



Data Collection to Support Sound Screening for Vapor Intrusion to Indoor Air at Petroleum Release Sites



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Program Overview

- A voluntary, multi-year, multi-stakeholder project
- Understand which site scenarios are either likely or unlikely to result in vapor intrusion.
- Form the foundation for an improved screening approach
- More easily identify sites that truly need additional site-specific data collection before a decision can be made about the significance of the pathway.
- Create a catalog (database) that will allow users to make their own interpretation.



Overview

- Introduction to the proposal
- Vision
- Current situation
- How the program might work



Vision

- Develop a data resource for understanding petroleum hydrocarbon sites that:
 - Contains data that most can agree is of good quality
 - Provides a common point developing better screening and consensus on conditions warranting further investigation.
 - Is accessible to all

The Situation

- It is widely recognized that VOCs of concern from petroleum hydrocarbons degrade aerobically (5%? 2%? oxygen or less)
- Bioattenuation can occur over short distances if the conditions are right.
- Biodegradation does not seem to occur at some sites. Why? What type of sites?
 - Background?
 - Oxygen shadows?
- What combination of conditions or other site characteristics account for the lack of bioattenuation?
 - Roggemans (2001)

The Situation

- So far, regulators have been cautious about treating PHC sites differently from solvent sites.
- Regulators are requesting and analyzing data.
- Can we leverage efforts and become more confident?

Petroleum Hydrocarbon Data in EPA OSWER Database

- 11 residential sites analyzed
- Data for 1 - 8 buildings per site
- For all but 2 sites, measured indoor air concentrations could not be distinguished from background

Hers et al, 2005. “Revising the Empirical Attenuation Factors: Data Analysis & Preliminary Results.” AEHS VI Workshop. March 14, 2005



Main Components

- Data Collection
- Analysis & Classification
- Data Distribution
- Supplemental Modeling

Site Classification - Divide and Conquer

- Source Strength and Building Proximity to Source
 - Over groundwater plumes
 - Direct contact with dissolved contaminants
 - Over LNAPL
 - Utility connects vapor source to building
- Measurable site characteristics
 - Building construction types (slab, crawl-space, basement),
 - Vadose zone characteristics (soil type, etc.)
 - Depth of the source (vert. dist. source to bldg)
 - Lateral distance between the source and building
 - Other

Data Classes

- 3 classes of data based on what information is collected: "platinum," "gold," "silver"
- Data quality standard to be defined
- Sites must be well characterized: See Checklist

Gold Class

- Is biodegradation contributing to the attenuation of hydrocarbon vapors between the source and building at this site?
- Items in Checklist 1
- Soil gas profiles: HC, O₂, biogenic gases
- Bonus data: subslab with HC, O₂, biogenic gases



Silver Class (Point Sampling)

- Implemented when conducting an initial assessment of the subsurface-vapor-to-indoor-air exposure pathway.
- Compare COC concentrations to screening levels
- Evaluate the results of simple, conservative models of vapor transport in soil or from groundwater.
- May provide additional support for site classification, but not as compelling as Gold Class data.

Platinum Class

- Studies that explain soil gas behavior
 - Santa Maria
 - Oxygen (or other gas, e.g., CH_4 transport study (to understand factors for O_2 (or other gases) moving below foundation)
 - Radon (or other tracer) studies that provide more confidence in alpha factors
 - Monitoring of environmental factors and driving forces for intrusion (likely over different seasons)
- Studies that generate data that improve default parameters
 - In situ diffusion or permeability tests (or moisture sat. data)

Modeling

- Supplemental modeling would be performed to
 - enhance visualization of possible behaviors
 - explore of ranges of conditions not covered by the empirical data.
- Extend work of Abreu and Johnson?

To Do List

- Clarify and publicize the initiative (Started)
- Identify partners (state UST regulators?, EPA OUST?, others? (Started)
- Figure out what it's going to cost to start and maintain
- Set up an advisory panel?
- Set up a network of data scouts?
- Establish data quality standards
- Find contractor to manage the database and perform QA filtering, website construction, etc.
- Begin gathering and entering data (Spring 2006)