/or impacting a receptor
- ❖ Filtering EPH gw samples may be appropriate in some cases, if conducted in this context



# Using Old/New “TPH” Data

- ❖ Future TPH data may be used *directly* to characterize C9 and heavier hydrocarbons (e.g., fuel oil), by using the TPH Method 1 standards
- ❖ Old TPH data and new TPH/screening data may be used *indirectly*, by “converting” the TPH value into EPH fractional concentrations



# *Converting TPH data*

- ❖ Making *informed* judgments on the chemistry of the TPH value(s), relative to percentage of aliphatics/aromatics, based upon:
  - ◆ chemistry/weathering of spilled product
  - ◆ available VPH/EPH data
  - ◆ default compositional assumptions



## *Recommended TPH Compositional Assumptions - Soil*

Petro Product	C11-C22 Aromatics	C9-C18 Aliphatics	C19-C36 Aliphatics
Diesel/#2 & Crankcase	60%	40%	0%
#3-#6 Fuel Oil & JP-4	70%	30%	0%
Kerosene & Jet-A	30%	70%	0%
MODF	20%	40%	40%
Unknown Oil	100%	0%	0%





## *Recommended Compositional Assumptions - Water*

- ❖ TPH data:
  - All non-targeted (PAH) compounds should be considered C11-C22 Aromatics
  
- ❖ Gasoline Range Organic data:
  - all non-BTEX/MtBE hydrocarbons should be considered C9-C10 Aromatics



## *Caveats and Fine Print*

- ❖ LSP must use professional judgment in using and applying TPH/screening data in the VPH/EPH approach!
  
- ❖ Key factors to consider:
  - knowledge of released petro product
  - reliability, validity, and bias of TPH/screening techniques
  - sensitivity of pollutant receptors



