



## 700 South 1600 East PCE Plume – U.S. EPA Region 8 CERCLA NPL Site Salt Lake City, Utah

### Public Information Meeting

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March 30, 2017



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# 700 South 1600 East PCE Plume Site History

- VA operated Dry Cleaning Facility On Site in late 70s
- Tetrachloroethylene(PCE)– sometimes called perchloroethylene (Perc)– is used as dry cleaning agent & metal degreaser
- PCE first detected at Mount Olivet irrigation well in the 1990s
- SLC removed a municipal drinking well as a precaution in 2004 after a test indicated PCE concentration of less than half of drinking water standards

# 700 South 1600 East PCE Plume Site History

- PCE detected in springs in 2010
- 2013 site added to the National Priorities List
- 2013 VA Listed as potentially responsible party (PRP)

# 700 South 1600 East PCE Plume Site History

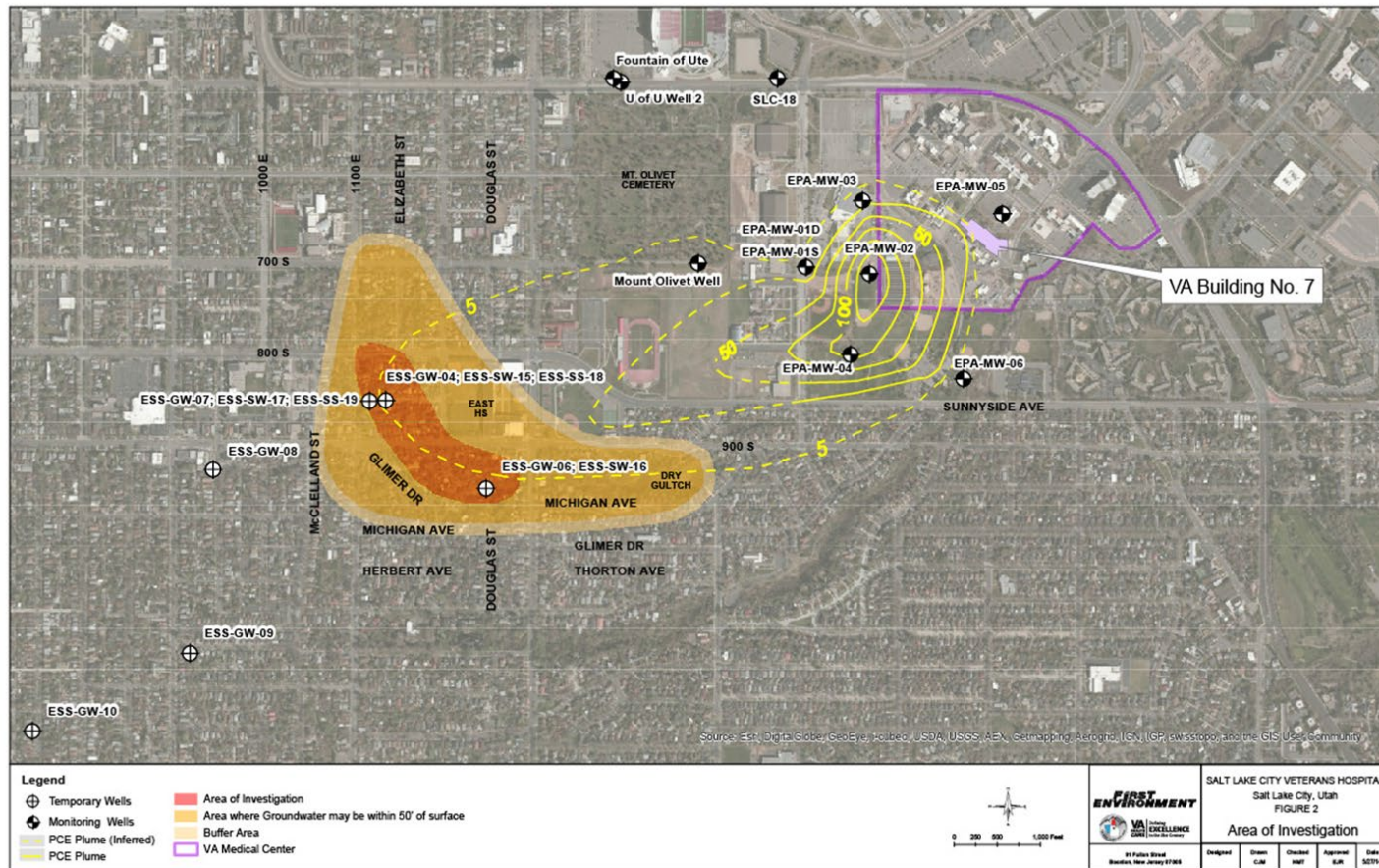




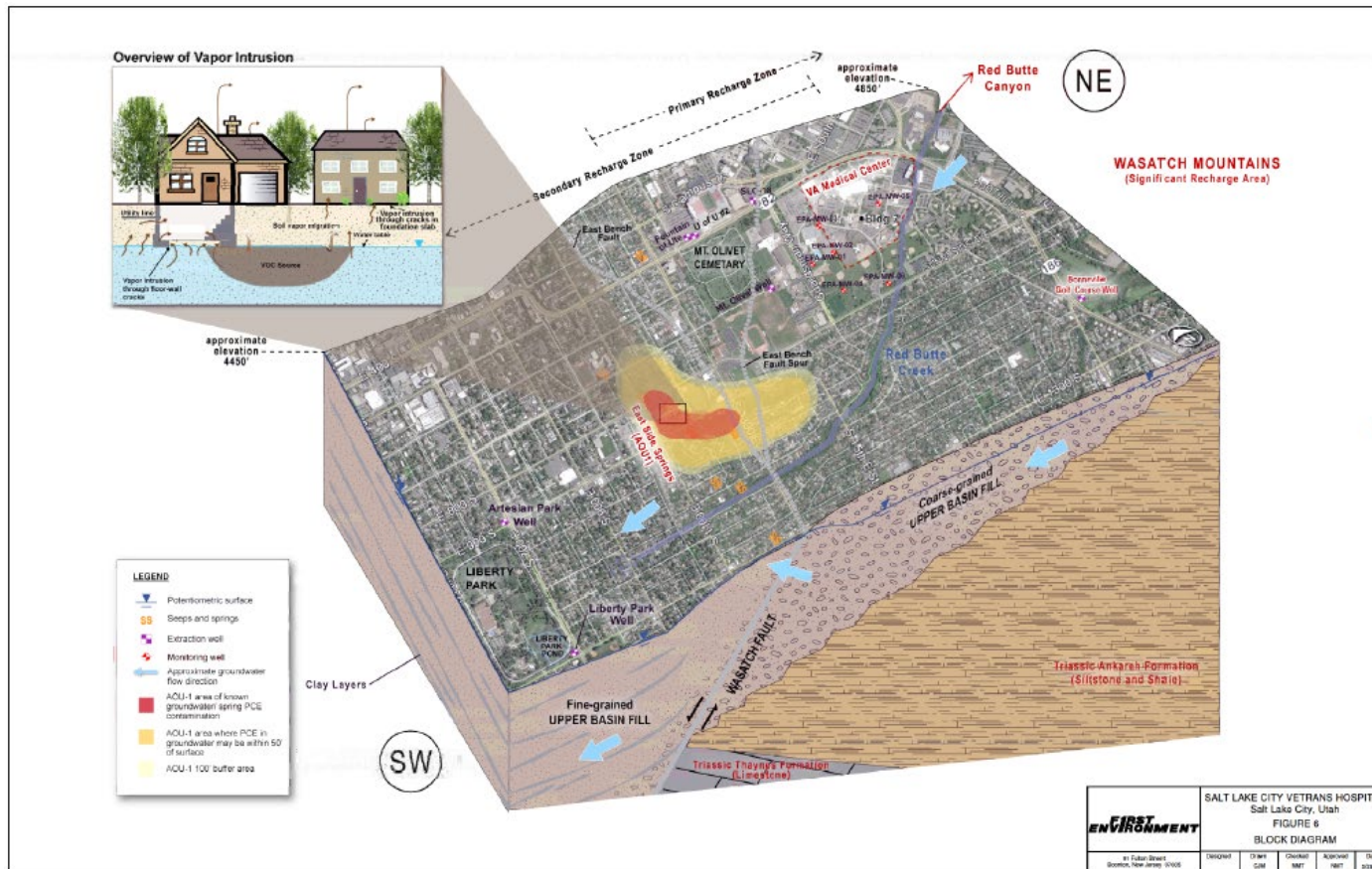
# 700 South 1600 East PCE Plume Factors for Cleanup Method Choice

- Type and amount of contaminate
- Geology of the Site
- How far contaminate reaches underground
- Limits on how a cleanup method can be used
- Size of the area
- Cost of cleanup
- When original release occurred
- Urgency of threat to people and the environment

# 700 South 1600 East PCE Plume Operable Units



# 700 South 1600 East PCE Plume Operable Units





# 700 South 1600 East PCE Plume Mitigation Methods

- Soil Vapor Intrusion Mitigation
- Groundwater Mitigation



# 700 South 1600 East PCE Plume Groundwater Remediation



# 700 South 1600 East PCE Plume

## Types of groundwater Remediation

- Excavation – source control
- Pump & Treat – hydraulic control and plume mitigation
- Bioremediation – plume mitigation
- In Situ Chemical Oxidation – source control
- In Situ Chemical Thermal – source control
- Soil Vapor Extraction – source control and plume mitigation
- Monitored Natural Attenuation – once source control complete

