

# **EPA Technical Publications: Introduction to Leaking UST-Related Resources**

Webinar presented  
by  
Office of Research and Development (ORD)  
and  
Office of Underground Storage Tanks (OUST)

December 6, 2016



# *Welcome*

Carolyn Hoskinson, Director,  
EPA Office of Underground Storage Tanks (OUST)



# Agenda

- Purpose
- Presenters
- Petroleum Vapor Intrusion (PVI)
- Monitored Natural Attenuation (MNA)
- Groundwater Withdrawals and Aquifer Vulnerability
- Modeling
- Fuel Composition
- Diving Plumes
- OUST Policy and Technical Guidance Documents
- Questions and Answers



## Purpose

- To provide UST regulators with an overview of selected ORD technical documents and OUST policy and technical guidance documents available on the web
- Webinar will cover 6 topic areas:
  - PVI, MNA, Groundwater Withdrawals and Aquifer Vulnerability, Modeling, Fuel Composition, Diving Plumes
  - and selected OUST Policy and Technical Guidance Documents

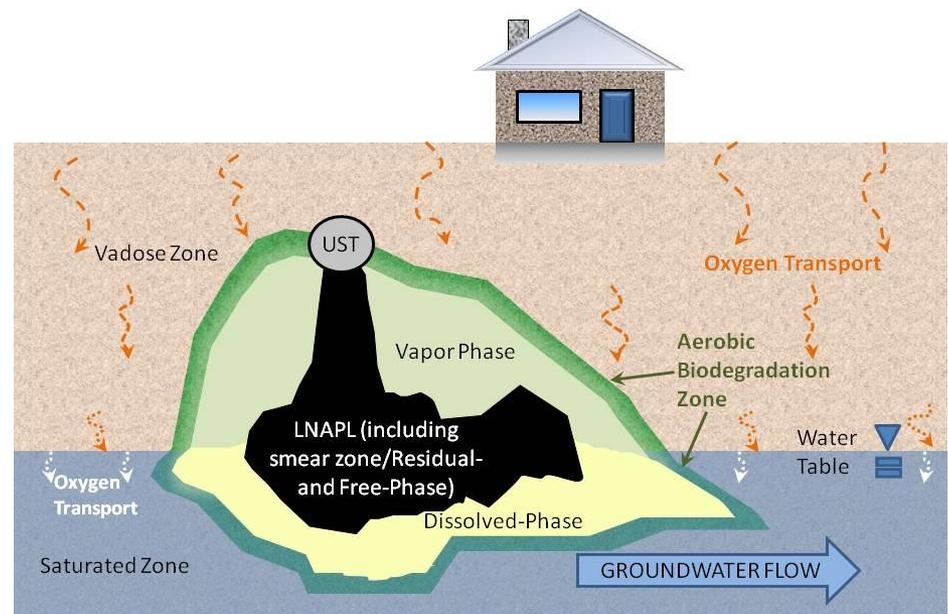


## Presenters

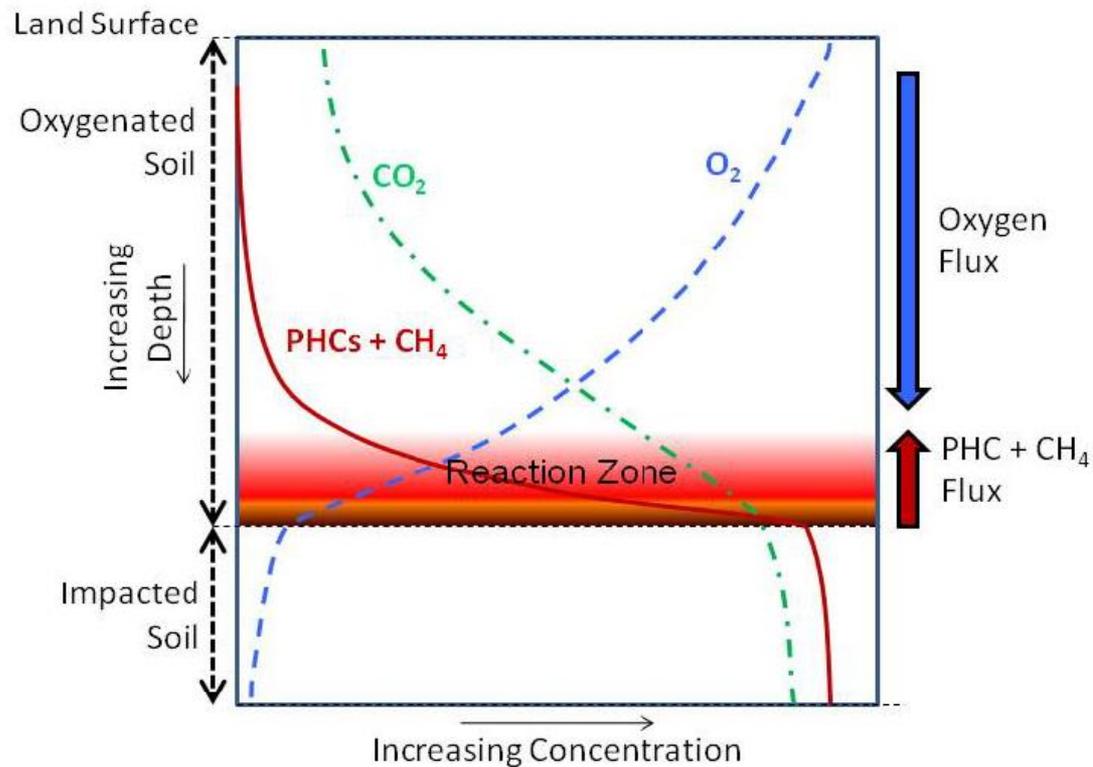
- Jim Weaver (ORD)  
([weaver.jim@epa.gov](mailto:weaver.jim@epa.gov), 580-436-8550)
- Fran Kremer (ORD)  
([kremer.fran@epa.gov](mailto:kremer.fran@epa.gov), 513-569-7346)
- Hal White (OUST)  
([white.hal@epa.gov](mailto:white.hal@epa.gov), 202-564-0579)

