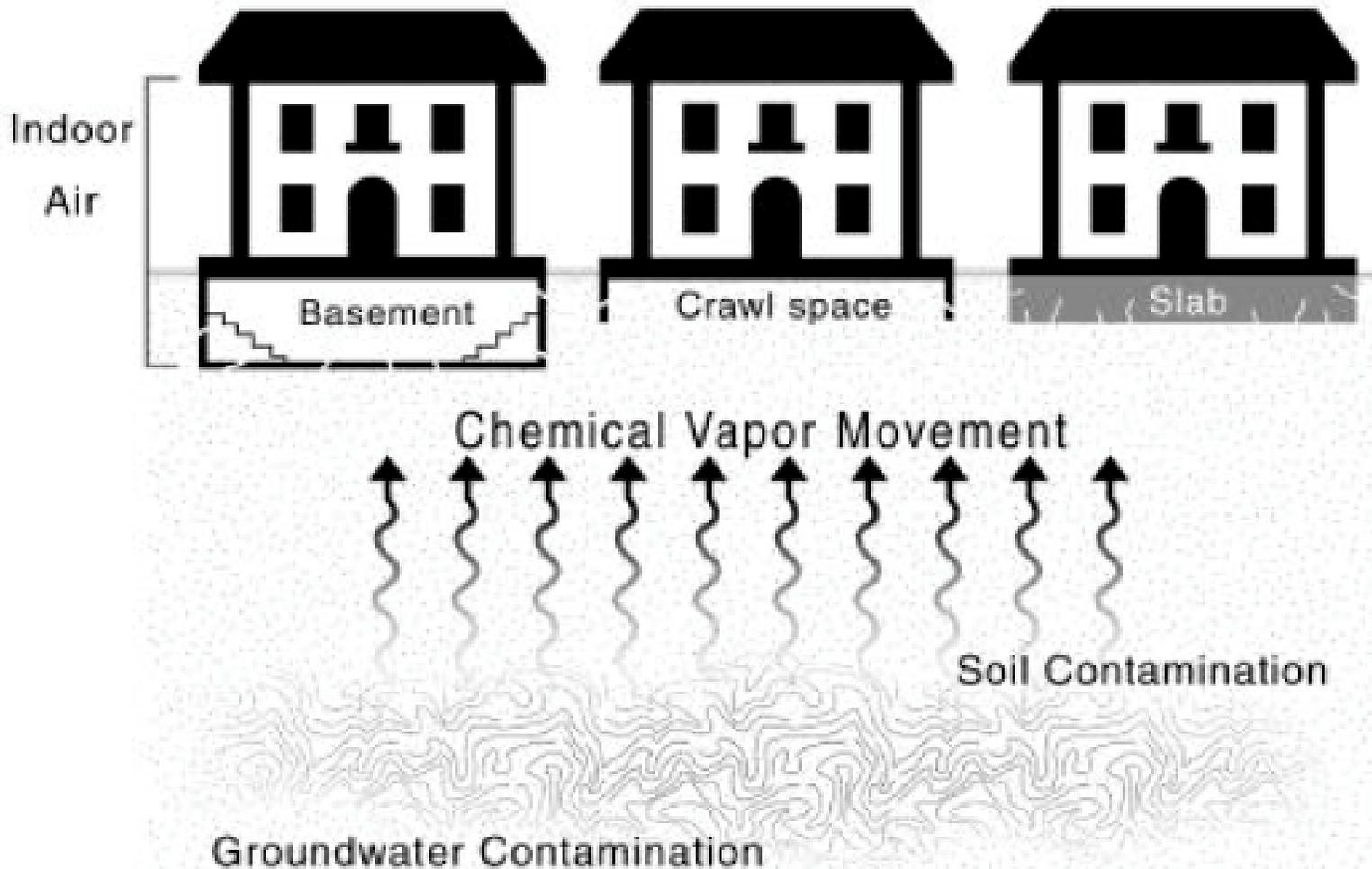


GENERAL CONCEPTS

- Soil vapor intrusion
- Factors affecting vapor migration, vapor intrusion and indoor air quality
- Human exposure
- Overall evaluation approach
- Community outreach



What is soil vapor intrusion?



