

# Vapor Intrusion



Soil Contamination

Contaminated Groundwater



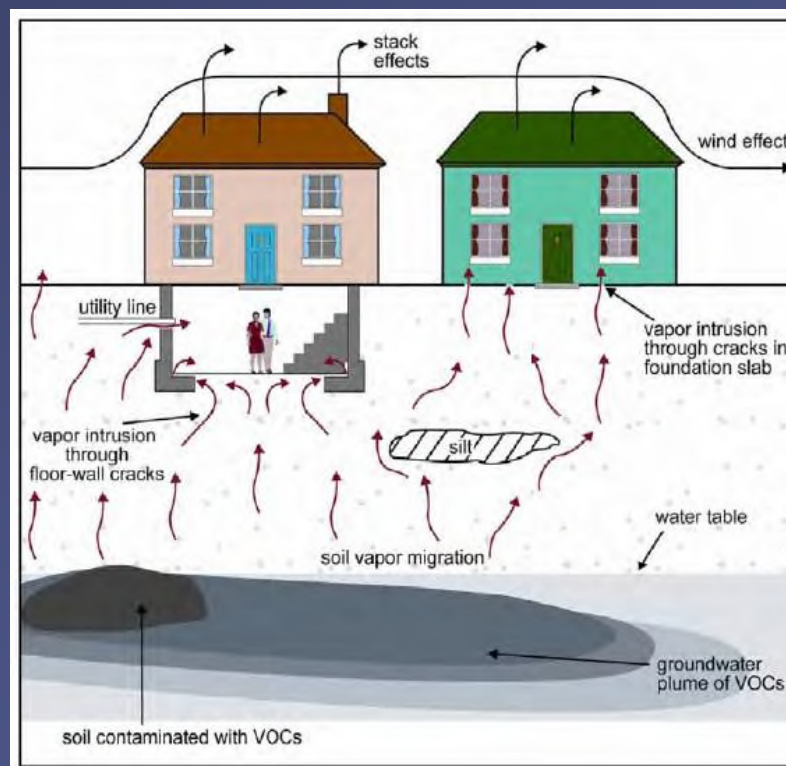
# Module Objectives

- ◆ Define and describe vapor intrusion and vapor intrusion pathways
- ◆ Describe a vapor intrusion sampling strategy
- ◆ Resolve vapor intrusion sampling questions
- ◆ Introduce mitigation approaches
- ◆ Present a real-life vapor intrusion case study



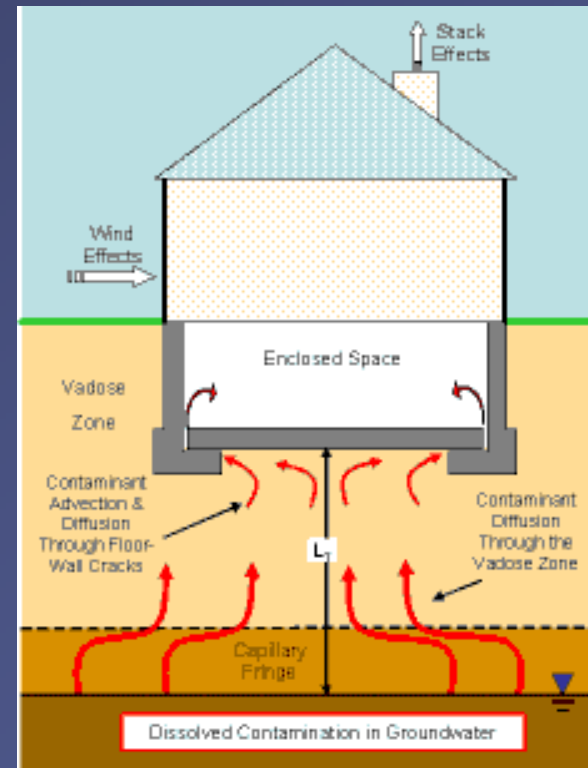
# Vapor Intrusion at Your Site

- ◆ “The migration of volatile chemicals from the subsurface into overlying buildings”: 2002 EPA OSWER Draft Guidance for Evaluating Vapor Intrusion
- ◆ The risk
- ◆ The concern



