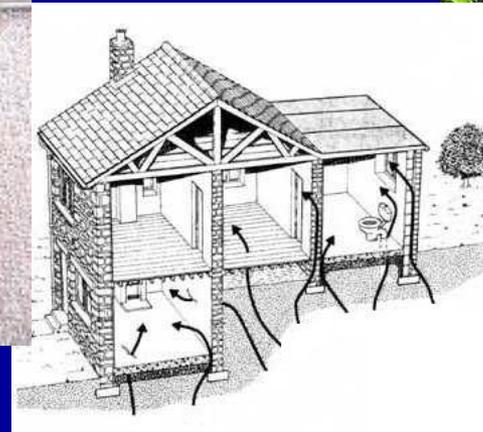

Draft Vapor Intrusion Guidance Document Rollout

Matthew Williams, VI Sampling Specialist, MDEQ
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Welcome!

What we will cover:

- History
- Changes
- Structure
- Highlights
- Discuss the rollout process



Development of the Guidance

Op Memo 4 – Attachment 4

- 2006 – Internal workgroup
- 2008 – External peer review
 - Public rollout and comment period
 - *Over 100 firms requested copies*
 - *90 day comment period*
 - *10 responses*

Issues Identified in 2008

- Biodegradation of petroleum hydrocarbons
- Number of samples
 - frequency
 - duration
- Methods and questions about sampling
- Time it takes to make decisions
- Wanted more information

Addressing the Issues

- Sought stakeholder involvement
 - *Learned from their experiences*
 - *Wanted soil gas*
- State funded sites
- Science
- Guidance vs. requirements



Stakeholders Involvement

- *AMEC E & I, Inc.*
- *American Petroleum Institute (API)*
- *AKT Peerless Environmental & Energy Services*
- *AMS, Inc.*
- *ARCADIS U.S., Inc*
- *ATC Associates Inc.*
- *Atlantic Richfield Company*
- *AQR ColorTec*
- *CETCO Lining Technologies*
- *Chrysler Group LLC*
- *Conestoga-Rovers & Associates (CRA)*
- *Cox-Colvin & Associates, Inc.*
- *Environmental Resources Management (ERM)*
- *Entech Instruments, Inc.*
- *Severstal North America, Inc.*
- *Fibertec Environmental Services*
- *Ford Motor Company*
- *Global Remediation Technologies, Inc. (GRT)*
- *Hamp, Mathews & Associates (HMA)*
- *Hartman Environmental Geoscience*
- *H&P Mobile Geochemistry, Inc*
- *Land Science Technologies*
- *MHE Products*
- *Michigan State Housing Development Authority (MSHDA)*
- *URS Corporation*
- *RAM Group of Gannett Fleming,*
- *Shell Global Solutions*
- *Soil and Materials Engineers, Inc*
- *TTL Associates, Inc.*
- *Weston Solutions, Inc.*
- *W. L. Gore & Associates, Inc*

Why so long?

- Breaking the mold – worked with other companies timelines and availability
- Science for VI was moving fast
- Looked for solutions
- Identifying a more flexible format
- Additional stakeholder input processes



Office of Regulatory Reinvention

- Released January 2012
- Recommendation R-2
 - Allow the use of a conceptual site model
 - Allow data collection and evaluation processes consistent with the needs of business transactions
 - Other recommendations dealt with screening values and criteria

Collaborative Stakeholder Initiative

- Identified VI as a key issue
- Development of a set of recommendations
 - Development of guidance documents
 - VI Criteria for soil, soil gas, and water



Things are moving!



General Summary of Changes

- Changes in the format
- Provides SOPs for examples
- Alternate procedures
- Review checklists



Key Considerations for the Regulated Community



- Optional
- Alternate approaches can be proposed
- Guidance document is not a statutory requirement

Terms for Screening Values

Sampling Location	Appropriate Vapor Intrusion Screening Value (SV_{vi})	Immediate Response Activity Screening Levels (IRASLs)
Soil sample	Soil concentration that identified a source of vapors (S_{vi})	-----
Air within the interior space of a building derived from VI sources	Acceptable indoor air value for VI (IA_{vi})	Indoor air values for consideration of an acute exposure for VI (AIA_{vi})
Soil gas collected from the subsurface	Soil gas concentrations for VI (SG_{vi})	Soil gas concentrations for consideration of an acute exposure for VI (ASG_{vi})
Sub-slab soil gas from beneath a building slab	Soil gas concentrations collecting less than five feet bgs or lowest point of a structure (SG_{vi-ss})	ASG_{vi} – see description above
Groundwater in contact with a structure	Groundwater concentrations when water is in contact or entering a structure for VI ($GW_{vi-sump}$)	Groundwater concentrations for consideration of an acute exposure when water is in contact or entering a structure for VI ($AGW_{vi-sump}$)
Groundwater beneath, but not in direct contact with a structure	Groundwater concentrations for VI (GW_{vi})	Groundwater concentrations for consideration of an acute exposure for VI (AGW_{vi})