Factors affecting vapor migration and intrusion

Environmental factors include

- soil conditions
- underground conduits
- biodegradation processes
- confining layers



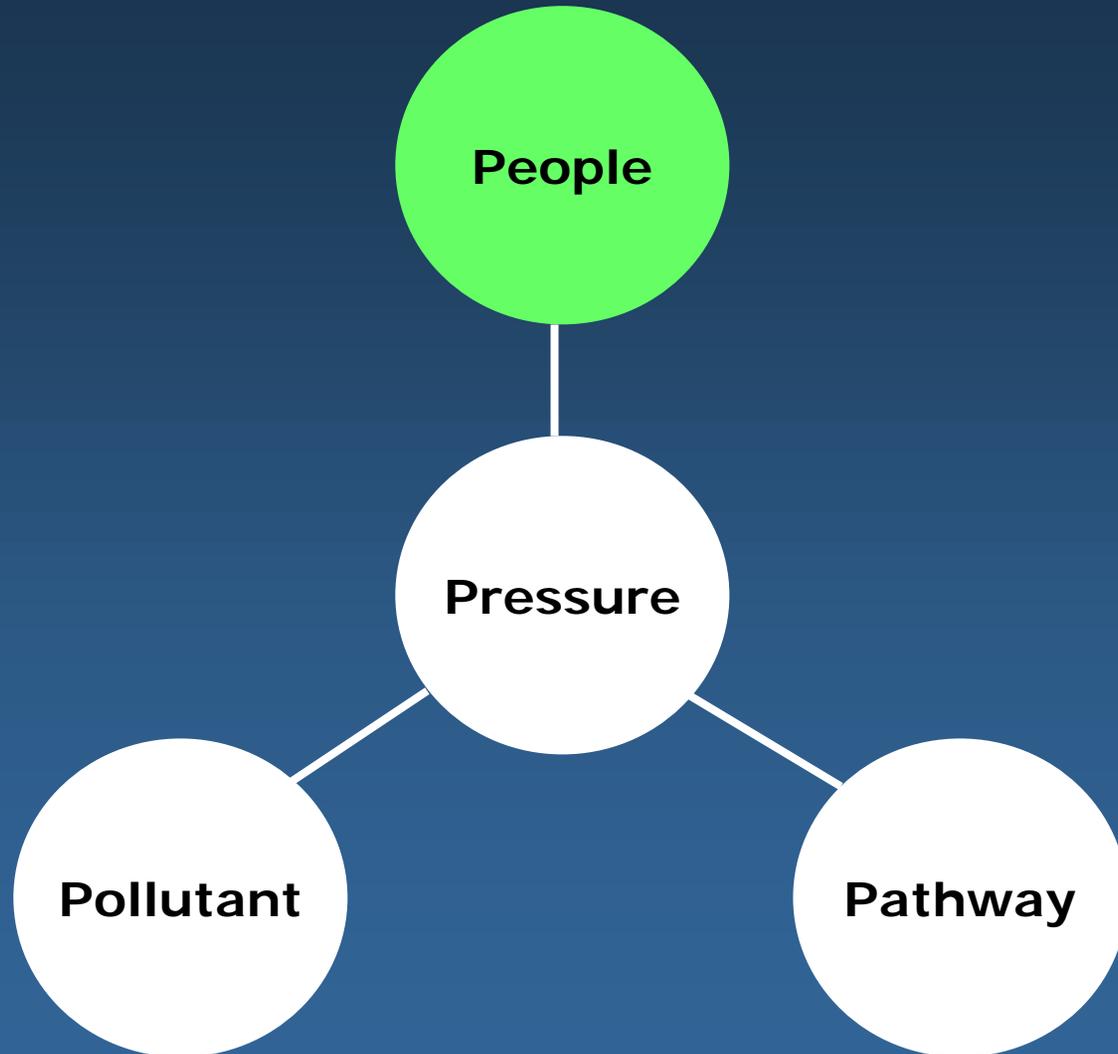
Factors affecting vapor migration and intrusion

