

Vapor Intrusion Risk Pathway: Latest Regulatory Updates

AEHS – PVI Workshop

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The VI Regulatory Topics (as of 1/2015)

Red Hot

1. Short Term TCE Exposure
2. Hydrocarbon Sites
3. New EPA VI Guidances

Semi-Red Hot

1. New ASTM Phase I Standard
2. What's Going On With the States

EPA-OSWER Guidance Updates

Release Date: 2014~~5~~

- Multiple lines of evidence (more time & expense)
- Preference for soil gas near source (terrible for HCs!)
- Longer indoor air sampling period (terrible for HCs!)
- Fixed Att factor of 0.10 for shallow SG (~50x drop in SL!)
- Sub-slab Att factor 0.03 (3.3x increase in SL)
- Sampling protocols inconsistent with EPA-ORD studies!

<http://www.epa.gov/oswer/vaporintrusion>

EPA-OUST Guidance Updates

Release Date: 201~~4~~5

- Only for UST Sites – OSWER Keeps Others
- Exclusion Criteria? Yes
- Testing/Adoption of Biovapor model? Yes
- New Model: PVI Screen
- No Screening Levels
 - Released draft pipes you to OSWER!!
 - Revised, not released draft, sends you to the models.

<http://www.epa.gov/oust/cat/pvi/index.htm>

Allowable Benzene in GW

1e-6 risk, Residential Scenario

- DTSC VI Guidance:

$$0.084 \text{ ug/m}^3 / 0.001 = 0.084 \text{ ug/L} / 0.2 = 0.42 \text{ ug/L}$$

~2500 Times Lower than CA Exclusion Value of 1000 ug/L!!

- New EPA OSWER Guidance:

$$0.31 \text{ ug/m}^3 / 0.001 = 0.31 \text{ ug/L} / 0.2 = 1.5 \text{ ug/L}$$

~3300 Times Lower than EPA-OUST Value of 5000 ug/L!!

Exclusion Criteria for Petroleum Sites

Can we quickly screen out
HC sites from VI assessments?



Table 3 Required Vertical Separation Distance Between Contamination And Building Foundation, Basement, Or Slab.

Media	Benzene	TPH	Vertical Separation Distance (feet)*
Soil (mg/kg)	≤10	≤250	6
	>10 (LNAPL)	>250 (LNAPL)	15**
Groundwater (ug/L)	≤ 5,000	≤30,000	6
	>5,000 (LNAPL)	>30,000 (LNAPL)	15**

The thresholds for LNAPL indicated in this table are indirect evidence of the presence of LNAPL. These thresholds may vary depending on site-specific conditions (e.g., soil type, LNAPL source). Investigators may have different experiences with LNAPL indicators and may use them as appropriate. Direct indicators of LNAPL also apply; these include measurable accumulations of free product, oily sheens, and saturated bulk soil samples.

*Vertical separation distance represents the thickness of clean (TPH ≤ 100 mg/kg), biologically active soil between the source of PHC vapors (LNAPL, residual LNAPL, or dissolved PHCs) and the lowest (deepest) point of a receptor (building foundation, basement, or slab).

** EPA recommends that sub-slab monitoring be used to evaluate the risk of vapor intrusion whenever LNAPL is present in any sample and the vertical separation distance is less than 15 feet. When LNAPL is

States Adopting Exclusion Criteria

- CA
- NJ
- AK
- IN
- LA
- MI – Verbal, but not in writing
- IL – But Flowchart Still Requires Work

CA Agencies

- CA-DTSC/OEHHA/Water Boards
 - New VI Guidance (10/2011) & Soil Gas Advisory (4/2012)
 - Retracted TPH Guidance
- EPA Region 9
 - Adopted Higher Value for PCE – oops, but not on CA sites
- SF-RWQCB
 - ESLs updated in December 2013–TPH fractions SL decreased
- SWQCB
 - Low Threat Closure Policy – TPH Not A Concern