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1.0 Introduction

**2.0 MDEQ's Approach for Evaluating the Vapor
Intrusion Pathway**

3.0 Step 1: Screening Level Assessment

4.0 Step 2: Conducting a Soil Gas Investigation

5.0 Step 3: Building-Specific Investigation

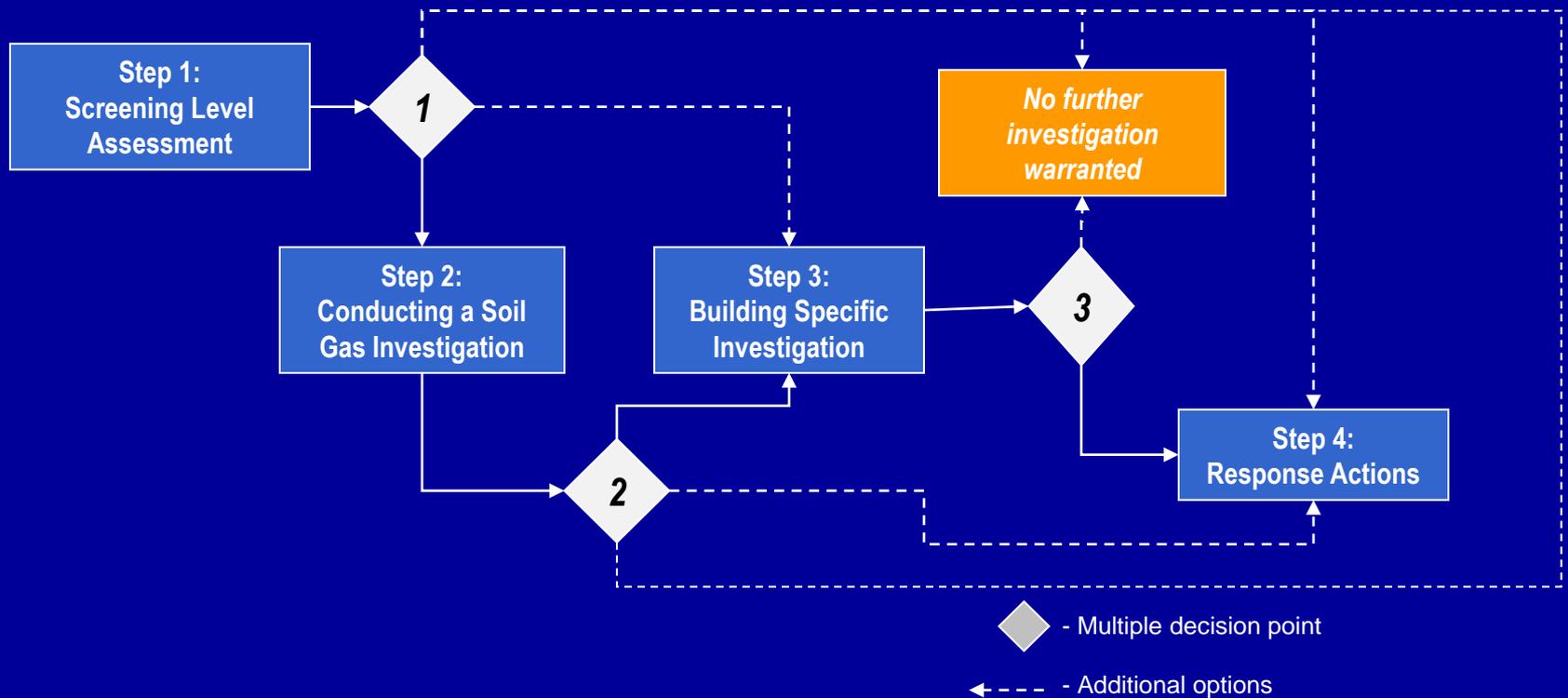
6.0 Step 4: Response Actions

7.0 References

Appendices

- A – Generalized Flowcharts for the Evaluation of the Vapor Intrusion Pathway
- B – Supplemental Guidance Information
- C – Checklists for Evaluating Compliance with Part 201
- D – Vapor Intrusion Screening Values
- E – Soil Gas Compounds Screening List
- F – **MDEQ's Standard Operating Procedures**
- G – Laboratory Quality Assurance and Quality Control for Vapor Intrusion Data
- H – Model for a Declaration of a Restrictive Covenant
- I – Rule 290, Permit to Install Exemption

Overview of Investigating VI



**Step 1:
Screening Level
Assessment**

Review existing site information
or collect information necessary
to develop initial CSM

Evaluate for conditions that may pose
a VI risk (establish receptor screening
area)

Conditions that may warrant further evaluation:

- Ground water exceedance of GW_{vi}
- NAPL within critical distances
- Indoor Air exceedance of IA_{vi}
- Soil Gas exceedance of SG_{vi}
- Shallow soil gas exceedance of SG_{vi-SS}
- Wet basement or sump above $GW_{vi-sump}$
- Methane present that may cause an explosion hazard
- Soils above S_{vi}
- Other indications of VI (odor)

NO

Sufficient
data
available?

YES

Evaluation
identifies
conditions
for VI
present?

YES

Immediate
response
required

YES

NO

Presumpti
ve
mitigation?