# Petroleum Vapor Intrusion (PVI)

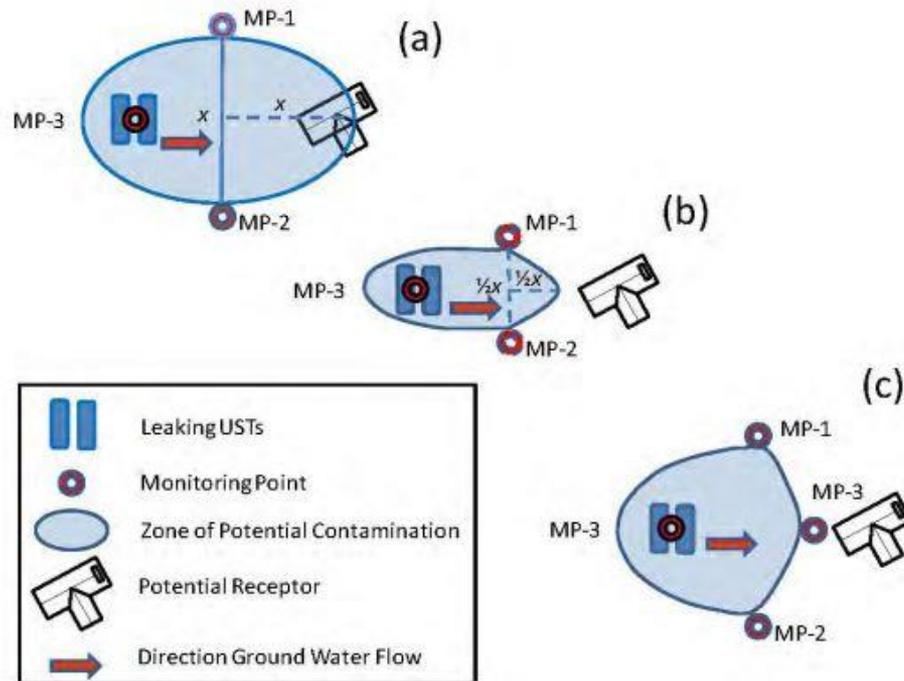
PVI is defined as the intrusion of vapors from subsurface petroleum hydrocarbons (PHCs) and non-PHC fuel additives into overlying or nearby buildings or structures



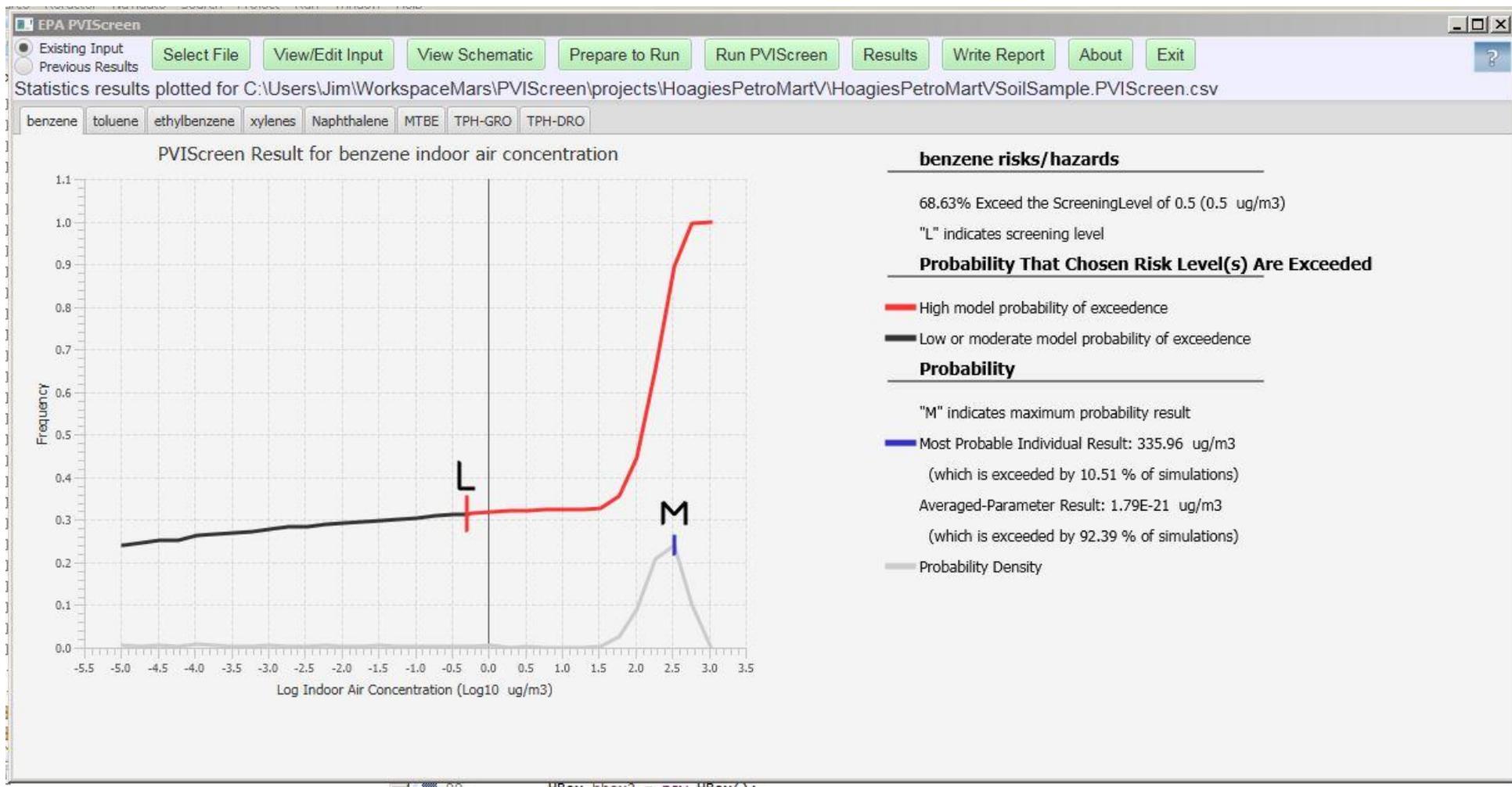
# Data-driven assessment approach (EPA 510/R-13/001 OUST)



# Lateral Exclusion Zone Assessment (EPA 600/R-13/047)

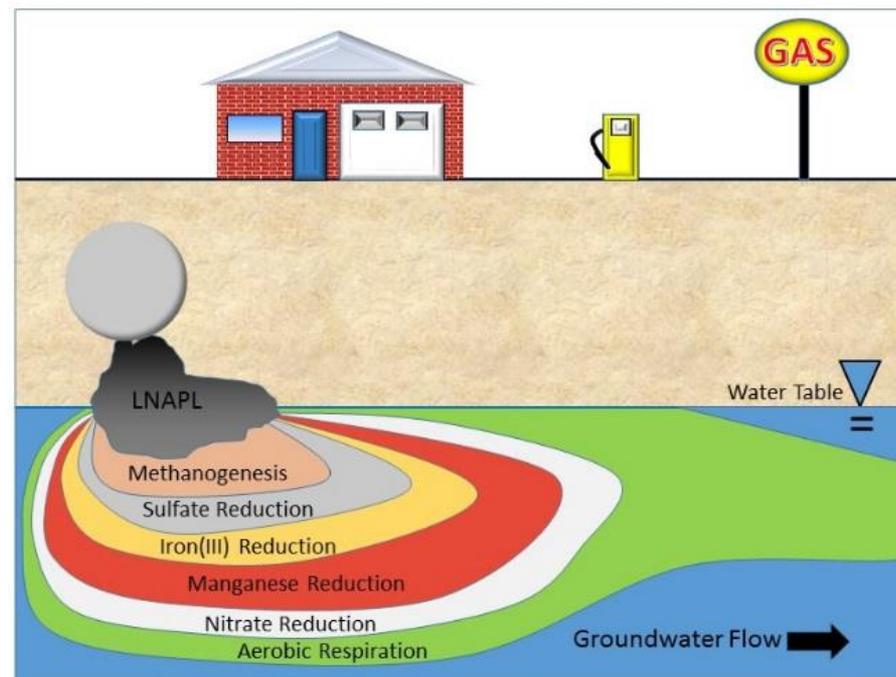


# PVIScreen – Modeling with Assessment of Uncertainty (EPA/600/R-16/175 to appear)



# Monitored Natural Attenuation (MNA)

The term “monitored natural attenuation” refers to the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods.





