

## What's New With Vapor Intrusion

### 2010 Oregon Brownfield Conference

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## Vapor Intrusion – What's New

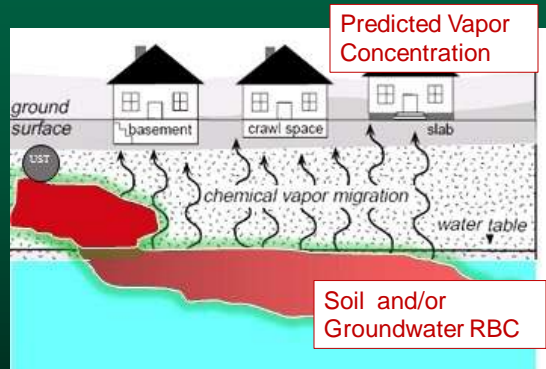
- DEQ recent guidance changes approach to evaluating vapor intrusion
- Favors site-specific approach to minimize uncertainty, multiple lines of evidence
- Result is more complex and technically proficient assessment required
- Often requires complex communications, often with an emotional twist



## VI Evaluation Past and Present

Past – Relied on Modeling

- Soil & groundwater data
- Chemical properties
- Physical properties
- Building specific properties



Under-predicted Risks

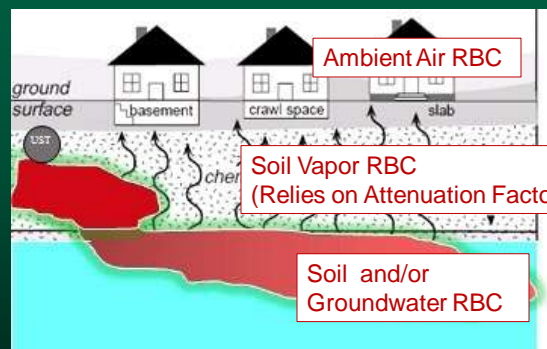
- Model defaults often applied
- Accurate collection of building properties difficult

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## VI Evaluation Past and Present

Present – Weight of Evidence  
(Tiered Approach)

- Modeled values from soil/gw used for decision making when little contamination present
- Soil vapor and ambient air samples used for majority of decision making on contaminated sites



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## Brownfield Assessment Summary

- Soil contamination from One UST and Fuel Island
- Fuel release was very weathered
- Groundwater contamination limited, within site boundaries
- Impacts present from offsite LUST site





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## Risk Summary

- Complete exposure pathways (direct contact, outdoor air volatilization, vapor intrusion)
- Fuel Island – VOCs greater than several RBCs for naphthalene, 1,2,4-trimethylbenzene, TPHg
- Tank D area – VOCs minimally exceed soil VI RBCs
- Potential for site-wide risks from TPHg, however very weathered product

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## Weight of Evidence Approach - Design

Soil concentrations > Soil Vapor Intrusion RBCs within 100 feet of occupied structure

- Evaluate Risks from TPHg
  - Site specific RBC calculation using VPH
- Evaluate Potential Vapor Intrusion Risks
  - Four soil vapor samples
- Confirm Extent of Source Soils Near Fuel Island
  - Fuel Island Characterization



## Weight of Evidence Conclusions

- Site specific TPHg RBC greater than maximum theoretical value (>MAX), indicating TPH not a risk driver
- Vapor results indicate vapor intrusion risks present only at fuel island due to naphthalene and 1,2,4-trimethylbenzene concentrations
- Fuel island impacts with direct contact risk (occupational & urban residential) limited to surface soils near fuel island and near surface within 10 feet of fuel island



## Unable to Rule Out Vapor Intrusion?

- Ambient Air Sampling
  - Sample design for soil gas and/or ambient sampling
  - Implement sampling plan
  - Evaluate Results
  - Risk communication
- Possible Corrective Action

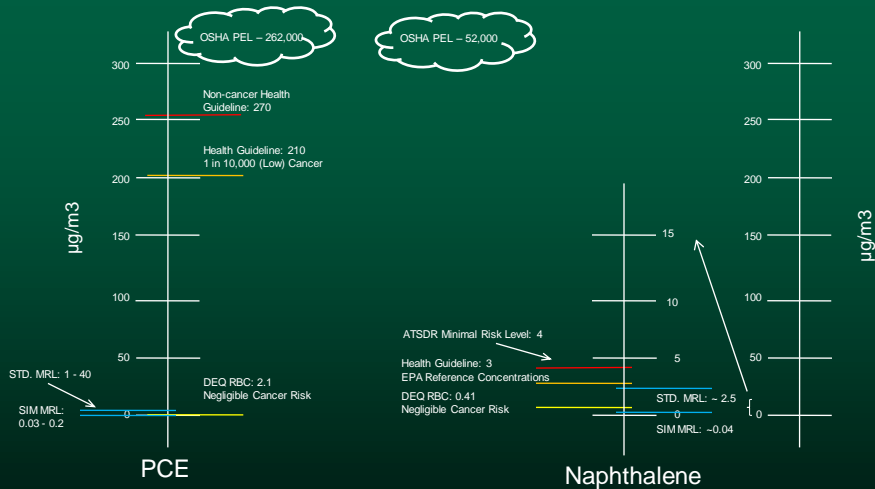


## Sample Design

- Direct Soil Gas and/or ambient sampling
  - Target compounds identified in Phase I
  - Consider atmospheric conditions
  - Building construction, HVAC and proximity to source
  - Method Selection: Data Quality Objectives (QA)/reporting limits very important
  - Identify, characterize, remove confounding sources
    - Triggers initial round of risk communication