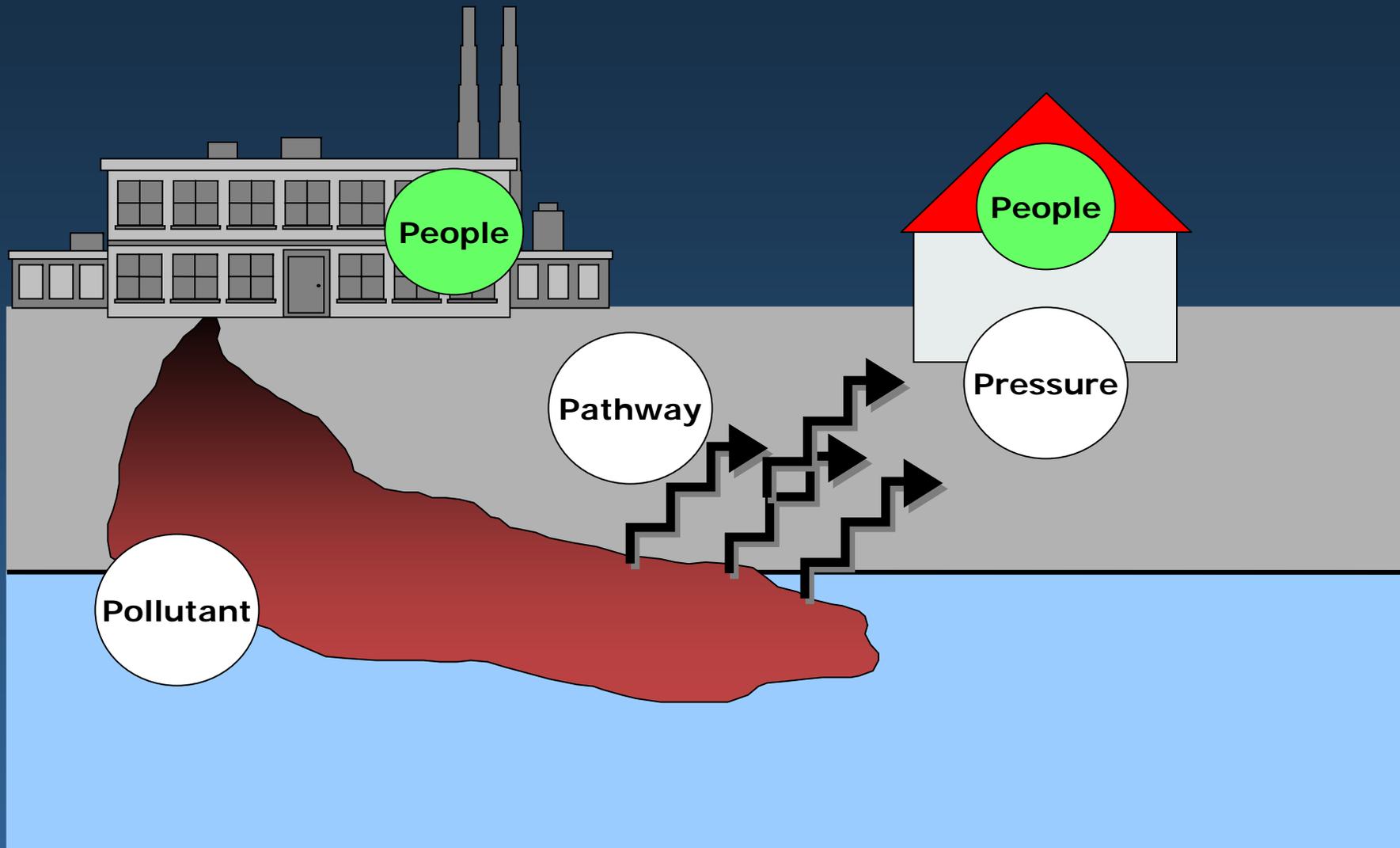
Building factors include

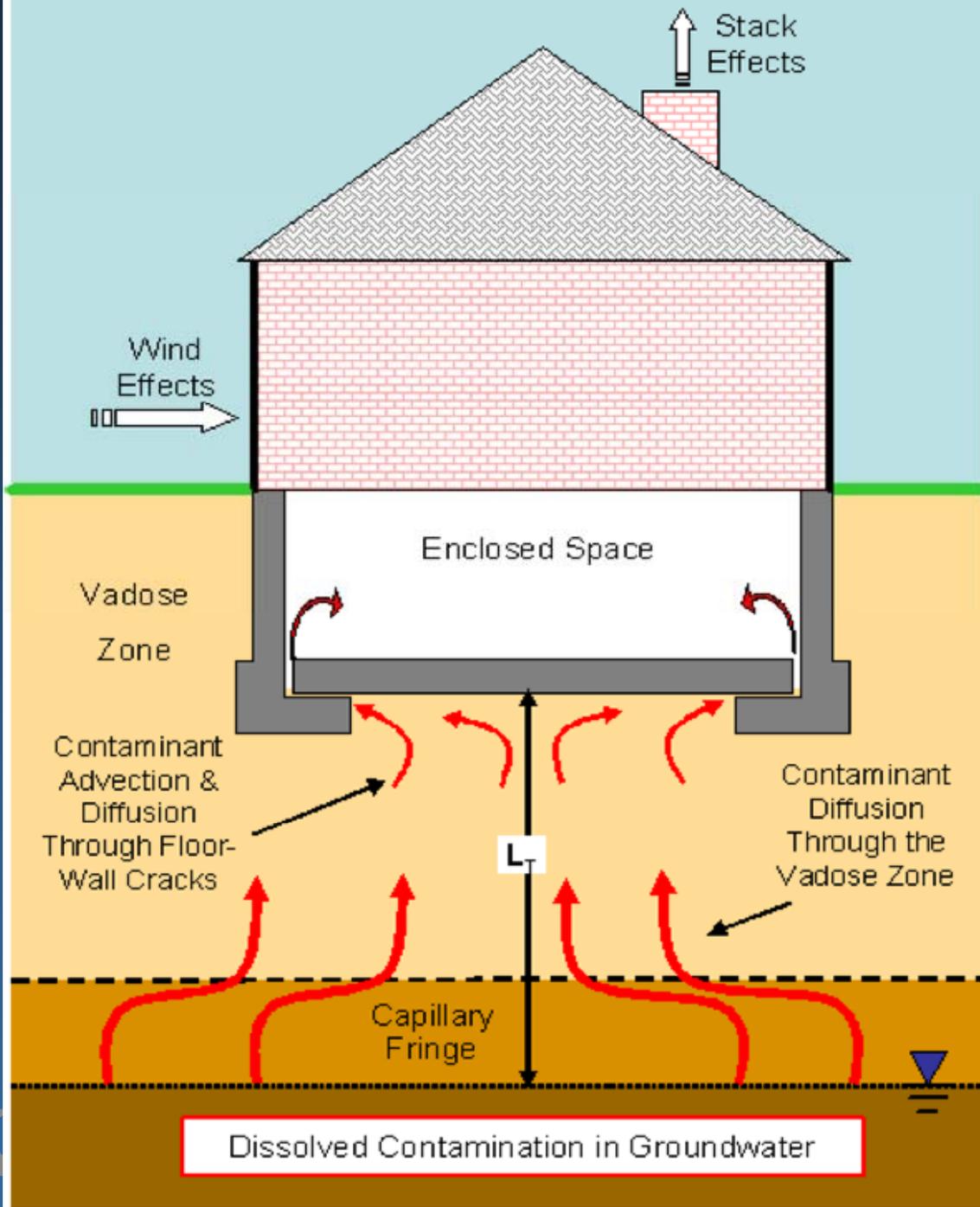
- foundation type & integrity
- operation of HVAC system, fireplaces and mechanical equipment
- subsurface features