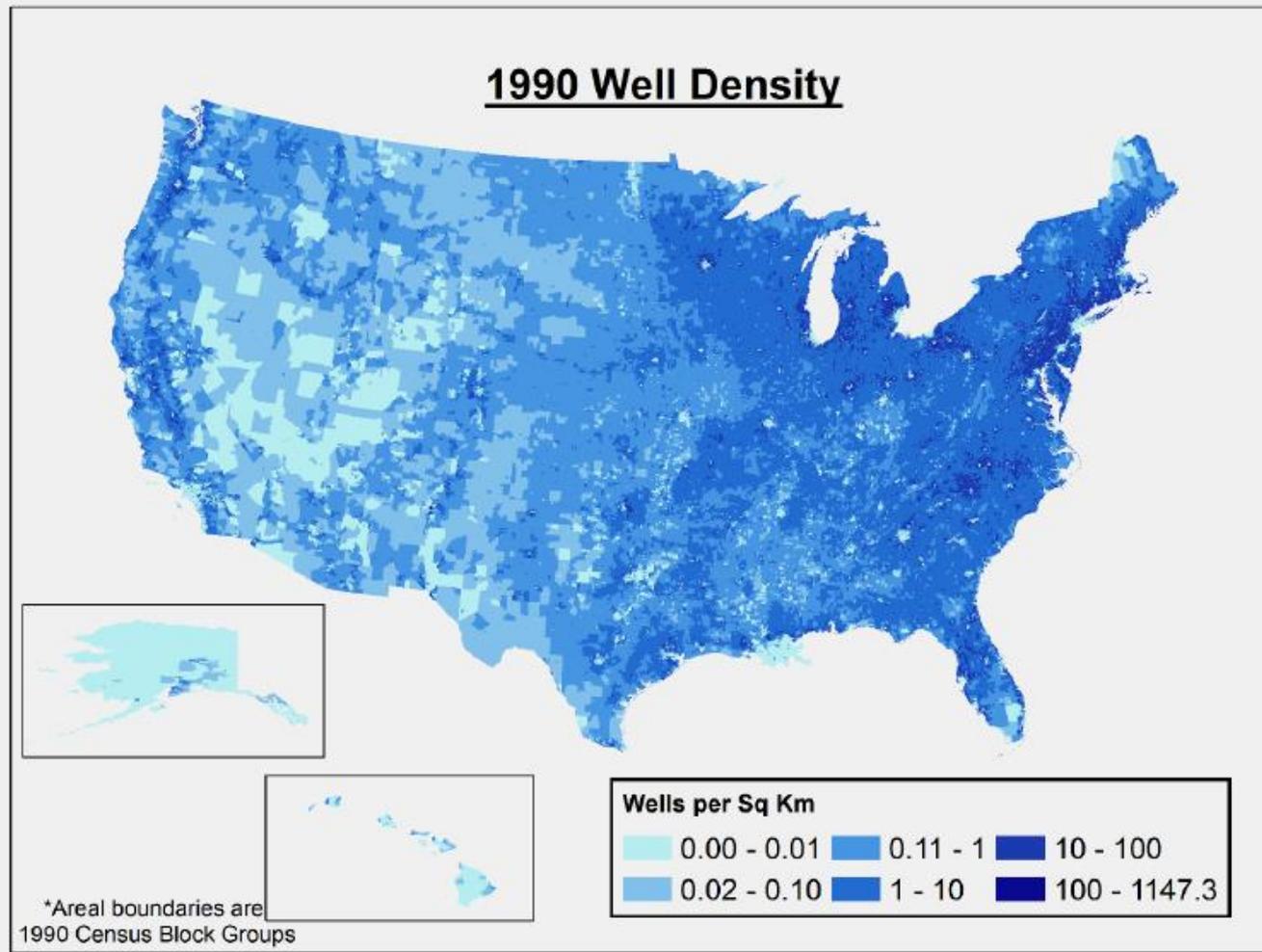
## Monitored Natural Attenuation (MNA)

- Research supporting Agency MNA Technical Guidance
- Completed MNA training in all 10 Regions – over 5000 participants
- Assessed impact of BTEX on MNA of MTBE
- Assessed impact of ethanol on MNA of BTEX and MTBE
- Evaluated MNA of lead scavengers (EDB, 1,2-DCA)

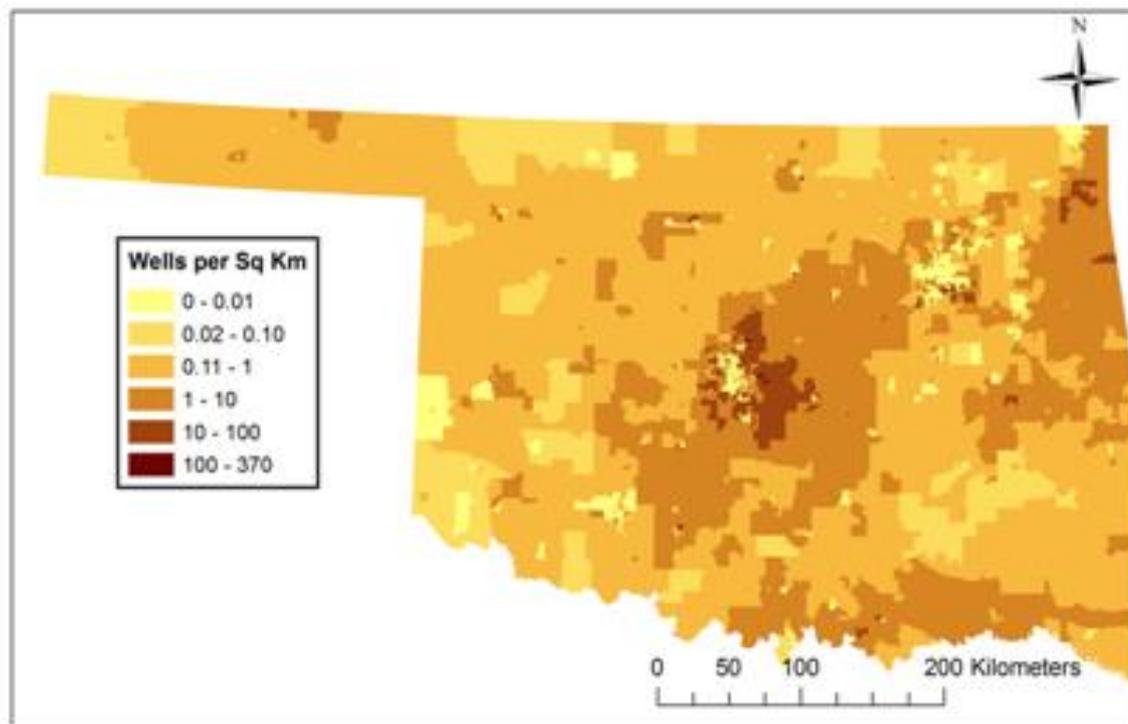


# Groundwater Withdrawals and Aquifer Vulnerability

- Association between private domestic wells and USTs/LUSTs
- Locations of private domestic wells?

