

Addressing Potential TCE Exposures at Closed Sites



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Basic Regulatory Questions for Suspected Chemical Releases

- Are the releases rare?... Common?
- Are the quantities released small?... Large?
- Are the chemicals of low toxicity?... High?
- Are the compounds easily biodegraded?...
Are they persistent?
- Are the chemicals insoluble and/or non-
volatile?... Are they mobile?

How Concerned Should We Be About Potential Exposures?



How Concerned Should We Be About Potential Exposures?

Small, rare releases of relatively non-toxic, immobile biodegradable material that we fully understand

More Concern



Less Concern

Large, common releases of mysterious, persistent toxic chemicals that migrate quickly in the environment



Change in USEPA Toxicity Information

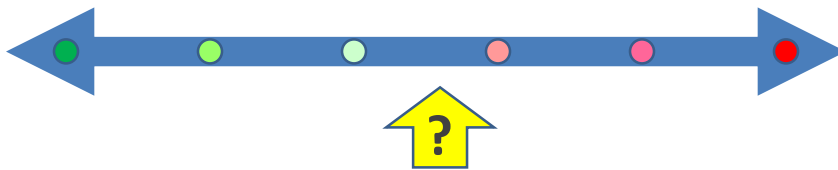
Considered carcinogenic to humans but most sensitive endpoint is non-cancer health effects:

- 2011 EPA released new “Reference Concentration” (RfC) of $2 \mu\text{g}/\text{m}^3$
- $2 \mu\text{g}/\text{m}^3$ is safe for short- and long-term exposure
- RfC considers developmental effects (fetal cardiac malformations) that may occur **after only a few days exposure** during early pregnancy



TCE as an Emerging Contaminant

Change in toxicity information results in a change in level of concern



At what point above $2 \mu\text{g}/\text{m}^3$ is TCE exposure a concern pregnant women?

- MassDEP raised the issue with its Health Effects Advisory Committee
- Short-term levels of concern identified for
 - Women who may be in their first 8 weeks of pregnancy;
 - General population;
 - Residential settings; and
 - Workplace settings



Combination of VI & TCE

1. Relatively low levels of TCE in soil or groundwater can result in low-but-significant contamination in indoor air
2. Limited options for effective short-term actions to reduce exposure potential
3. Sites closed under OLD cleanup standards may still have levels of concern in soil or groundwater
4. MGL c21E requires MassDEP to insure that all Imminent Hazards are addressed




Imminent Hazard Values for Pregnant Women and Those Who May Become Pregnant

<i>Residential Exposure Scenario</i> ⁵	Indoor Air Concentration	Concern Level	Actions
Fetal developmental effects (Subchronic Exposure Noncancer Risk, HQ=1)	> 6 µg/m³	Imminent Hazard 2-hr Notification	Immediate Response Action Goal to reduce levels to <u>at least</u> less than 6 µg/m ³ ASAP (within several days if possible)
<i>Typical Workplace Exposure Scenario</i> ⁶	Indoor Air Concentration	Concern Level	Actions
Fetal developmental effects (Subchronic Exposure Noncancer Risk, HQ=1)	> 24 µg/m³	Imminent Hazard 2-hr Notification	Immediate Response Action Goal to reduce levels to <u>at least</u> less than 24 µg/m ³ ASAP (within several days to a week if possible)




Imminent Hazard Values for All Receptors

<i>Residential Exposure Scenario</i>	Indoor Air Concentration	Concern Level	Actions
Immune system effects (Subchronic Exposure Noncancer Risk, HQ=10)	> 20 µg/m³	Imminent Hazard 2-hr Notification	Immediate Response Action initiated on an expedited time table
<i>Typical Workplace Exposure Scenario</i>	Indoor Air Concentration	Concern Level	Actions
Immune system effects (Subchronic Exposure Noncancer Risk, HQ=10)	> 80 µg/m³	Imminent Hazard 2-hr Notification	Immediate Response Action initiated on an expedited time table



Changes in Toxicity => Changes in Levels of Concern
for TCE In Indoor Air and Groundwater for
POTENTIAL Imminent Hazards

(Residential)	Pre-2011	Current
Indoor Air	85 µg/m ³	6 µg/m ³
Groundwater	300 µg/L pre-2006 50 µg/L post-2006	5 µg/L
Health Effect	Long-term Cancer Risk	Short-term Developmental Effect



Scope of the Potential Problem

- **~ 1,000(+/-) potential sites for initial screen**
Based on a database search for “TCE”,
“trichloroethylene”, “chlorinated solvents”, etc. -
NOT DEFINITIVE
- **~ 200 (+/-) identified for follow-up**
concentration of TCE in groundwater, proximity to
receptors, etc
- **~25% (+/-) of follow-up results in addition response
actions** “worst sites” prioritized



MassDEP Review of Conditions at TCE Sites Closed Under Old Standards

- MassDEP contact current owners
- MassDEP can/will conduct initial sampling
to determine if current conditions require
further assessment or response actions
- Primary concern is identifying any potential
for exposure and mitigating that exposure,
NOT enforcement



It is Not Just “Closed” Sites:

- Downgradient Property Status
- Financial Inability
- Temporary Solutions
- Permanent Solutions (RAOs) in past
- Partial Permanent Solutions (RAO-P)
- Adequately Regulated Sites
- Active (in process) Sites
- Self-Motivated Re-Notifications
- BRAND NEW Sites



MassDEP TCE Information Online

<http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/site-cleanup-policies-guidance.html#4>

- A Fact Sheet, *“TCE Toxicity Information: Implications for Chronic and Shorter-Term Exposure”* targeted to the regulated community;
- Two sets of *“Frequently Asked Questions”*, for residential and workplace exposures, to address concerns raised by individuals who live and work in buildings affected by the TCE contamination;
- Documentation of MassDEP’s review of the USEPA’s toxicity values for TCE and the Department’s advisory committee recommendations for addressing short-term exposure; and
- technical guidance: *“Vapor Intrusion Guidance: Site Assessment, Mitigation and Closure”*