YES

**Step 4:
Response Actions**

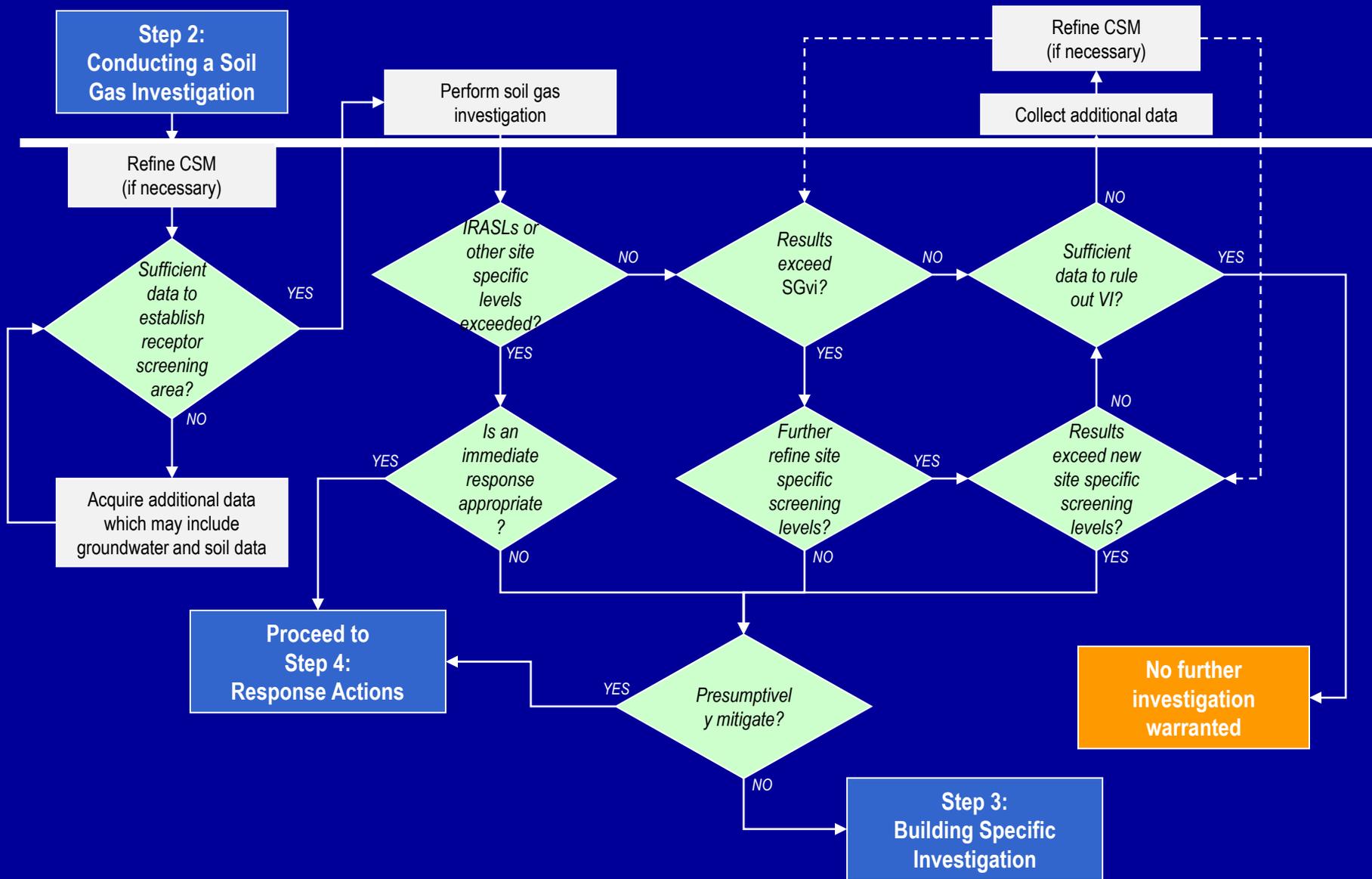
**Step 3:
Building Specific
Investigation**

Evaluate
building
first?