## Health Based Levels and QA Goals



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## Common VI Corrective Actions

- Engineering Controls: building pressurization, vapor barriers, sub-slab venting
- Soil vapor extraction
- Based on current and future land use, array of technologies could be applied

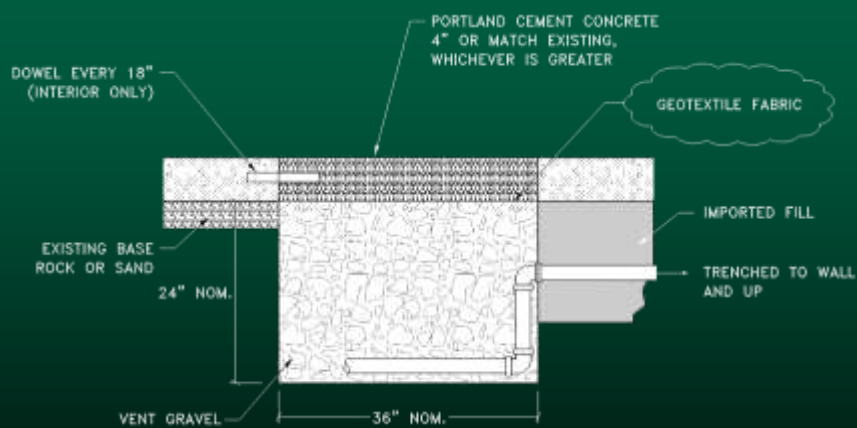
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## Engineering Controls



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## Subslab Vapor Collection Pits



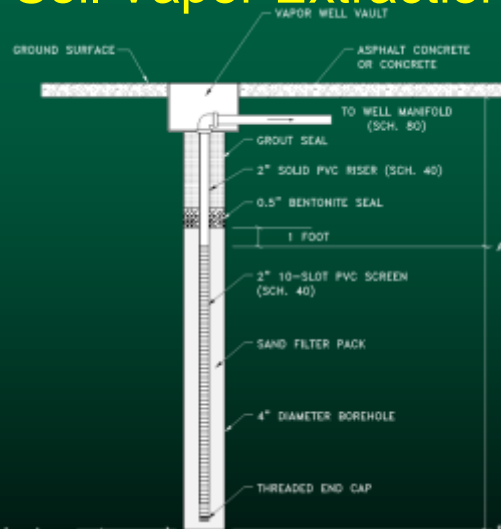
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## Subslab Vapor Collection Pits



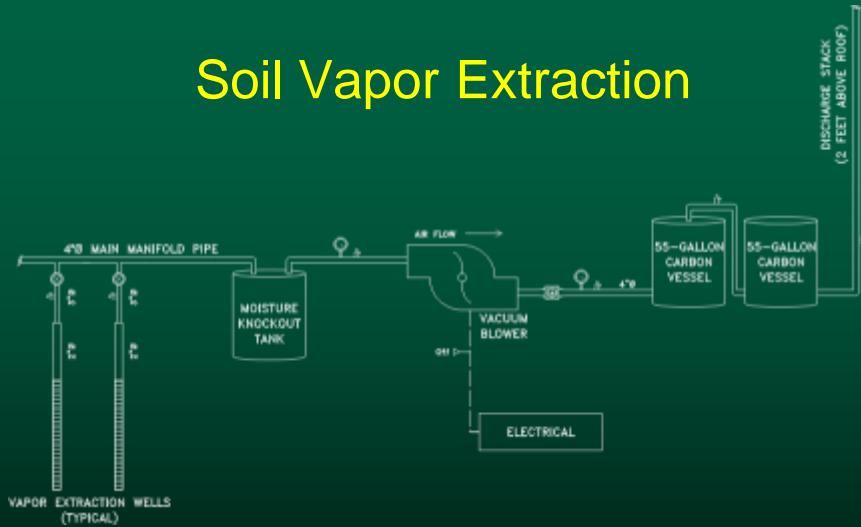
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## Soil Vapor Extraction



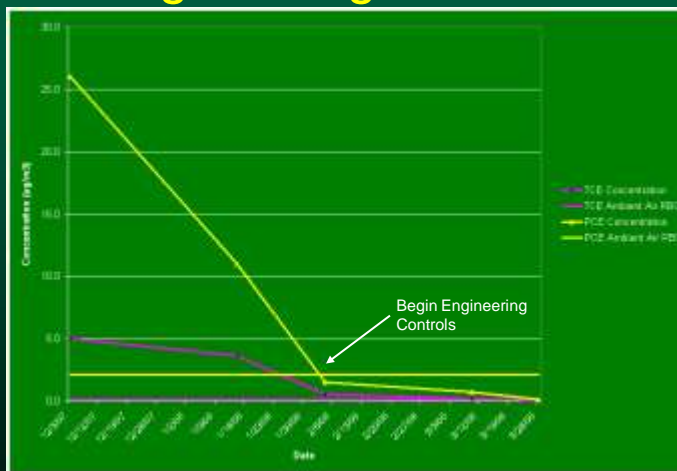
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# Soil Vapor Extraction



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# Ambient Concentrations After Engineering Controls



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# Questions



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