Vapor Intrusion
What is Vapor Intrusion?

The migration of volatile chemical vapors from the subsurface to overlying buildings
Vapor Intrusion and Indoor Air Contamination

Dissolved contamination in groundwater volatilizes...

Migrates as vapor into overlying vadose zone...

Enters structures through floor and wall cracks...

Becomes trapped inside enclosed space...

Exposes occupants to indoor air contamination
Who Can Be Affected by Vapor Intrusion?

Commercial/Industrial Worker Working Over Plume

Residents Living Over Plume
- Basement or Crawl Space
- Without Basement

Vapor Intrusion
Basics of Vapor Intrusion / Indoor Air Assessment
(*Refer to Applicable Guidance for Appropriate Methods)

Delineate groundwater contamination plume, soil vapor plume and/or contaminated soil areas

Conduct soil vapor sampling to identify structures potentially impacted by vapor intrusion

Conduct sub-slab soil vapor sampling to identify potential for indoor air concerns

Conduct indoor and ambient air sampling to confirm indoor air concerns
Basics of Vapor Intrusion / Indoor Air Assessment continued

- Screen indoor air prior to sampling to identify residential interferences
- Remove potential sources before sampling
- Drilling through slab
- Placement and cementing of probe
- Collecting an indoor air sample using a SUMMA canister
- Collecting an ambient air sample using a SUMMA canister
Determine Actions Based on Pathway Completion and Risks

- **Completed Pathway?**
  - Yes
  - Indoor Air Concentration?
    - Concentrations greater than Action Levels
      - Mitigate
    - Concentrations less than Action Levels
      - Monitor or Mitigate
  - No Further Action (NFA)

- **Health Issue**
  - Short-term:
    - Acute health effects
    - Intermediate health effects
  - Long-term:
    - Chronic health effects
    - Cancer
  - Immediate:
    - Fire and explosion
    - Asphyxiation, oxygen depletion

**Concentrations greater than Action Levels**

**Concentrations less than Action Levels**
Vapor Intrusion Mitigation Methods

Existing Structures
- Sub-Slab Depressurization
- Sub-Membrane Depressurization
- Sub-Slab Pressurization
- Building Pressurization
- Indoor Air Treatment
- Passive Barriers
- Backfill Depressurization

Pre-Construction Abatement
- Institutional Controls
- In-Design Systems
- Soil / Groundwater Cleanup
Typical Single Building Vapor Intrusion Mitigation

- Sub-Slab Depressurization System (SSDS)
- Similar to radon gas mitigation system
- Negative pressure applied under building
- Prevents vapors from entering structure
Innovative Multiple Building Vapor Intrusion Mitigation

- Soil Vapor Extraction (SVE) System
- Simultaneous mitigation for multiple structures
- Vapor collection points connected by lattice
- Centralized vapor treatment system
## Who Can BTSC Help?

### Direct Technical Assistance
- State and local governments
- Tribes
- Brownfields Grantees
- EPA Regional Coordinators
- EPA Remedial Project Managers
- EPA On-Scene Coordinators
- Other EPA Regional staff

### Information Support
- Real estate professionals
- Developers and financial institutions
- Other private redevelopment interests
- Consultants, engineers and remediators
- Potentially Responsible Parties (PRPs)
- Affected Communities
- General public
Direct Technical Assistance Services

- Project Strategy Consultation
  - Including use of the Triad Approach, Exit Strategies
- Facilitation of Systematic Project Planning
- Review or development of:
  - Conceptual Site Models (CSMs)
  - Dynamic Work Strategies
- Recommendation of innovative and real-time investigation technologies
- Support with Johnson-Ettinger Vapor Intrusion Model
- Evaluation of remedial technologies
- Review of mitigation designs
- Training – Live / Webcast / Archived
“Self-Help” Information Assistance

- Guidance Documents
- Special Issues Primers
- Technical Bulletins
- Fact Sheets
- Case Studies
- Technology Descriptions
- Web-resources
Vapor Intrusion Summary

- Vapor Intrusion is a common Brownfields issue that can significantly affect redevelopment
- Methods and tools exist to identify and determine risks
- Technologies exist to mitigate concerns

Contact:
Mike Adam
Office of Superfund Remediation and Technology Innovation
adam.mike@epa.gov