Air Sparging

“A report on contamination remediation technology”

Caleb Wegener
Juliette Cortez
Jenna Davey
Chris Bautista
What is Air Sparging?

- Also called in situ volatilization.

- The injection of air into the soil below the groundwater.

- It is used to extract VOCs.

- Normally used with soil vapor extraction.
How does it work?

<table>
<thead>
<tr>
<th>total marked-up costs:</th>
<th>small site</th>
<th>Difficult (sand-silt/sand-clay)</th>
<th>large site</th>
<th>difficult (sand-silt/sand-clay)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>easy (gravel/sand)</td>
<td></td>
<td>easy (gravel/sand)</td>
<td></td>
</tr>
<tr>
<td>Air Sparging</td>
<td>$70,817</td>
<td>$143,169</td>
<td>$399,386</td>
<td>$2,070,532</td>
</tr>
<tr>
<td>Soil Vaper Extraction</td>
<td>$80,295</td>
<td>$93,536</td>
<td>$152,989</td>
<td>$368,465</td>
</tr>
<tr>
<td>Chemical Oxidation</td>
<td>$327,664</td>
<td>$368,553</td>
<td>$814,971</td>
<td>$1,032,496</td>
</tr>
<tr>
<td>Bioventing (In-situ Bio-Remediation)</td>
<td>$59,101</td>
<td>$61,805</td>
<td>$100,334</td>
<td>$139,266</td>
</tr>
<tr>
<td>Phytoremediation (In-situ Bio-Remediation)</td>
<td>$239,482</td>
<td>$887,681</td>
<td>$1,121,846</td>
<td>$3,691,490</td>
</tr>
</tbody>
</table>
Costs

- Not the cheapest option compared to other remediation technologies
- Recommend using a different option
- Cheaper and more effective alternatives
- Air sparging + SVE=$2,438,997
Limitations of Air Sparging

- Mobilization of contaminants

- Mounding: Rising of the vadose zone due to subsurface waves and increased air pressure

- “Radius of influence” vs “zone of influence”
  - Radius > zone

- Ground movement damaging nearby structures

- Escaping vapors

- Soil
What else?

- Contaminant type
- Sufficient air distribution/many injection wells
- Electrical resistivity tomography (ERT), Geophysical diffraction tomography (GDT), and vertical induction profiling (VIP).
- Too many variables
- Short/long term remediation
Figure 4.19  Cleanup rates for various contaminants during *in situ* air sparging.
Will this help HSU?

- Think about the lab from last week
- How did having the playdough/clay affect the water and contaminant flow?
- The three soils/sand demonstrated that we have many heterogenous soils
How does it work?

http://www2.bren.ucsb.edu/~keller/courses/esm223/SuthersanCh04AirSparge.pdf


