

# Vapor Intrusion and Due Care

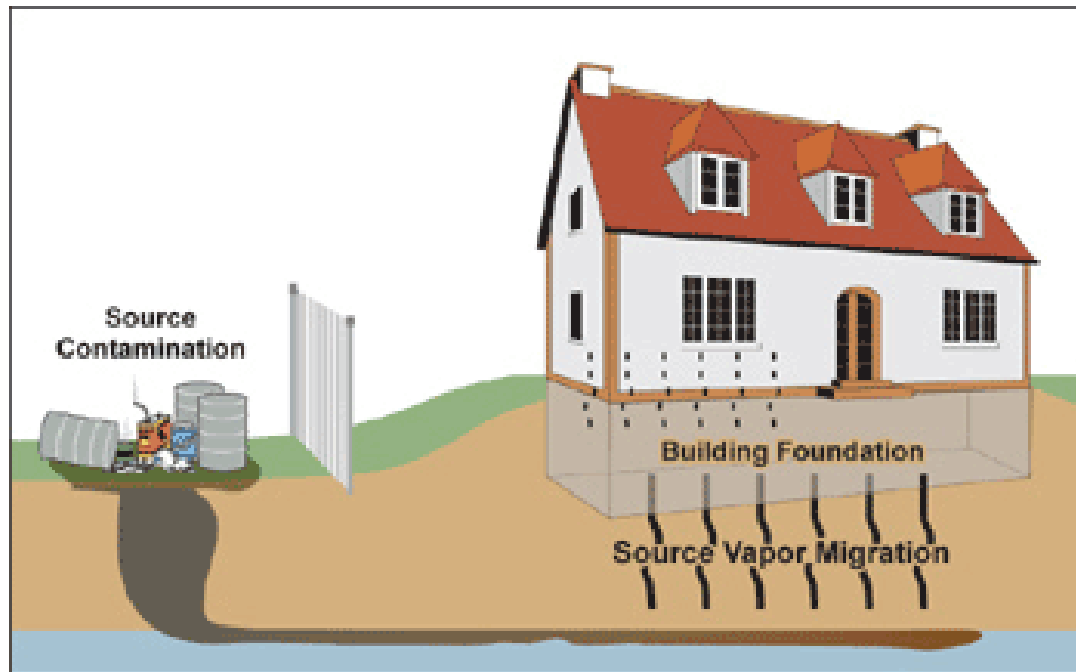
for West Michigan AWMA, April 27, 2017

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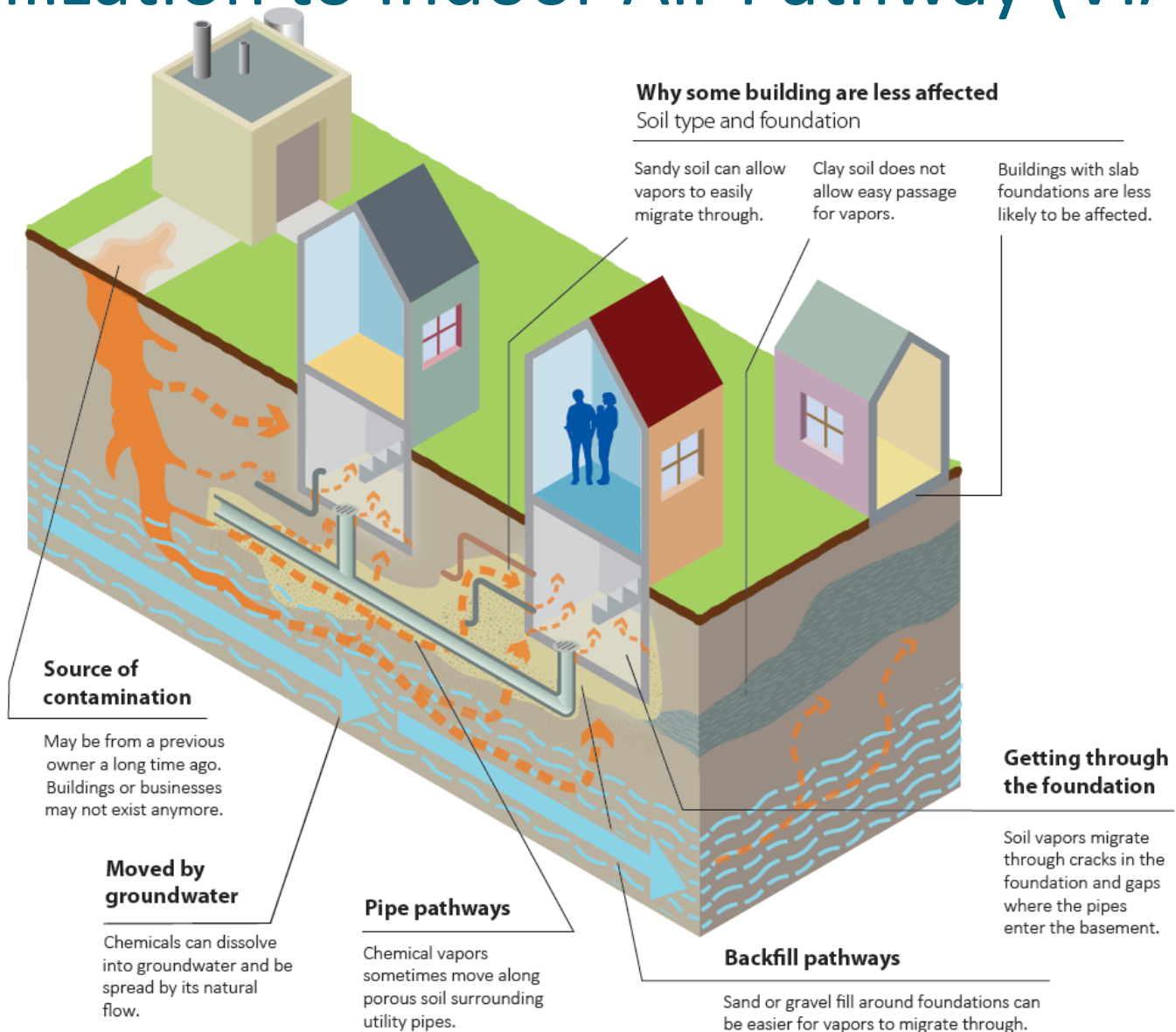


# What is Vapor Intrusion?

Vapor Intrusion or VI is a process by which chemicals in soil or groundwater, especially Volatile Organic Compounds (VOCs), migrate through soil to indoor air.