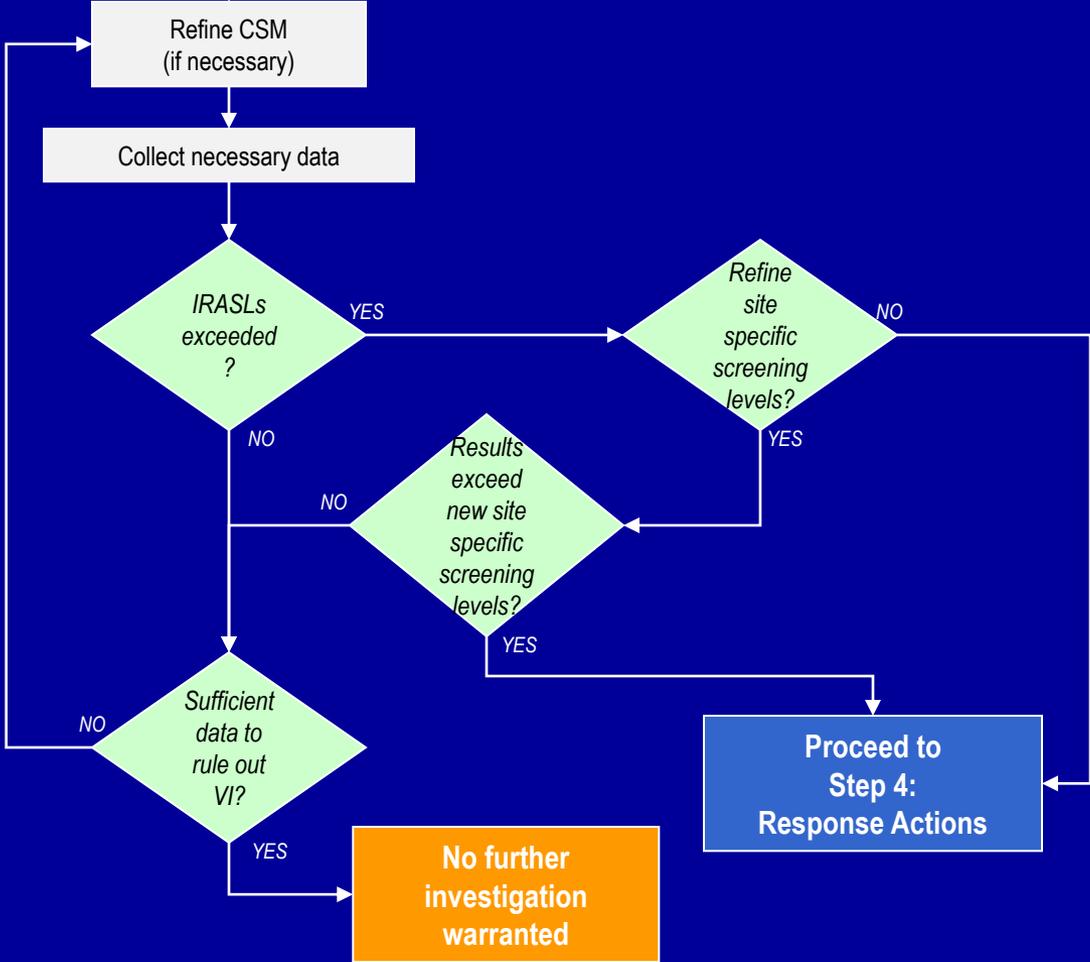
YES

**Step 2:
Conducting a Soil
Gas Investigation**

**No further investigation
warranted**



**Step 3:
Building Specific
Investigation**



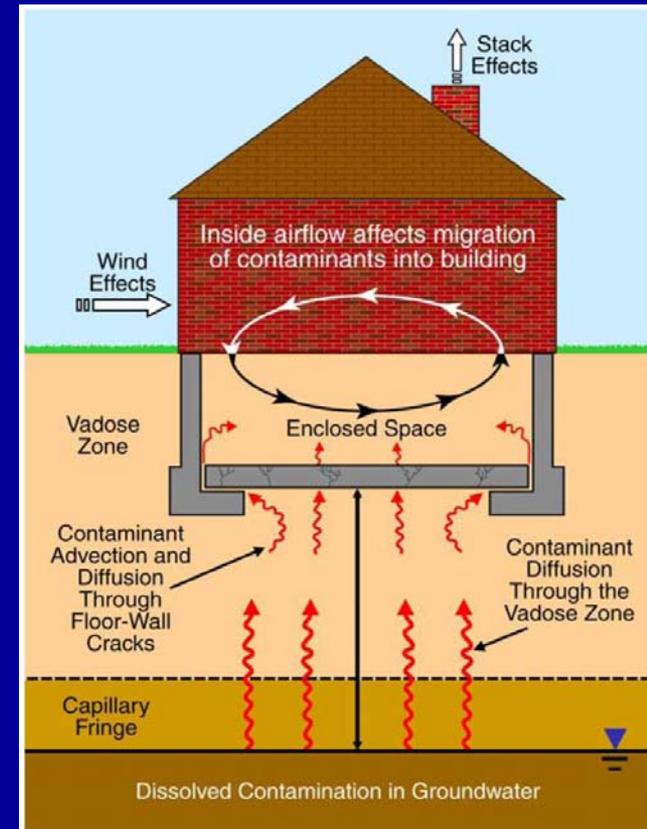
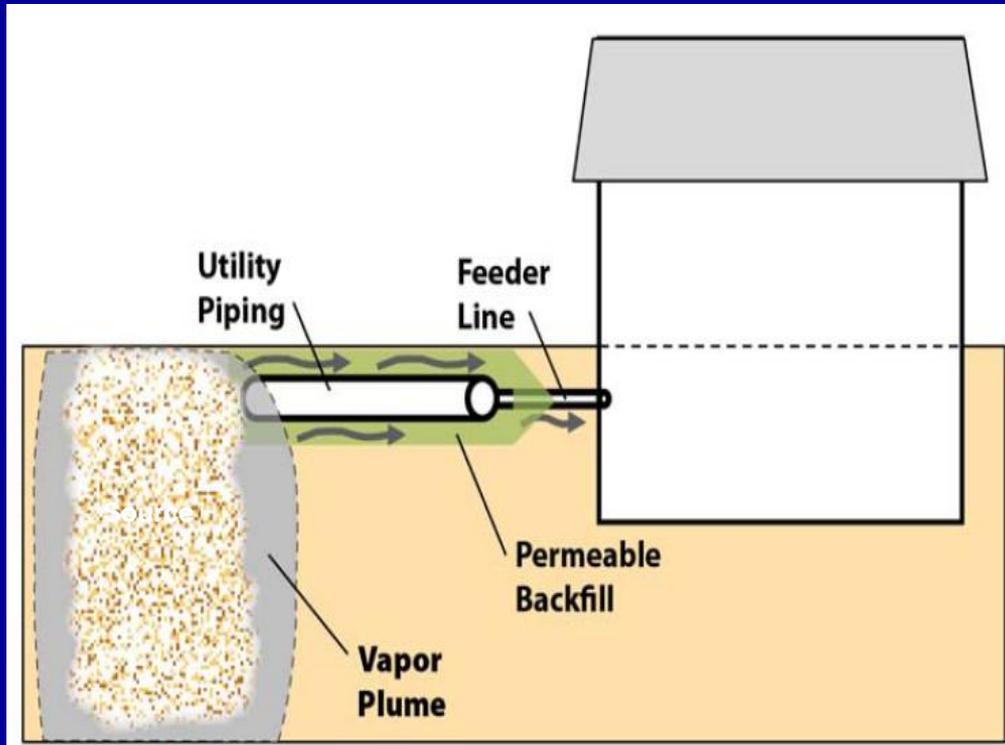
Checklists