Soil Gas Allowed Levels

Benzene, Residential Receptor, 1e-6 Risk

	RBSL (ug/m ³)
EPA OSWER @ 5' (no bio)	3.1
EPA OSWER sub-slab	10.3
EPA OUST (calc from GW)	1,000,000
CA sub-slab (af=0.05)	1.7
CA Low-Risk Policy: No O2	85
CA Low-Risk Policy: O2>4%	85,000

***Ambient levels: 1 to 10 ug/m³**

Uh Oh

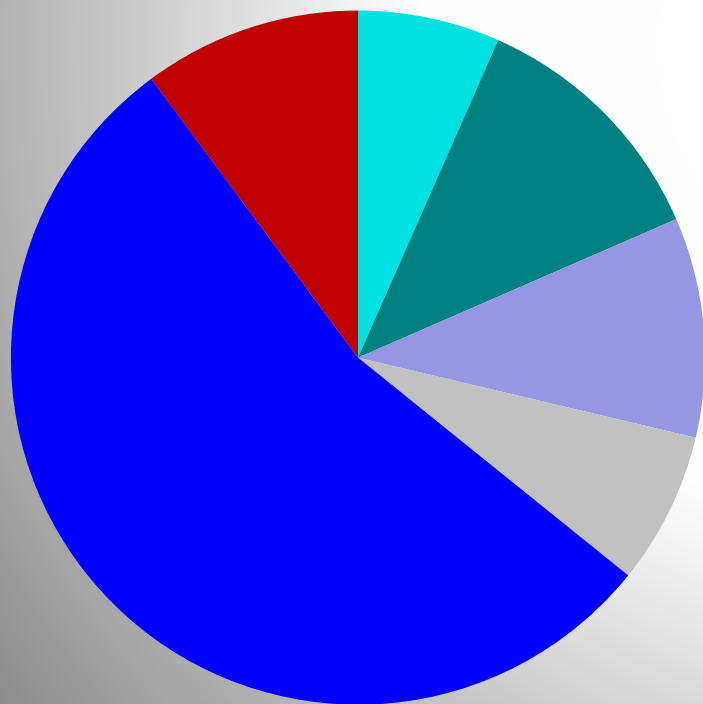
TPH Fractions Now Posted in RSLs!

	RSL (ug/m ³)	
TPH Aliphatic C5-C8	18	630
MT-DEQ	62	
SF-RWQCB	590	
TPH Aliphatic C9-C18	0.84	100
MT-DEQ	10.4	
SF-RWQCB	140	

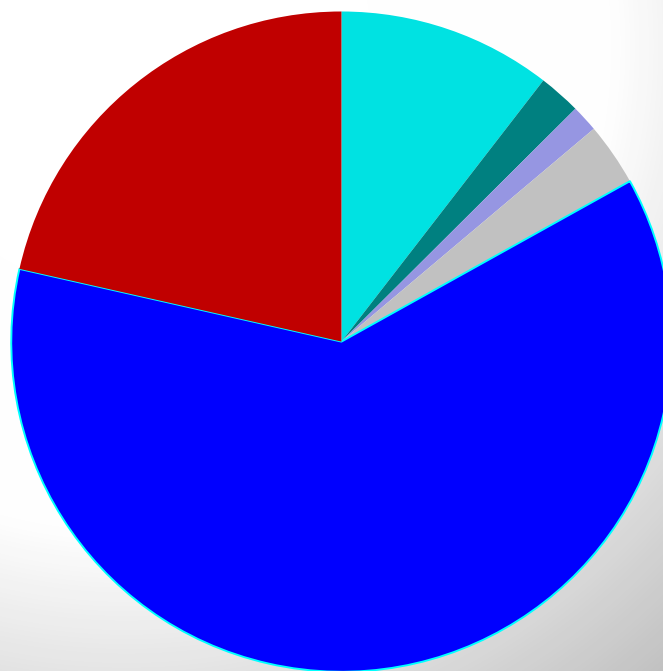
Risk Exceedence

EPA RSLs x 1,000, 10^{-6} ECR,
HQ = 0.2

Augusta 2' (0.65x)



Augusta 7' (2.3x)



- Napthalene
- BTEX
- 1,3-butadiene
- C5-C8 aliphatic
- C9-C12 aliphatic
- C9-C10 aromatic