Arsenic in Rhode Island

An Update to the Environmental Round Table on

The Legislative Commission on Arsenic

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Office of Waste Management

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Legislative Commission on Arsenic

• Created by Legislature to evaluate arsenic in soil & standards.

• Members included legislators, housing groups, DEM, DOH, and others.

• Met throughout winter/spring 2007.
Focus of Commission:

• Fiscal impacts of arsenic remediation on affordability of housing.

• Evaluate/understand naturally occurring arsenic levels in the State - particularly Aquidneck Island levels.

• Understand rationale of current standards.
DEM’s Discussion Points:

• Overview of State Standards
  Risk Based versus Background

• Existing State/Federal Arsenic Standards

• History of R.I. Arsenic Standard & Background Studies

• Current Regulatory Options for Remediation.
Discussion on Standards:

• R.I. clean up standards (both residential and industrial/commercial standards) for most metals are based on US EPA human health risk calculations.

• The R.I. Arsenic standard is based on state background studies, and is not a risk based standard.
What does “risk based” mean?

- Risk is the chance or probability of an event occurring (e.g. cancer).

- Risk = Hazard x Exposure

- Hazard is “How toxic is it?”

- Exposure is “How likely is it to happen?”
Results for Arsenic:

• For arsenic – a calculated risk based standard, using the default parameters for a residential exposure scenario, would be 0.4 ppm.

• The current 7 ppm standard therefore represents an increased risk of about 1 in 50,000.
Existing State/Federal Arsenic Standards
<table>
<thead>
<tr>
<th>State</th>
<th>Residential</th>
<th>Industrial/Non Residential</th>
<th>Basis of Standard</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>0.4</td>
<td>1.6</td>
<td>Risk based</td>
<td>No statewide background study performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>screening levels. Site-specific studies allowable.</td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska</td>
<td>8 artic zone 4.5-5.5 40 inch zone</td>
<td>Risk Based</td>
<td>No Background study</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>0.07</td>
<td>0.24</td>
<td>Risk Based</td>
<td>No background study found</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recommend evaluating background</td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
<td>0.21</td>
<td>0.81</td>
<td>Risk based</td>
<td>No background study</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>guidance 1 superfund site background 10-14 ppm</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>Background</td>
<td>UCL</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Connecticut</td>
<td>Background</td>
<td>10</td>
<td>No Background study performed. Background value determined by professional judgment.</td>
<td></td>
</tr>
<tr>
<td>Delaware</td>
<td>11 Change in 2005 23</td>
<td>20</td>
<td>Average 10, 95 % UCL 29 (Based on 19 soil samples and review of 20 sites)</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>2.1</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>20</td>
<td></td>
<td>Background based</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>0.4? From compendium, could not confirm by evaluating regs.</td>
<td>3.0? From compendium, could not confirm by evaluating regs.</td>
<td>Could not find standards for arsenic which confirm number listed</td>
<td>Background 11 -13</td>
</tr>
<tr>
<td>State</td>
<td>Background</td>
<td>Site Specific Background</td>
<td>Risk Based, Background (Typically Employed)</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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<td>----------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Iowa       | 1.4        | Or site specific background | Risk based, Background (typically employed) | Mean 8.9  
Range 0.59-55  
95 % UCL 9.4  
Site specific mean must be below statewide 95 percentile (21.2), no points above 95 percentile one half of samples must be below 60 percentile (8.3) |
| Kentucky   | 0.39 or background | 1.6 or background | Risk based, Background (typically employed) | No background study performed                                                                        |
| Louisiana  | 12         | 12                         | Risked based.                              | No background study performed                                                                        |
| Maine      | 10         | 30                         | Risked Based                               | No background study performed                                                                        |
| Maryland   | 2          | 3.8                        | Risked Based                               | No background study performed                                                                        |
| Massachusetts | 20       | 20                         | Risked Based                               | 3 Background Studies  
Statewide  
139 samples  
Average 4.8,  
95 UCL 24.5  
Central Artery Project  
754 sample  
Average 5.3,  
95 UCL 21  
Boston Area  
599 samples  
Average 5.5  
95 UCL 12.9 |
<table>
<thead>
<tr>
<th>Region 9 PRGs</th>
<th>non cancer endpoint</th>
<th>22</th>
<th>260</th>
<th>Risk Based (non cancer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 9 PRGs cancer endpoint</td>
<td>0.39</td>
<td>1.6</td>
<td>Risk based</td>
<td></td>
</tr>
<tr>
<td>Region 6 PRGs</td>
<td>non cancer endpoint</td>
<td>22</td>
<td>280</td>
<td>Risk based (non cancer)</td>
</tr>
<tr>
<td>_region 6 PRGs cancer endpoint</td>
<td>0.39</td>
<td>1.8</td>
<td>Risk based</td>
<td></td>
</tr>
<tr>
<td>Region 3 PRGs</td>
<td>0.43</td>
<td>1.9</td>
<td>Risk based</td>
<td></td>
</tr>
</tbody>
</table>
History of R.I. Arsenic Standard & Background Studies
How Did We Get Here?

