



**New Hampshire  
Department of Environmental  
Services**

**Vapor Intrusion  
Guidance  
Update**

September 27, 2013

by

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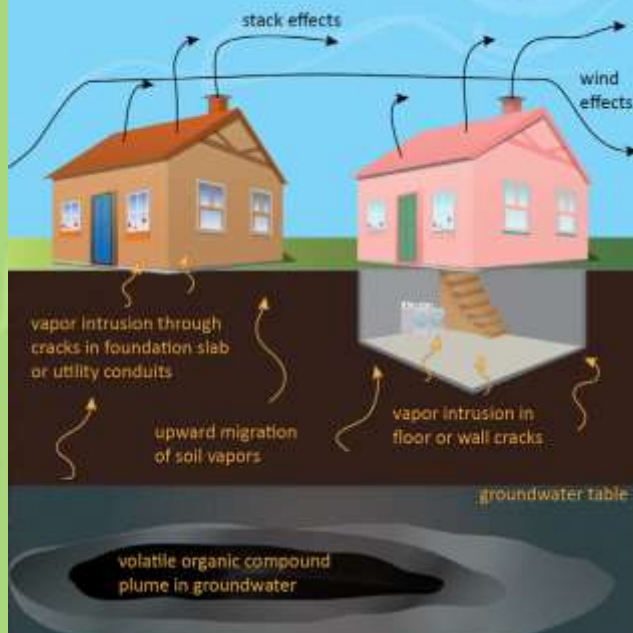
**NEWMOA Vapor Intrusion Workshop  
Westford, MA**

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## Vapor Intrusion

- Partitioning
- Diffusion
- Advection
- Dilution





# NHDES Vapor Intrusion Guidance

- **July 2006 Original Guidance**
- **February 2007**
  - Screening level updates
- **June 2009**
  - Screening level updates
- **July 2011**
  - Screening level updates
  - Sub-slab soil gas sampling
  - Mitigation decision criteria
  - Site specific risk assessments
  - Active facilities
- **February 2013**
  - Screening level updates
  - TCE update

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# NHDES Vapor Intrusion Guidance Updates

## 2013 Updates

- **Screening Level Update**
  - Indoor Air
  - Soil Gas
  - Groundwater
- **TCE Update**
  - Short term and chronic health effects
  - Screening levels
  - Action levels

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## NHDES Vapor Intrusion Guidance Updates

### Indoor Air Screening Levels (IASL)

- **Lowest risk based value**
  - 20% RfC
  - $10^{-6}$  Cancer Risk
- **Background**
  - EPA Background Paper (June 2011)  
<http://www.epa.gov/oswer/vaporintrusion/>
- **Method reporting limit**
  - EPA Method TO-15 SIM

IASL based on highest value

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## NHDES Vapor Intrusion Guidance Updates

### Indoor Air Screening Levels

- **Risk**
  - 25 of the 31 compounds are based on risk
- **Background**
  - Benzene, Ethylbenzene, Naphthalene, 1,2,4-Trimethylbenzene
- **Method reporting limit**
  - Ethylene dibromide, 1,1,2,2-Tetrachloroethane

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## NHDES Vapor Intrusion Guidance Updates

### Soil Gas and Groundwater Screening Levels

- Soil Gas Screening Level  
 $SGSL = IASL / \alpha$   
 $\alpha = 0.02$
- Groundwater Screening Levels (GWSL)  
 $GWSL = IASL / (\alpha \times D \times H \times C)$   
 $\alpha = 0.0001$   
 $D = 0.1$  for PH  
 $H =$  Henry's law constant, dimensionless  
 $C = 1000L/m^3$

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## NHDES Vapor Intrusion Guidance Updates

### TCE Update based on EPA's Integrated Risk Information System Toxicological Review (September 2011)

- Short term health effect
  - Fetal cardiac malformation (FCM) during first trimester
- Chronic health effects
  - Cancer
    - Liver, kidney, non-Hodgkin's lymphoma
  - Non-cancer
    - Thymus effect

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## NHDES Vapor Intrusion Guidance Updates

Chemical	Residential Indoor Air Screening Level $\mu\text{g}/\text{m}^3$	Residential Indoor Air Action Level $\mu\text{g}/\text{m}^3$	Commercial Indoor Air Screening Level $\mu\text{g}/\text{m}^3$	Commercial Indoor Air Action Level $\mu\text{g}/\text{m}^3$
<b>TCE</b>	<b>0.4</b>	<b>2.0*</b>	<b>1.8</b>	<b>8.8*</b>

\* TCE Action levels based on FCM short term health effect

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## NHDES Vapor Intrusion Guidance Updates

### TCE Above the Indoor Air Action Level

If women of child bearing age are present  
NHDES recommends they be informed of the  
potential FCM short term health effect and be  
relocated.

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 Chemical	2013 Residential Indoor Air Screening Levels	2011 Residential Indoor Air Screening Levels	2013 GW-2	2011 GW-2
	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/L)	(µg/L)
Dichloroethane, 1,1-	1.7	100	130	10,000
Methylene Chloride	120	5.6	24,000	1,000
Ethylene dibromide	0.04	1.5	35	700
PCE	8.0	1.4	240	80
Trichlorobenzene, 1,2,4-	0.4	3.7	150	1,000
TCE	0.4	1.3	20	100



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- **TCE Update**
  - Short term and chronic term health effects
  - Screening levels
  - Action levels

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Department of  
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