

HeplerBroom, LLC

Vapor Intrusion in Missouri, Kansas
and Iowa

Midwest Environmental Compliance
Conference
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Vapor Intrusion

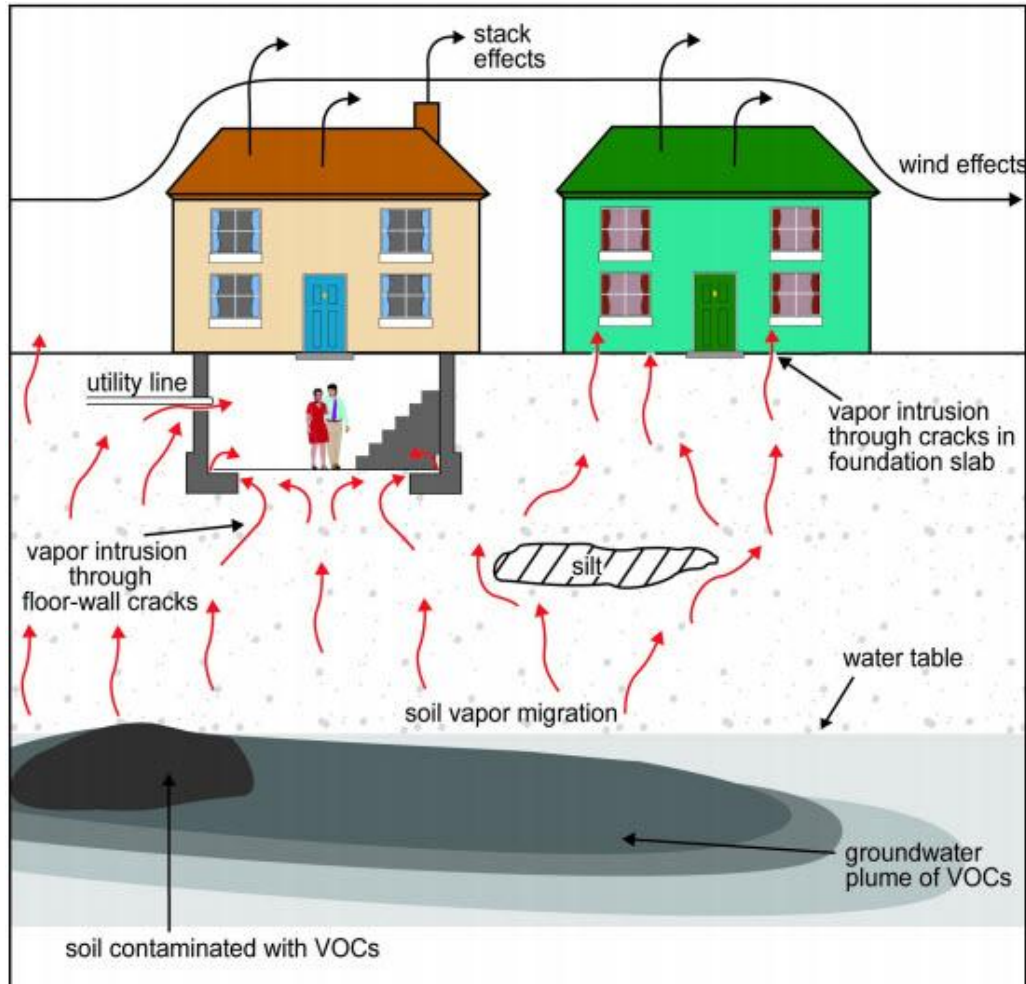
“Vapor intrusion is the general term given to migration of hazardous vapors from any subsurface vapor source, such as contaminated soil or groundwater, through the soil and into an overlying building or structure. These vapors can enter buildings through cracks in basements and foundations, as well as through conduits and other openings in the building envelope. Vapors can also enter structures that are not intended for human occupancy (e.g., sewers, drain lines, access vaults, storage sheds, pump houses) through cracks and other openings.

All types of buildings, regardless of foundation types (e.g., basement, crawl space, slab-on-grade), have openings that render them potentially vulnerable to vapor intrusion...”

OS

OSWER Publication 9200.2-154

Vapor Intrusion



Vapor forming chemicals may include:

- VOCs, e.g., TCE and benzene
- Some semi-volatiles, e.g., naphthalene
- Elemental mercury
- Some PCBs and pesticides

Different state definitions

USEPA Vapor Intrusion Guidance

OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil (November 2002)

Superseded and replaced by:

OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (June 2015) (OSWER Publication 9200.2-154)

- CERCLA, RCRA, Brownfields, or state agencies acting under CERCLA or RCRA authority

and

OSWER Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites (EPA 2015b)

Missouri Vapor Intrusion Guidance

History:

- 2006 MRBCA Guidance and Risk-Based Target Levels (RBTLs)
- **May 2016 and January 2017:** MRBCA Stakeholder Group Meetings
- **May 23-24, 2018 and June 5, 2018:** MDNR issues draft Vapor Intrusion Guidance and revised draft MRBCA Guidance, including revised RBTLs.
- **October 2, 2018:** Deadline for public comment
- **January 22, 2019:** MRBCA Stakeholder Group Meeting

Missouri Draft Vapor Intrusion Guidance

Draft VI Guidance includes **separate provisions** addressing: (1) Volatile petroleum hydrocarbon COC (includes BETX and TPH) and (2) Volatile non-petroleum COC.