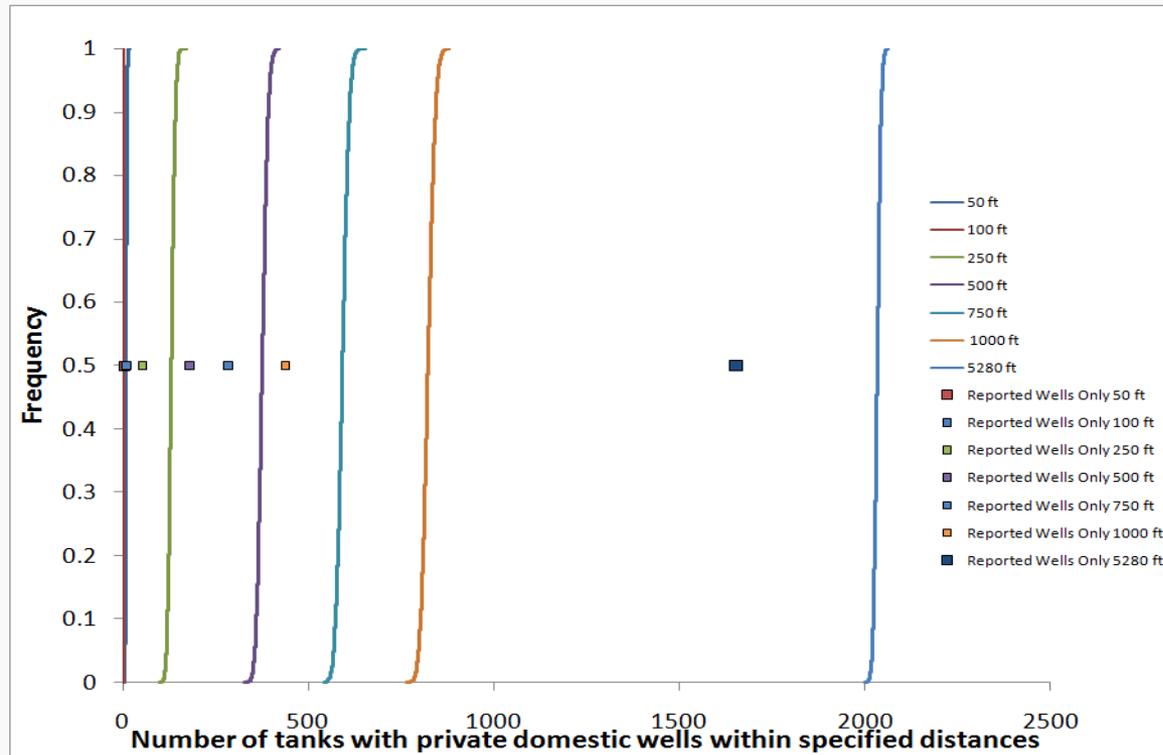


## Updated private well density estimates for 2010





# Estimated Numbers of Tanks with private wells within specified distances (Oklahoma Data)





# Modeling

- BioScreen
- The Hydrocarbon Spill Screening Model (HSSM)
- Uncertainty Calculations
- On-Line Calculators
- Plume Diving



