



Licensed Site Remediation Professionals Association

Vapor Intrusion Guidance

January 30, 2013

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### Websites to Visit Often



<http://www.state.nj.us/dep/srp>

<http://www.LSRPA.org>

<http://www.nj.gov/lspbboard>

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## LSRP Continuing Education Requirements



36 Continuing Education Credits (CECs) over 3 year LSRP license renewal period:

Minimum no. of CECs must be satisfied in these categories:

- 3 CECs Ethics
- 10 CECs Regulatory
- 14 CECs Technical
- +9 CECs Discretionary

Board can require "CORE" courses

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## Continuing Ed Credits (CECs)



- One CEC is equivalent to 1 hour of instruction from university, college, DEP, LSRPA & other professional organizations
- Conferences Conventions Workshops 1hr = ½CEC
  - Up to 8 CECs allowed within 3 year renewal cycle
  - Changes to this policy are up to discretion of LSRP Board
- Webinar and On-Line Courses: CEC is 1:1 but exam is required
- CECs available for presentations, publications but not 1:1 credit

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## A Look Ahead for Continuing Ed in 2013



- **LSRPA Breakfast Roundtable**
  - February 26<sup>th</sup> 7:30 -10 am
  - Register on [LSRPA.org](http://LSRPA.org) (members only)
- Continue LSRP exam preparation courses (May 7<sup>th</sup>)
- Additional Business Practice Seminars (Quarterly)
- Continue Assistance with Guidance Training
- Assist DEP w/ Practical Applications Course
- Ethics (modified)
- GIS Training
- Laboratory Analytical Process
- Technical Courses from NGWA, Battelle & Others

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Thank you for your support!

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## Basis for the Updated Vapor Intrusion Screening Levels (VISL)

January 2013

Diane Groth  
diane.groth@dep.state.nj.us  
609-984-9782



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## Updates to the VISL Tables

- Values are based on the USEPA Regional Screening Levels (RSL) Table (November 2012)
- Naphthalene and 2-methylnaphthalene added to tables
- Rapid Action Levels (Residential and Nonresidential) developed for all Table 1 contaminants
- Five contaminants eliminated due to the absence of toxicity information (2-chlorotoluene, 1,3-dichlorobenzene, 1,2-dichloroethene (cis), 1,2-dichloroethene (total) and tertiary butyl alcohol)
- Air values are in  $\mu\text{g}/\text{m}^3$  units only



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## Calculation of the Health-Based Indoor Air Values

- Risk-based equations consistent with USEPA Risk Assessment Guidance for Superfund (RAGS) Part F
- Nonresidential equations include an exposure time (ET) of 8 hours/24 hours (day)
- Mutagenic mode of action/early lifetime exposure cancer effect equations used for 3 chemicals: methylene chloride, trichloroethene and vinyl chloride
- Toxicity factor changes for 23 contaminants (8 more stringent than previous toxicity factors)




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## Air Analytical Reporting Limits

Indoor air and soil gas screening levels represent the higher of the health-based value and the analytical reporting limit

- Naphthalene and 2-methylnaphthalene reporting limits are based on USEPA Method TO-17
- Elemental Mercury reporting limit is based on NIOSH 6009
- Remaining screening levels reporting limits continue to be based on USEPA Method TO-15




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## Vapor Intrusion Screening Levels

- Indoor Air Screening Levels*
- Rapid Action Levels for Indoor Air*
- Soil Gas Screening Levels*
- Ground Water Screening Levels*




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## Indoor Air Screening Levels (IASL)

### Residential

- Most of the values are the same or higher
- 8 values are lower with 2 by an order of magnitude or greater (1,1-dichloroethane and ethylbenzene)

### Nonresidential

- Most of the screening levels are same or higher
- 3 screening levels are lower with 2 by an order of magnitude or greater (1,1-dichloroethane and ethylbenzene)




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## Rapid Action Levels (RAL) for Indoor Air

Health-based levels represent the lower of 100X cancer health-based IASL and 2X noncancer health-based IASL

- 3 chemicals have RAL based on the higher analytical reporting limit:
  - 1,2 dibromoethane,
  - Elemental mercury
  - 1,1,2-trichloroethane
- 3 RAL have decreased from previous values with 1 (ethylbenzene) by greater than an order of magnitude