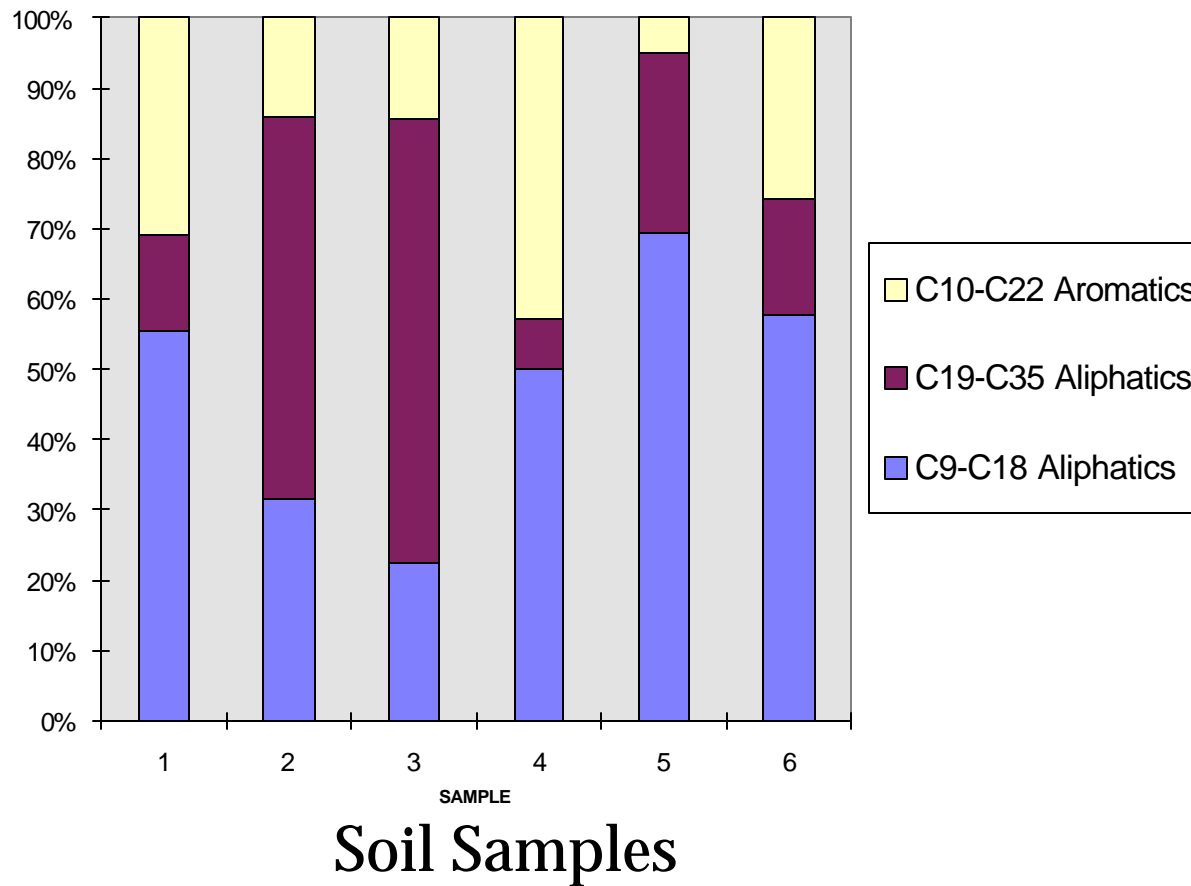
# *Compositional Variability*

- ❖ One VPH/EPH sample usually not adequate to define hydrocarbon chemistry and relative aliphatic/aromatic percentages at a site
- ❖ Sample chemistry can vary significantly across a site



# Compositional Variability

## Fuel Oil Spill at a Residential Property





# *Compositional Variability*

## ❖ Considerations:

- source vs migration areas
- fate/transport conditions and parameters
- presence of micro-environments



# *Characterization Options - The Easy Way*

- ❖ Step 1: Get VPH and/or EPH fractional data
- ❖ Step 2: Calculate Exposure Point Concentration (EPC)



# Characterization Options - The Harder Way

- ❖ Obtain VPH/EPH data from *key areas* and *critical exposure pathways*
- ❖ Supplement with screening/TPH data
- ❖ Consider chemistry of petroleum products, fate/transport factors, VPH/EPH data, and default conservative compositional assumptions
- ❖ Determine fractional composition/EPC for risk assessment/Method 1 Standards



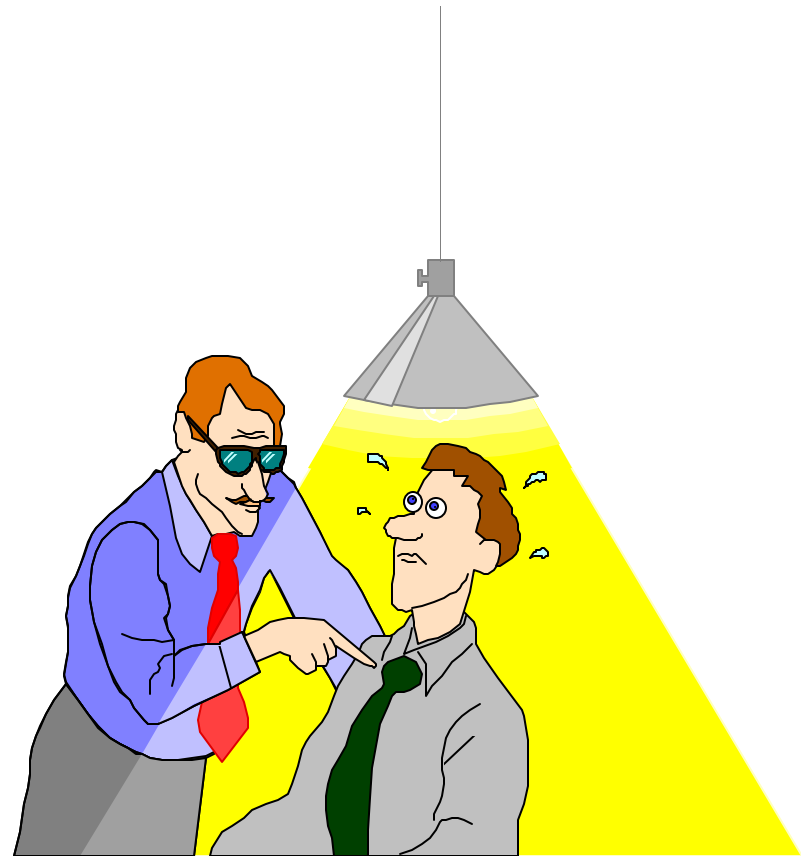
## *Ground Rules*

- ❖ If using MCP Method 1 Fractional Standards, must have at least *some* actual VPH/EPH fractional data - not just assumed values
- ❖ In Method 3 assessment, more flexibility to “make a case” that fractional concentrations have been adequately established, without having actual VPH/EPH data



# Regulatory Stuff

- ❖ Phasing in Approach
- ❖ MCP requirements
- ❖ Old/Closed sites
- ❖ What to do **NOW**





# *Phasing in the new Approach*

❖ **Effective date of MCP changes: Fall 1997**

## ***What happens on Effective Date?***

- New Reportable Concentrations in effect
- New Method 1 Cleanup Stds in effect
- New UCLs in effect

