



Ministry of
Environment

Technical Guidance 4: Vapour Investigation and Remediation

GeoEnviroLogic

Vancouver– February 18, 2011

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- Substantive Changes to TG-4

- Discuss Several Recent Q&As

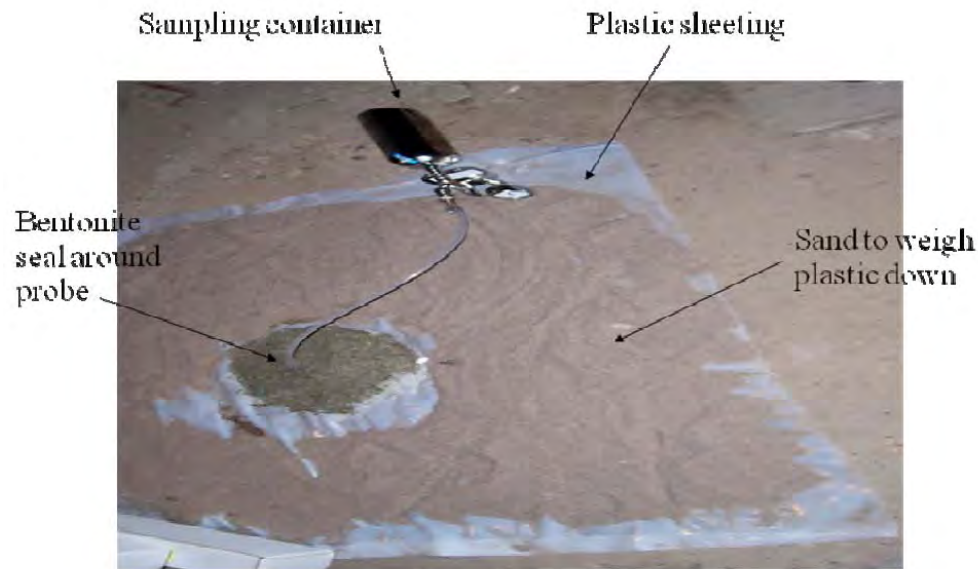
- CSAP Soil Vapour Advice and Practice Guidelines incorporated
- Attenuation Factors – Table 2 (formerly Table 1) updated
- Adjustment of Table 2 Attenuation factors for Biodegradation
- 30m Lateral screening
- Policy change for refinement of PCOCs

Table 2 update

17/02/2011

Sample Location	Sample Depth ^{2,3}	Vapour Attenuation Factor (α) ¹		
		Outdoor Exposure	Indoor Exposure	
			Agricultural, Urban Park, Residential Use	Commercial/ Industrial Use
Below unlined crawlspace, earthen basement, or wooden basement ⁵	0.45 to 5 m	-	1.0 x 10 ⁻¹	
Subslab ⁶	-	-	2.0 x 10 ⁻²	
In preferential flow pathway ⁷	-	1.0 x 10 ⁻⁴	2.0 x 10 ⁻²	
Subsurface ⁴	< 1.0 m	1.0 x 10 ⁻⁴	2.0 x 10 ⁻²	
	1.0 m	1.5 x 10 ⁻⁶	2.8 x 10 ⁻³	3.7 x 10 ⁻⁴
	1.5 m	1.2 x 10 ⁻⁶	2.3 x 10 ⁻³	3.4 x 10 ⁻⁴
	2.0 m	9.2 x 10 ⁻⁷	2.0 x 10 ⁻³	3.1 x 10 ⁻⁴
	3.0 m	6.1 x 10 ⁻⁷	1.6 x 10 ⁻³	2.7 x 10 ⁻⁴

- Shallow (<1m) sampling and attenuation
Soil Vapour Sampling - Surface Seal



D. Grady, NY-4234 (from New York State Training in Soil Vapor Sampling)

Figure 1. Temporary Surface Seal

From CSAP (2009)

Biodegradation Adjustment for Attenuation

17/02/2011

- A 10 fold adjustment of Table 2 attenuation factors may be applied to account for biodegradation under certain conditions:
 - For BTEX only
 - Minimum 3m vertical distance
 - Soil vapour must be collected near source
 - No substantive surface capping
 - Soil gas (O₂, CO₂, CH₄) data availability

