

Vermont

Department of Environmental Conservation

Vapor Intrusion Guidance Update

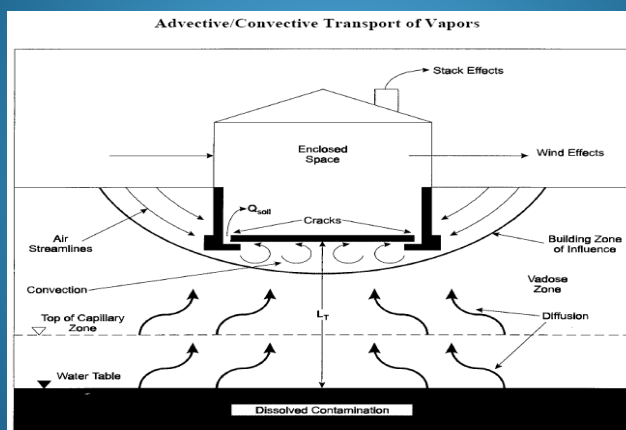
Vermont Vapor Intrusion Workshop

May 13, 2014

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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, Michael Smith working on Sampling Procedure
- 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 ≤ 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 α 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 background or Ambient outdoor air higher)
 - Exposure duration calculated at 70 years
- VI Investigations Iterative; GW, Soil Vapor, Sub Slab, Indoor Air



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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
- Residual NAPL in soils adjacent to structure foundation



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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 (look for SMS SOPs)
 - 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)



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TCE Update

- 9/28/2011- Revised IRIS citation
 - CANCER
 - Weight Of Evidence: carcinogenic to humans by all routes of exposure
 - cancer toxicity values based on kidney, liver, and non-Hodgkin's lymphoma
 - kidney cancer operates via mutagenic mode of action
 - estimated 1 in a million risk assuming continual lifetime exposure (0-70 years) **0.2 ug/m3**
 - NON-CANCER
 - Various non-cancer systemic effects including immunotoxicity and developmental toxicity
- concern for chronic and short-term exposure
- screening values and action levels under national debate



VI Screening Values Table (Example Set)				
Chemical	Target Indoor Air Screening Levels (ug/m3)	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?
 Vermont
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