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## Soil Gas Screening Levels (SGSL)

Values calculated using the health-based indoor air screening values and an attenuation factor of 0.02 (or 50X health-based IASL)

### Residential

- Most of the values are the same or higher
- 8 values are lower with 3 by an order of magnitude or greater (1,1-dichloroethane, ethylbenzene and 1,2,4-trichlorobenzene)

### Nonresidential

- Most of the screening levels are same or higher
- 3 screening levels are lower with 2 by an order of magnitude or greater (1,1-dichloroethane and ethylbenzene)




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### Ground Water Screening Levels (GWSL)

GWSL based on higher of the Johnson & Ettinger (J&E) model calculated value or the NJ GWQS

- Incorporate USEPA RSL table updates (toxicity factors and chemical properties)
- Adjustment factors applied to mutagenic mode of action/early lifetime exposure contaminant calculations for methylene chloride, trichloroethene and vinyl chloride




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### Ground Water Screening Levels (continued)

- Biodegradation factor of 10 now included for Table 1 hydrocarbons (including 1,3-butadiene, cyclohexane, n-hexane, 2-methylnaphthalene, naphthalene and styrene)
- Most of the values are the same or higher
- 8 values are lower with 3 by an order of magnitude or greater (1,1-dichloroethane, ethyl benzene and 1,2,4-trichlorobenzene)




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### Application of the VISL

- VISL used as outlined in the NJDEP VIT (Version 3) Guidance (Sections 2.2, 4.3, 4.5 and 6.4.1)
- Residential screening levels are applicable to residential properties, child care centers and schools
- Nonresidential screening levels are applicable to commercial/industrial sites that are not currently handling/using the subsurface contaminants of concern
- Facilities using the same chemicals consider the applicability of OSHA and the nonresidential screening levels




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### VISL Site-Specific Options

Use of Table 3- GWSL for Alternate Soil Textures

Development of alternative screening levels

- USEPA IRIS chemical toxicity factor or risk assessment methodology changes not yet included in the tables
- Site-specific factors
- Modeling
- Contacting the Department prior to the use of alternative VISL is recommended




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### VISL Site-Specific Options (continued)

- Contact the Department for the development of screening levels for those VI contaminants of concern not currently on the table
- NJDEP VI contacts: Diane Groth and Dr. Paul Sanders  
<http://www.nj.gov/dep/srp/guidance/vaporintrusion/>
- Information on NJDEP *Alternative Soil Remediation Standard and/or Screening Level Application Form*  
<http://www.nj.gov/dep/srp/srra/forms/>




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### NJDEP VI Screening Levels

#### NJDEP Vapor Intrusion Web Site

Contains links to information on the basis of the VISL, including:

- Table 1 –Master Table with the Generic VI Screening Levels
- Table 2 –Rapid Action Levels for Indoor Air
- Table 3- Ground Water Screening Levels for Alternate Soil Textures
- VISL Comparison Table
- Update to the VISL document (including derivation Tables A-1 to A-5)




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## Questions?

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## Implementation Strategy for Revised Vapor Intrusion Screening Levels

Andrew Sites  
Manager of Immediate Concern Unit  
[andrew.sites@dep.state.nj.us](mailto:andrew.sites@dep.state.nj.us)  
(609) 530-2582  
January 30, 2013



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## VISL: Overview of Changes

- New VISL implemented 1/16/2013
- Expanded list of Residential RALs
- Non-Residential RALs were added
- Some VISL increased while others decreased
- VISL comparison table



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### Impact of the VISL Changes

- All cases, including closed cases, need to be evaluated using the VISL Implementation Strategy
- Additional vapor intrusion investigation may be required
- Status of IEC/VC cases may change




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### VISL Implementation Strategy Committee

VISL Implementation Strategy -developed by a Committee of NJDEP representatives & LSRPs from the Steering Committee:

Committee Members:

- Richard Katz: Pennerjsey Environmental Consulting
- Kathi Stetser: Roux Associates Inc.
- Julian Davies: Sovereign Consulting Inc.
- Barry Frasco: NJDEP
- Len Romino: NJDEP
- John Boyer: NJDEP
- Andrew Sites: NJDEP




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### Implementation Strategy Basics

