Indoor Air Vapor Intrusion

Dean C. Miller
Davis Graham & Stubbs LLP
Relatively New Issue

• Fifteen years ago, focus was on groundwater with little concern for indoor air.

• In the mid-1990s, elevated indoor-air concentrations were discovered in structures overlying groundwater with relatively low concentrations of volatile organic compounds (VOCs).
Colorado

• Colorado is on the cutting edge in indoor-air issues
• Several of the most prominent indoor-air sites are in Colorado
  – Lowry Air Force Base
  – CDOT Headquarters
  – Redfield Site
  – Hamilton Sundstrand Site
Vapor Intrusion Pathway

• Soil gas enters structures because:
  – the air pressure in the structure is lower than the air pressure in the soil
  – there are pathways for the soil gas to migrate into the structure
    • Cracks, utility penetrations, expansion joints, diffusion
1. Cracks in solid floors
2. Construction joints
3. Cracks in walls
4. Gaps in suspended floors
5. Gaps around service pipes
6. Cavities inside walls
7. The water supply
Factors that Enhance Soil-Vapor Intrusion

- Stack Effect
- Combustion Appliances
- Exhaust Fans
- Unbalanced HVAC Systems
Indoor Air Testing
Summa Canister
Summa Canister

- Placed in lowest-livable area of home for 24 hours
- Sent to lab for analysis
- Very sensitive
Sampling Plan

- Generally start over areas with highest contaminant concentrations in groundwater
- Step-out two homes from any home with actionable indoor-air concentrations
Indoor-Air Mitigation
Sub-Slab Ventilation
Other Mitigation Methods

- Crack sealing
- Over-pressurization
- Air-to-air heat exchanger
VI Liability Concerns

- Prospective/Current/Past Property Owner
- Phase I Environmental Consultant
- Property Lender
- Property Insurer
Current/Prospective Owner Concerns

- NFA properties are being re-opened in NY, CA and NJ because of potential vapor intrusion issues
- Further investigation and expense may be required
- Potential liability arising from tenant suits
- Tenant losses (leaving the property – breaking leases)
- Inability to attract new tenants
- Stigmatized property – devaluation?
- Toxic tort potential
- Regulatory enforcement potential
Past Property Owner Concerns

- Lawsuits by current property owner against past property owner for:
  - non-disclosure
  - misrepresentation
Phase I Consultant Concerns

- Litigation against environmental professionals who did not consider vapor intrusion in their Phase I is growing.

- Vapor intrusion can become an issue created by a source that ordinarily would not be considered a REC under ASTM E 1527 (e.g., source down-gradient of target property).
Lender Concerns

• Adverse impact on property value (collateral)
• Potential negative impact on borrower’s creditworthiness and ability to repay loan
• Foreclosure complications
Insurer Concerns

- “Reopener policy” claims
- “Property pollution liability policy” claims
- E&O claims to defend Phase I consultants
- Toxic tort claims
- Potential “pollution exclusion” litigation
Evolving Indoor Air Action Levels

PCE – >31 μg/m³ triggers mitigation
  15.5 μg/m³ to 31 μg/m³ triggers further study
  <15.5 μg/m³ – Continued monitoring not required

• TCE – >1.6 μg/m³ triggers mitigation
  0.8 μg/m³ to 1.6 μg/m³ triggers further study
  < 0.8 μg/m³ – Continued monitoring not required
Evolving Indoor Air Action Levels

• “No Further Action” determination can be issued if indoor-air TCE levels are below background or within EPA 1X10^-6 proposed range
Guidance for Identifying Indoor Air Contamination

- ASTM Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions
- CDPHE Draft Indoor Air Guidance
- EPA OSWER Draft Guidance for Evaluating the Vapor Intrusion Pathway
ASTM Standard

• Brand New
• Designed to be used in conjunction with ASTM Phase I standard
• Applies to:
  – VOCs (including petroleum compounds)
  – Select semi-VOCs and inorganics (Hg)
VIA Tiered Methodology

• Tiers 1 & 2
  – Identify if p-VIC exists
  – Qualitative and quantitative screening

• Tier 3
  – Toolbox of assessment approaches
  – User directed to agency guidance

• Tier 4
  – General mitigation alternatives
  – Specific methods beyond scope of standard
CDPHE Draft Indoor Air Guidance

• Provides Ground Water Screening Concentrations for Various Chemicals
  – Defaults to MCL for PCE and TCE (5 µg/L)
  – In reality, concentrations of ~ 1000 µg/L PCE in groundwater will result in actionable indoor-air concentrations
  – For TCE, ~ 30-50 µg/L to create VI problem
Potentially Problematic Issues

- Indoor Sources of VOCs
- Access Issues
- Community Relations
- Agency Relations
Indoor Sources of VOCs

• Cleaning Products
• Painting Materials
• Dry Cleaning
• Solvents
• Moth balls
• Nail polish / remover
• Air fresheners
Access Issues

• Some homeowners are very difficult to reach (i.e. long-haul truckers, pilots)
• Some refuse access entirely
• You need a good access agreement
Community Relations

• Get in front if the vapor intrusion issue and stay there
• Consider PR firm
• Provide updates on investigation and remediation to residents
• Be nice – every neighbor is a potential plaintiff
Agency Relations

• Keep agencies informed of the progress of your project

• Are you in RCRA corrective action program or VCUP?
  – Agency involvement very different depending on regulatory program
Indoor Sources

- Indoor sources can be identified by looking at solvent ratios in groundwater and other lines of evidence.
- If indoor air ratios are much different, indoor source may be contributing:
  - i.e. Groundwater PCE/TCE 1.5 : 1
  - Indoor Air PCE/TCE 25 : 1
Indoor Sources

- Sub-slab soil gas has lower concentrations than indoor air
- First floor levels higher than basement
Consultants

- Pick a knowledgeable consultant
- Your indoor air and groundwater consultants may be different
- Always retain the consultant through outside counsel
  - Protect communications to extent possible
  - Generally cannot protect facts
Plume Delineation

• Indoor air solvent concentrations generally are an excellent tool for identifying the extent of the groundwater plume
• It is especially helpful in densely populated areas
  – Avoid “Battleship” syndrome
Hypothetical Site

• Smith v. Jones
• Potential buyer discovers groundwater contamination
• A former drycleaner on your client’s property released PERC (PCE) and caused groundwater contamination
Facts

• The first thing you do is tell your client to call his or her insurance company
• You hire a consultant, who drills several groundwater monitoring wells in the area
• The wells confirm significant groundwater contamination migrating off-site
Facts

• Pre-1980 releases established – in VCUP program
• Water well survey reveals that nobody is drinking the groundwater
• CDPHE says that either you will do indoor-air testing or it will
Facts

• Attorney for owner of six-plex calls and says that three potential buyers have been scared away because of the groundwater contamination

• She says if you don’t buy the property from the owner, we’ll sue for trespass, nuisance, negligence . . . .
What do you do with respect to CDPHE and the neighborhood?
What do you do with respect to the six-plex owner?