

# Air Sparging

The image shows an outdoor site with two air sparging units. Each unit consists of a yellow and orange vertical riser pipe with a black hose connected to it. The hoses run across a grassy field towards a manifold in the foreground. The manifold is made of white PVC pipes with several red-handled valves. The background shows a line of trees with some autumn-colored leaves.

"A report on contamination remediation technology"

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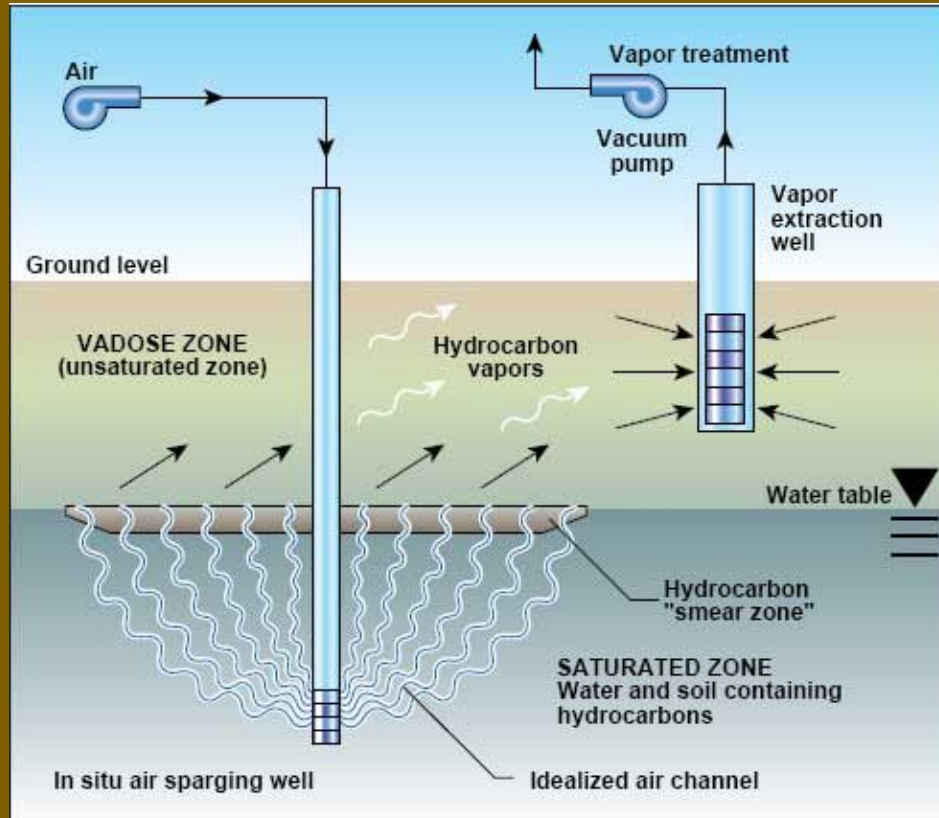
# What is Air Sparging?

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- 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?



