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Bureau of Environmental Cleanup & Brownfields

# Draft Vapor Intrusion Guidance Overview

## Cleanup Standards Scientific Advisory Board Meeting
## April 22, 2015

Tom Wolf, Governor

John Quigley, Acting Secretary

# Timeline

- Versions of the conceptual document discussed by Cleanup Standards Scientific Advisory Board (CSSAB) at March, July and December 2014 meetings.
- VI Workgroup addressed CSSAB recommendations between each meeting.
- Regional office staff reviewed the conceptual document and discussed at June and October 2014 meetings.
- Every version of the conceptual document and supporting documentation were reviewed internally at DEP before each CSSAB meeting.

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# 2004 Guidance Limitations

- Confusion with how to handle VI under SSS.
- Indoor air “MSCs” are not really MSCs.
- Screening values too high?
- Confusion addressing future onsite structures.
- Minimal sampling guidance.
- No discussion of PVI.
- Confusion with “background” reference.

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# March 2014 Version

## Simple but Limited

- Did not address future construction
- No soil gas sampling allowed
- No soil screening values
- No figures or flow-charts
- No PVI

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# Screening and Lines of Evidence

- Screening Option
  - Limiting conditions
  - Allowed for groundwater and soil VI screening
  - Petroleum proximity distances
  - Allowed for indoor air, sub-slab soil gas or near-source soil gas screening
- Lines of Evidence (LOE) Option
  - Single lines of evidence
  - Multiple lines of evidence

# Problems with July 2014 Version

- No definitions of important terms
- How to address VI under SSS?
- Attainment language misleading
- Near-source soil gas screening should be single line of evidence
- Format and flow charts were confusing

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# December 2014 Version

- Reorganized for clarity
- Added definitions and uses of key terms
- Consolidated flow charts
- Moved preferential pathways to beginning of process
- Moved proximity distance screen near beginning creating “VI Areas of Potential Concern”

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# December 2014 Version

- Moved near-source soil gas sampling to single line of evidence – eliminated LOE language
- Removed “attainment language” and replaced with “address Ch. 250 Requirements” language
- Added SSS section – separate process and flow chart

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# Draft VI Guidance

## SHS Process

- Identify Preferential Pathways
- Identify VI AOPCs – Proximity Screening
- Identify Limiting Conditions
- Screen Soil and Groundwater Data
- Apply Alternate VI Assessment Options
  - ✓Indoor air, near-source, or sub-slab soil gas screening
  - ✓Modeling
- Address Regulatory Requirements

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# SSS Process

- Same as SHS process except:
  1. Different screening values
  2. Substitute risk assessment for modeling option

# Issues with December 2014 Version

- Preferential pathway discussion needed clarification.
- Are there options other than indoor air sampling if a preferential pathway is identified?
- How to evaluate sample variability without requiring excessive amount of sampling.
- How to add flexibility to SSS screening.
- What constitutes petroleum?
- Is measuring to the PQL reasonable when delineating contamination?
- Other minor issues.

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# Changes from December 2014

- Added Conceptual Site Model (CSM) section
- Expanded the preferential pathway discussion
- Clarified proximity distance language for petroleum
- Emphasized that flow charts are not meant to be used without the text.
- Revised soil gas and indoor air screening methods section – removed variability tests
- Screening values based on $10^{-5}$ risk can be used under certain circumstances.
- Finalized sampling methods appendix

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## Conceptual Site Model

- Central to the VI evaluation.
- Identifies contaminant sources, migration pathways, exposure mechanisms and potential receptors.
- Needed for development of sampling plan and for modeling.
- Sampling locations and number of sampling rounds will be determined by the CSM.

# Draft VI Guidance

## Identify Preferential Pathways

- The definition remains unchanged but use description has been simplified.
- Details added to Section C
  - ✓Emphasis on building size and utility backfill concerns.
  - ✓Detail on separation distances for preferential pathways and how they apply to the area of contamination and building location.
  - ✓Expanded discussion on how preferential pathways can impact the path of a VI evaluation.
  - ✓Clarified previous language.

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# Draft VI Guidance

## Clarifications

### Flow Chart Use

- Flow charts should not be used as the sole guide for performing VI evaluations. Need to use along with text.

### Petroleum Proximity Distances

- Petroleum proximity distances apply to any petroleum substance, not just what is listed on the short list.

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# Draft VI Guidance

## Soil Gas and Indoor Air Screening

- Concern about excessive sampling requirements.
- Also concerned about temporal variability.
- Proposed variability tests were not useful.
- Can use a combination of multiple sample locations and sample rounds to collect the necessary amount of data.

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# Draft VI Guidance

## Flexibility with SSS Screening

- EPA indoor air RSL values converted to at $10^{-5}$ risk level can be used for screening when VI is the only complete exposure pathway.

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# Draft VI Guidance

## Sampling Methods Appendix

- For near source, sub-slab, indoor air, $O_2$
  - Sampling procedures
  - Sampling equipment
  - Analytical methods
  - Standard practices
- QA/QC methods
- Active sub-slab depressurization system testing

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# Current Version of VI Guidance

## Improvements from Previous Versions

- Ability to evaluate VI for future buildings
- Introduction of petroleum proximity distances
- Clear guidance on the use of environmental covenants
- Exterior soil gas sampling not recommended
- Clear guidance on how to evaluate VI under the SSS
- Clearer language on application of OSHA programs
- Appendices explaining screening value development, modeling requirements and sampling guidance
- Improved figures showing points of application for screening values

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# Draft VI Guidance

## Further Revisions

- Thresholds for defining contamination are currently the PQLs.
- Need to find justifiable alternative values so remediators can:
  - Determine source depths
  - Evaluate preferential pathways
- Solution should not be overly complicated or too prescriptive.
- Trying to avoid creating a table of threshold values.
- VI Workgroup evaluated multiple options.


# Thanks to VI Workgroup

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