30m Lateral screening

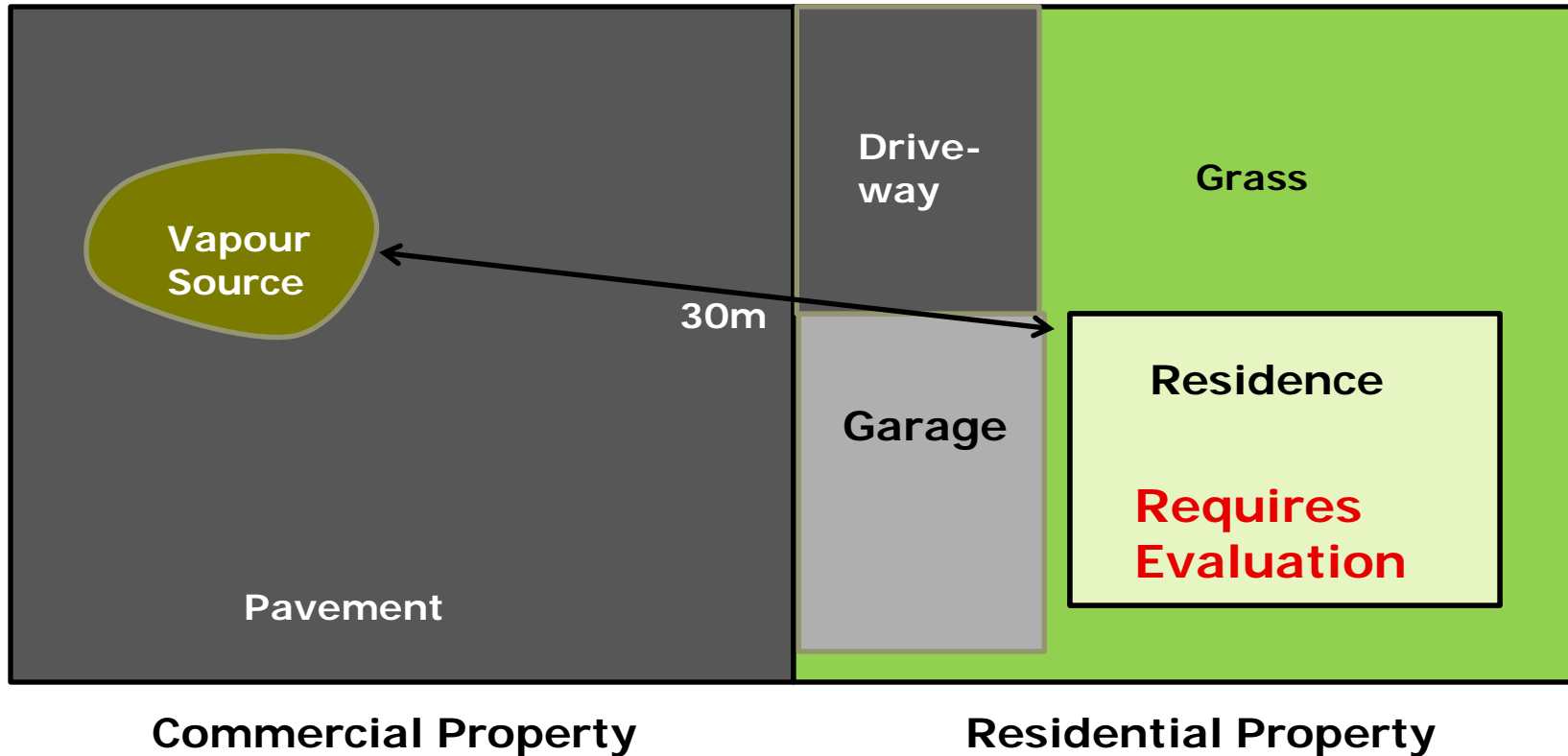
17/02/2011



30m Lateral screening

17/02/2011

Soil, GW \geq DL



- Now only allowed for the 16 substances listed in Table 1 of the Guidance.
- Policy applies to "*gasoline and diesel component substances*"
- Can be applied to other hydrocarbon sites
 - (e.g., substances listed in Table 1 can still be refined for an airport fuelling site)