# 700 South 1600 East PCE Plume Excavation of Contaminated Soil

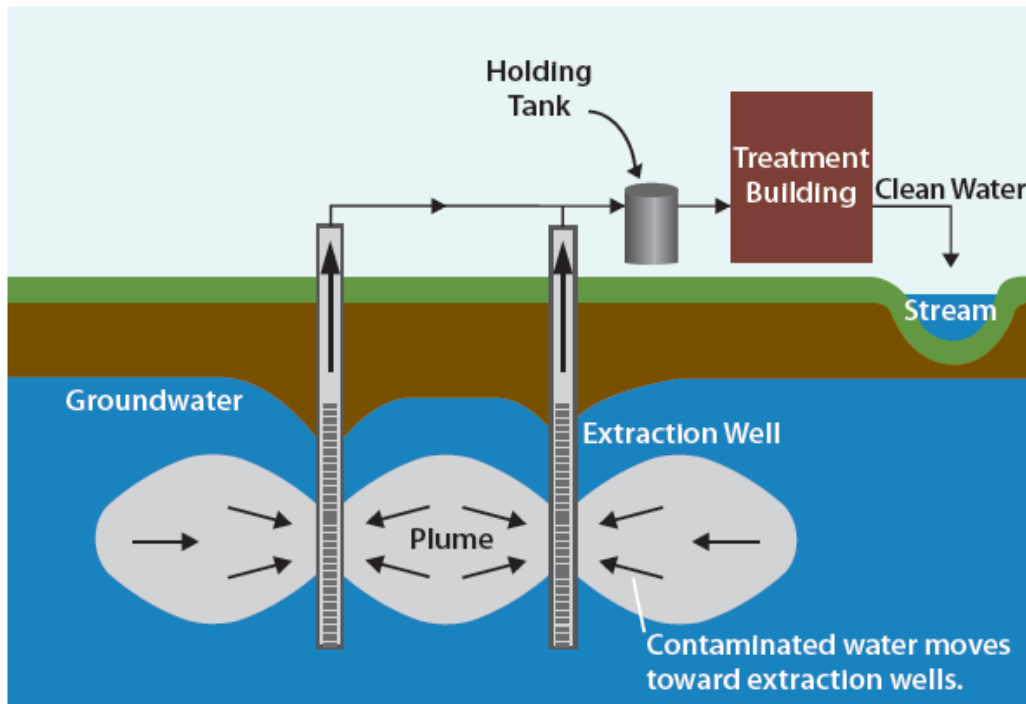
- Digging up contaminated soil & sending to landfill
- How deep is the contamination
- How much soil is affected
- Generally limited to shallower depths
- Not generally used when contaminated soil is under building or in groundwater.



*Soil piles are covered with plastic tarps during excavation.*



# 700 South 1600 East PCE Plume Pump and Treat



*Example of a Pump and Treat System with Two Extraction Wells.*

- Groundwater is pumped to above-ground treatment system that removes contaminate.
- Used to slow or stop the plume.
- Treated water can be pumped into storm sewer or sanitary sewer, or reinjected into aquifer.
- Different Treatment Systems

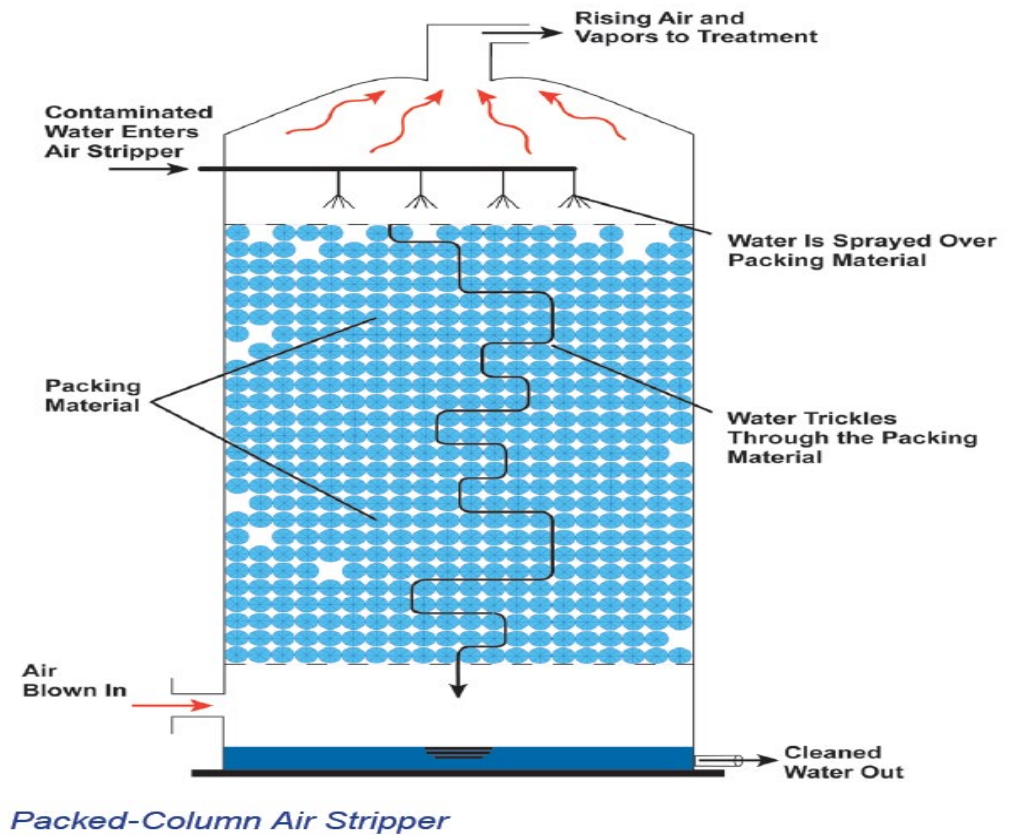
# 700 South 1600 East PCE Plume Pump and Treat