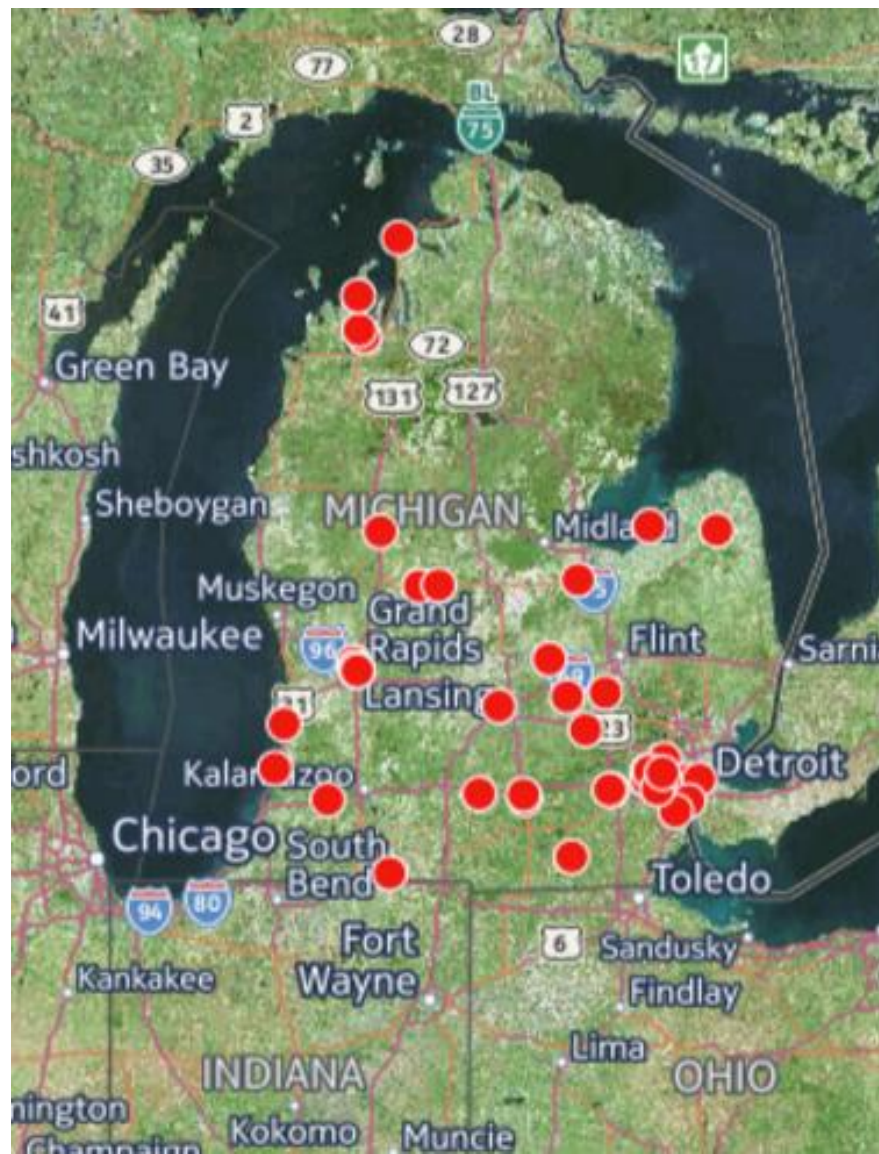


# Volatilization to Indoor Air Pathway (VIAP)



# Vapor Intrusion Is Real

- Updates in the Toxicology and Science of VI
- Vapor Intrusion cases in Grand Rapids
  - 5 evacuations in Michigan since April 2016
- Vapor Intrusion cases around the country.
- Great Lakes States including Ohio has set similar standards
  - <http://epa.ohio.gov/portals/30/Response%20Action%20Levels%20for%20VOC%20Final08.24.2016.pdf>



# Due Care?

- What is Due Care?
- Why is it important for your clients?
- When do you evaluate for Due Care?



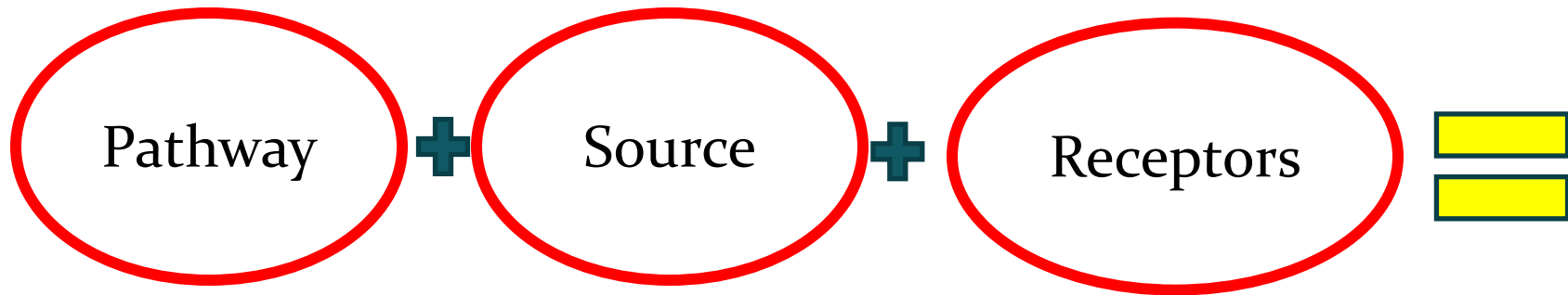
# Common Due Care Mistakes

1. Waiting until after purchase for Due Care Evaluation
2. BEA doesn't fully evaluate all of the Recognized Environmental concerns.
3. More than demonstrating that property is a facility.





