NJDEP VAPOR INTRUSION GUIDANCE:
DECISION FRAMEWORK

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Stages of VI Pathway Assessment

Preliminary Assessment & Site Investigation

Stage 1 Assess potential for Vapor Intrusion

Stage 2 Rapid Action Determination

Stage 3 Evaluate Existing Data Against Generic Screening Levels

Remedial Investigation

Stage 4 Develop & Implement VI Investigation Work Plan:

4A. Delineate GW contamination

4B. Investigate soil gas

4C. Conduct sub-slab and indoor air sampling

Stage 5 Evaluate RI Data Using Generic Screening Levels

Stages of VI Pathway Assessment

Remedial Investigation (continued)

Stage 6 Prepare and Implement Site-Specific Investigative Approach

Stage 7 Evaluate Data using Generic Screening or Site-Specific Screening Levels

Remediation & Monitoring

Stage 8 Determine Appropriate Remedial Action

Stage 9 Implement Remedial Action, including Institutional and Engineering Controls

Stage 10 Establish a Long-Term Monitoring Program

Stage 11 Assess Ability to Terminate Remedial Action

Decision Flow Chart for Vapor Intrusion Pathway

Preliminary Assessment and Site Investigation (PA / SI)

Stage 1
Initial Assessment for Vapor Intrusion

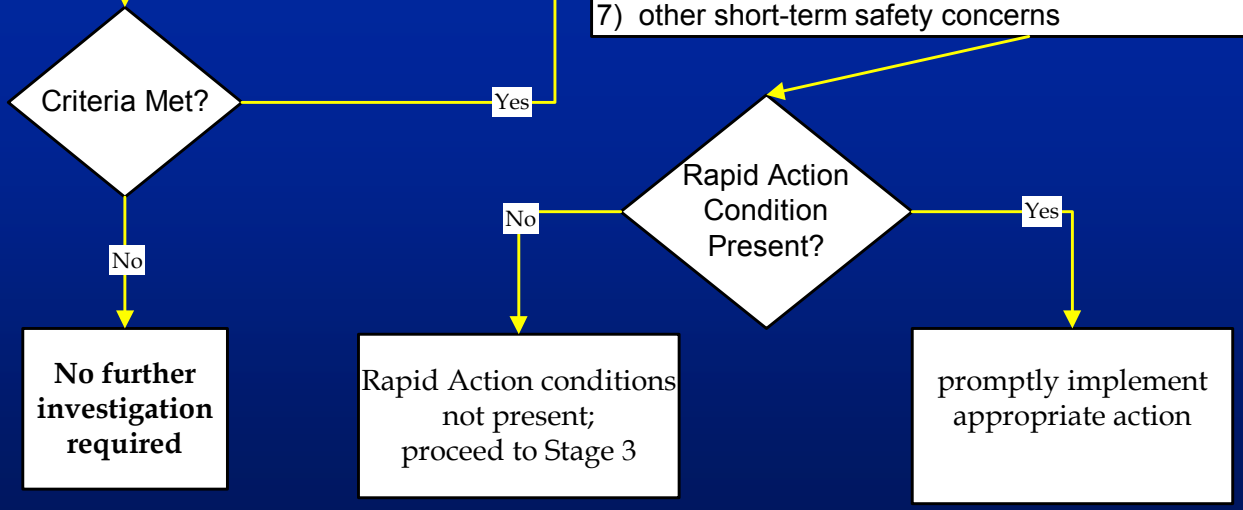
Criteria Required for Vapor Intrusion Investigation:

1) Contaminants of concern present (primarily volatiles);
2) Potential pathway exists; and,
3) Receptors near vapor source (current or future).

Stage 2
Rapid Action Determination

Primary conditions requiring rapid action:

1) Indoor air exceedance of Rapid Action Levels
2) known spill in structure
3) odors reported in structure
4) physiological effects reported
5) wet basement (or sump) with free product or contaminated GW
6) free product on wt under/immediately adjacent to structure
7) other short-term safety concerns



Rapid Action Determination

Qualitative Criteria

- Known spill in a structure (e.g., heating oil tanks)
- Physiological effects reported by occupants (with a known or suspected source nearby)
- Wet basement or sump with contaminated GW nearby
- Odors reported in a structure (with a known or suspected source nearby)
- Free product at the water table under or immediately adjacent to a structure
- Other short-term safety concerns.

Rapid Action Determination

Quantitative Criteria

Rapid Action Levels (RAL)

- trigger levels for the initiation of prompt action, whether further investigation or implementation of an Interim Remedial Measure

Decision Flow Chart for Vapor Intrusion Pathway

PA / SI

Stage 3
Compare Existing Data to Generic Screening Levels

Compare Existing Data to:

1) NJDEP Ground Water Screening Levels;
2) NJDEP Soil Gas Screening Levels; and/or,
3) NJDEP Indoor Air Screening Levels.