United States  
Environmental Protection  
Agency

Office of Research and  
Development  
Washington DC 20460

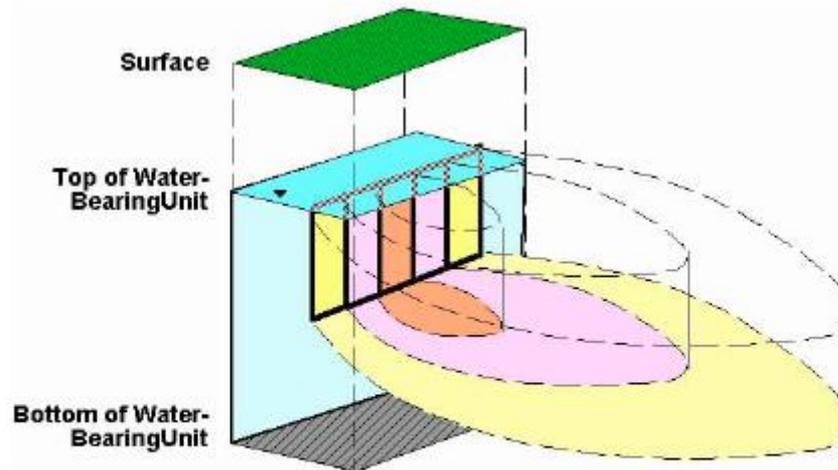
EPA/600/R-96/087  
August 1996

# BIOSCREEN

## Natural Attenuation Decision Support System

### User's Manual

### Version 1.3



# The Hydrocarbon Spill Screening Model (HSSM)

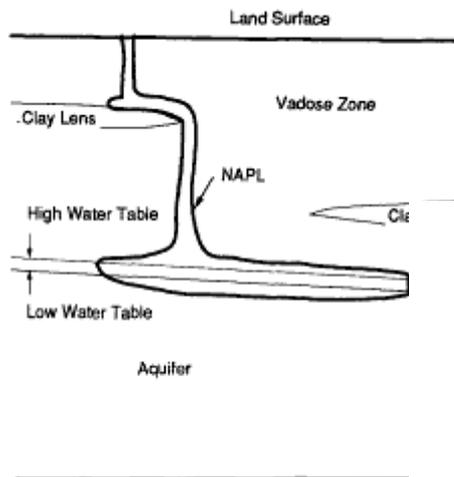


Figure 1 Schematic view of NAPL release

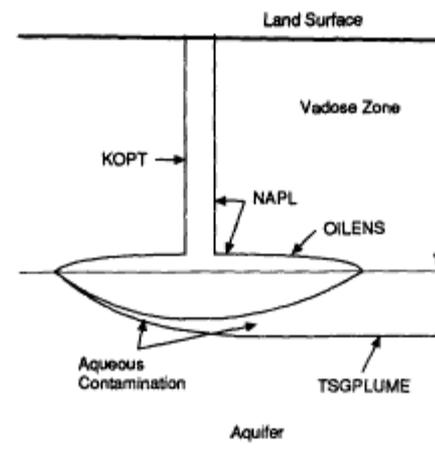
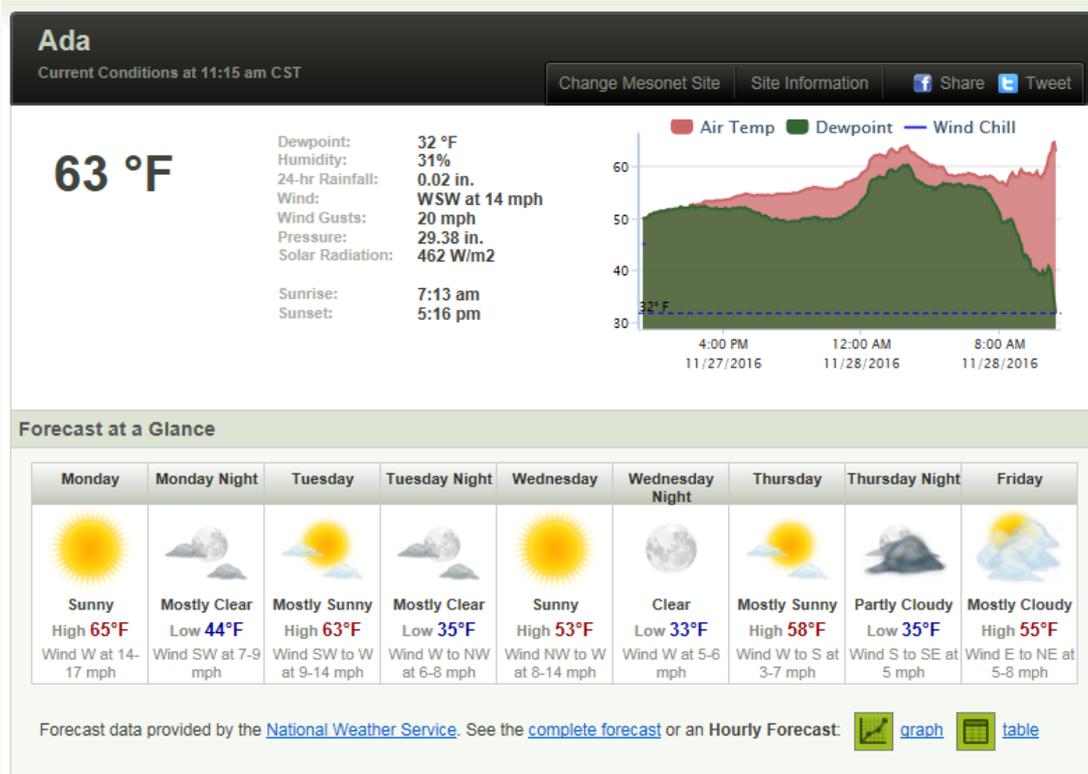


Figure 3 HSSM schematic showing the use of each module



# Uncertainty Calculations:





# On-line Calculators Site assessment/modeling

<https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/>

## Topic Examples:

- Horizontal and Vertical Gradients
- Effective Solubility
- Chemical Properties
- Mass Distribution
- Retardation Factor Calculation
- Plume Length at Steady State
- Uncertainty in Models
- Simple Models for Transport
- Unit Conversions

12/5/2016

U.S. Env

**EPA** United States Environmental Protection Agency

LEARN THE ISSUES SCIENCE & TECHNOLOGY LAWS & REGULATIONS ABOUT EPA

Ecosystems Research, Athens GA

## EPA On-line Tools for Site Assessment Calculation

[Module Home](#) [Objectives](#) [Table of Contents](#) [Next >](#)

### On-Site: the On-line Site Assessment Tool

**On-Site** was developed to provide modelers and model reviewers with prepackaged tools ("calculators") for performing site assessment calculations. The philosophy behind **OnSite** is that the convenience of the prepackaged calculators helps provide consistency for simple calculations, and access to methods and data that are not commonly available. The latter include data on fuel composition and models for leaching from fuel lenses. For a quick overview of the calculators, read the [fact sheet](#)

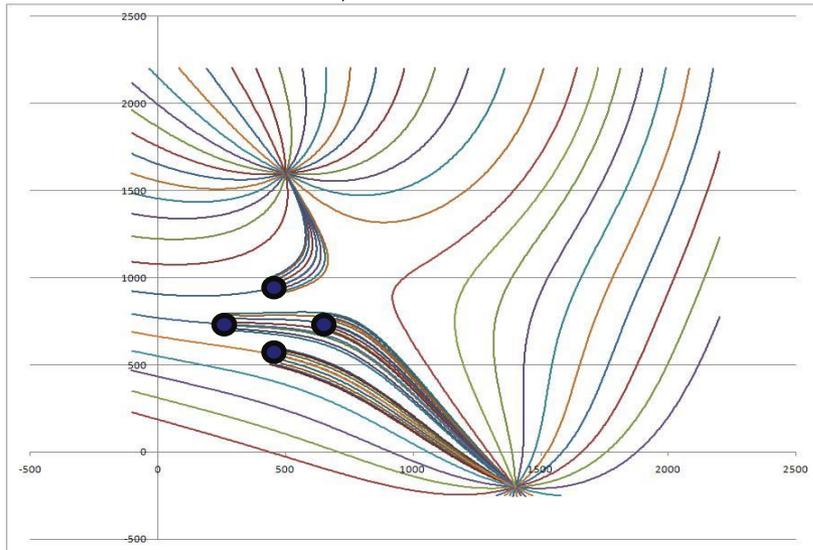
Use the:

- [Calculator list](#) to locate calculators of interest
- [Calculator reference](#) to see the background information for each calculator
- Example [applications](#) for practical ways to use the calculators

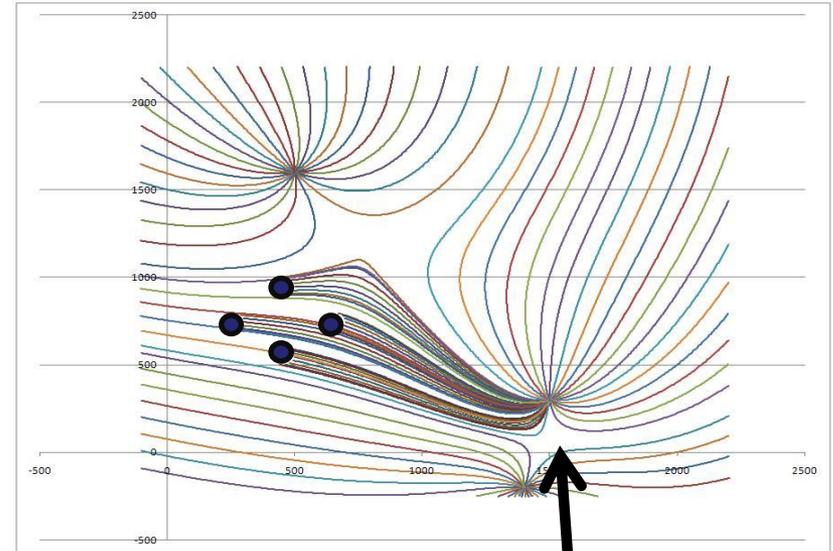
Sign up for the [OnSite listserver](#) to receive information on additions or other updates.