Key components of soil vapor intrusion: 4 "P"s







People

Pressure

Pathway

Pollutant



Pathway

Soil Vapor Migration Pathway May Be Complex

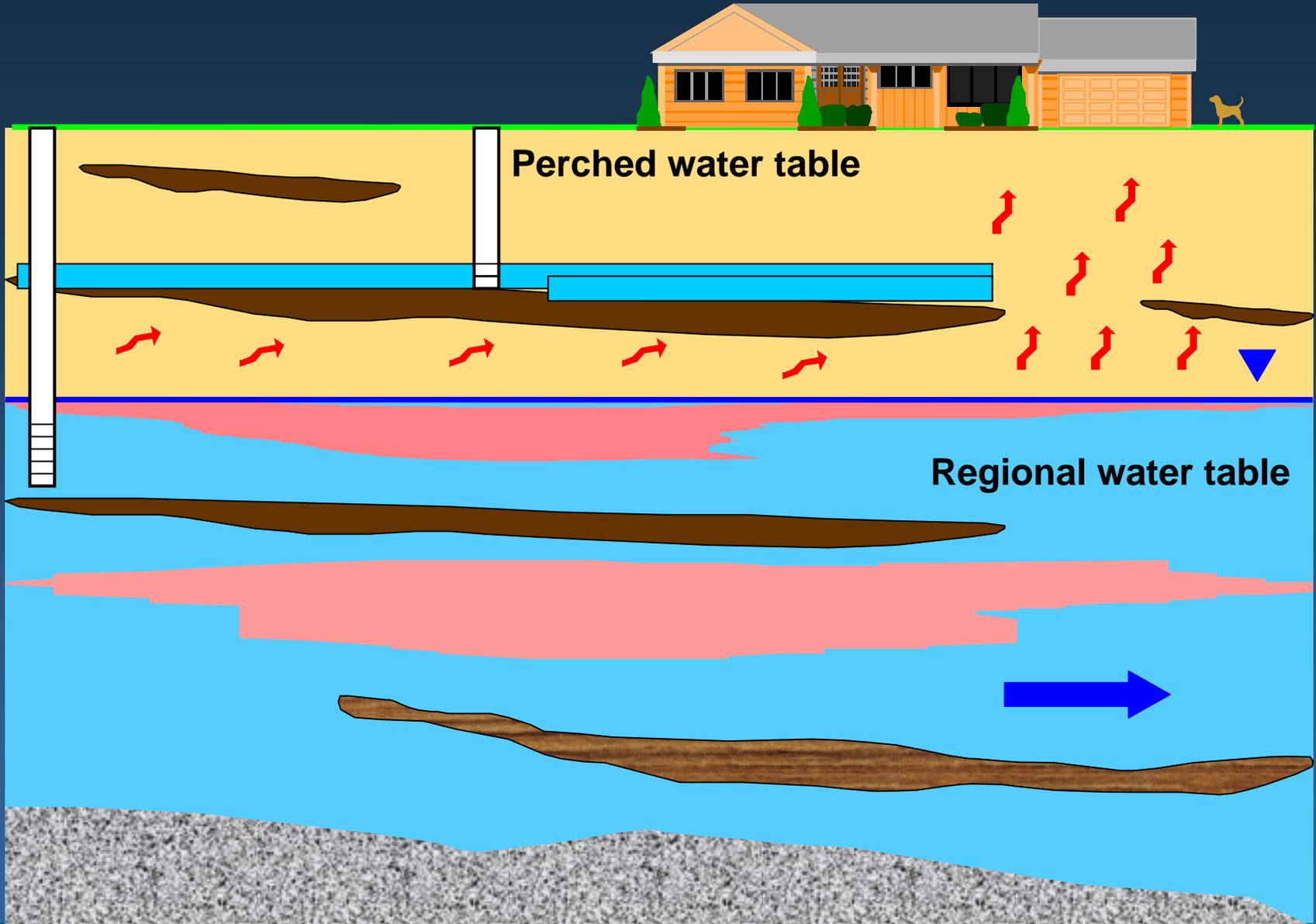


Figure B.31
TCE in Soil Vapor and Groundwater
 Quarterly Report - Soil Vapor Monitoring
 Comprehensive Operations, Maintenance, & Monitoring Program
 Endicott, New York