- Under the 2006 MRBCA Guidance, approach to VI is very similar for VCP and Tanks Program.
- Draft VI Guidance allows use of separation distances for screening only at petroleum sites

Evaluation of VI uses analytical data from: Groundwater, Soil gas, Sub-slab soil gas, and Indoor air.

- No soil target levels for VI, but soil data is needed for screening at petroleum sites
- Soil gas data generally takes precedence over groundwater data; indoor air data from existing buildings takes precedence over groundwater, exterior soil gas, and sub-slab soil gas data

No reopeners of closed sites, but Superfund/RCRA authority is available in unusual circumstances

Missouri Draft Vapor Intrusion Guidance

Two ways to address VI exceedances

1. Mitigation

- Engineered Controls: vapor barriers, sub-slab depressurization, sub-slab venting
- Institutional Controls: Activity and Use Limitations/Environmental Covenants

2. Remediation

MDNR anticipates an increased use of AULs and Environmental Covenants at sites with VI issues

Missouri Draft Vapor Intrusion Guidance

Draft VI Guidance explains that Environmental Covenants may be required for:

- Mitigation controls at sites with current buildings, such as vapor barriers, sub-slab depressurization, sub-slab venting
- Institutional controls at sites with potential future buildings, such as: (1) vapor barrier/mitigation system for future buildings, (2) additional investigation and re-evaluation of risk prior to construction, or (3) prohibition on construction.
- Combination of approaches for sites with existing buildings and undeveloped areas

Missouri Environmental Covenants Act, RSMo §§ 260.1000-260.1039

Section 15 of MRBCA Guidance

Missouri Draft Vapor Intrusion Guidance

Important Issues:

- RBTLs
- TCE
- Lack of input from stakeholders. Need critical review of guidance, particularly the nuts and bolts of the site assessment process

Next steps:

- Draft final VI Guidance and RBTLs for public comment by mid-May, 2019
- Close of 60 day public comment period in mid-July, 2019
- MDNR response to public comments and finalize RBTLs, MRBCA and VI Guidance
- Publication of Regulatory Impact Report in August, 2019

Kansas Vapor Intrusion Guidance

Kansas Vapor Intrusion Guidance (August 2016):

http://www.kdheks.gov/ber/download/Ks_VI_Guidance.pdf

- Follows USEPA VI and ITRC Guidance
- No current plans to update VI Guidance

Risk Based Standards for Kansas (RSK Manual 5th Edition) (indoor air screening levels for residential scenario)

USEPA Regional Screening Levels (RSLs) or site-specific determinations

Kansas Vapor Intrusion Guidance

Kansas VI Guidance includes screening approaches for **Chlorinated vapor intrusion (CVI)** and **Petroleum vapor intrusion (PVI)**

- Presence of preferential migration pathways
- Vertical and Lateral Separation Distances
- Vapor Intrusion Assessment Report

Sites that do not screen out under the CVI/PVI screening protocols must evaluate potential VI risks. A Conceptual Site Model (CSM) is preferred approach for VI site evaluation

- Groundwater screening
- Near-slab/sub-slab soil gas samples
- Possible indoor air (difficult to interpret without other lines of evidence)

Kansas Vapor Intrusion Guidance

Approaches to prevention of VI:

- Source Control – groundwater contamination, soil gas migration
- Air Quality Mitigation – seal gross openings, vapor barrier, ventilation, sub-slab depressurization systems

Future Use and Risk Management

- Need for institutional controls/restrictive covenants evaluated on a site-by-site basis - factors include COC and geology
- Vapor resistant construction methods
- Mitigation for new buildings
- “Active monitoring” may be an option for closure and is imposed through an institutional control

Iowa Vapor Intrusion Guidance

Leaking Underground Storage Tank Assessment Tier 1 Guidance

- Soil Vapor to Enclosed Space Pathway
- Applies to Actual/Potential Confined Spaces (basements and sewer lines, but not crawl spaces)
- Tier 1 Guidance includes Groundwater limits and Soil Gas Target Levels for the VI pathway for BTEX and diesel

VI evaluation at LUST sites:

- Are there exceedances of Tier 1 levels for groundwater and soil?
- If there is groundwater plume and a Confined Space, use Tier 2 modeling to determine location of soil gas samples
- If results of soil gas sampling are below Tier 1 VI levels, VI pathway excluded
- Indoor air sampling allowed under limited circumstances
- Explosive vapor survey may also be required

Iowa Vapor Intrusion Guidance

LUST Guidance (cont'd)

Model Environmental Covenants

- Restrictions on sewers and basements in affected areas
- Vapor barriers for new construction
- Technological controls, e.g., radon systems
- Building codes/property offsets may be recognized as institutional controls with confirmation from municipality

Iowa DNR preference is for investigation and excavation of contaminated soil

Iowa Vapor Intrusion

Contaminated Sites Program

Addresses vapor intrusion on site-by-site basis

Screening process:

1. Groundwater data for VOCs
2. VISL screening program
3. Iowa risk calculations for Residential, Site Worker, Construction Worker scenarios

If site fails, VI threat must be addressed

Mitigation:

- Planned/future buildings – vapor barrier, passive venting
- Existing buildings – retrofitting with passive mitigation system

Vapor Intrusion Considerations

- What is the applicable state VI program/guidance for your site?
- What are the VI requirements for site investigation and risk assessment?
- What requirements are applicable to current and future buildings on the site?
- What are the VI mitigation options?
- What institutional controls are required in connection with VI mitigation?
- If there are impacted off-site properties, how will VI obligations be addressed?

If the project is in early stages, discuss a strategy for site investigation and evaluation of vapor intrusion issues

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