



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

MO's VI Evaluation Process for Brownfield/VCP Sites

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Navigating the Vapor Intrusion Landscape

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MRBCA 2006: Outdated and Lacking

- Focuses on Soil & Groundwater
 - Soil Vapor and Indoor Air target levels also included
 - Most sites were using soil & groundwater
 - Based on JE Model w/o advection or biodegradation
- Vapor Measurement
 - Soil vapor appendix
 - No guidance for sampling subslab or indoor air
- Tier 2 allows site specific input into JEM
 - Highly sensitive to moisture content and foc

When Your VI Guidance is A Decade Old

It Might As Well Be From 1932



BVCP Current Practice

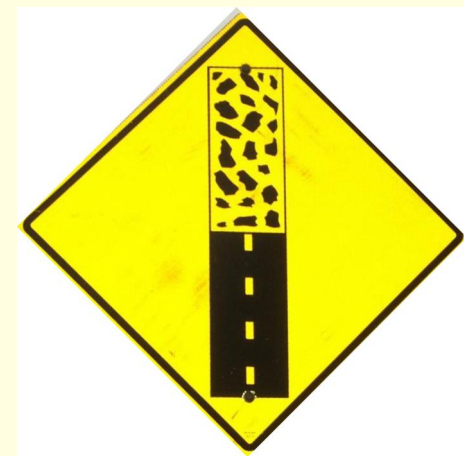
Keeping Up through Informal Policies

- Hierarchy of Vapor Sampling
 - Prefer subslab over soil vapor at depth
 - Often done if subsurface soil conc'n exceeded risk based target levels (RBTLs)
- Indoor air sampled at some sites
- Now using EPA AF's to generate subslab and soil vapor RBTLs from indoor air RBTLs.

Proposed Updates & Changes

- Updating entire MRBCA guidance with stakeholder input.
- Propose replacing mishmash of models and methods in 2006 guidance with EPA RSL methods and models, with very minimal MO tweaks such as risk levels.
- Would generally follow EPA VI Guidances – non-petroleum and possibly petroleum as well.
- Subsurface soil target levels would be eliminated.
- Not final – Stakeholder process ongoing, requires rulemaking after stakeholder input.

Rough Road Ahead?



Challenges to Work Around

1. Site screening (initial Phase II sampling) would require SV sampling
 - Increased time, costs
 - Decision criteria?
2. Evaluating VI risk for future buildings
 - Particularly slab on grade
3. Excavation Verification
4. Water Infiltration Problems in Sand-Packed Vapor Sampling Points in Clay

1. Site Screening

- Typical approach has been soil and groundwater sampling.
- Elimination of subsurface soil RBTLs would require additional effort (soil vapor sampling) to screen sites for VI risk => extra cost, time
- How to decide when to sample soil vapor?
- Multiple sampling events required?
 - time is the enemy for redevelopment