- Pump and Treat
  - a. Air Stripping
  - b. Activated Carbon

# 700 South 1600 East PCE Plume Air Stripping

- Removes VOCs, like PCE, from water
- Forces groundwater through air stripper or aeration tank forcing VOC to evaporate quicker
- Air and Chemical vapors are collected either removed or vented depending on levels
- This technology transfers contamination from one media to another unless there is vapor capture

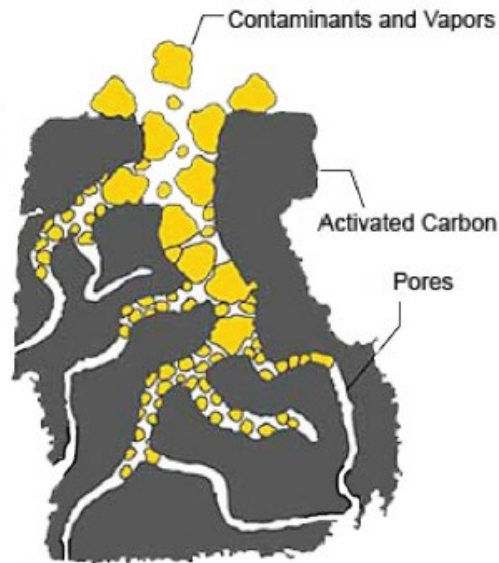




# 700 South 1600 East PCE Plume Granular Activated Carbon (GAC)



*Activated carbon granules*

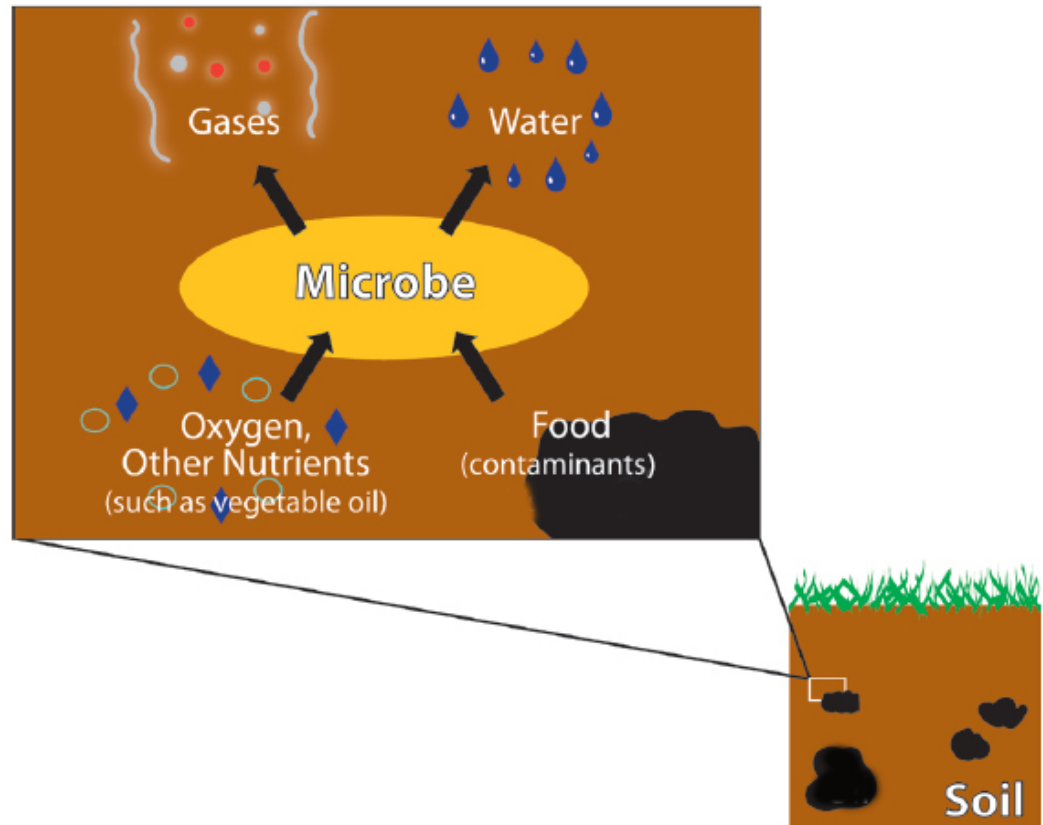


*Contaminants and vapors sorbed to activated carbon*

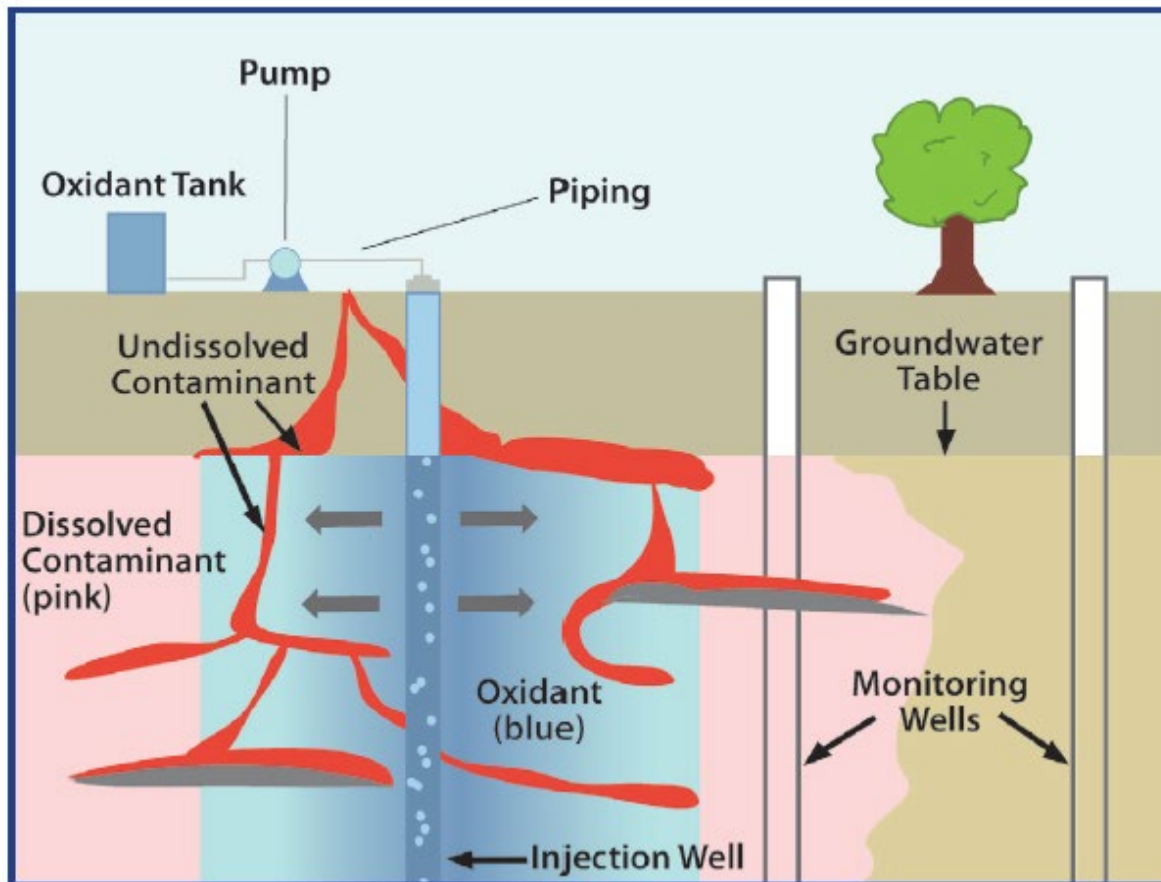
- Contaminated water flows through GAC, contaminants stick to the outer and inner surface of the granules and are removed.