# Due Care Obligations?



Complete Pathway for Due  
Care



# Due Care Evaluation vs. Closure Evaluation

## Due Care

- Pathways Complete
- Obligations 24/7/365 – limited to on the property
- Limited to evaluating for potential human exposures
- Based on current use of property
- Not required to record land or resource use restrictions

## Characterization for Closure

- Pathways Relevant
- Obligation to diligently pursue – entire area of “facility”
- Full characterization needed to define contamination
- Demonstrate compliance with criteria
- Must consider future use of facility



# Volatilization to Indoor Air Pathway

## Complete or Not?

### Step 1

#### Considerations:

- Source of vapor present?
  - Remediation Conducted?
- Route of Contamination?
- Receptors?
  - Building Evaluation



# Volatilization to Indoor Air Pathway

## Complete or Not?

### Step 2

- How to compare the data collected?
- Generic Criteria (Does the site meet the assumptions?)
- Screening Levels (Which ones are considered best science and most protective of public health???)





# Generic Criteria/RBSLs

- Obligations under 7a or 4c are based upon the current generic cleanup criteria/RBSLs
- The application is not different than under other sections of 201 or 213
- If the property characteristics are not consistent with the assumptions.... You have an obligation to do an evaluation
- Are the criteria applicable (do site conditions meet the assumptions of the model)?

# Volatilization to Indoor Air Pathway

## Risk Screening Levels

- Current Part 201 Criteria (Chronic)
- Proposed Part 201 Rules w/ Table 4 Screening Levels (Chronic + Acute Considerations for Developmental Toxicants)
- 2013 VI Guidance Document w/ Screening Levels (Chronic)
- Public Health derived screening values (Brown & Gold sheet) (Acute)
- Pending DHHS Screening Values (Acute)



Table of Action and Trigger Levels for vapor intrusion sites (

Analyte	Residential, Mixed Use, Sensitive Populations			Commercial		
	Indoor air ( $\mu\text{g}/\text{m}^3$ )/ppbv	Subslab soil gas ( $\mu\text{g}/\text{m}^3$ )/ppbv	Groundwater ( $\mu\text{g}/\text{L}$ )	Indoor air ( $\mu\text{g}/\text{m}^3$ )/ppbv	Subslab soil gas ( $\mu\text{g}/\text{m}^3$ )/ppbv	Groundwater ( $\mu\text{g}/\text{L}$ )
1,4-Dichlorobenzene	(2.6)/0.43	(85)/14	26	(11)/1.8	(370)/62	110
	(2.6)/0.43	(85)/14	26	(11)/1.8	(370)/62	110
cis-1,2 Dichloroethene <sup>1</sup>	(8.3)/2.0	(280)/71	50	(35)/8.8	(1,200)/300	210
	(25)/6.3	(830)/210	150	(100)/26	(3,500)/880	620
trans-1,2 Dichloroethene <sup>1</sup>	(83)/21	(2,800)/710	220	(350)/88	(11,700)/3,000	920
	(250)/63	(8,300)/2,100	660	(1,100)/260	(35,000)/8,800	2,800
Tetrachloroethylene (PCE)	(42)/6.0 <sup>2</sup>	(1,400)/208	58	(180)/27	(5,800)/860	240
	(110)/16	(3,600)/530	150	(470)/69	(16,000)/2,360	650
1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene	(63)/13	(2,100)/420	170	(260)/53	(9,000)/1,800	730
	(188)/38	(6,300)/1,300	520	(790)/160	(26,000)/5,300	2,200
1,1,1-Trichloroethane	(5,200)/950	(170,000)/31,000	7,400	(22,000)/4,000	(730,000)/130,000	31,000
	(16,000)/2,900	(520,000)/95,000	22,000	(66,000)/12,100	(2,200,000)/400,000	93,000
Trichloroethylene (TCE)	(2.1)/0.4	(70)/13	5.2	(8.8)/1.6	(290)/54	22
	(4.8)/0.89	(160)/30	12	(26)/4.8	(880)/160	65
Vinyl Chloride (VC)	(1.7)/0.67	(56)/22	1.5	(28)/11	(930)/360	25
	(1.7)/0.67	(56)/22	1.5	(28)/11	(930)/360	25

Calculated using the USEPA OSWER Vapor Intrusion Assessment Calculator unless noted.