Instrument Footnotes and Conditions

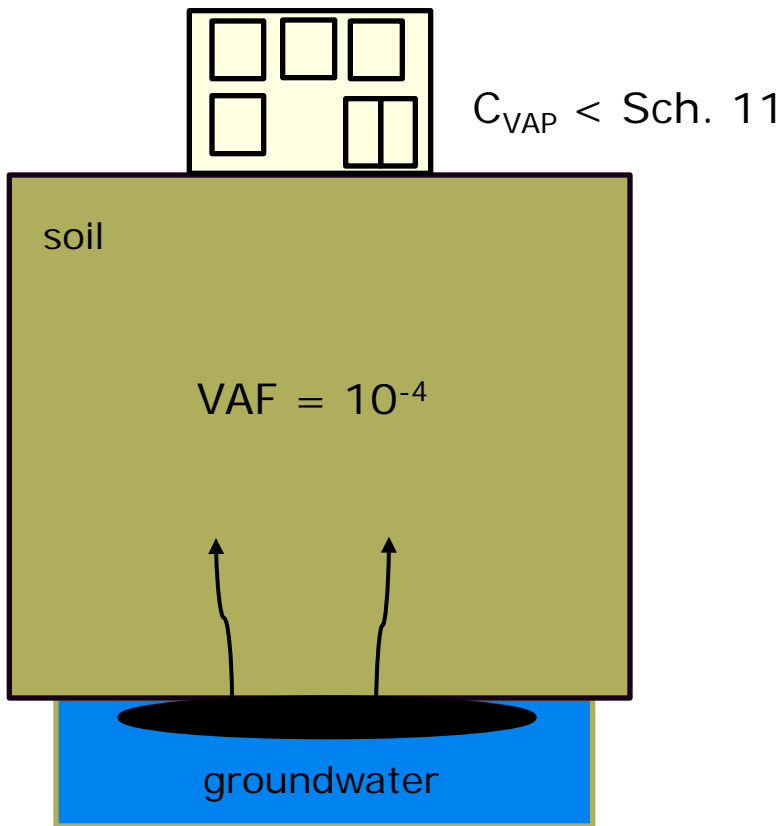
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- Issue: There is no reference to vapour on an AiP, CoC or Determination that was issued based on an assumption of vapour attenuation.
 - Vapours managed in the breathing zone, therefore may or may not be acceptable depending on assumption of attenuation.