- Determining if the Generic Volatilization to Indoor Air Inhalation Criteria Apply
- Developing a Conceptual Site Model
- Reviewing
 - Soil Gas Sampling Protocols and Lab Data
 - Sub-Slab Sampling Protocols and Lab Data
 - Design of an Active Mitigation System
 - Design of a Passive Mitigation System

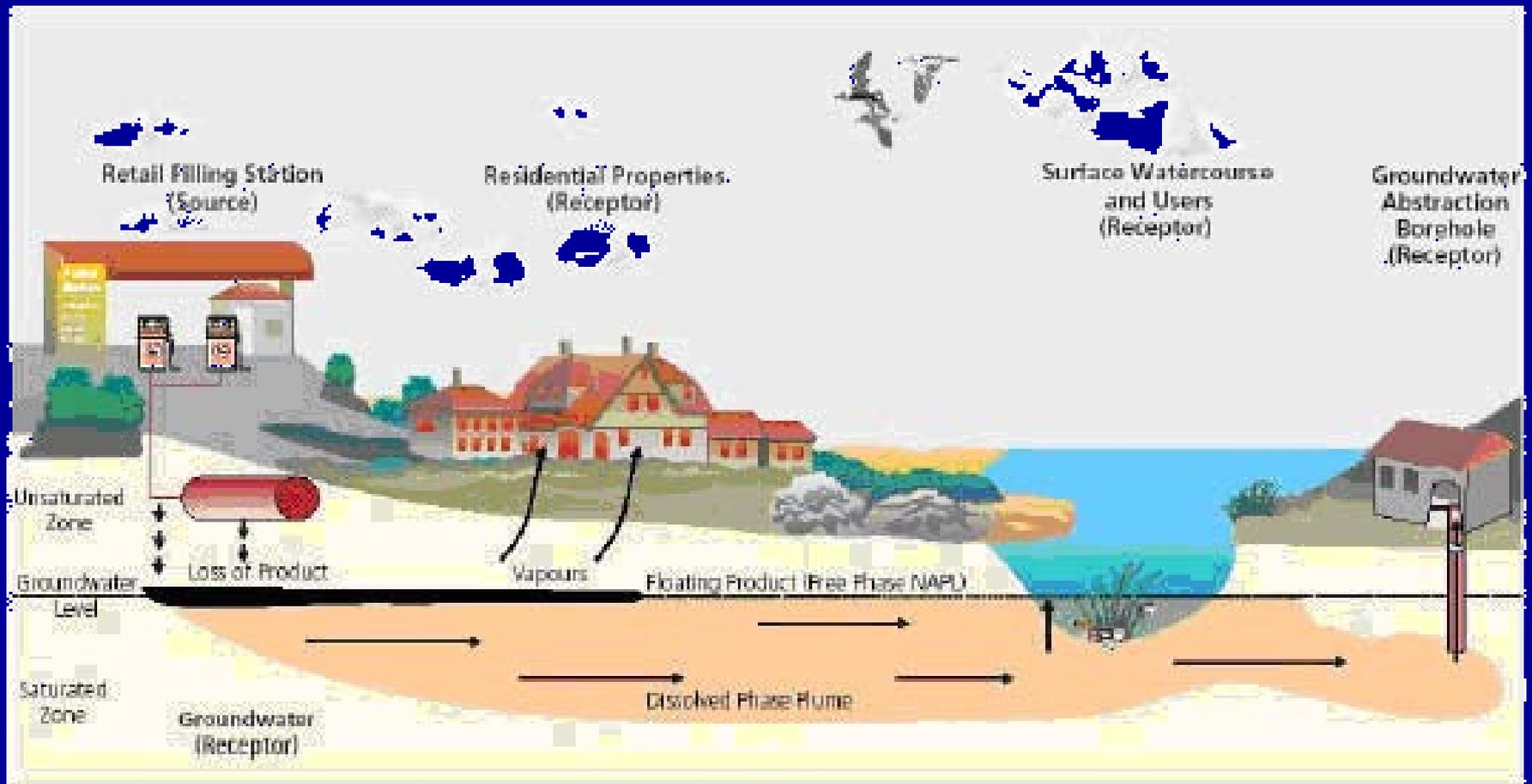
State SOPs

- Installation of a Soil Gas Probe/Vapor Monitoring Point
- Installation of a Sub-Slab Soil Gas Probe/Vapor Monitoring Point
- Sampling Utilizing USEPA Method TO-15 *via* a Bottle-Vac[®]
- Indoor Air Sampling
- Dynamic Flux Chamber Method
- **Installation of a Vapor Pin[™]**