- The GAC will need to be replaced when the surfaces on the granules are taken up.
- Treated groundwater may be pumped to nearby stream or river, pumped back underground or sprinkled on the ground to seep back into soil, or discharged into sewer line.

# 700 South 1600 East PCE Plume Bioremediation

- Certain contaminants can be eaten by microbes
- Injecting harmless fluids like molasses or vegetable oil can stimulate microbes that use contaminants as food source
- If certain types of microbes are needed to break down contaminants, they may be added.



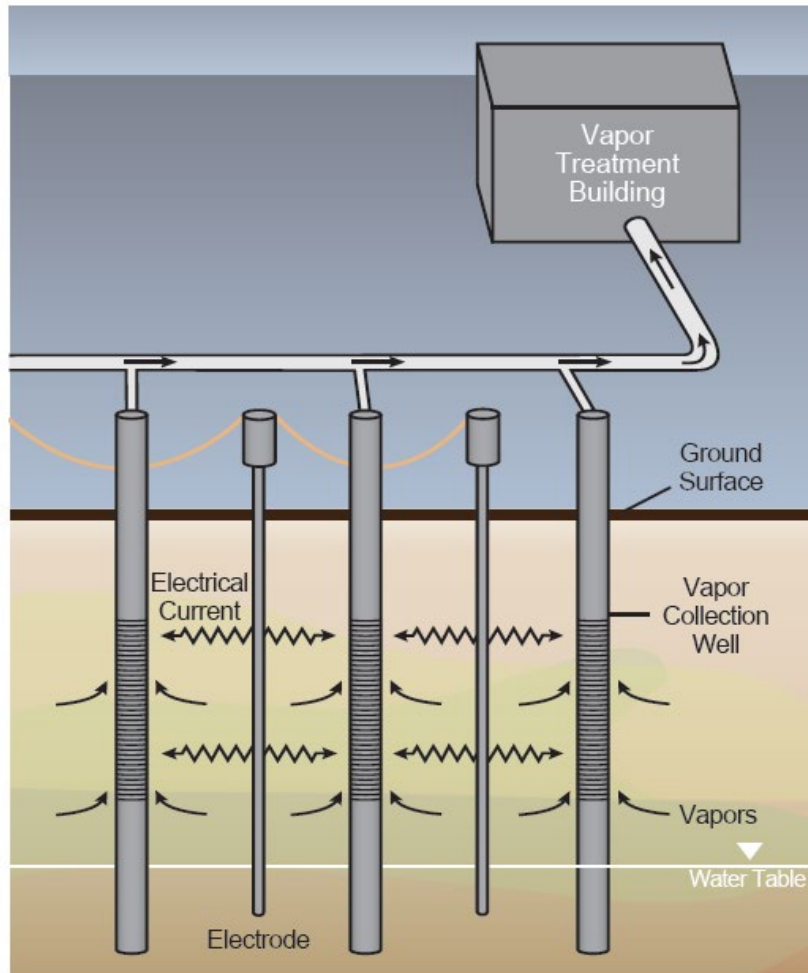
# 700 South 1600 East PCE Plume In Situ Chemical Oxidation



- Oxidants injected into soil or groundwater using wells
- Chemical reaction occurs that destroys contaminants
- Produces harmless byproducts.
- Several injection wells may be required, but [system is portable](#).