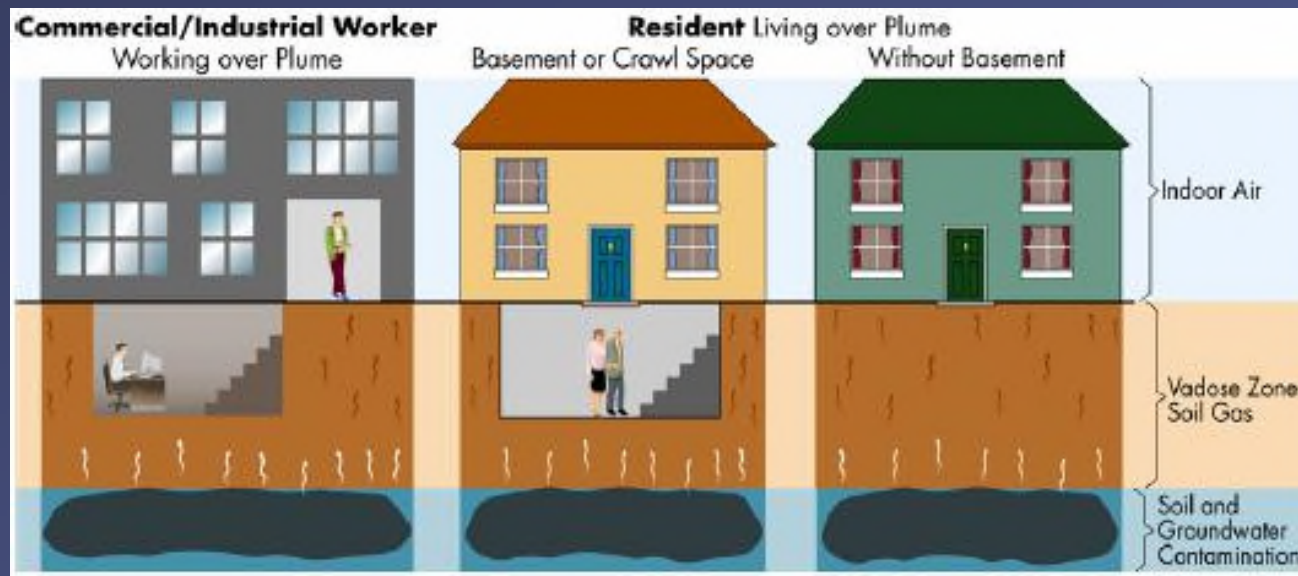
# The VI Pathway

- ◆ Many variables
- ◆ Differences from other exposure pathways



# Conceptualizing VI

- ◆ Conceptual site model
  - » New EPA technical document
- ◆ Interstate Technology and Regulatory Council
- ◆ Dynamic CSMs at VI sites