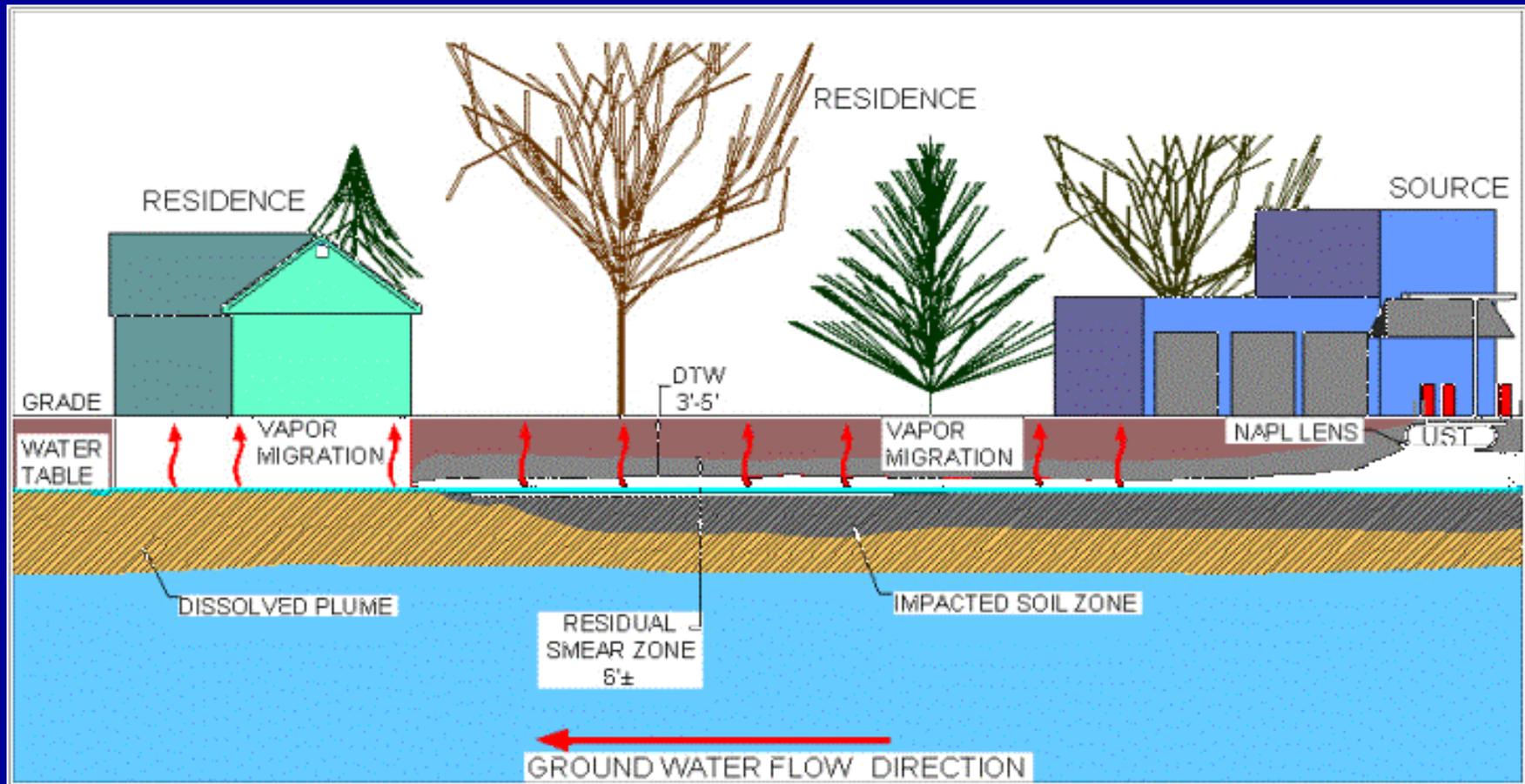
Conceptual Site Model



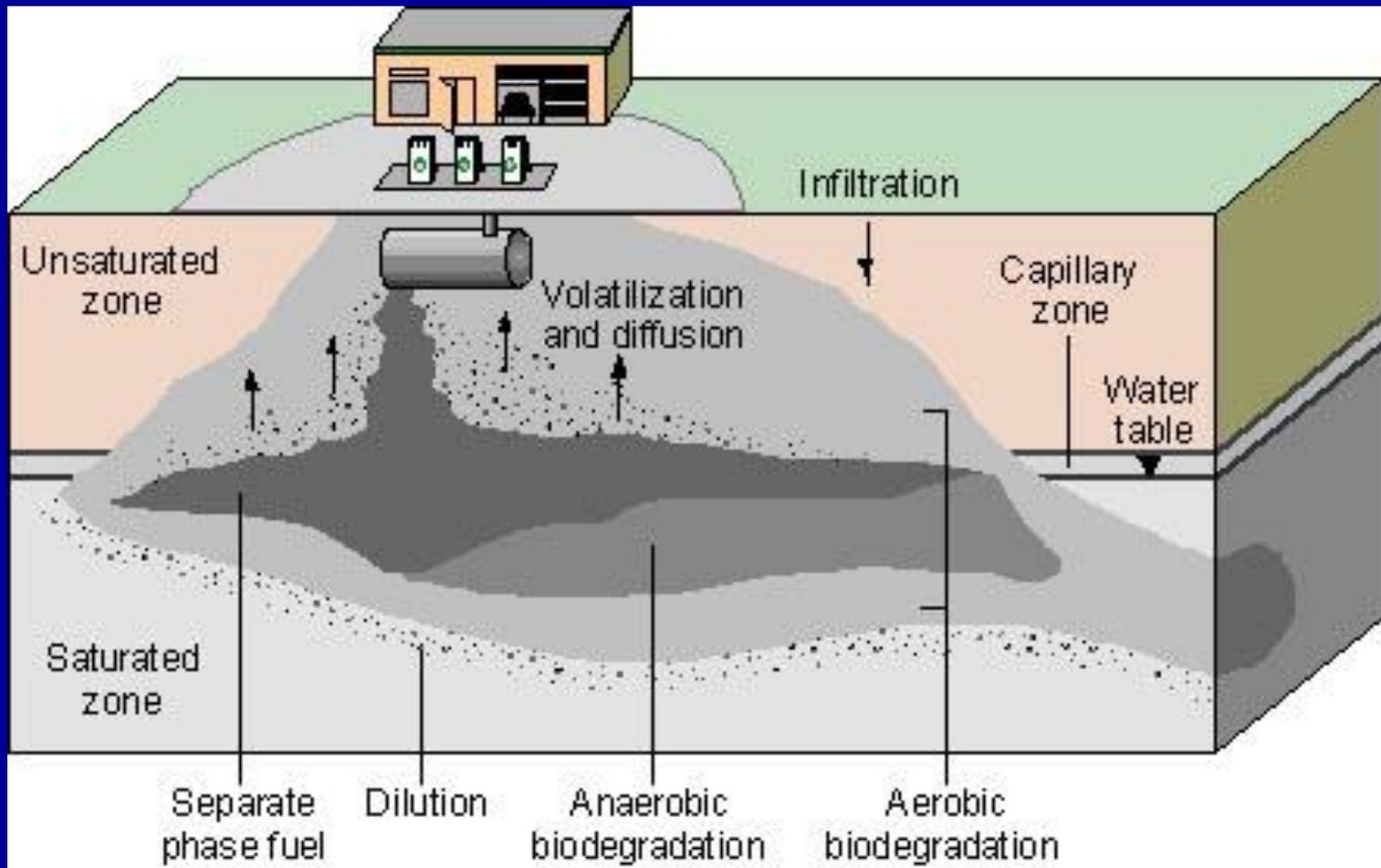
Example of Multiple Properties



Another CSM



One more. . .



"New Stuff"

- Process for demonstrating mixing in large structures or buildings
 - *"Big Building Model"*
- Exclusion zone for petroleum hydrocarbons
 - *One of the first in the nation*
- Process for resolving potential ambient air issues
 - *VSIC*

Big Building Model (BBM)

- Alternative methodology for large nonresidential buildings to utilize multiple lines-of-evidence in demonstrating compliance with the volatilization to the indoor air exposure pathway