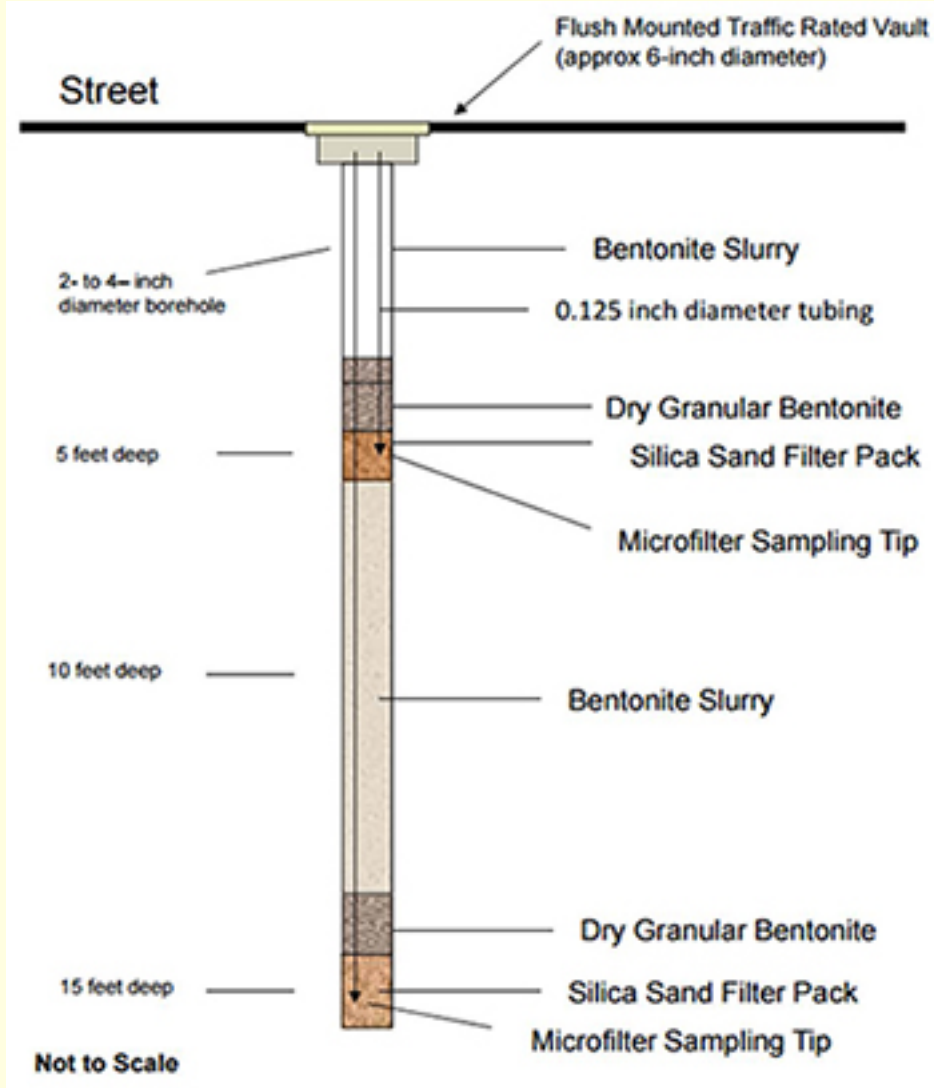
2. Excavation Verification Sampling

- About half of BVCP remediations involve excavation
- For VOCs, where to stop and how to evaluate post remediation conditions?
- Options:
 - Vapor sampling (post-backfill) – How long does it take for residual soil vapors to equilibrate within many ft. of backfill?
 - Deep vapor sampling - may not be indicative.
 - Mitigate anyway (install vapor barrier).

3. Evaluating VI Risk For Future Buildings

- No indoor or subslab vapor to sample
- Soil Vapor is only alternative
- Attenuation Factors for Shallow and Deep Soil are the same
- Atten. Factor is the same for Subslab or Soil Vapor regardless of depth (0.03)
- Generally 3 ft. the upper limit for SV sampling
- Result is overly conservative target level to compare SV results to.

4. Reported Problems with Sand Points in Clay Soils



Reported Problems with Sand Points in Clay Soils

- Reported by various contractors on different sites
- Installed in vadose zone, not saturated
- Sampling goes OK immediately after installation
- Days/weeks/months later, water is extracted and/or sufficient vapor cannot be extracted while staying below vacuum limit
- May be caused by water slowly draining from low transmissivity clay into porous sand pack

Sand Point Saturation: Possible Solutions

- ‘Micropurge’ design with no sand pack.
 - Potential issues with repeatability
- Use sample point once, abandon and replace for future sampling events.
 - Extra cost
 - Equilibration time?
- Sample at shallower depths
 - May not be possible for some sites.
 - Conditions unpredictable



More Information

MRBCA Web Page

- <http://dnr.mo.gov/env/hwp/mrbca.htm>
- Recently renovated
- Links to Tanks and Departmental MRBCA

Dept. MRBCA Stakeholder Group

- Follow the above link to “2016 Revision” page
- Documents, Announcements, Meeting Notes
- Sign up to get email updates or join SH group
- Next Meeting Feb. 3, Jefferson City
- Coordinator Tim Chibnall, HWP
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