# VI Sampling Strategy

- ◆ Multiple lines of evidence



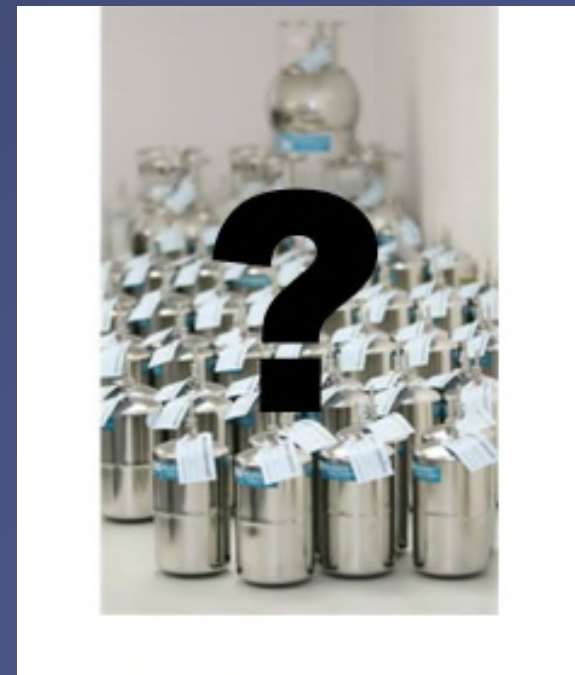
# VI Sampling Strategy

- ◆ Source delineation
- ◆ Complete pathway sampling



# The Inevitable Sampling Questions

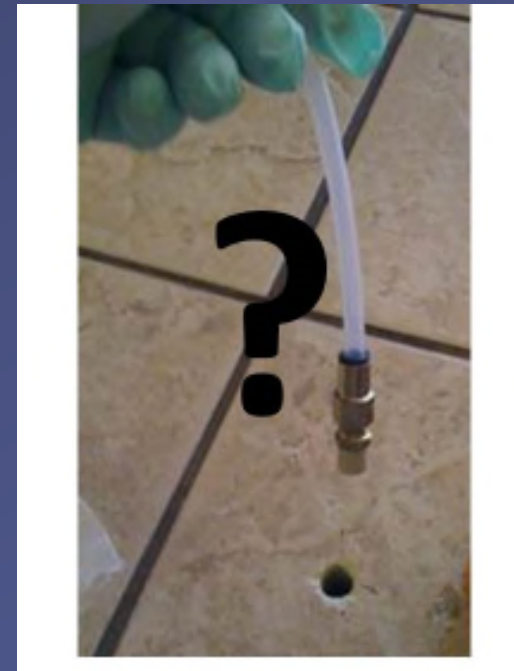
- ◆ How many homes/buildings should I sample?
- ◆ What is the duration of a vapor sampling event?
- ◆ How many rounds of sampling are needed?
- ◆ How many
  - » indoor air samples per building?
  - » sub-slab samples per building?





# The Inevitable Sampling Questions

- ◆ Is it necessary to remove indoor sources?
- ◆ What about outdoor (ambient) samples?
- ◆ What about sampling soil gas during or soon after rainfall?
- ◆ What if access is denied for sub-slab sampling?



# Sampling and Analyses

- ◆ Collection techniques
  - » Air canisters
  - » Tedlar bags
  - » Adsorption tubes
- ◆ Considering DQOs
- ◆ Mobile laboratories



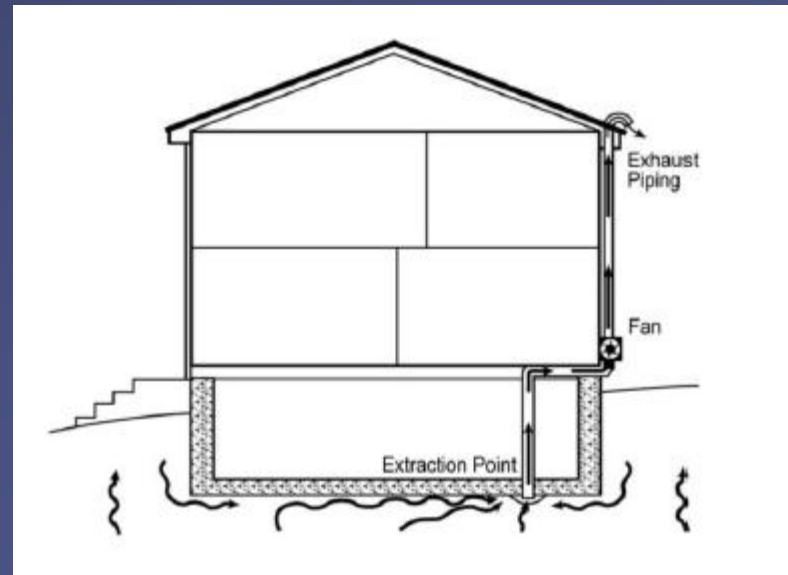
# Determining a Complete VI Pathway

- ◆ Data evaluation
- ◆ A word on attenuation factors



# Mitigation Approaches

- ◆ Active soil depressurization
- ◆ Passive soil ventilation
- ◆ Positive indoor pressurization
- ◆ Indoor ventilation
- ◆ Sealing
- ◆ Passive barriers



# Ensuring Proper Installation

- ◆ Series of tests and monitoring
- ◆ Maintenance sampling
- ◆ Operational and functional



# The Sunny Side of VI?

- ◆ Delfasco Forge
- ◆ Crawl space fans
- ◆ Saving green and going green



# VI Resources are Large and Growing

- ◆ EPA
  - [www.clu-in.org](http://www.clu-in.org)
- ◆ Regional resources
- ◆ States
  - » ITRC
  - » Individual states



# On the VI Horizon

- ◆ Final EPA subsurface vapor intrusion guidance
- ◆ VI science is advancing and changing





# Questions?