- Evaluate all cases, including closed cases, using the VISL Implementation Strategy
- VISL include screening levels for groundwater, soil gas, indoor air and RALs: both residential and non-residential
- Follow existing Technical Rules and Guidance
- No new forms or rules




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### Implementation Strategy Basics

- A Flow Chart is used to present the Implementation Strategy
- FRD – Final Remediation Document; includes both NFAs and RAOs
- “Order of Magnitude Change” - new VISL is 10 times or more lower in concentration compared to March 2007 VISL
- If order of magnitude change -implement new VISLs & follow Tech Rules and Guidance (N.J.S.A. 58:10B)




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### Contaminants with an Order of Magnitude Reduction

- **1,1 Dichloroethane:**
  - GWSL, SGSL (Res. and non-Res.), IASL (Res. & non-Res)
- **Ethylbenzene:**
  - GWSL, SGSL (Res. and non-Res), IASL (Res. & non-Res), RAL (Res.)
- **1,2,4 Trichlorobenzene:**
  - GWSL, SGSL (Res.)




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### Delayed Implementation

- Naphthalene & 2-Methylnaphthalene were added to the VISL
- DEP will not require collection and analysis of Naphthalene & 2-Methylnaphthalene for the next 6 months (until July 16, 2013)
- 6 month delay will allow time for labs to obtain certification for USEPA Method TO-17
- VI samples to investigate kerosene, jet fuel, No. 2 fuel oil spills and all other heavier (long chain) petroleum fractions shall be analyzed for naphthalene & 2-methylnaphthalene [7:26E-2.2(a)]