## Price Comparison

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



# Costs

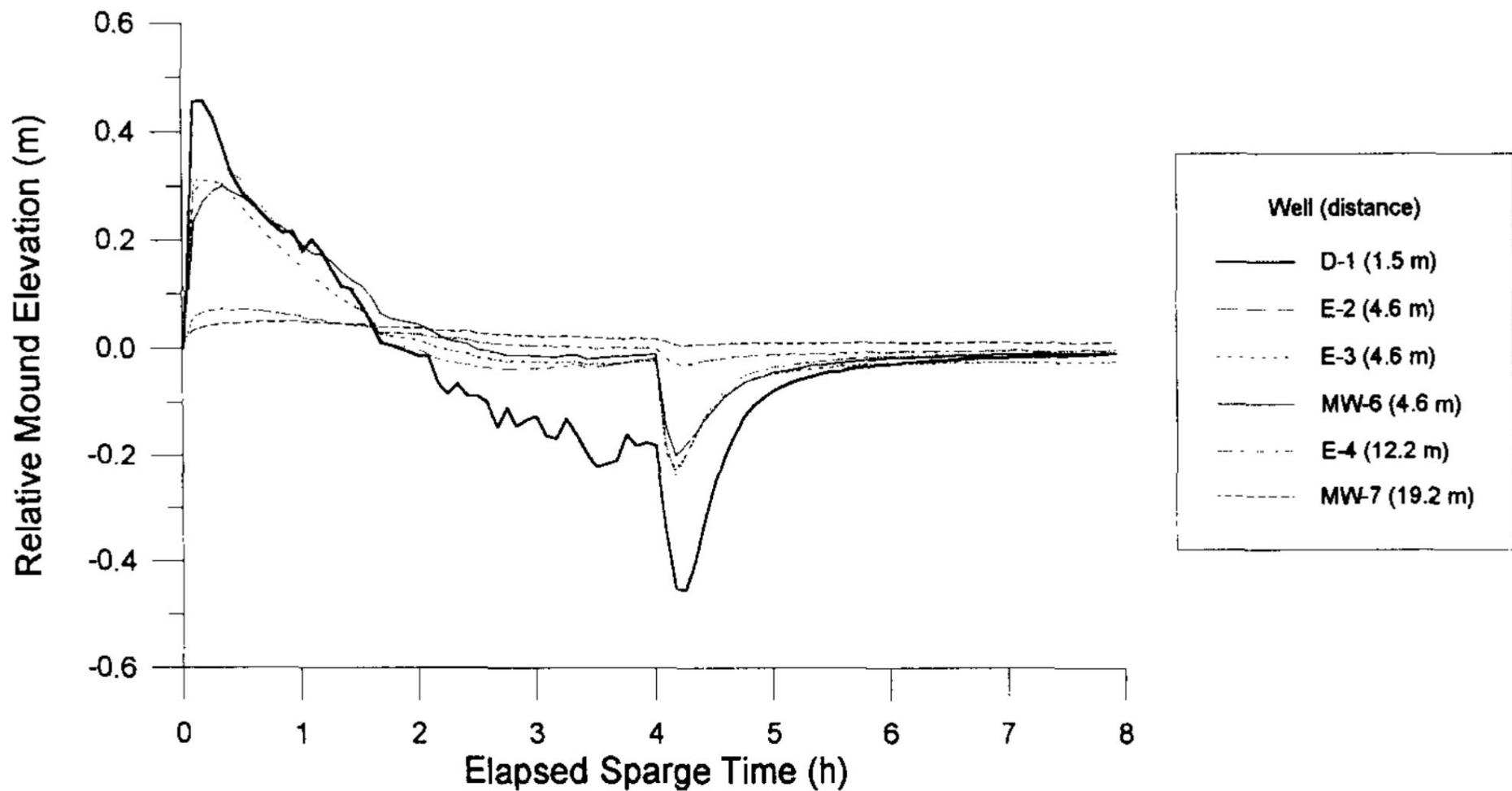
- Not the cheapest option compared to other remediation technologies
- Recommend using a different option
- Cheaper and more effective alternatives
- Air sparging + SVE=\$2,438,997