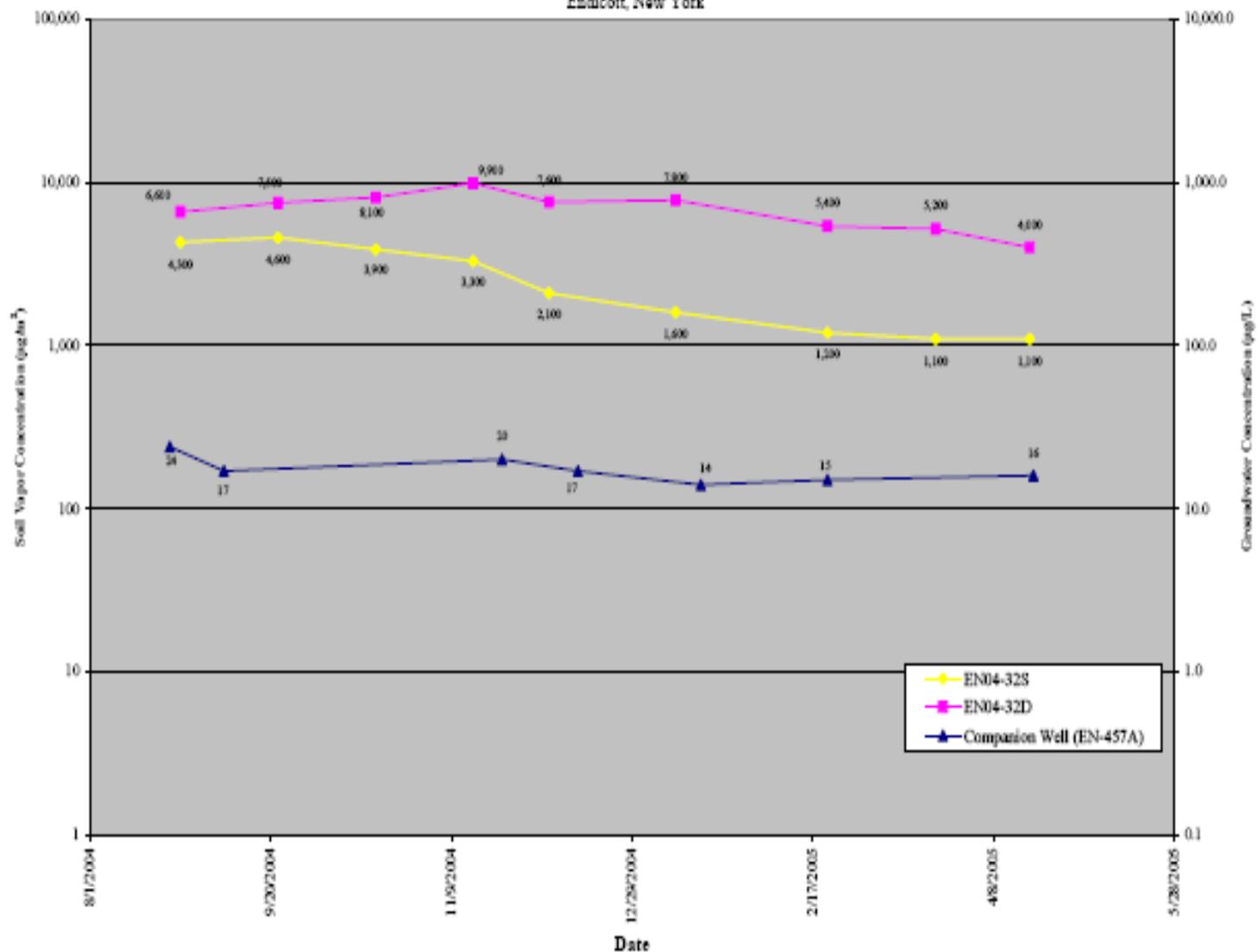
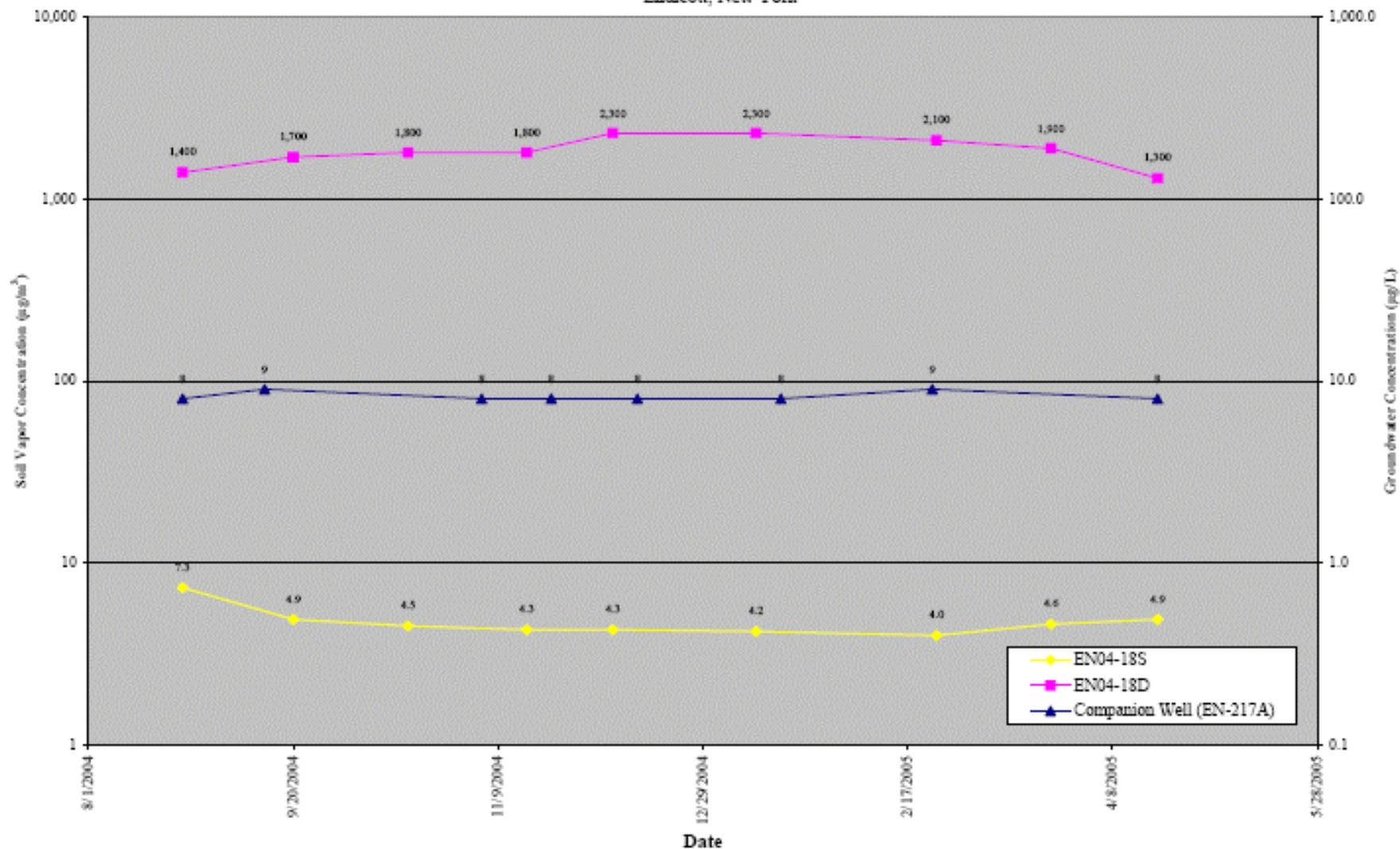