**\*\*\* *No Grandfathering Provisions* \*\*\***



## *Regulatory Requirements/Context*

- ❖ MCP will not “mandate” testing for VPH/EPH fractions
- ❖ Like any other standard, LSPs must decide when it is necessary to address/demonstrate compliance with these standards
- ❖ Alternative approaches acceptable via Method 3 Risk Characterizations



- ❖ After effective date of MCP changes, there will be an expectation that LSPs will address VPH/EPH concerns at **ALL** new and open sites, per Response Action Performance Standard of 40.0191
- ❖ Prior to effective date of MCP changes, there is an expectation that LSPs will address VPH/EPH concerns *only* at those FEW sites with *direct and compelling exposure concerns*



# *Reopening Old Cases*

- ❖ **Direct and Compelling Exposures:**
  - Drinking water wells impacted by gasoline releases
  - Persistent indoor air impacts from gasoline releases




# *Applying a New Standard?*

❖ No.

❖ Risk standards in effect since 1988

❖ VPH/EPH not a new standard, but a new tool to evaluate and characterize risks, and document compliance with existing risk management standards



# *What can/should/must be done NOW?*

- ❖ Use existing MCP standards and traditional approaches UNLESS direct and compelling exposure concerns
- ❖ Electively use proposed Method 1 Standards and UCLs as part of a Method 2 characterization per 40.0982(7)
- ❖ If site will not be closed out by effective date, consider use of VPH/EPH now

# *VPH/EPH Owners Manual*

- ❖ Guidance Document will be finalized and issued prior to effective date of MCP changes
- ❖ Questions? Contact John Fitzgerald at:

(617) 932-7702, or

[John.Fitzgerald@state.ma.us](mailto:John.Fitzgerald@state.ma.us)





*For a Closer Look.....*



## **VPH/EPH Bibliography**

**Spring 1997**

### **DEP Publications:**

- *Interim Final Petroleum Report: Development of Health-Based Alternative to the Total Petroleum Hydrocarbon (TPH) Parameter*, August, 1994

Summary: Original report presenting the toxicological basis of the proposed new VPH/EPH approach

- *Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)*, Public Comment Draft 1.0, August, 1995
- *Method for the Determination of Extractable Petroleum Hydrocarbons (EPH)*, Public Comment Draft 1.0, August 1995

Summary: Detailed Analytical Methods

- *Issues Paper: Implementation of VPH/EPH Approach*, Public Comment Draft, May, 1996

Summary: Detailed discussion and recommendations on how to develop MCP Method 1 cleanup standards, and otherwise incorporate new VPH/EPH approach into MCP regulatory process

- *Revisions to the Massachusetts Contingency Plan, 310 CMR 40.0000 - Public Comment Draft*, January 17, 1997

Summary: Proposed VPH/EPH fractional standards; discussion of risk management issues; spreadsheets of standard calculations.

**All DEP publications available on the World Wide Web at <http://www.state.ma.us/dep/deppubs.htm>**

- over-

## Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) Publications

- *A Risk-Based Approach for the Management of Total Petroleum Hydrocarbons in Soil - A Technical Overview of the Petroleum Hydrocarbon Risk Assessment Approach of the TPH Criteria Working Group, March, 1997*

Summary: Overview of TPHCWG framework and approach

- *Selection of Representative TPH Fractions Based on Fate and Transport Considerations, Volume III in a Series, Final Draft, 2/27/97*

Summary: Extensive data on physical properties of hydrocarbon compounds, discussion on fate/transport, recommendations on physical/chemical properties for aliphatic and aromatic fractions

- *Development of Fraction Specific Reference Doses (RfDs) and Reference Concentration (RfCs) for Total Petroleum Hydrocarbons (TPH), Volume IV In a Series, 1996*

Summary: Extensive data on toxicological properties of hydrocarbon compounds, mixtures, and products; recommended toxicological parameters for aliphatic and aromatic fractions. NOTE: The information and recommendations contained in this report have not been peer-reviewed, and are currently being evaluated by MADEP.

TPHCWG Publications available on World Wide Web at <http://voyager.wpafb.af.mil>

- click on "publications" -

## State of Wisconsin Publications

- *Studies of Sampling, Storage and Analysis of Soils Contaminated with Gasoline & Diesel*

Summary: Extensive data, information, and recommendations on soil sampling, storage, and preservation.

Wisconsin Publications available on World Wide Web at <http://www.dnr.state.wi.us/eq/errhw/>

- document to look for: SCSSREP.ZIP -