*Bankruptcy*

Do not pass Go,

do not collect \$200





# Limitations of Air Sparging

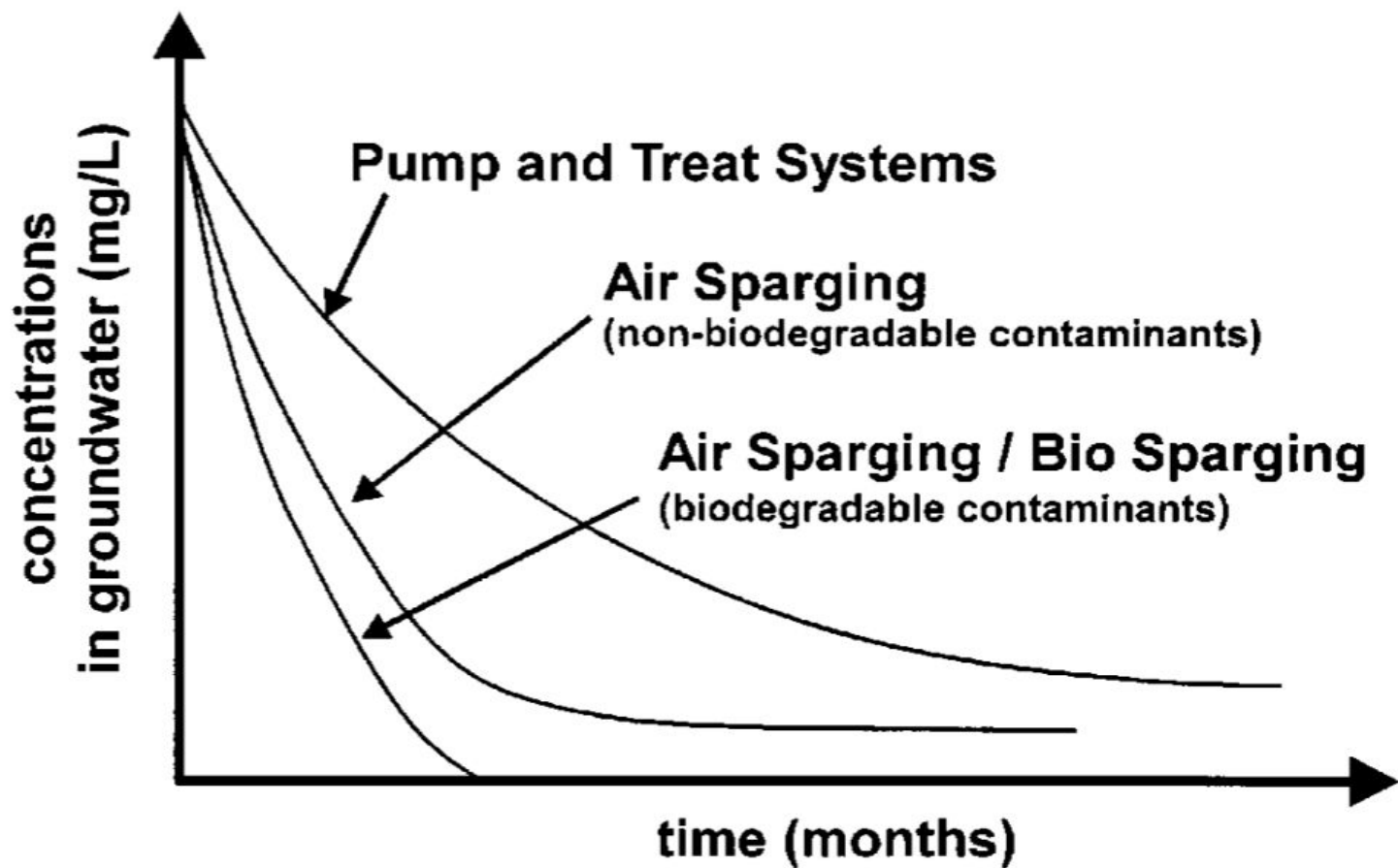
- Mobilization of contaminants
- Mounding: Rising of the vadose zone due to subsurface waves and increased air pressure
- “Radius of influence” vs “zone of influence”
  - Radius > zone
- Ground movement damaging nearby structures
- Escaping vapors
- Soil

# What else?

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- 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?