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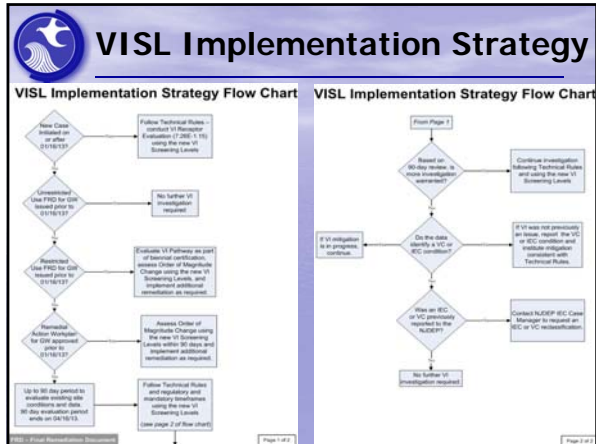
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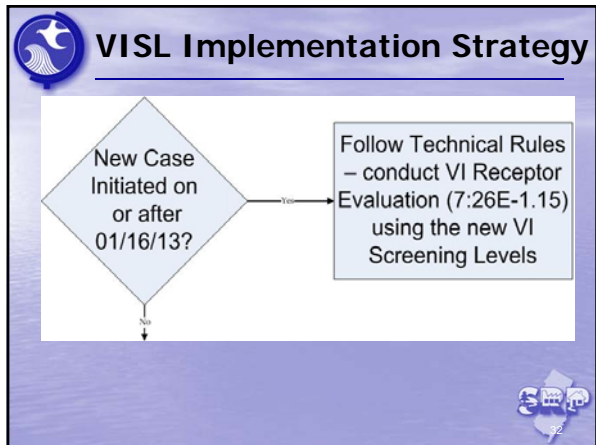
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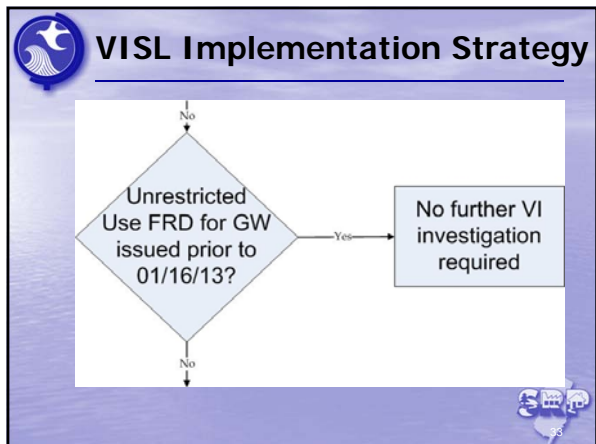
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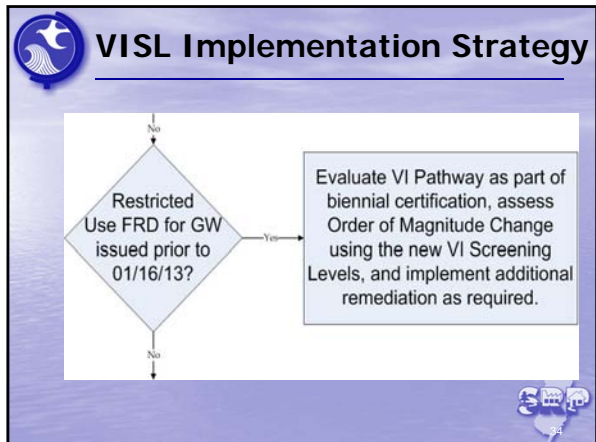
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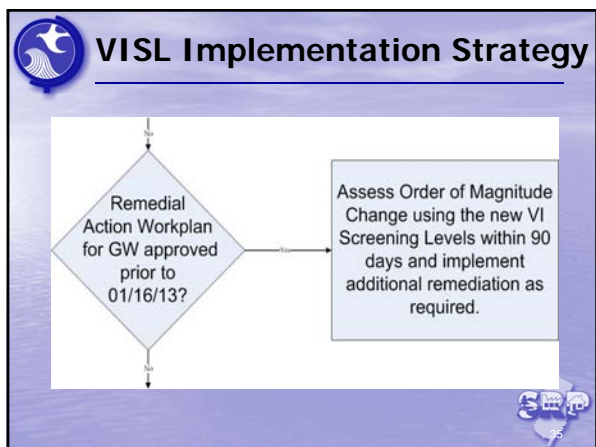
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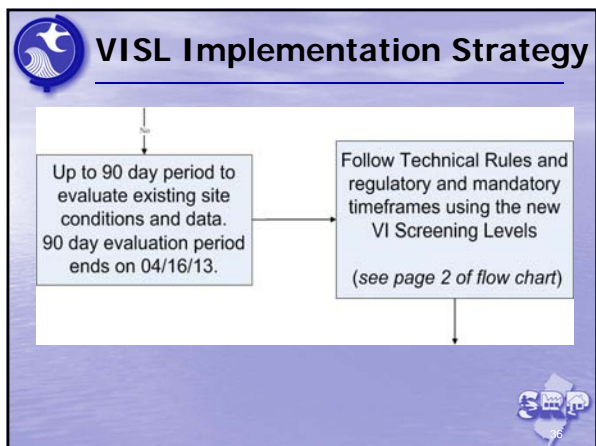
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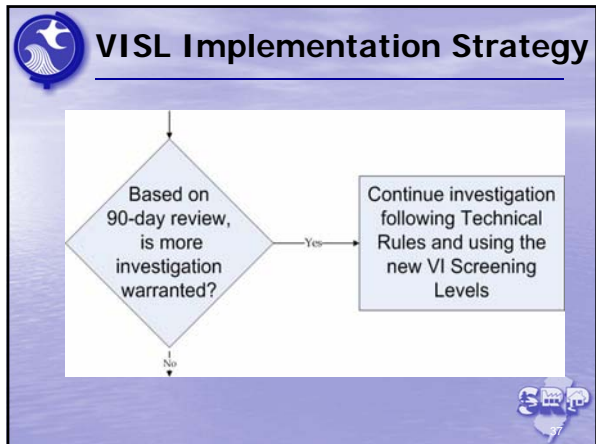
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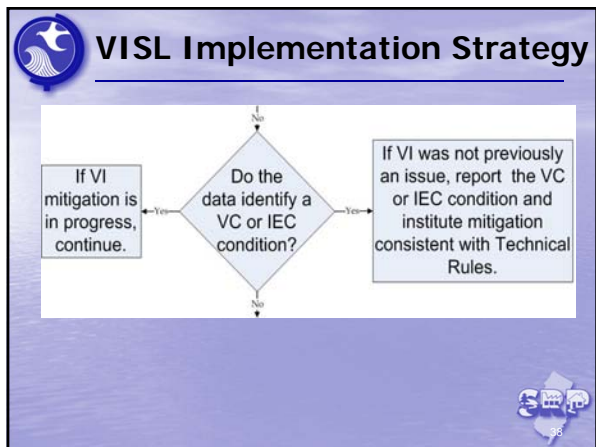
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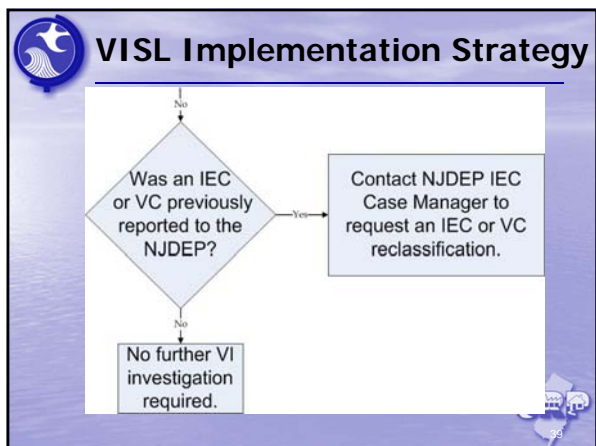
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### Increasing VISL