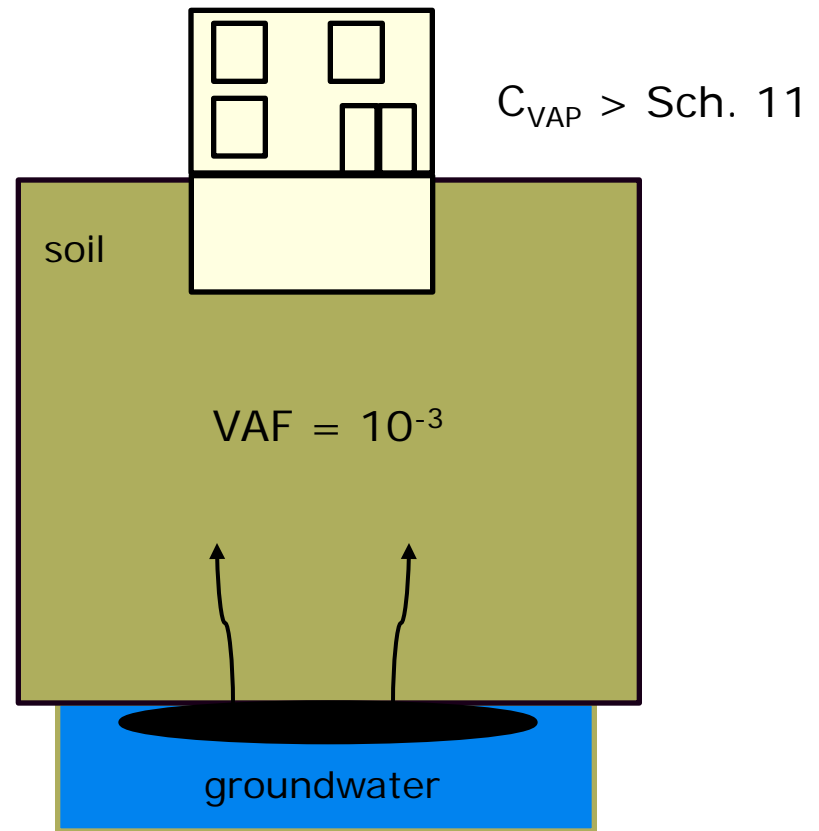
Instrument Footnotes

17/02/2011

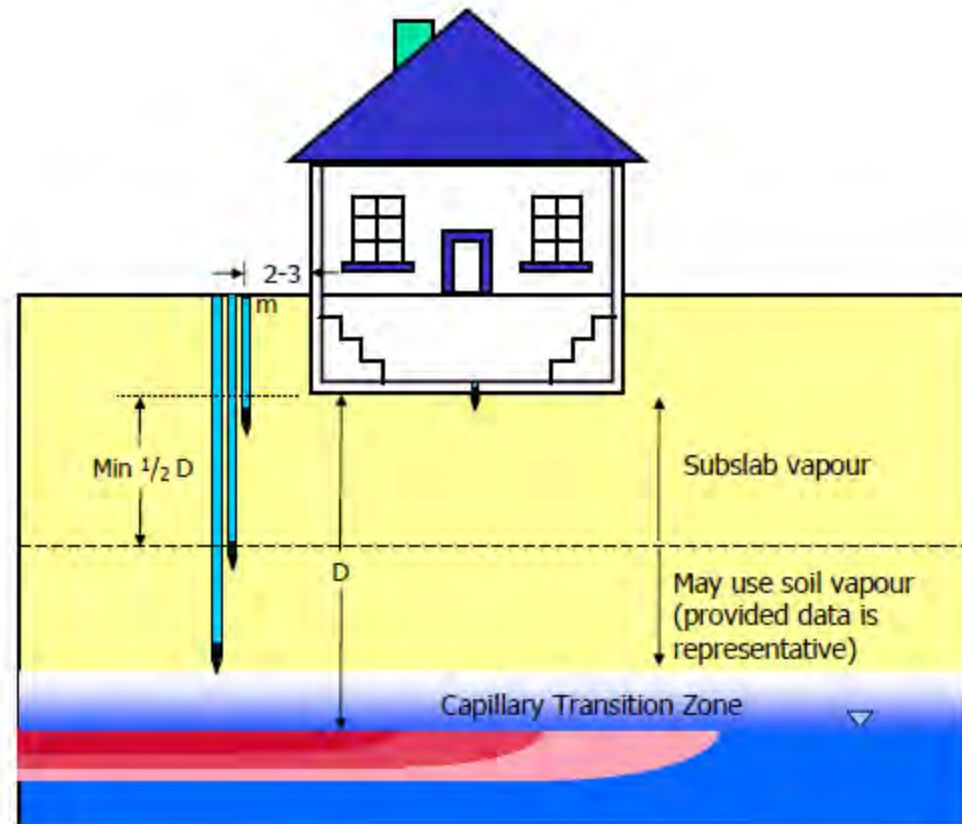
DSI / RA Assumption



Development Reality



- Sampling adjacent to buildings
- Health Canada recommends sampling depth at least $\frac{1}{2}$ way between foundation base and contamination.



- Source reduction or removal implemented
 - Requirement for confirmatory vapour samples?
 - yes

- Except in cases where PCOCs are limited to those found in Table 1 and there are no longer detectable concentrations in soil, sediment or water.

- Estimating naphthalene vapour concentrations using Health Canada partitioning equations from soil and groundwater data at sites with hydrocarbon contamination.

Draft TG-4

- Not **allowed** for substances with a liquid specific gravity greater than 1.
- Potential for DNAPL formation.

Final TG-4

- Not **recommended** for substances with a liquid specific gravity greater than 1.
- Can only be done if:
 - VERY confident that the site is well characterized and determined to be free of DNAPLS

Questions?