# Understanding the Spatial Implications of Contaminants Impacting Ground Water Supplies

Base Scenario with 2 pumping Wells and 4 sources



• Contaminant source



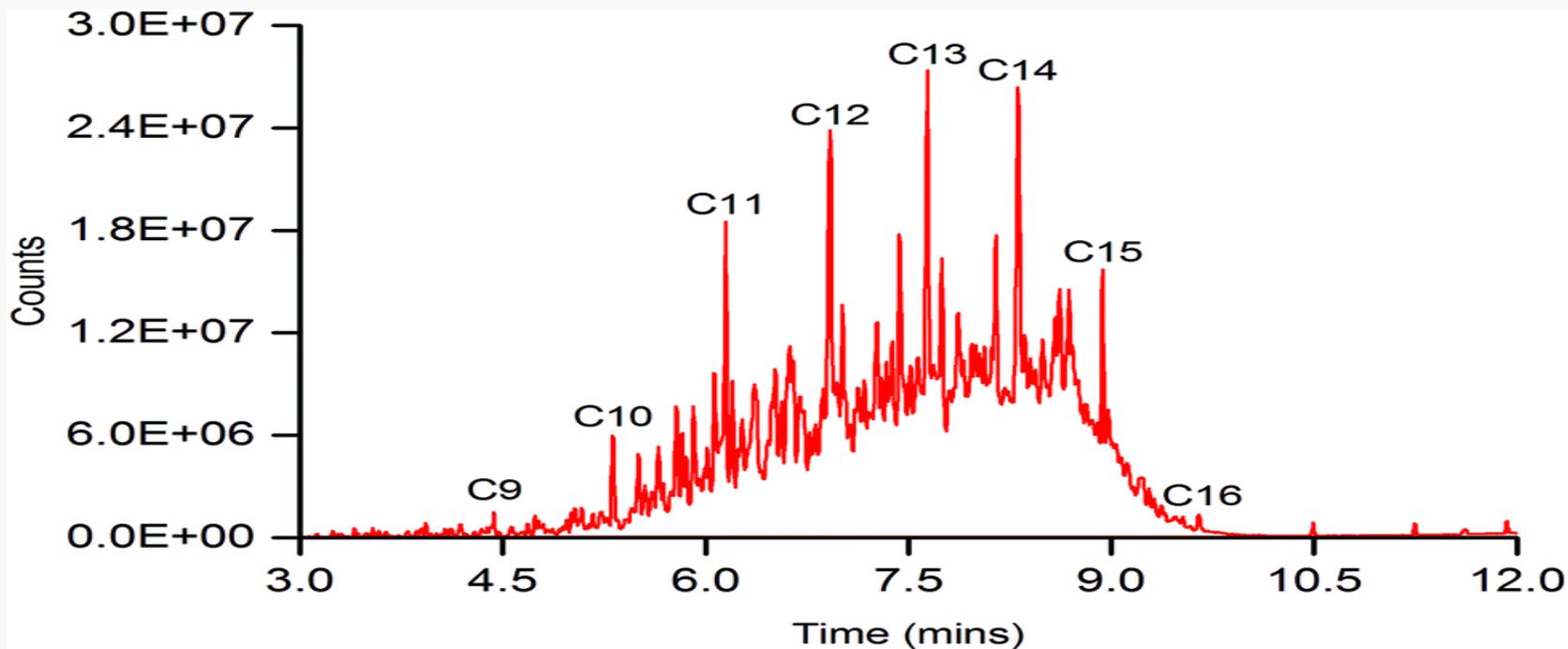
3<sup>rd</sup> well is vulnerable to all sources, one original well no longer vulnerable

Jim Weaver, USEPA, ORD

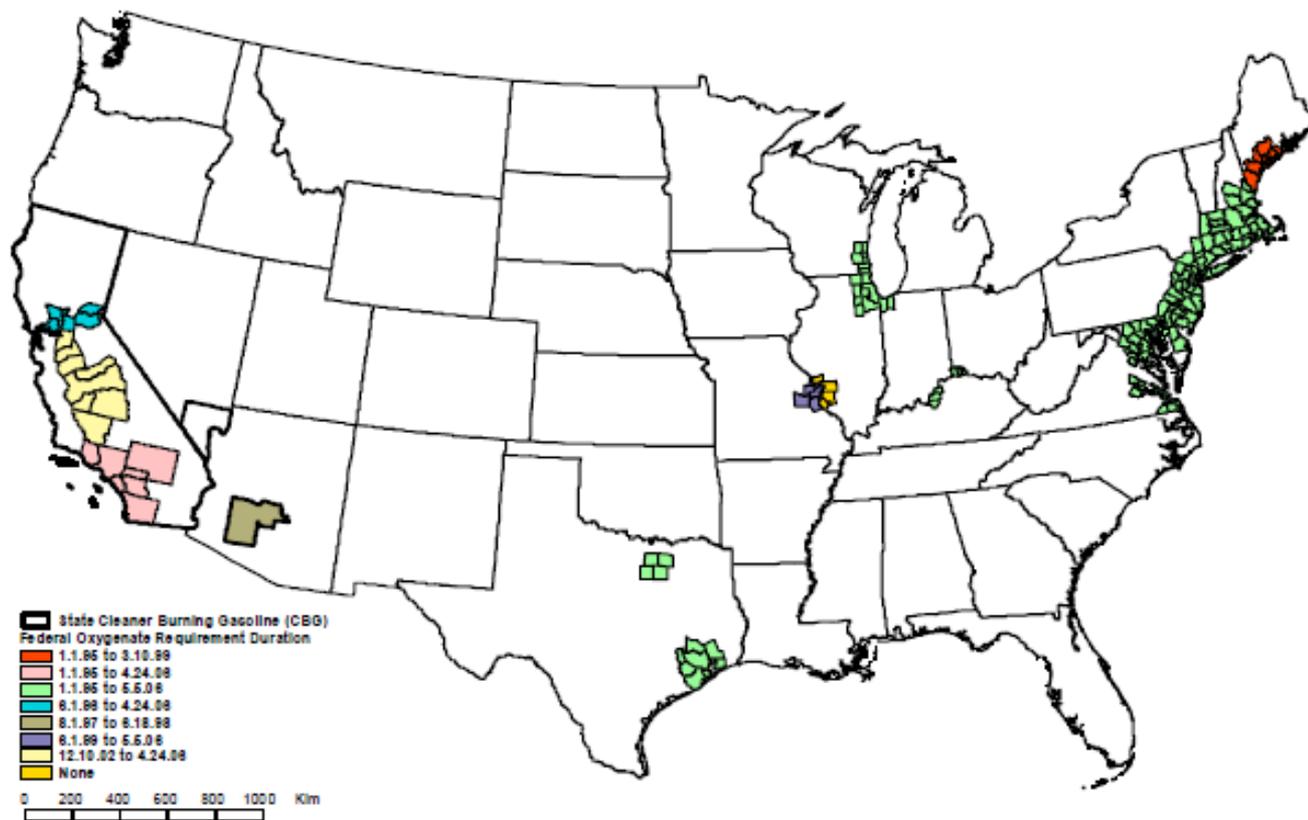
Continuing work on model updates...



