Toxicity Information Updates

NEWMOA Meeting
EPA New England Presentation
March 28, 2013

Topics

- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Dioxin
- Naphthalene
PCE

- Final Health Assessment released Feb. 2012 with new IRIS toxicity values (oral and inhalation).
- Comparing to old toxicity values:
  - New cancer values decrease → cancer risks decrease → cancer screening levels less stringent
  - New non-cancer values decrease → NC hazards increase → NC screening levels more stringent
- No change to MCL of 5 µg/L.

<table>
<thead>
<tr>
<th>Medium</th>
<th>1E-06 Cancer Risk Screening Level (Old Screening Level)</th>
<th>Hl=0.1 Non-cancer Screening Level (Old Screening Level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Soil</td>
<td>21.9 mg/kg (0.6)</td>
<td>8.6 mg/kg (37.2)</td>
</tr>
<tr>
<td>Residential Tap Water</td>
<td>9.8 µg/L (0.072)</td>
<td>3.5 µg/L (8.4)</td>
</tr>
<tr>
<td>Residential Indoor Air</td>
<td>9.4 µg/m³ (0.4)</td>
<td>4.2 µg/m³ (28.2)</td>
</tr>
<tr>
<td>Groundwater for Vapor Intrusion</td>
<td>12.5 µg/L (0.5)</td>
<td>5.6 µg/L (37.3)</td>
</tr>
</tbody>
</table>
PCE - Worker Screening Levels

<table>
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<tr>
<th>Medium</th>
<th>1E-06 Cancer Risk Screening Level</th>
<th>HI=0.1 Non-cancer Screening Level</th>
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<tbody>
<tr>
<td>Soil</td>
<td>110.0 mg/kg</td>
<td>41.3 mg/kg</td>
</tr>
<tr>
<td>Indoor Air</td>
<td>47.2 µg/m³</td>
<td>17.5 µg/m³</td>
</tr>
<tr>
<td>Groundwater for Vapor Intrusion</td>
<td>63.0 µg/L</td>
<td>23.3 µg/L</td>
</tr>
</tbody>
</table>

TCE

- Final Health Assessment released Sep. 2011 with new IRIS toxicity values (oral and inhalation).
- Comparing to old toxicity values:
  - New cancer values increase \( \rightarrow \) cancer risks increase \( \rightarrow \) cancer screening levels more stringent
  - New non-cancer values decrease \( \rightarrow \) NC hazards increase \( \rightarrow \) NC screening levels more stringent
- No change to MCL of 5 µg/L.
TCE

• Cancer values: oral slope factor (CSF) and inhalation unit risk (IUR)

• Cancer values have 2 components:
  ▪ Kidney Cancer
    • Mutagenic Mode of Action
    • More toxic for Early Life Exposure
    • Age-Dependent Adjustment Factors apply
  ▪ Non-Hodgkin Lymphoma and Liver Cancer
    • No adjustments needed

TCE

• Non-cancer values:
  ▪ Oral reference dose (RfD) value based on critical effects of heart malformations (rats), adult immunological effects (mice), and developmental immunotoxicity (mice).

  ▪ Inhalation reference concentration (RfC) value based on route-to-route extrapolated results from oral studies for critical effects of heart malformations (rats) and immunotoxicity (mice).
### TCE - Residential Screening Levels

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<tr>
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<th>HI=0.1 Non-cancer Screen (Old Screening Level)</th>
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</thead>
<tbody>
<tr>
<td>Residential Soil</td>
<td>0.91 m/kg</td>
<td>0.44 mg/kg</td>
</tr>
<tr>
<td>Residential Tap Water</td>
<td>0.44 µg/L (2.0)</td>
<td>0.26 µg/L (2.1)</td>
</tr>
<tr>
<td>Residential Indoor Air</td>
<td>0.43 µg/m³ (1.2)</td>
<td>0.21 µg/m³ (1.0)</td>
</tr>
<tr>
<td>Groundwater for Vapor Intrusion</td>
<td>1 µg/L (2.89)</td>
<td>0.5 µg/L (2.38)</td>
</tr>
</tbody>
</table>

### TCE - Worker Screening Levels

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<th>1E-06 Cancer Risk Screening Level</th>
<th>HI=0.1 Non-cancer Screening Level</th>
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</thead>
<tbody>
<tr>
<td>Indoor Air</td>
<td>3.0 µg/m³</td>
<td>0.88 µg/m³</td>
</tr>
<tr>
<td>Groundwater for Vapor Intrusion</td>
<td>7.1 µg/L</td>
<td>2.1 µg/L</td>
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</tbody>
</table>
TCE – short-term exposure issue

• Chronic toxicity values (RfD and RfC) are estimates of continuous exposure without an appreciable risk of non-cancer effects over a lifetime.

• TCE RfD and RfC based on increased developmental effects (fetal cardiac malformations) observed in short-term exposure to rats.

TCE – short-term exposure issue

• Issue: Chronic toxicity value versus short-term exposure with developmental health effects.

• Significant implications regarding immediate actions and decisions to reduce exposure.
TCE – short-term exposure issue

- **Question:** What is the appropriate duration exposure measure for comparison with chronic RfD and RfC based on short-term developmental effects?

- ORD and OSWER currently reviewing available science and implications to develop recommendations for appropriate exposure time frame.

TCE – Issues at VI Sites

- **Implementation issues**
  - Use the RfC value as average or not-to-exceed?
  - Sampling – how many rounds, samples, days?
  - Analytical turn-around time
  - Short time to respond upon receiving data
  - What are the appropriate actions? At what level and when to consider them?
  - Communications – how and when to inform potentially exposed people – before or after sampling?
  - Cost
  - Legal/enforcement
**Dioxin Reanalysis Vol.1**

- Final **Non-Cancer** Dioxin Reanalysis (Vol.1) released Feb. 2012 with new IRIS oral RfD of $1E^{-09}$ mg/kg-day for 2,3,7,8-TCDD.
- To use RfD to develop site-specific risk-based cleanup levels at CERCLA and RCRA sites.
- To use RfD for soil, dust, sediment, fish tissue via ingestion and dermal pathways.

**Dioxin Reanalysis Vol.2**

- **Cancer** Dioxin Reanalysis (Vol.2) is under development, schedule TBD.
- Available oral CSF for use from different sources (EPA 1985, CalEPA), not on IRIS.
### Risk-based Dioxin Soil Levels

<table>
<thead>
<tr>
<th></th>
<th>Cancer Risk-Based</th>
<th>$HI = 0.1$</th>
<th>$HI = 1.0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident</td>
<td>4.5 ppt</td>
<td>5 ppt</td>
<td>50 ppt</td>
</tr>
<tr>
<td>Outdoor Worker</td>
<td>18 ppt</td>
<td>66 ppt</td>
<td>660 ppt</td>
</tr>
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</table>

### Dioxin – Sampling and Cleanup Levels

- Recommend an incremental composite sampling approach for soil and sediment.
- **Dioxin Tool Box for sampling and analysis**
  - [http://www.epa.gov/superfund/health/contaminants/dioxin/dioxinsoil.html](http://www.epa.gov/superfund/health/contaminants/dioxin/dioxinsoil.html)
- Consult with HQ on sampling and setting dioxin cleanup levels.
Naphthalene

• Currently, non-cancer toxicity values (oral and inhalation) available on IRIS.

• Additional assessment under development, schedule TBD.