Figure B.18
TCE in Soil Vapor and Groundwater
 Quarterly Report - Soil Vapor Monitoring
 Comprehensive Operations, Maintenance, & Monitoring Program
 Endicott, New York

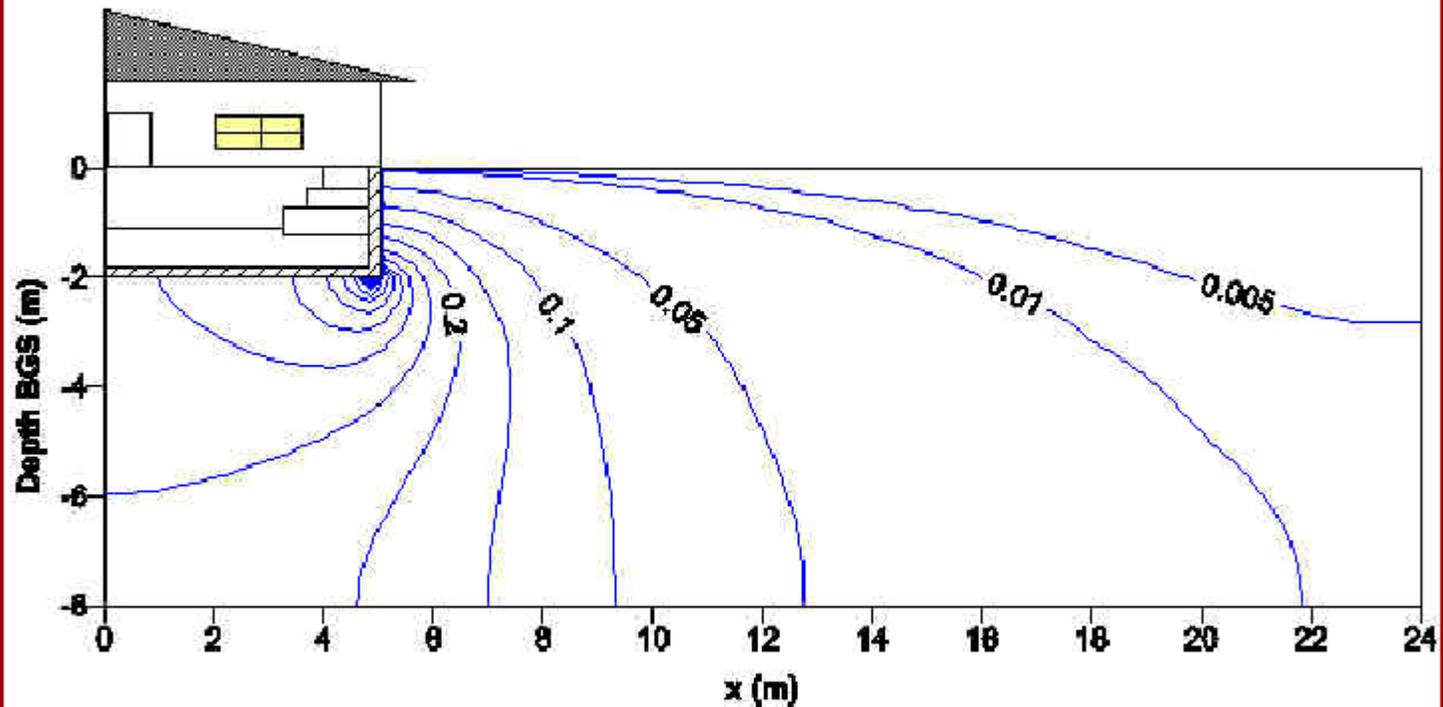


Pressure

Pressure Gradients Change Through Time

Need to Consider Worst-Case Conditions

A Sample Pressure Field...