If no existing data, proceed to Stage 4.

Remedial Investigation (RI)

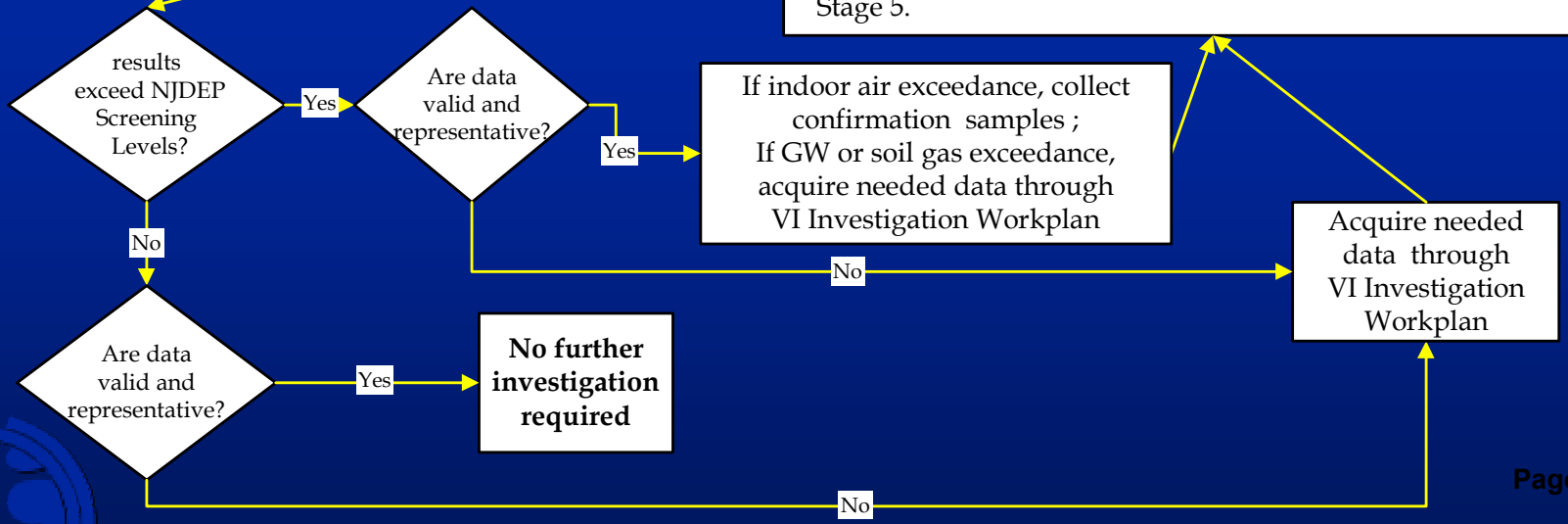
Stage 4
Develop & Implement VI Investigation Workplan

In order of preference:

Stage 4A - Ground Water (GW) Investigation
Delineate ground water contamination; then go to Stage 5

Stage 4B - Soil Gas Investigation
Assess near slab and/or sub-slab soil gas (for existing structures) or exterior soil gas (for future use); then go to Stage 5

Stage 4C - Indoor Air Investigation
Conduct sub-slab soil gas and indoor air sampling; then go to Stage 5.

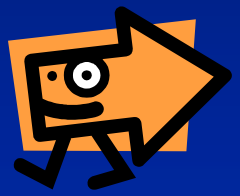
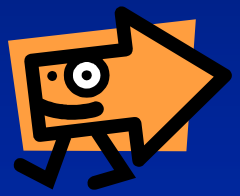


Comparing Existing Data With Generic Screening Levels (Stage 3)

Distance Criteria Using GWSL

- Investigate structures within 100 feet of shallow GW contamination in excess of GWSL
- 30-foot distance criterion utilized for petroleum-related GW contamination (including **MTBE**)
- use the 100-foot distance criterion for free product
- consider future land use even if buildings not present

General VI Investigative Procedures (Stage 4)

Ground Water  Soil Gas  Indoor Air

- Refer to the Decision Flow Chart for initial decision points
- Periodically update the CSM
- Consider preferential pathways when designing an investigative approach
- Additional reporting requirements for VI pathway

Preferential Pathways

"…a natural (e.g., shallow rock or vertically fractured soil) or manmade (e.g., buried utilities) feature that creates a sufficiently direct pathway from a source to a receptor to make the use of the default model for predicting indoor air concentrations unacceptable." Pennsylvania DEP

Technical Issues

- all VI investigations must assess the presence of preferential pathways.
- RP may be required to canvass the immediate area, locate all subsurface utilities and basements, and determine the presence/ absence of organic vapors in accordance with TRSR 7:26E-4.4(h)3.viii.
- The exact locations of all subsurface utilities and basements should be plotted on a scaled site map.