- VISL are increasing for some chemicals
- Non-Residential RALs were added
- Example: Tetrachloroethene (PCE) at a non-residential location

		Soil Gas	Indoor Air	RAL
Old	SL	36	3	30
New	SL	2,400	47	360




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### Reclassifying an IEC or VC

- Cases can be reclassified based on new VISL
- Heating season data needs to be used for determination (Nov 1<sup>st</sup> thru March 31<sup>st</sup>)
- Residential RALs will be used for schools and childcare centers
- Sub slab soil gas > SGSL:
  - Long Term Monitoring still applies (see VIT Guidance, section 6.1.1.5)




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### Reclassification Process

- Contact the Immediate Concern Unit (ICU) case manager
- Provide an updated IEC/VC spreadsheet
- Submit an email to case manager specifying
  - The change being requested
  - The justification for the change
- Notify impacted receptor




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## Confirmation of IEC/VC Change ?

- Check Data Miner
- A new Task description will be added in the Activity Tracking Report for the OSA activity: Examples
  - IEC Designation Removed Due to Standards Change
  - IEC Reclassified as VC Due to Standards Change
- IEC/VC oversight component complete?
  - IEC Oversight Complete, w/ completed date

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IP-CRPA report base page - Windows Internet Explorer

http://datamini2.state.nj.us/IEP\_CRPA/CPraMan/get\_long\_report?

View Favorites Tools Help

IP-CRPA report base page

**Activity Tracking Report**  
01/25/2013 11:04 AM

SCHOLLER BROTHERS INCORPORATED

PI Number: 015422

OSA130001

Activity Class Description	SRP Oversight
Activity Type Description	IEC-SRP

Assigned To	Description	Completed Date
SRP CLEARING HOUSE LSRP	IEC Identified	11/1/2012
SITES, ANDREW	Received by ICU	11/12/2012
SITES, ANDREW	IEC 14-Day Information Submittal and Interim Response Action Received	11/13/2012
MACGREGOR, STEVE	IEC 120-Day Report Received/Engineered System	1/18/2013
MACGREGOR, STEVE	IEC 120-day Report Complete	1/23/2013
MACGREGOR, STEVE	IEC Reclassified as VC Due to Standards Change	1/24/2013
MACGREGOR, STEVE	IEC Oversight Completed	1/25/2013
MACGREGOR, STEVE	VC Oversight Completed	1/25/2013

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## Summary

- VISL implementation date 1/16/2013
- Strategy applies to all cases
- Follow flow chart
- 90 day evaluation period ends 4/16/2013
- Follow existing Tech Rules and Regulatory & Mandatory timeframes
- Use technical guidance
- IEC/VC cases can be reclassified