- Based on Eklund and Burrows (2009)

BBM Characteristics

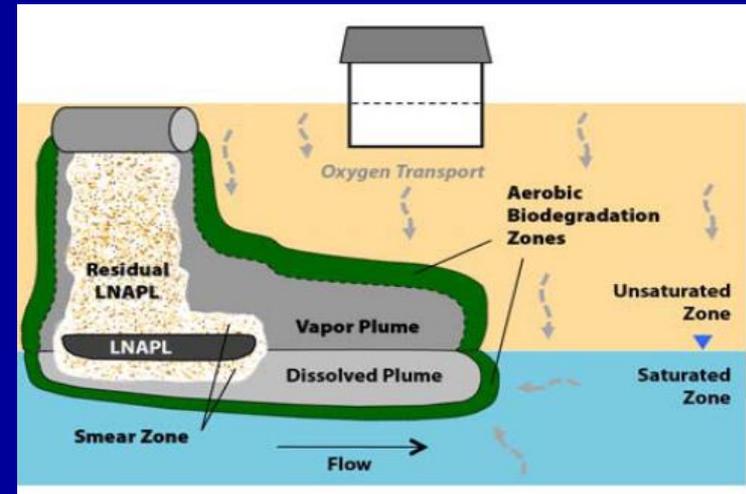
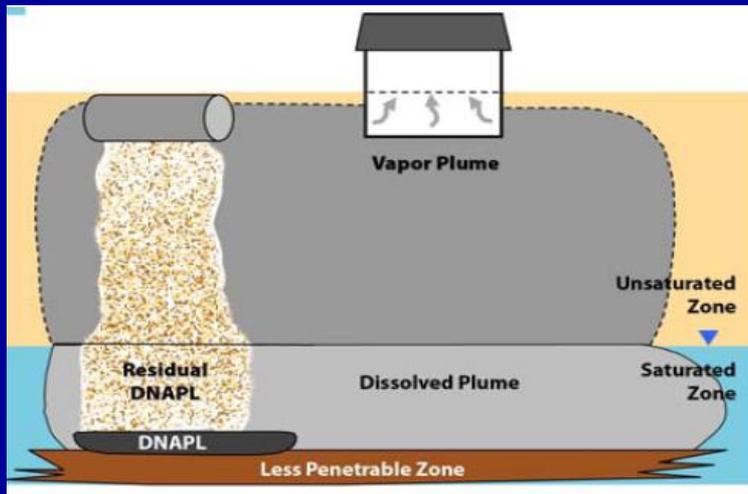
- Large continuous open areas greater than 4,000 m² (43,000 ft²)
- Ceiling heights greater than 5 m (16 ft)
- Slab-on-grade construction with thicknesses greater than 15 cm (6 inches)
- No dry wells, floor drains, sumps, or other building features are present that would provide a direct conduit to the subsurface are present
- When groundwater is present, concentrations are stable and/or decreasing