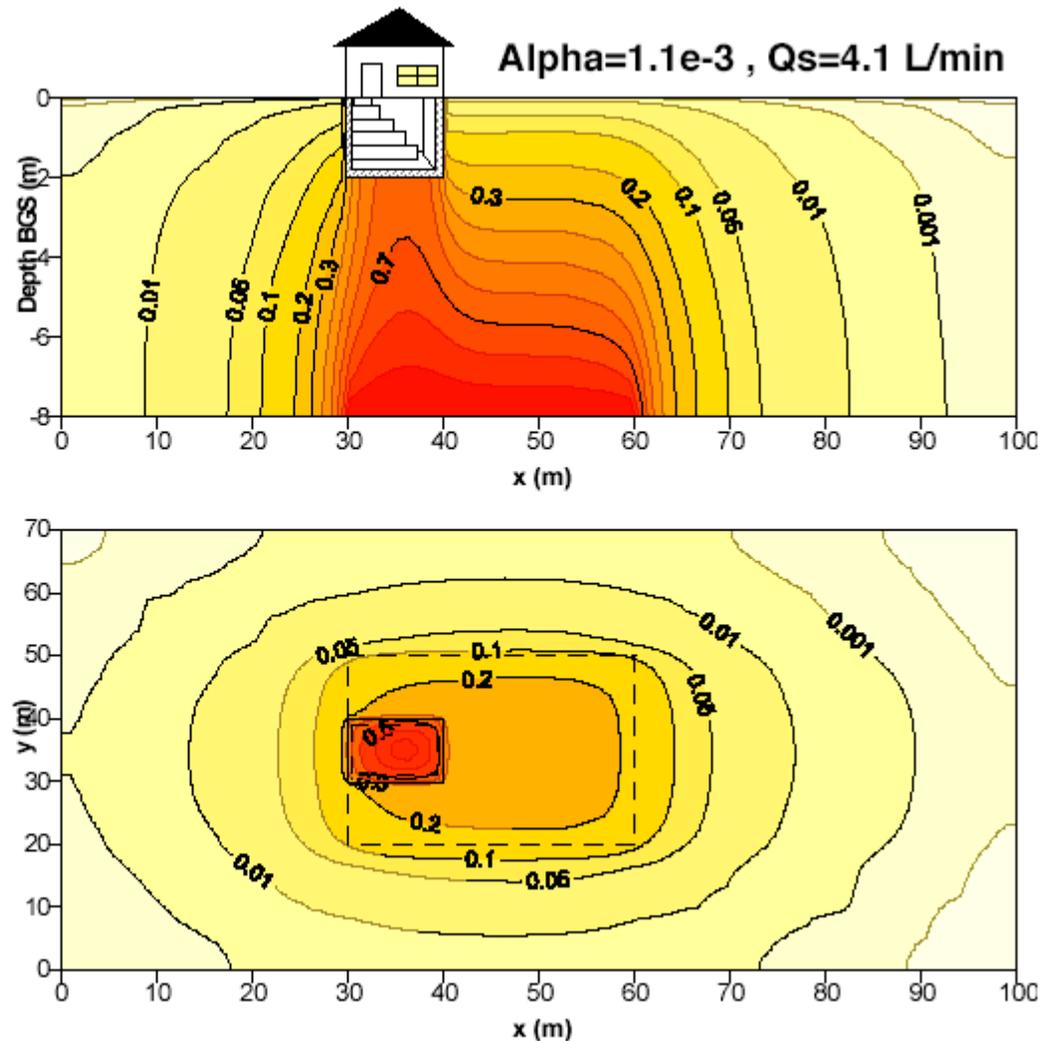


Symmetrical Simulation - cross-section through plane of symmetry



Changes in α with Source Position and Depth...

No biodegradation



Δp Pressure gradients are the driving force

Induced by

- convection (temp difference in winter)
- mechanical equipment (clothes dryers, exhaust)
- heating appliances (combustion air)
- air handlers and return air ductwork (furnaces)
- fireplace (combustion air)
- weather — barometric pressure changes, wind, rain

Δp Pressure gradients are the driving force

Exacerbated by

- surface barriers such as saturated soil, frost, paved areas, etc.
- relative differences in permeability — clay vs. gravel

People

Vapor intrusion and human exposures

Exposure = Contact

When contaminated vapor is drawn into an occupied building and mixes with the indoor air

Route of Exposure = Inhalation

Manner in which volatile chemicals enter the body

NOTE

Exposure does not necessarily mean that health effects will occur.

Vapor intrusion and human exposures

Current Exposures

When vapor intrusion is documented in an occupied building

Potential Exposures

When volatile chemicals are present in the subsurface, but have not affected indoor air quality due to current site conditions

— OR —

When vapor intrusion is documented in an unoccupied building



Alternate sources of VOCs in indoor air

- Outdoor air
- Attached or underground garages
- Off-gassing from...
 - building materials, furnishings, dry-cleaned clothing, contaminated groundwater, etc.
- Household products
- Occupant activities

Both current and potential exposures are considered when evaluating vapor intrusion

Community outreach

Fact sheets available...

- *What is Exposure?*
- *Soil Vapor Intrusion: Frequently Asked Questions*

Fact sheets coming soon...

- household products and indoor air



Overall approach to evaluating vapor intrusion

Factors affecting vapor migration and intrusion, and indoor air quality, are considered when conducting an investigation and evaluating the results

Each site is unique

Phased iterative approach

- understanding of site — Conceptual Site Model



Overall approach continued...

Investigation

- Soil vapor contaminated? If so, nature and extent? Source(s)?
- Current and potential exposures?
- What actions needed — mitigation & remediation?

Decision-making

- whole picture
- multiple lines of evidence