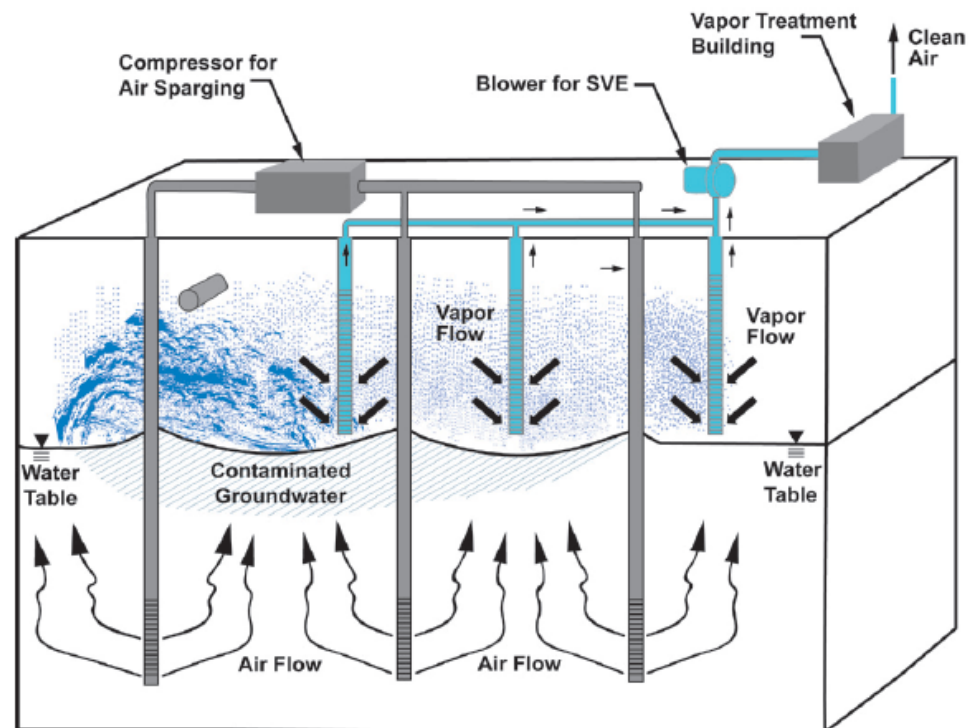
# 700 South 1600 East PCE Plume In Situ Chemical Thermal



- Uses heat to destroy or vaporize contaminants in soil and sometimes nearby groundwater.
- Vapors are pulled to collection wells and then treated above ground.
- Heat Generated in Several Ways:
  - Electrical Resistance heating (ERH) delivers an electrical current b/t metal rods– generating heat as current meets resistance from soil and water.
  - Steam enhanced extraction (SEE) injects steam underground by pumping it through wells. The steam heats the area and mobilizes and evaporates contaminants.
  - Thermal conduction heating (TCH) uses heaters placed in underground steel pipes.

# 700 South 1600 East PCE Plume Soil Vapor Extraction & Air Sparging

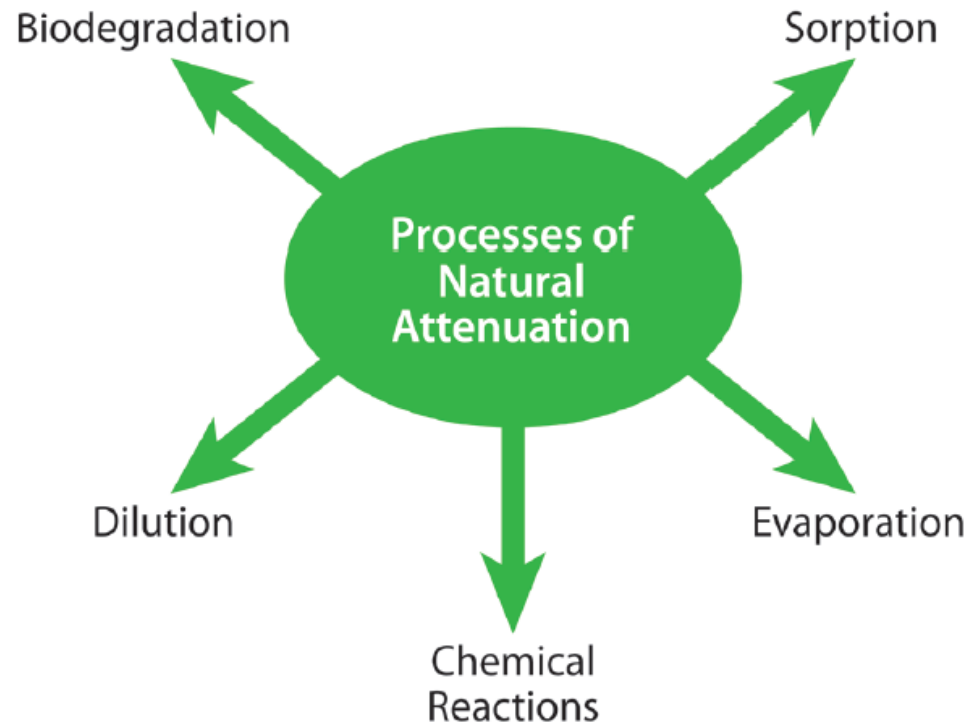
- Both Soil Vapor Extraction (SVE), and air sparging remove contaminant.
- SVE used to extract vapors from just above water table by applying vacuum to pull vapors out.
- Air sparging pumps air below the water table to help blow the contaminate vapors out.
- Vapors are treated at above ground treatment facility.