# Fuel Composition (including lead scavengers and oxygenate additives)

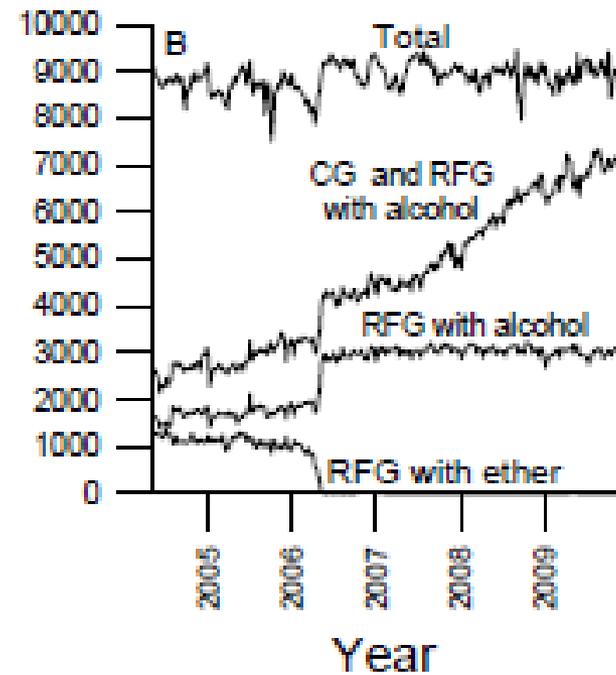
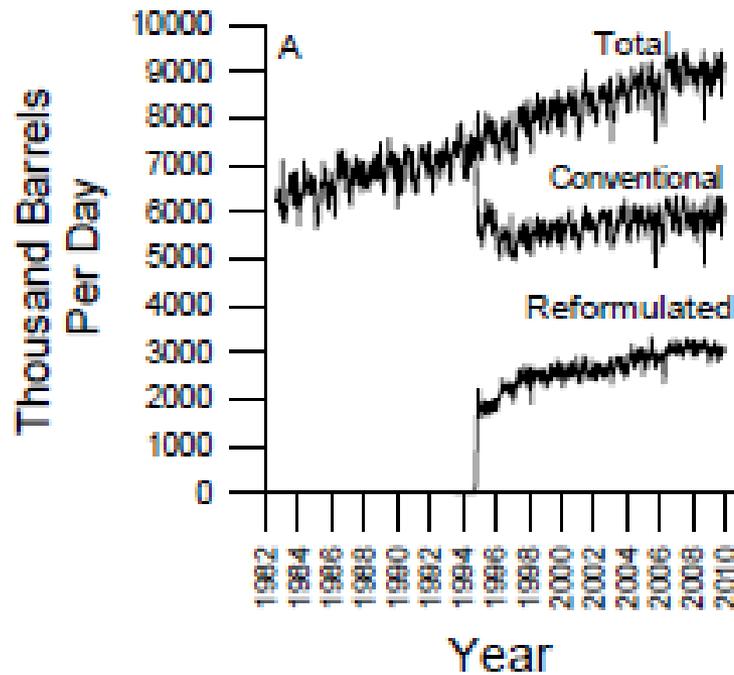