Peach/orange (top line for each chemical) = Action level: No Further Action if sub-slab is below, collect indoor air if sub-slab is above, mitigation if indoor air is above;

1 in 100,000 HQ of 1

Yellow (bottom line for each chemical) = Trigger level: Evacuation if indoor air is above; ELCR 1 in 100,000 HQ of 3

## Notes:

1. Calculated using the U.S. EPA RSL calculator for indoor air with MDEQ-derived Reference Concentrations ( $8 \mu\text{g}/\text{m}^3$  for cis and trans-1,2 dichloroethene) were adjusted using the attenuation factor of 0.03 for subslab soil gas levels; groundwater levels were calculated using the equation provided in the Green Level Calculator User Guide.  
(Groundwater screening level = indoor air levels / [Henry's Law Constant x attenuation factor groundwater])
2. Adjusted to match the Agency for Toxic Substances and Disease Registry inhalation acute, intermediate, and chronic reference dose for tetrachloroethylene (PCE)

ACUTE VS. CHRONIC

# Emerging VI Paradigm

- Science requires updated assessment; better definition of VIAP risks



# Common Due Care Questions

- Contamination/vapors from my property are present next door, what do I “have” to do?
  - If property is regulated under Part 201
    - ✓ O/O of the source property,
    - ✓ Rule 1017 - Notice of Migration
  - This obligation does not exist under Part 213,.....



# Common Due Care Questions

- My property is a “closed” site, do I still need to evaluate for VI?



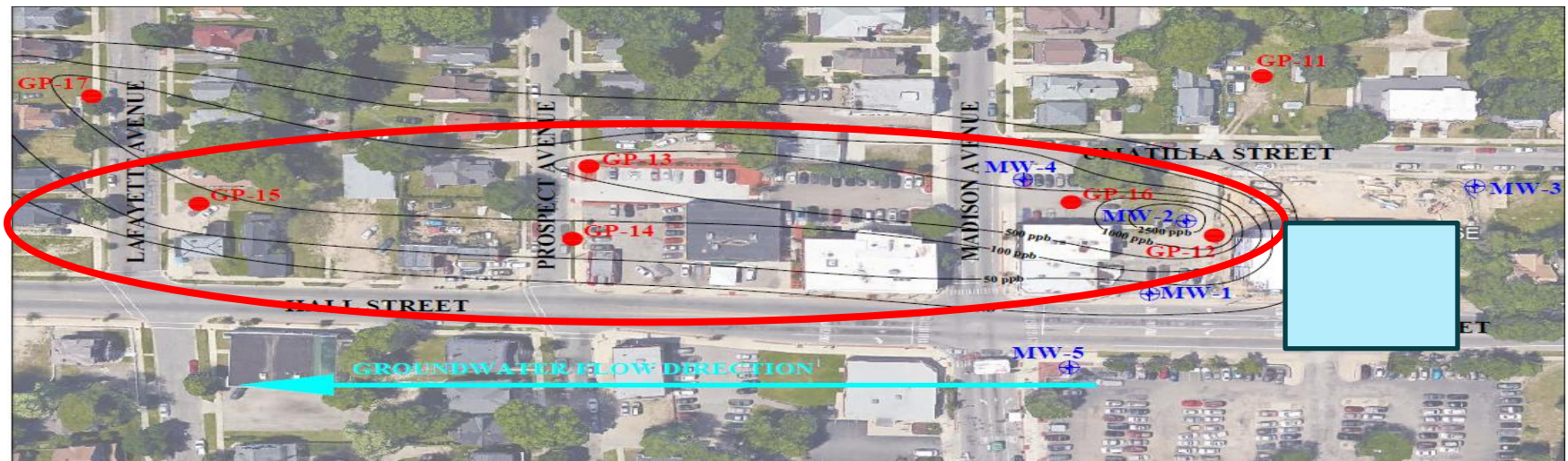
- **Depends:**

- A release (201 or 213) closed unrestricted residential is no longer regulated.
- However if new information comes to light,....
- An O/O's obligations under 7a or 4c...

# Notice of Migration

## To Clarify the obligations:

- NOM required if contamination is migrating off site
- NOM & Soil Gas = not required if only vapors are found off site





# Questions?

# Michigan Department of Environmental Quality

800-662-9278

[www.michigan.gov/deq](http://www.michigan.gov/deq)



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