*Illustration of a combined air sparging and SVE system.*

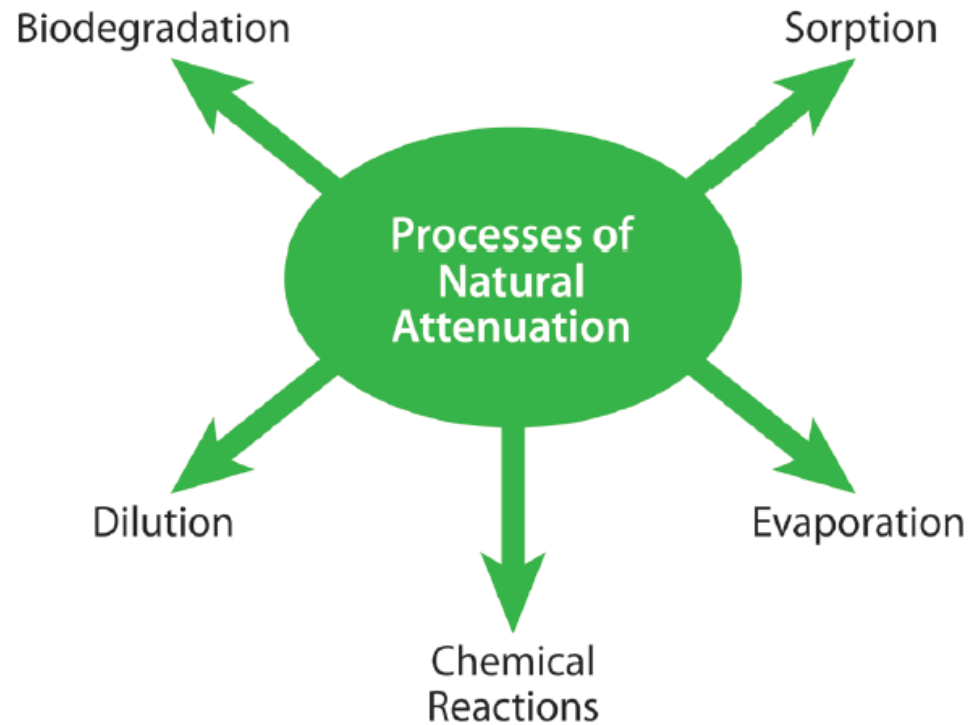
# 700 South 1600 East PCE Plume Monitored Natural Attenuation

- Once the source of contamination is controlled.
- Relies on natural conditions in the subsurface to decrease or “attenuate” concentrations of contaminants.
- MNA may work in five ways to clean up contaminants.



# 700 South 1600 East PCE Plume Monitored Natural Attenuation

1. Biodegradation occurs when microbes eat the contaminants.
2. Sorption causes contaminants to stick to soil– does not clean but keeps it from moving.
3. Dilution decreases the concentrations of contaminants.
4. Evaporation causes some contaminants to change to gas.
5. Chemical reactions with natural substances underground may convert contaminants into less harmful forms.