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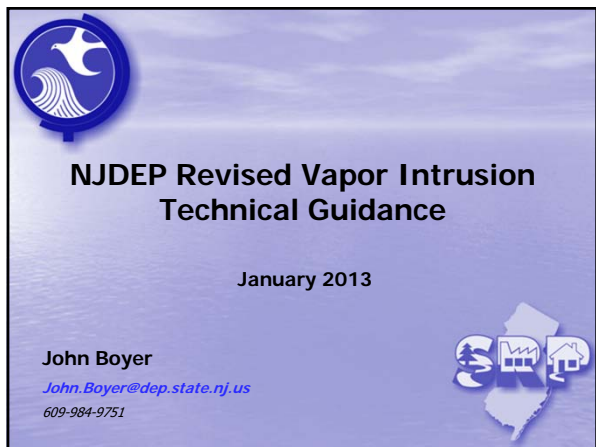
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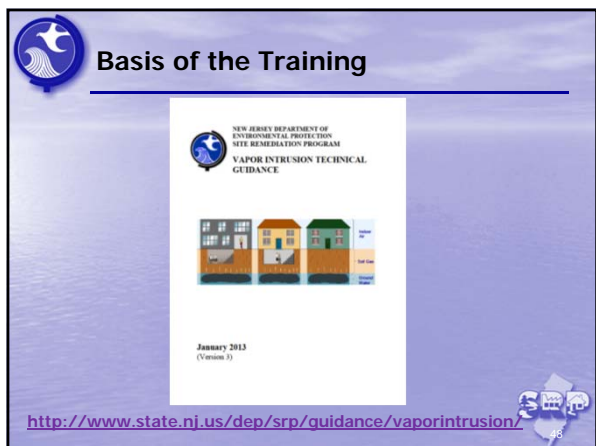
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 **NJDEP/Stakeholders VI Guidance Committee**

Members:

- Buddy Bealer, Shell
- Ken Bird, Cummings Riter
- Brian Blum, Langan
- John Boyer, NJDEP (Chair)
- Michael Draikiwicz, Novartis
- Scott Drew, Geosyntec
- Diane Groth, NJDEP
- Peter Sorge, JM Sorge
- Chad Van Sciver, NJDEP


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 **GW Trigger to VI Receptor Evaluation**

- GW may be resampled to confirm the presence of contamination provided the initial results do not exceed three times (3X) the GWSL.
- Two confirmation samples should be collected from the same monitoring well using similar purging & sampling techniques, evenly spaced temporally within 60 days of the initial sampling event.
- Average the results.
- Consistent with NJDEP Attainment/Compliance Technical Guidance.



VIT Guidance Section 2.1




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 **Modification to Trigger Distances**

Dissolved petroleum hydrocarbons	<b>30 feet</b>
All other dissolved compounds	<b>100 feet</b>
 Petroleum-based free product	<b>30 feet</b>
All other free product	<b>100 feet</b>



The critical distance criteria are now referred to as trigger distances

VIT Guidance Section 2.4.3




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## Landfill Trigger to VI Receptor Evaluation

- A landfill located on or adjacent to the site is no longer a trigger for a VI receptor evaluation.
- Methane generating conditions that may cause an oxygen deficient environment or explosion is still a trigger for a VI receptor evaluation.
- Once a receptor evaluation is triggered, a landfill located on or adjacent to the site must be identified and a determination of methane generating conditions be made [7:26E-1.5(b)4].



VIT Guidance  
Section 3.1.4




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## Sampling & Analysis Issues



- The initial round of VI samples shall be analyzed for the full compound list, plus TICs [7:26E-2.1(c)3]
- VI samples include indoor air, ambient air and sub-slab soil gas [7:26E-2.1(c)3]
- Full laboratory data deliverables shall be submitted for all VI sample (IA, SG & AA) analyses [7:26E-2.1(a)15]
- Quality Assurance Project Plan (QAPP) required for all sample and data collection [7:26E-2.2(a)]




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## Canister Pressure Issues

- Verify the vacuum in the stainless steel canister before and after the sample collection.
- Compare the canister's initial vacuum at the site (prior to collecting a sample) with the lab's reading. If the initial vacuum at the site is in excess of 10% lower than the lab reading, the canister should not be utilized for sampling.
- The potential for pressure loss during transit negates the data usability from the defective canister or regulator.
- It is not necessary to maintain residual vacuum in the canisters for soil gas samples.

