Ecology Listening Session

December 17, 2018
NW Regional Office
Bellevue, WA

Agenda

1. Welcome and Introductions

2. Implementation Memo No. 22 –Vapor Intrusion (VI) Investigations and Short-term Trichloroethene(TCE) Toxicity
   - Background
   - Overview of the Guidance
   - Comment Period Schedule

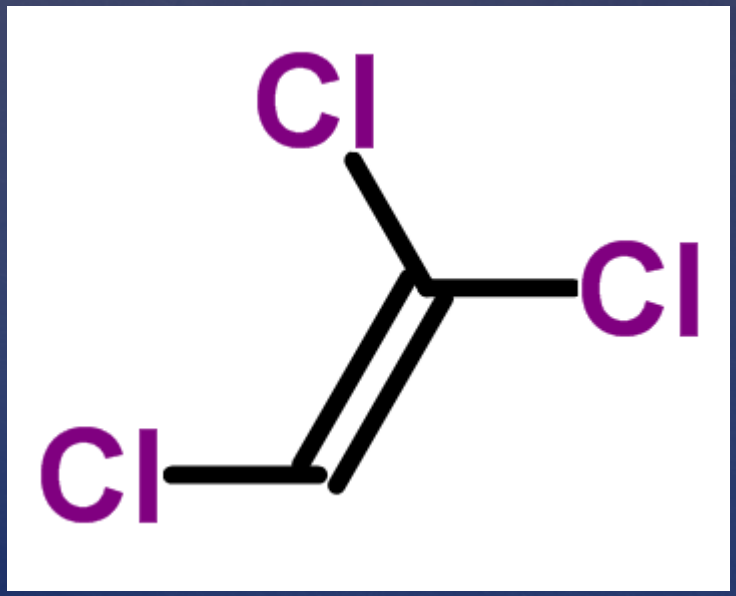
3. Discussion and Feedback

4. Meeting Summary/Adjourn

Ecology (TCP)
Implementation Memorandum #22

short-term TCE inhalation exposures due to vapor intrusion (VI)

- assessing and responding

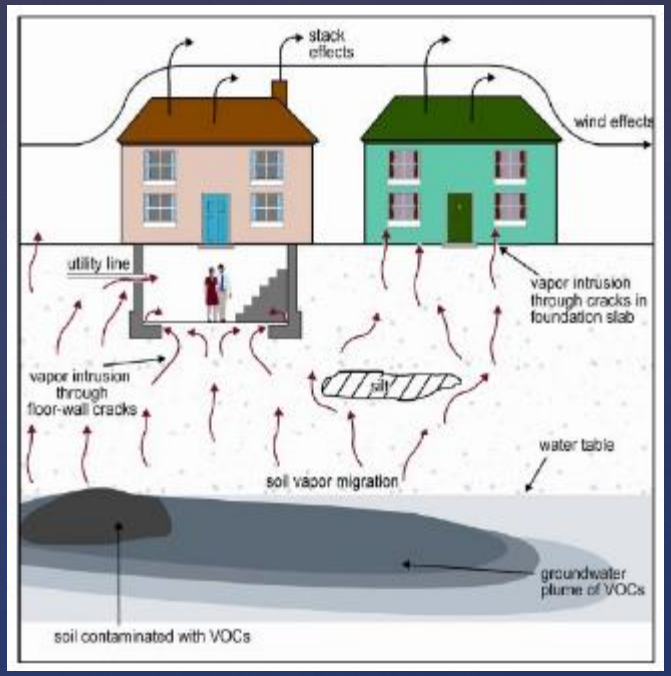


Vapor Intrusion

VI occurs when volatile subsurface contaminants in the vapor phase migrate to, and enter, buildings.

The subsurface contamination (the VI "source") can be:

- **soil** contamination
- **NAPL**
- (dissolved) **groundwater** contamination at the water table
- combinations of the above



For VI to occur: VOCs in the source must change phase (volatilize), migrate towards a building, enter that building, and mix with indoor air.