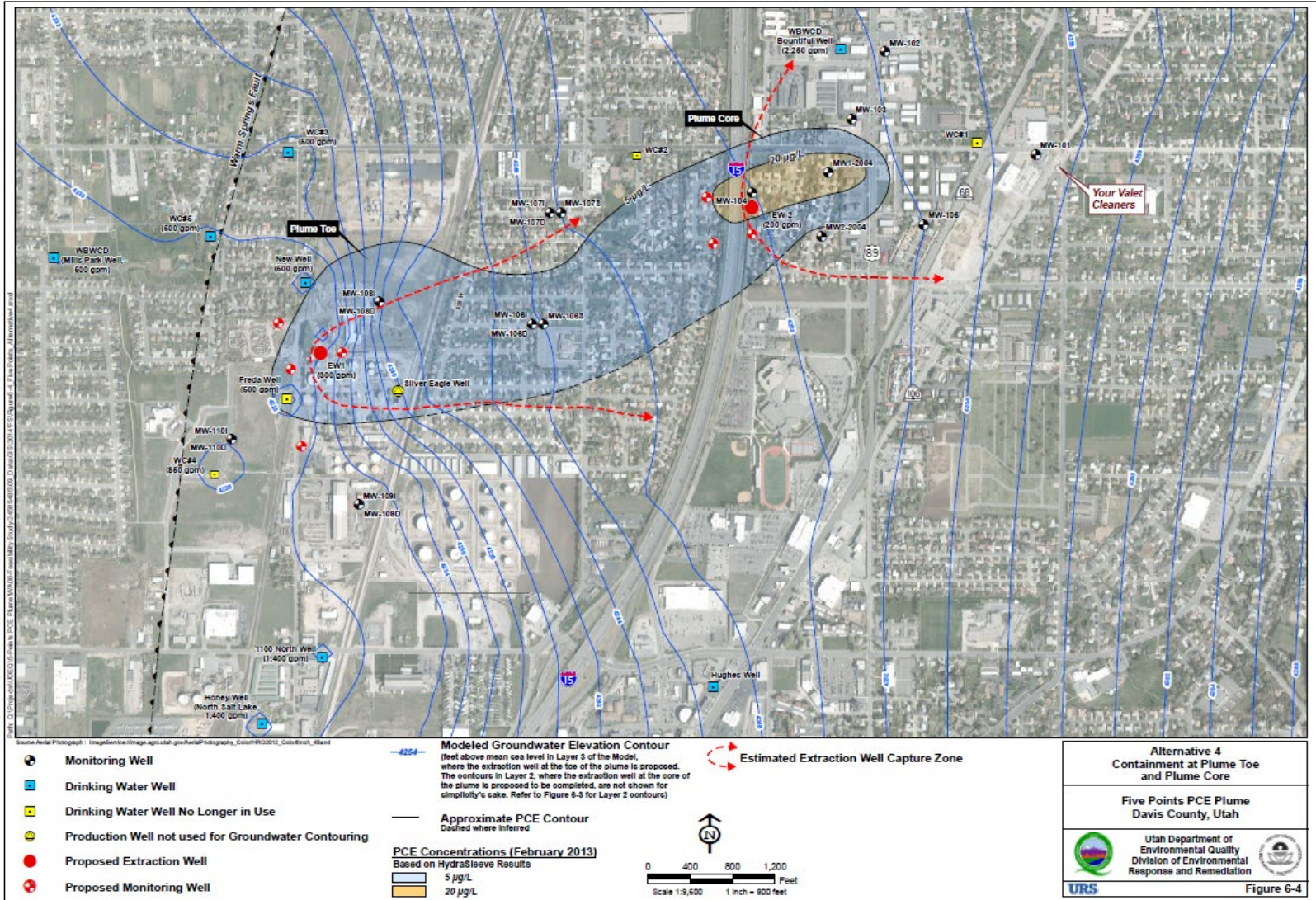
# 700 South 1600 East PCE Plume Utah Plumes

Cleanup Technologies at other Utah Plumes

Dave Allison

UDEQ

# Alternative 4 Containment at Plume Toe and Plume Core



**Alternative 4**  
**Containment at Plume Toe**  
**and Plume Core**

**Five Points PCE Plume**  
**Davis County, Utah**

Utah Department of  
 Environmental Quality  
 Division of Environmental  
 Response and Remediation

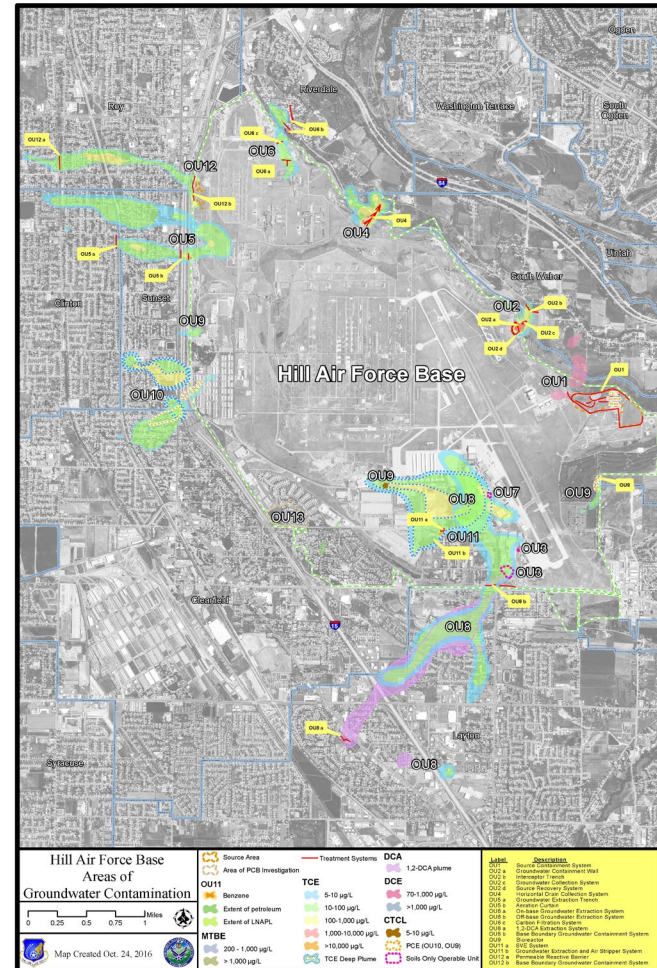
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Figure 6-4



# 700 South 1600 East PCE Plume

## Hill Air Force Base Plumes



# 700 South 1600 East PCE Plume Community Resources

For additional information visit:

- <https://clu-in.org/products/citguide/>
- <https://clu-in.org/download/citizens/scrd-cleanup-factsheet.pdf>



# VA Salt Lake City HCS