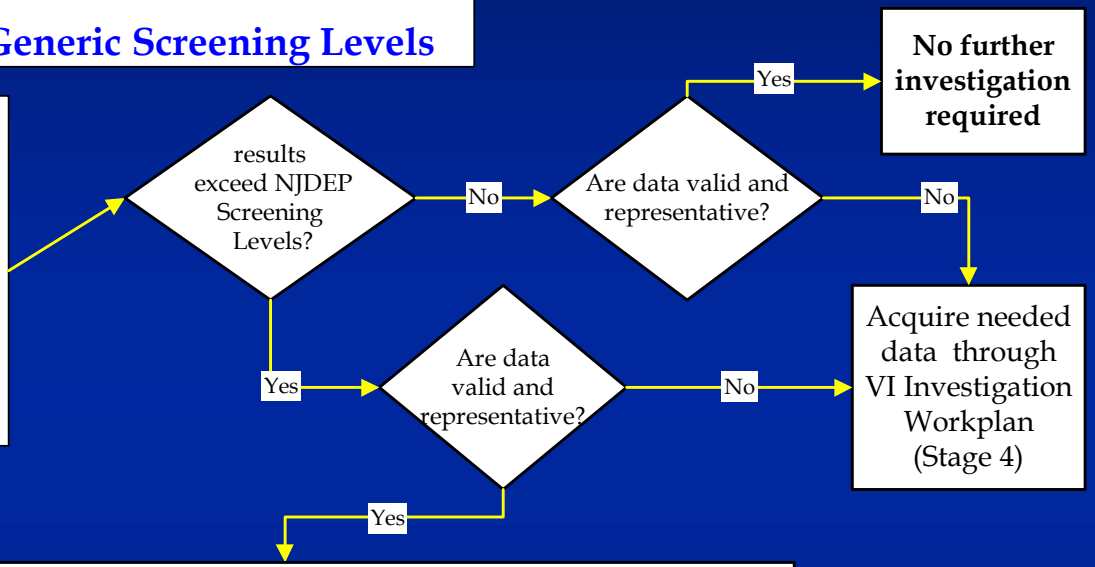
Decision Flow Chart for Vapor Intrusion Pathway

Remedial Investigation (RI)

Stage 5
Evaluate RI Data using NJDEP Generic Screening Levels

Compare RI Data to:

1) NJDEP Ground Water Screening Levels;
2) NJDEP Soil Gas Screening Levels;
3) NJDEP Indoor Air Screening Levels; and/or,
4) or site-specific screening levels developed consistent with Chapter 5



Appropriate Action Based on Type of Data:

GW data - proceed to Stage 4B and continue GW delineation (if necessary)
near slab soil gas data - Proceed to Stage 4C
exterior soil gas data (for future use) - proceed to Stage 8 (Remedial Action)
sub-slab soil gas data (w/o indoor air data) - proceed to Stage 4C
indoor air data - collect confirmation indoor air & sub-slab soil gas samples
confirming indoor air data - proceed to Stage 8

The option to conduct a site-specific evaluation (Stages 6 & 7) is also available - see Chapter 5 for more information.

Data Valid and Representative?

- Was the sampling plan properly designed, approved by NJDEP, and accurately implemented?
- Were the samples properly collected?
- Is the investigator confident that the sampling equipment was not moved or otherwise tampered with?
- Were the samples validated (QA/QC) and determined to be acceptable?
- Was consideration given to potential background contamination?
- Were any other issues that might impact on the data's usability addressed appropriately?

Site-Specific Investigative Approach (Stages 6 and 7)

- Utilization of alternative soil gas sampling procedures (flux chambers, continuous monitoring, vertical depth profiling)
- Assessment of biodegradation for petroleum hydrocarbons (oxygen levels in subsurface soils, depth to ground water table)
- Development of alternate attenuation factors (with sub-slab or near slab soil gas)
- Implementation of other appropriate site-specific screening options.

Remediation and Monitoring

Stage 8 Determine Appropriate Remedial Action **(RASR & RAW)**

Stage 9 Implement Remedial Action, including Institutional and Engineering Controls **(RA Report)**

Stage 10 Establish a Long-Term Monitoring Program **(O & M)**

Stage 11 Assess Ability to Terminate Remedial Action **(Closure)**

Future Training Opportunities

Vapor Intrusion Seminar

November 30, 9 am - 4 pm, NJDEP Public Hearing Room

This seminar will present an overview to the NJDEP's Vapor Intrusion Guidance document with an emphasis on sampling plan development and implementation, data interpretation, and case studies, primarily dealing with **soil gas sampling**.

Special guest speaker - **Dr. Blayne Hartman** of H&P Mobile GeoChemistry (San Diego, CA)

Register with Karen.Frascella@dep.state.nj.us