

# Vermont

Department of Environmental Conservation

## Vapor Intrusion Guidance Update

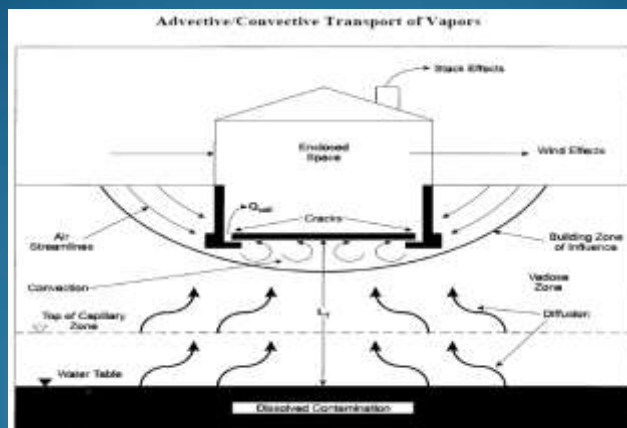
NEWMOA Vapor Intrusion Workshop

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By

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## Vermont Vapor Intrusion Guidance

- First Indoor Air Guidance for Petroleum written in 1989; included background as standard
- Guidance Memos on Cl solvents began in mid-2000
- VI first formally addressed for all COCs in April 2012 IROCP
- IROCP not a “how to” but includes background to VI and screening table
- VI Section most detailed part of IROCP (Appendix C: Vapor Intrusion) due to all other media covered by other State Programs



## Vermont Vapor Intrusion Guidance

- VI Screening Values Table, which includes:
  - Target Indoor Air Value for approx. 90 COCs
  - Back calculates GW concentration triggers
  - Shallow Soil Gas  $\leq 5$  ft;  $\alpha = 0.1$
  - Deep Soil Gas  $< 5$  ft;  $\alpha = 0.01$
- Some COCs reported at background from VDH Background IA Study or can use VT Haz Ambient Air Levels
- BTEX alpha at 0.001 & 0.0001 for shallow & deep soils



## Vermont Vapor Intrusion Guidance

### Indoor Air Screening Levels

- Risk
  - All risk at  $10E-6$  (unless IA or Ambient outdoor air higher)
  - Exposure duration calculated at 70 years
- VI Investigations Iterative; GW, Soil Vapor, Sub Slab, Indoor Air



## Vermont Vapor Intrusion Guidance

### VI Evaluations Follow 1 of 2 Processes

#### Petroleum Sites (or other biodegradable COCs)

- TPH w/i 5' structure, use VI Screening Values Table
  - TPH soils  $>100\text{mg/kg}$  or PID  $>10$  ppm  
&/or GW above VI Screening Value, or
- TPH soils  $>5'$  from structure, use UT empirical data studies
  - TPH Soils 5-10' use TPH  $>100$  mg/kg or PID  $>10$  ppm  
&/or GW exceeds 1000 ug/l benzene or 10,000 TPH, or
- NAPL on water table within 30' of structure, or
- NAPL in soils adjacent to structure foundation



## Vermont Vapor Intrusion Guidance

### VI Evaluations Follow 1 of 2 Processes

#### Chlorinated Solvent Sites

- VI Investigation required if CIHC in soil, GW, or soil gas within 100' of structure above VI Screening Values
- If work required, then a SI Work Plan must be submitted and approved
- VI Soil Gas Sampling
  - SGS-Min. 2 points acap to structure, 2-5' below structure
  - Sub Slab-Directly below slab, number of points site specific
  - Ambient Outdoor-Upwind of structure
  - Indoor Air-Basement & living space (compare & household chemicals)




## Vermont Vapor Intrusion Guidance

### TCE Update

- Short Term Health Effects
  - Fetal cardiac malformation (FCM) during first trimester
- Chronic Health Effects
  - Cancer (Liver, kidney, non-Hodgkin's lymphoma)
  - Non-Cancer (Thymus effect)
- VT DOH working on new VI Screening Value
  - Talk now about some average between FCM and chronic value



VI Screening Values Table (Example Set)				
Chemical	Target Indoor Air Screening Levels	GW Concentration (ug/l)	Shallow Soil Gas <5 ft (ug/m3) alpha 0.1	Deep Soil Gas >5 ft (ug/m3) alpha 0.01
1,1-Dichloroethane	50	218	500	5000
Methylene Chloride	2.1	5.8	21	210
Ethylene dibromide	0.0045	Nsv	0.045	0.45
TCE	0.5	1.19	5	50
Benzene*	1.18	5.2	1180(0.001)	11800(0.0001)



Questions?  
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