# Reformulated (indicated) versus Conventional Gasoline (EPA/600/R-10/001)

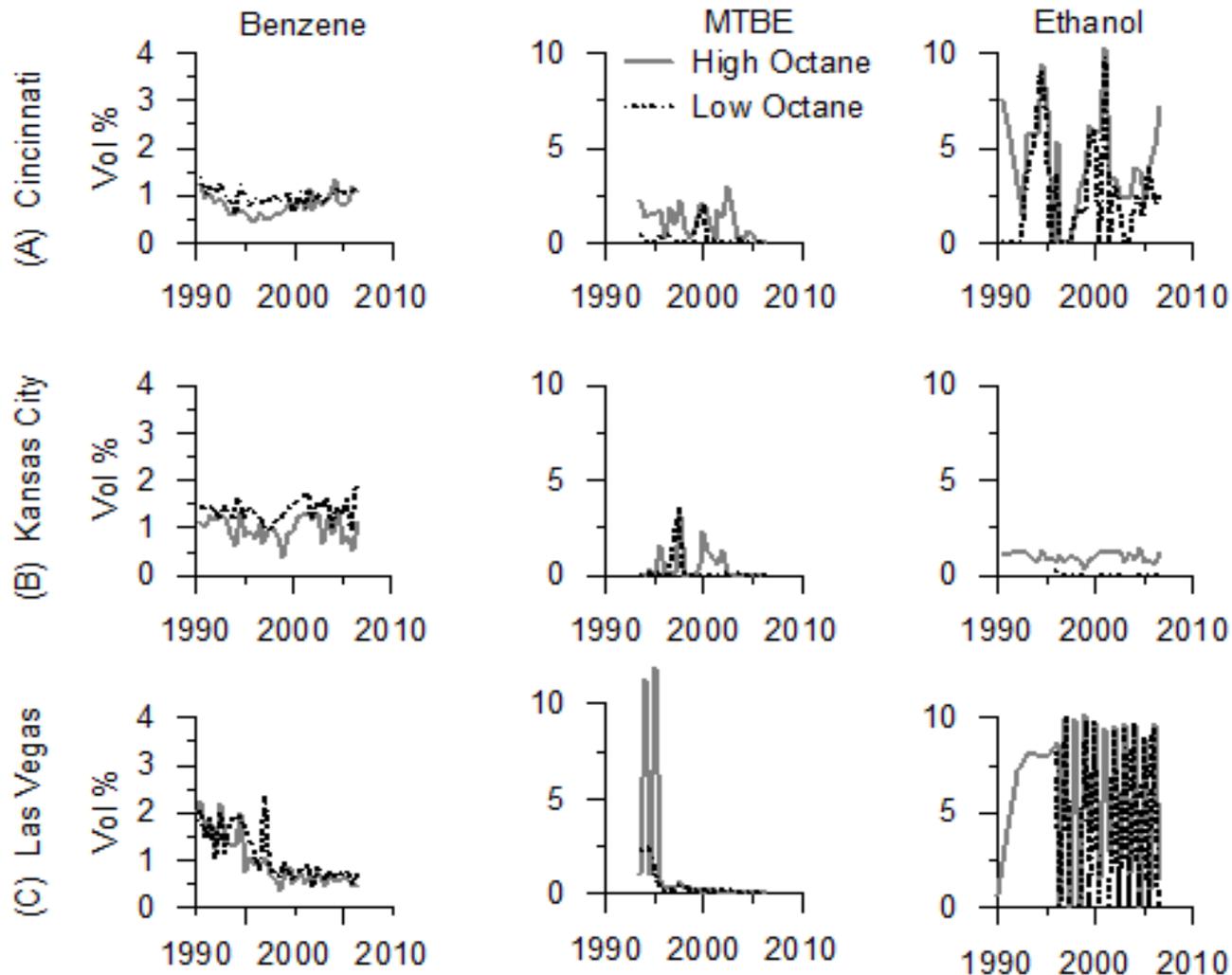




## Gasoline Production Data



# Conventional Gasoline Examples

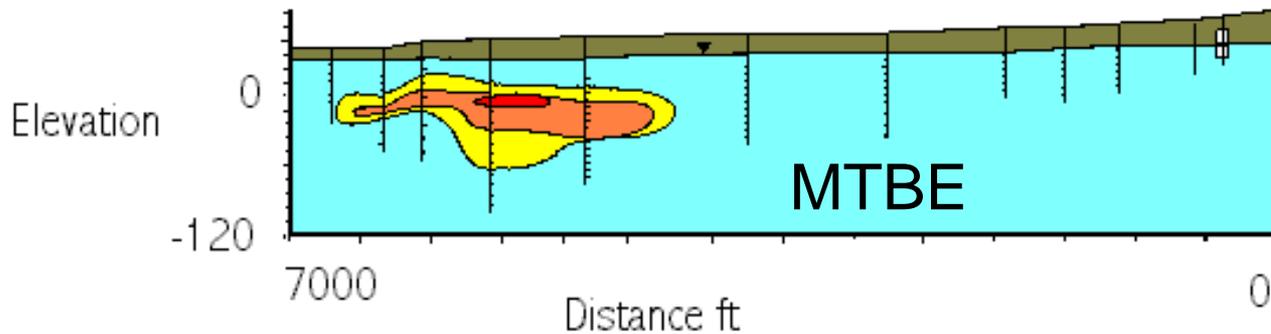
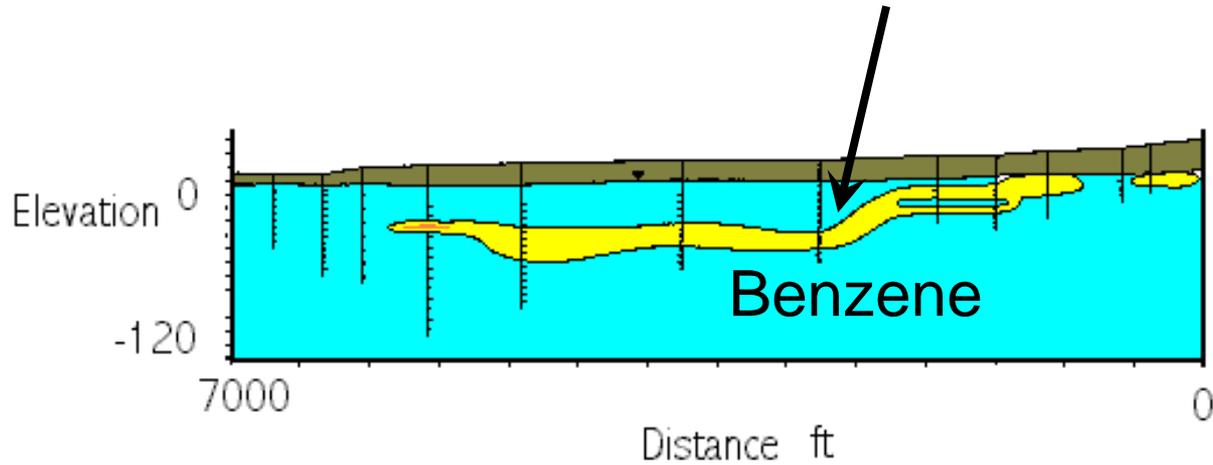




## Diving Plumes

- Contaminant plumes follow the flow of water from recharge points (downward—diving) to discharge points (upward)
  - Consider:
    - Regional hydrology
    - Runoff from pavement, roofs
    - Landscape features which admit water

# Plume Dropped Beneath Gravel Pit (East Patchogue, NY)



# On line plume diving calculator

<https://www3.epa.gov/ceampubl/learn2model/part-two/onsite>

Calculate/Redraw				Reset			
<input checked="" type="checkbox"/> Draw Watertable ?				<input checked="" type="checkbox"/> Vertical Exaggeration ?			
<input checked="" type="checkbox"/> Draw UpperBound of Plume ?				<input checked="" type="checkbox"/> Label Drawing ?			
Upgradient Head (at A)	<input type="text" value="65.0"/>	ft					
Downgradient Head (at B)	<input type="text" value="63.6"/>	ft					
Source Location	<input type="text" value="1.0"/>	ft					
Well Location	<input type="text" value="450.0"/>	ft					
Vertical Exaggeration	<input type="text" value="10.38"/>						
Plume Depth at Well	<input type="text" value="11.05"/>						
% Mass Balance Error	<input type="text" value="1.460e-12"/>						
Results...calculated for:							
Source Location at 1.0							
Well Location at 449.99999999999994							
Hydraulic Conductivity	<input type="text" value="215.0"/>	ft/d	<input type="text" value="215.0"/>	ft/d	<input type="text" value="215.0"/>	ft/d	
Segment Length	<input type="text" value="300.0"/>	ft	<input type="text" value="300.0"/>	ft	<input type="text" value="300.0"/>	ft	
Recharge	<input type="text" value="36.0"/>	in/yr	<input type="text" value="36.0"/>	in/yr	<input type="text" value="36.0"/>	in/yr	

[Previous](#) [Top](#) [Next](#)



# Policy and Technical Guidance Documents

In addition to the ORD technical documents and tools described earlier, OUST has produced a number of policy and technical guidance documents covering topics such as MNA, PVI, Lead Scavengers, Oxygenates in Fuel, and various site characterization and remediation technologies



## Policy Guidance Documents

- Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites (EPA 510-R-15-001) June 2015. <https://www2.epa.gov/sites/production/files/2015-06/documents/pvi-guide-final-6-10-15.pdf>
- Recommendation for States, Tribes and EPA Regions to Investigate and Clean Up Lead Scavengers When Present at Leaking Underground Storage Tank (LUST) Sites. May 21, 2010. [https://www.epa.gov/sites/production/files/2015-07/documents/lead\\_scavengers\\_memo\\_05212010.pdf](https://www.epa.gov/sites/production/files/2015-07/documents/lead_scavengers_memo_05212010.pdf)
- Monitoring and Reporting of MTBE and Other Oxygenates at UST Release Sites. January 18, 2000. <https://archive.epa.gov/oust/mtbe-a/web/pdf/jan1800.pdf>
- Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. (OSWER Directive 9200.4.17P) April 1999. <https://www2.epa.gov/sites/production/files/2014-02/documents/d9200.4-17.pdf>



## Technical Guidance Documents

- How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers (EPA 510-B-94-003; EPA 510-B-95-007; EPA 510-R-04-002, and EPA 510-B-16-005) <https://www.epa.gov/ust/how-evaluate-alternative-cleanup-technologies-underground-storage-tank-sites-guide-corrective>
- Expedited Site Assessment Tools for Underground Storage Tank Sites: A Guide for Regulators (EPA 510-B-97-001, and EPA 510-B-16-004). March 1997. <https://www.epa.gov/ust/expedited-site-assessment-tools-underground-storage-tank-sites-guide-regulators>
- How To Effectively Recover Free Product At Leaking Underground Storage Tank Sites: A Guide For State Regulators (EPA 510-R-96-001). September 1996. <https://www.epa.gov/ust/how-effectively-recover-free-product-leaking-underground-storage-tank-sites-guide-state>

A large, faint watermark of the U.S. Environmental Protection Agency logo is centered in the background. The logo features a stylized flower with three leaves and a circular center, surrounded by the text "UNITED STATES" at the top and "ENVIRONMENTAL PROTECTION AGENCY" at the bottom.

# Questions?



*Thank You For  
Participating!*