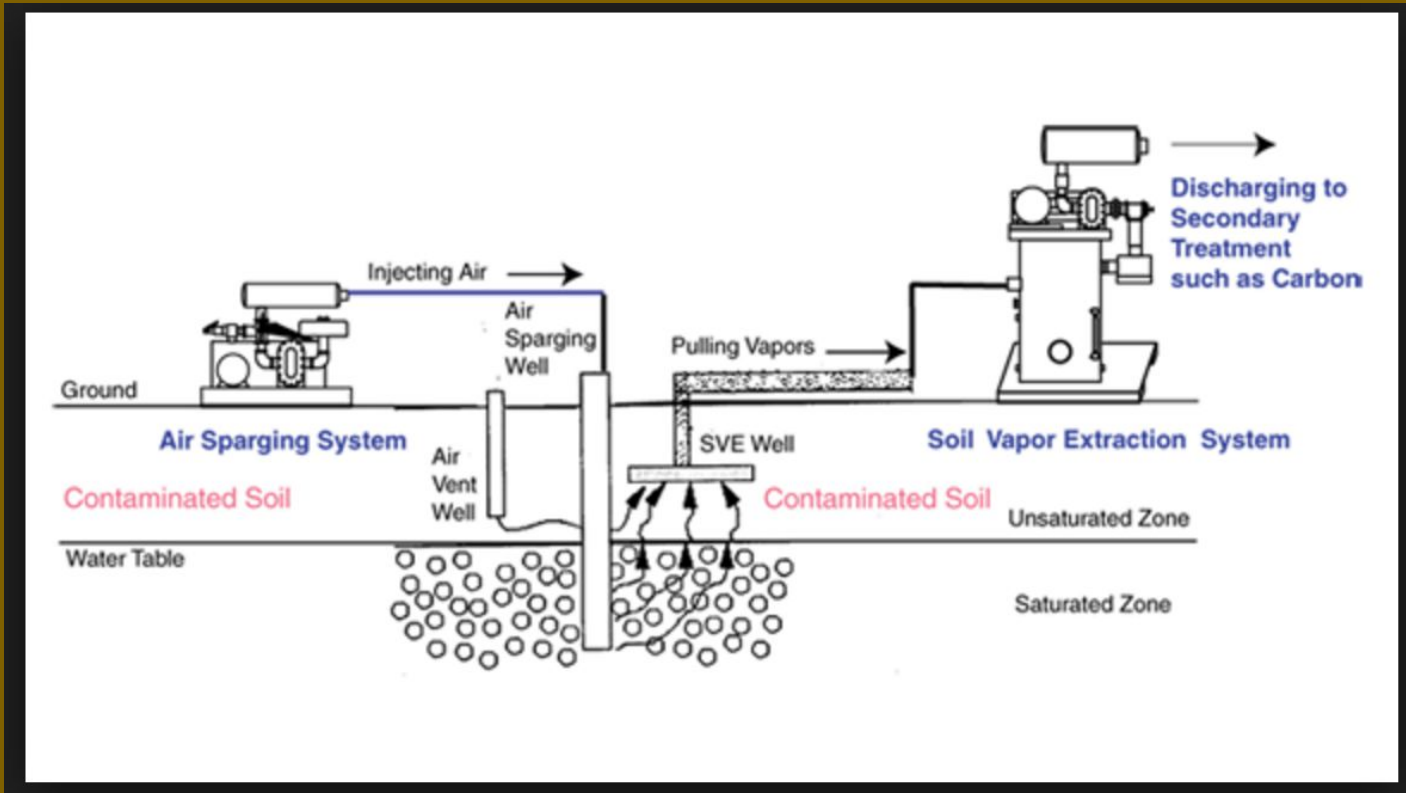
- Think about the lab from last week
- How did having the playdough/clay affect the water and contaminant flow?
- The three soils/sand demonstrated that we have many heterogenous soils

MONITORING WELL LOG						Well No.	MW-2
PROJECT:			PROJECT NO.:				
BORING LOCATION: HSU Plant Operations			DATE: 9/13/02				
DRILLING METHOD: Rotary auger			ELEVATION:				
DRILLER: Lake's Well Drilling			LOGGED BY: TDN				
DEPTH TO WATER: INITIAL 7'			COMPLETION 7'				
SITE GEOLOGY: Pleistocene Marine Terrace							
WELL CASING: 0.010 PVC			WELL SCREEN AND INTERVAL: screened 1'-6' bgs				
SEAL AND INTERVAL: sealed 0'-1' bgs			SAND PACK AND INTERVAL: 2/12 sand 1'-6' bgs				

ELEVATION/ DEPTH	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	P.D. ppm	Handy Result	Well Construction Diagram
0			Asphalt.			
0.5		GW-GM	GRAVEL fill; black, loose, wet, 10% clay, 30% silt, 30% well graded sand, 30% well graded gravel. No hydrocarbon odor or staining.			
2		ML	SILT; black, soft, moist, 90% silt, 10% fine sand. No hydrocarbon odor or staining.			
2.5		SC	SANDY CLAY; gray, soft to firm, moist, low to medium plasticity, 50% clay, 10% silt, 40% sand. No hydrocarbon odor or staining.			
3.5		SM	SAND with SILT; green brown, soft, moist, 5% clay, 15% silt, 80% fine sand. No hydrocarbon odor or staining.			
4		SC	SANDY CLAY; light brown, 50% clay, 10% silt, 40% sand. No hydrocarbon odor or staining.			
5		CL-CH	CLAY; orange brown, 80% clay, 10% silt, 10% sand. No hydrocarbon odor or staining.			
6.5			HALT at 6.5' bgs.			

# How does it work?



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