Vapor Intrusion

Volatile contaminants of concern:

- big list, > 100; mostly VOCs; see EPA's *Vapor Intrusion Screening Levels (VISL) Calculator* data tables
- CLARC data tables (sub-set of the "big list")
  - Vapor Intrusion Method **B** indoor air, soil gas, & GW CULs/SLs

TCE	Method B "indoor air cleanup level"	Method B VI groundwater screening level	Method B VI sub-slab SG screening level
carcinogen [risk = 1E-6]	0.37 µg/m³	1.6 µg/l	12 µg/m³
noncarcinogen [HQ = 1]	0.91 µg/m³	3.8 µg/l	31 µg/m³

  - also Vapor Intrusion Method C (industrial) levels
  - CLARC's *Indoor Air CULs*: based on **chronic** indoor exposures

TCE short-term toxicity

One health risk potentially associated with short-term exposure to TCE is fetal heart malformation during the mother's 1st trimester of pregnancy

Short exposures – e.g., 3 weeks – can potentially result in this effect.

exposures [ATSDR]		
acute (< 2 weeks)	**intermediate duration (> 2 weeks to < 1 yr)**	**chronic (> 1 yr)**

These are much shorter exposure timeframes than assumed in chronic exposure-based, standard MTCA Method B and C (air) Cleanup Levels.

Indoor air short-term Action Levels for TCE

Recommended by EPA R10 in a Dec 2012 Memorandum

Other federal/state/local policies and guidance (in VI context):

- EPA Region 9: July 2014; EPA nationally, Aug 2014
- Mass DEP: Mar 2014
- 2014 → 2018: CalEPA DTSC, SFB RWQCB, ADEC, NHDES, NJDEP, NYDOH, OhioEPA, EPA R7, others

- variability among the agencies' short-term TCE "action level" values
- some agencies advocate different responses or response speeds for different indoor air TCE concentrations

Ecology TCP's DRAFT Implementation Memorandum #22

- GOAL:
  - guidance and consistency
  - provide *TCE short-term action levels for indoor air*, and response recommendations, to Ecology site managers and enviro consultants
- APPLIES: at WA state cleanup sites where TCE is a subsurface CoC
- supplements Ecology's 2009 Draft VI Guidance & other VI Implementation Memos

Implementation Memorandum #22

CONTENT:

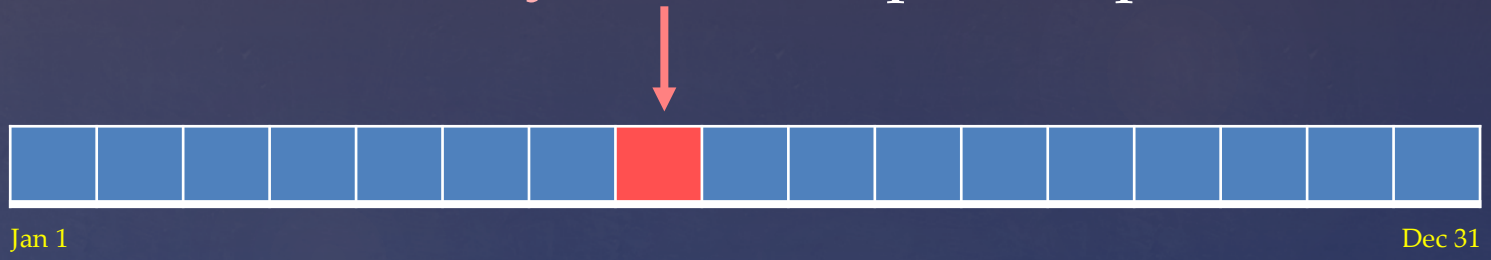
- Applicability [Section 1]
- chapter 4:
  - TCE indoor air short-term action levels (for VI)
  - TCE GW and soil gas screening levels protective of the indoor air short-term action levels (for VI)
- limited investigation/sampling-related info [Section 5]
- response (mitigation, etc.) recommendations [Section 6]
- notification and outreach recommendations [Sections 5 and 7]
- references

Ecology TCE short-term indoor air Action Levels*

	Target TCE Level [µg/m3]	Target Level compared to:	applicability
resident			
Method B air CUL, carcinogen	**0.37**	**long-term** average indoor air TCE concentration	unrestricted use within a building (e.g., where receptors are residents)
Method B air CUL, noncarcinogen	**0.91**	**long-term** average indoor air TCE concentration	unrestricted use within a building (e.g., where receptors are residents)
residential short-term Action Level	**2**	**short-term (3-week) average indoor air TCE concentration**	**unrestricted building use; pregnant woman may be an indoor resident**
worker			
short-term Action Level for workers	**7.5 (45-hr wk)**	**short-term (3-week) average indoor air TCE concentration**	**non-residential building use; pregnant woman may be an indoor "commercial" or "industrial" worker**

* DRAFT Implementation Memorandum #22; Section 4

Ecology's proposed short-term indoor air TCE Action Levels [2 and 7.5 µg/m3] correspond to an average TCE concentration that should not be exceeded over **any** 3-week exposure period.