• Remediation Regs 1993 – No soil criteria
• Remediation Regs 1996 – Included soil criteria
  – 3 Public work shops
  – 1 Public hearing
  – Many one on one stakeholder meetings
  – Arsenic residential criteria of 1.7 ppm based on geometric average of background study 106 samples
• RIDEM Arsenic workshops 2000 to 2003
• Remediation Regs 2004 – Revised Arsenic Criteria to 7 ppm based on background study using 374 samples (including some of the 106)
2001 Background Study

Statewide:

Thesis evaluated 1,039 total sites
971 total samples

Final Data Base 125 sites
374 background samples

State Average 1.87 ppm
95% UCL 7.1 ppm
2001 Background Study cont.

Aquidneck Island data

- Total # of samples reviewed = 105
- Total # background samples incl. = 62
Additional Aquidneck Island data compiled, not included in 2001 study

- 10 Additional sites reviewed
- 398 total background samples
- 97 of 398 samples from Newport
- Average concentration = 4.2 ppm
Current Regulatory Options for Remediation

Rule 12.0 – Special Requirements for Managing Arsenic in Soil
2004 revisions included, but not limited to:

Rule 12.02 Sampling Requirements

- Reduced the minimum # of samples required to determine consistency with background from 20 to 10 samples.
Rule 12.03 Determining Compliance with the Standard

- Allows 10% of results to exceed standard, up to 15 ppm.
- Allows averaging of results.
Rule 12.04 Remedial Options for Jurisdictional Arsenic Releases Above 7.0 ppm

- Reduces encapsulation requirements for arsenic between 7 & 15 ppm
- 6” inch soil cap versus 2’ feet.
- Permits soil blending to lower levels.
Rule 12.05 Certification Requirements for Sites Formerly Jurisdictional

• Created simple mechanism for releasing any title restrictions on deed, required under prior regulations.
Commission Findings:

• General agreement to not change or raise the existing standard of 7 ppm.

• Have DEM & DOH meet with Housing Groups to meet/evaluate more cost effective remedies.

• Bothered by inconsistent sampling/reporting requirements – given prevalence of arsenic.

• Reconvene in fall/winter 2007.
DEM, DOH, Housing Group Sub-Committee

• Met several times this summer.
• Evaluating pros/cons of applying DOH model for residential lead remediation to arsenic (i.e. reducing cap requirements).
• Evaluating impacts & possible alternatives to the ELUR (as the institutional control mechanism) for homeowners w/ arsenic.
• Evaluating broader outreach options to the public on arsenic – possibly thru the Real Estate disclosure act.
Next Steps:

• Sub-Committee will report back to Commission this fall.
• Commission will evaluate those recommendations for further consideration.
• Possible Regulatory Changes this winter?
• Possible Statute changes next Spring?
Questions?