VIT Guidance  
Section 3.3.1.9




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### Timeframe for Analytical Data & Result Submittals

Actions	No Exceedance*	Vapor Concern	Immediate Environmental Concern
Submittal of full laboratory data deliverables and form to the NJDEP with appropriate maps & figures	30 days	14 days	14 days
Submittal of result letters & summary tables to owner/ occupants, local health department & NJDEP	30 days	14 days	14 days
Submittal of IA & ambient air results on CD to NJDOH with appropriate maps & figures	14 days	14 days	14 days

\* No exceedance of an IA sample OR results of soil gas samples only (no IA samples)




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### NJDOH Data Submittals


As required in the Technical Rules [N.J.A.C. 7:26E-1.15(h)], the following items shall be submitted to the NJDOH in Adobe Portable Document Format (pdf):

- All indoor and ambient air results
- All maps and figures related to the indoor air sampling
- A sample location spreadsheet

Submittals should be transmitted electronically to [LSRPIA\\_Submission@doh.state.nj.us](mailto:LSRPIA_Submission@doh.state.nj.us).

Any questions can be directed to the NJDOH Standard Setting and Risk Assessment Project at (609) 826-4920. Please do NOT mail hardcopies of any data to NJDOH.

VIT Guidance Section 2.4.2




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### Access for Sampling/Mitigation

- File a legal action to obtain access to private properties if access is not granted voluntarily (N.J.S.A. 58:10B-16), regardless of the building's use (e.g., residential, commercial, retail, industrial).
- Legal action is not necessary if owner permits near slab SG samples instead of sub-slab SG samples (exterior SG samples are not an acceptable alternative).
- Pursue court ordered access of a property to perform the mitigation when the general public or tenants may access the building. Otherwise, the decision to mitigate is left to property owner.



VIT Guidance Section 2.4




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 **Modification to Gasoline Exclusion Criteria**

- Specific exclusion criteria have been developed for gasoline discharges only where the benzene concentration exceeds the Department's GWSL.
- Exceedances of the Department's GWSL by other PHCs does not have to be evaluated under this alternative approach provided the benzene exceedance exists.
- If benzene does NOT exceed the Department's GWSL, the gasoline exclusion criteria can NOT be utilized and any exceedances by other PHCs shall follow the provisions of the Technical Rules.



VIT Guidance  
Section 5.4.1




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 **Step-Out Investigations**

- A "step-out" investigation required when a VC [7:26E-1.15(e)6] or IEC [7:26E-1.11(a)6] condition is identified.
- VI investigation shall be completed (including sampling) for all buildings within 100 feet of the impacted building irrespective of the COCs involved. The trigger distance criteria shall not be used during "step-out" investigations.
- The timeframe for completing the "step-out" investigation is 60 days for an IEC condition and 150 days for VC conditions.



VIT Guidance  
Section 2.4.2




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 **Mitigation Based on SG Results**

- The *Mitigation Decision Matrix* (Appendix A) recommends mitigation or long-term monitoring at a building where IA results do not exceed IASL, but the SSSG results are greater than 10X the applicable SGSL.
- This situation is technically not a VC or an IEC condition.
- However, follow the reporting and monitoring provisions enumerated for a VC concern.
- For long-term monitoring, the provisions of Section 6.5.2 should be followed.

VIT Guidance  
Section 6.1.1.5




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## Assessing Post-Mitigation VS Impact from Operational Activities

Consult Immediate Concern Unit (ICU) case manager when VS results exceed IASLs after mitigation with suspected background contamination or operational activities:

1. Have all IEC/VC actions and forms been completed and submitted, including an acceptable IEC Source Control Report?
2. Has a subsurface depressurization system been installed properly, tested & post-commission adjustments been made to optimize performance?
3. Has post-installation monitoring shown a minimum negative sub-slab pressure of 0.004 inches of water across the entire impacted area?
4. Does the CM support the assumption that the active establishment (i.e., dry cleaner) is the source of the IASL exceedances?
5. Has it been confirmed the contaminated subsurface air is being properly vented and is not short-circuiting to the building's air circulation system?

Field inspection will be conducted by the NJDEP ICU case manager.

VIT Guidance Section 6.4.4




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## OSHA Applicability

2 buildings on same site

**VISL Applicable**

Office

PCE - 450 µg/m<sup>3</sup>

**OSHA Applicable**

Warehouse (uses PCE)

PCE - 7,500 µg/m<sup>3</sup>

PCE - 25,000 µg/m<sup>3</sup>

PCE - 1,000 ppb


**Office**

- Occupants not covered by OSHA
- VISLs are applicable
- IA PCE > RAL
- Building is an IEC

**Warehouse**

- PCE utilized in building
- OSHA PELs are applicable
- Future use must be addressed

VIT Guidance Section 2.2.3




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## Questions?


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