These ALs should be compared to indoor air measurements/estimates representative of the average indoor TCE concentration over any 3-week period (during 1 or multiple yrs) – due to VI

To ensure that average indoor TCE concentrations are lower than the AL over any 3-week period, you must be able to estimate the **max** 3-week average concentration

Ecology's TCE short-term VI SLs (soil gas and GW; Section 4*)

	indoor air SL/ Action Level [µg/m3]	soil gas VI SL [µg/m3]	GW VI SL [µg/l]
	resident		
TCE	0.37 (CLARC CUL for chronic [1E-6] risk)	12 (CLARC SL to ensure indoor air is ≤ 0.37 µg/m3)	1.6 (CLARC SL to ensure indoor air is ≤ 0.37 µg/m3)
TCE (short-term)	**2** (AL for S-T exposures to women)	**67** (SL to ensure indoor air is ≤ 2 µg/m3)	**8** (SL to ensure indoor air is ≤ 2 µg/m3)
	adult worker (not Method C)		
TCE	2.3** (SL for chronic [1E-6 risk]; 45 hrs/wk)	77 (SL to ensure indoor air is ≤ 2.3 µg/m3)	9.8 (SL to ensure indoor air is ≤ 2.3 µg/m3)
TCE (short-term)	**7.5** (AL for S-T exposures to women; 45 hrs/wk)	**250** (SL to ensure indoor air is ≤ 7.5 µg/m3)	**31** (SL to ensure indoor air is ≤ 7.5 µg/m3)

* DRAFT Implementation Memorandum #22.

** example value for context

Implementation Memorandum #22 Section 5

step-wise process (assessment & response)

- Is TCE in (shallow) GW, soils, soil gas?
- Are TCE concentrations in GW/soils/soil gas high enough to potentially result in indoor air levels above the short-term Action Levels?
- For these buildings, develop a building-specific VI conceptual model, based on what's currently known and can be conservatively assumed

Implementation Memorandum #22 Section 5 (continued)

- Unless it's already known that women of child-bearing age do not, and will not, occupy these buildings, quickly plan for:
  - informing the building owner/tenant of the potential TCE risk, and answering questions
  - a building visit to choose sampling locations, collect info, discuss sampling access, and determine if women of child-bearing age are, or may later be, present
  - determining if Action Level exceedances are occurring. This will require a SAP, access, and indoor sampling
  - protecting the indoor receptors, as needed

sampling results – and plans/proposals for next steps – should be promptly communicated to building owners/tenants/occupants

if VI is impacting indoor air quality and the resulting TCE concentrations exceed short-term Action Levels, **action(s)** should be taken quickly

Section 6: responding to short-term TCE Action Level exceedances

- VI "response actions" are usually implemented as interim actions
- mitigation and "stop gap" actions

Implementation Memorandum #22 Section 6

Region 9's recommended response actions to reduce VI-caused indoor air TCE levels (2014):

- increasing building pressurization and/or ventilation
- sealing conduits where vapors may potentially be entering building
- treating indoor air (carbon filtration, air purifiers)
- temporarily relocating occupants
- installing and operating engineered exposure controls (i.e., mitigation systems; e.g., sub-slab/crawlspace depressurization systems)

Implementation Memorandum #22

Section 7: recommended outreach activities
("working with people who are affected by vapor intrusion")

IM#22 COMMENT PERIOD:

- comments will be accepted on the draft Memorandum through January 7, 2019
- comments must be provided through Ecology's website at: **http://wt.ecology.commentinput.com/?id=7M58V**.
- For more information, contact:

  Ed Jones, HWTR, 425-649-4449, Ed.Jones@ecy.wa.gov; or

  Mark Gordon, TCP, 360-407-6357, Mark.Gordon@ecy.wa.gov