BBM

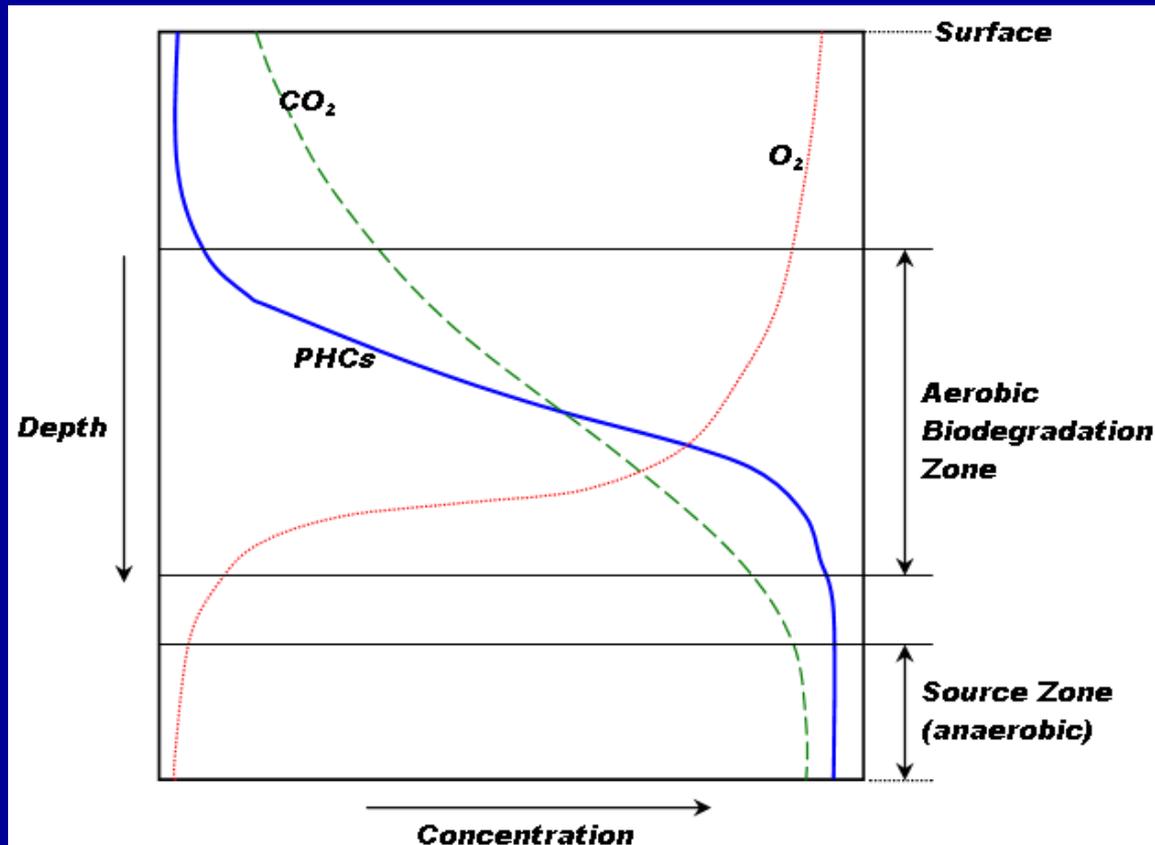


Petroleum Hydrocarbons Considering Bioattenuation

- There are differences between PHCs and CHCs that influence whether and how vapors migrate into buildings.



PHC Bioattenuation



Assists in Categorizing Sites

- Biodegradation clearly occurs and there is therefore a low potential for VI
- Biodegradation clearly does not occur and the potential for VI must be evaluated
- A conclusion regarding biodegradation cannot be drawn without further evaluation

Additional Support

- DEQ Vapor Intrusion Specialists
 - Sampling
 - Site Specific Criteria
- VI TAPS Team
 - District Points of Contact

VI TAPS Team

- Made up with staff from each district
- Meets 1-2 times each month
- Assists in training district staff and the regulated community
- Speeds up the review process for VI issues

Send Comments to:

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Questions?

