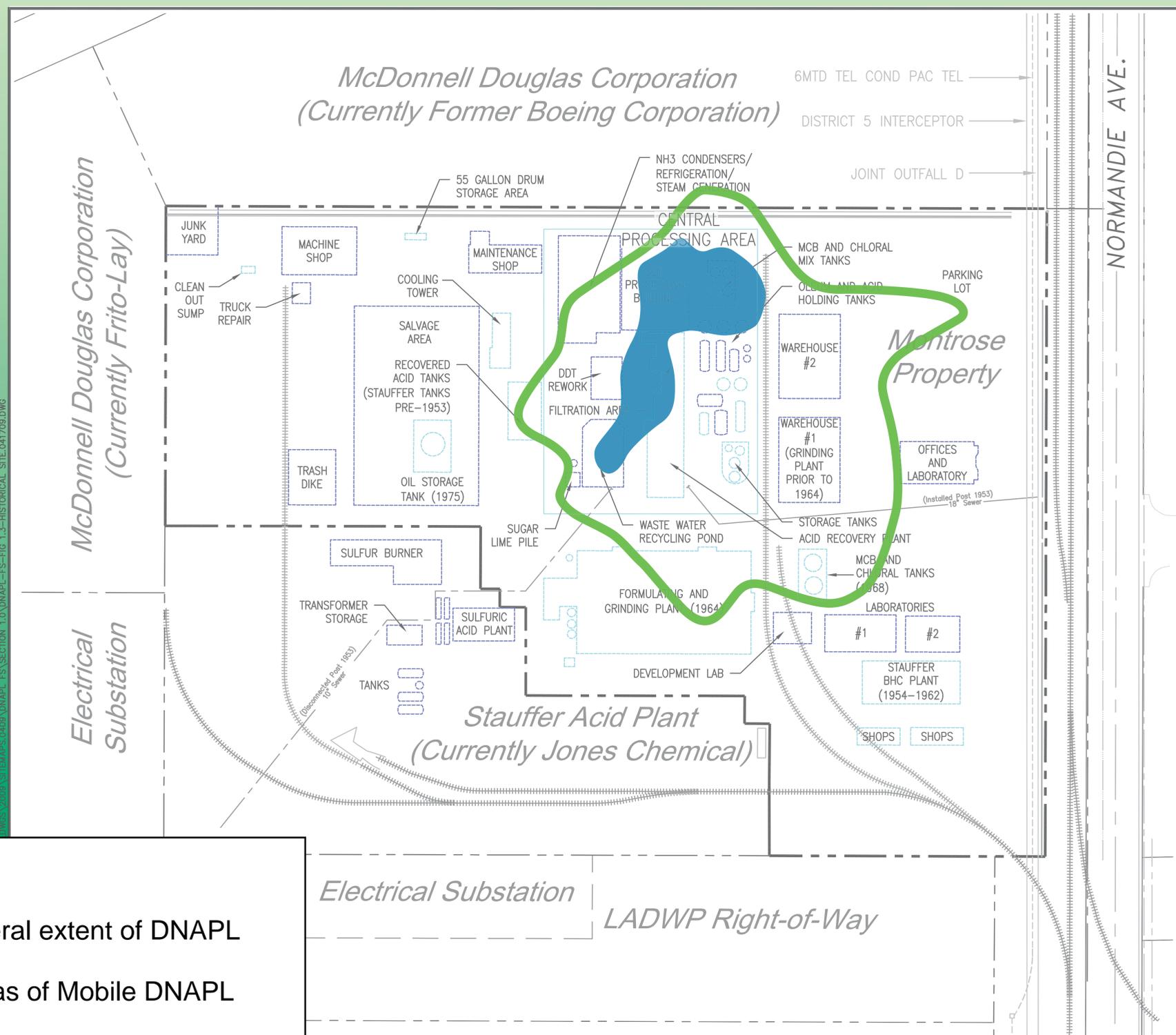


# MONTROSE DENSE NON-AQUEOUS PHASE LIQUID (DNAPL) WORKSHOP

## Historical Site Features and DNAPL Location



# MONTROSE DENSE NON-AQUEOUS PHASE LIQUID (DNAPL) WORKSHOP

## DNAPL Investigation



# MONTROSE DENSE NON-AQUEOUS PHASE LIQUID (DNAPL) WORKSHOP

## Technologies Considered

### What are Institutional Controls?

Legal and administrative controls applied to properties to minimize the potential for human exposure to contamination left on a property or to protect the remedy in place.

#### Land Use Covenant

Will prevent access to DNAPL-impacted soils and groundwater, and restrict future activities at the Montrose property for industrial use only. The effectiveness of the institutional controls will be monitored.

### What is Soil Vapor Extraction (SVE)?

Removes chemicals in the form of vapors by vacuuming vapors out of soil, and treating them by an air treatment technology onsite. Final air emissions meet air pollution regulations.

#### Vapor Treatment Options

##### Adsorption

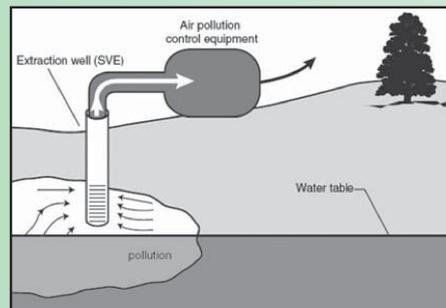
Adsorbent material like carbon and polymer resin adsorbs contaminants.

##### Condensation

Vapors are cooled until contaminants become liquid and are removed.

##### Thermal Oxidation

High heat (1400-1800°F) is used to destroy vapor contaminants.



#### At a Glance:

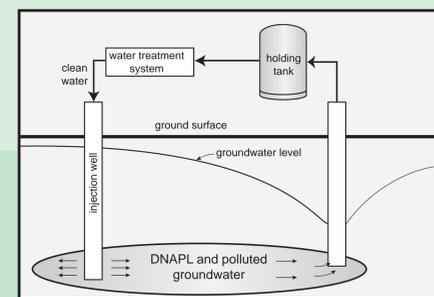
- Used since the 1970s
- Best uses for removing chemicals that evaporate easily (VOCs)
- Cost-effective

### What is Hydraulic Displacement?

Simultaneous extraction and injection of groundwater to mobilize DNAPL toward extraction wells. Extracted groundwater is separated from DNAPL and treated before reinjection (treatment is not included for Alternative 4a).

#### At a Glance:

- Removes moderate amount of contamination
- Moderately intrusive



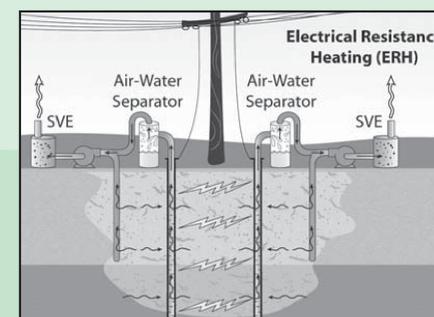
### What is In-Situ Soil Heating?

Heating the soil in order to volatilize (vaporize) the contamination, then capturing and treating the vapors in a soil vapor extraction system.

Vapors will be treated using vapor treatment options described in the SVE section.

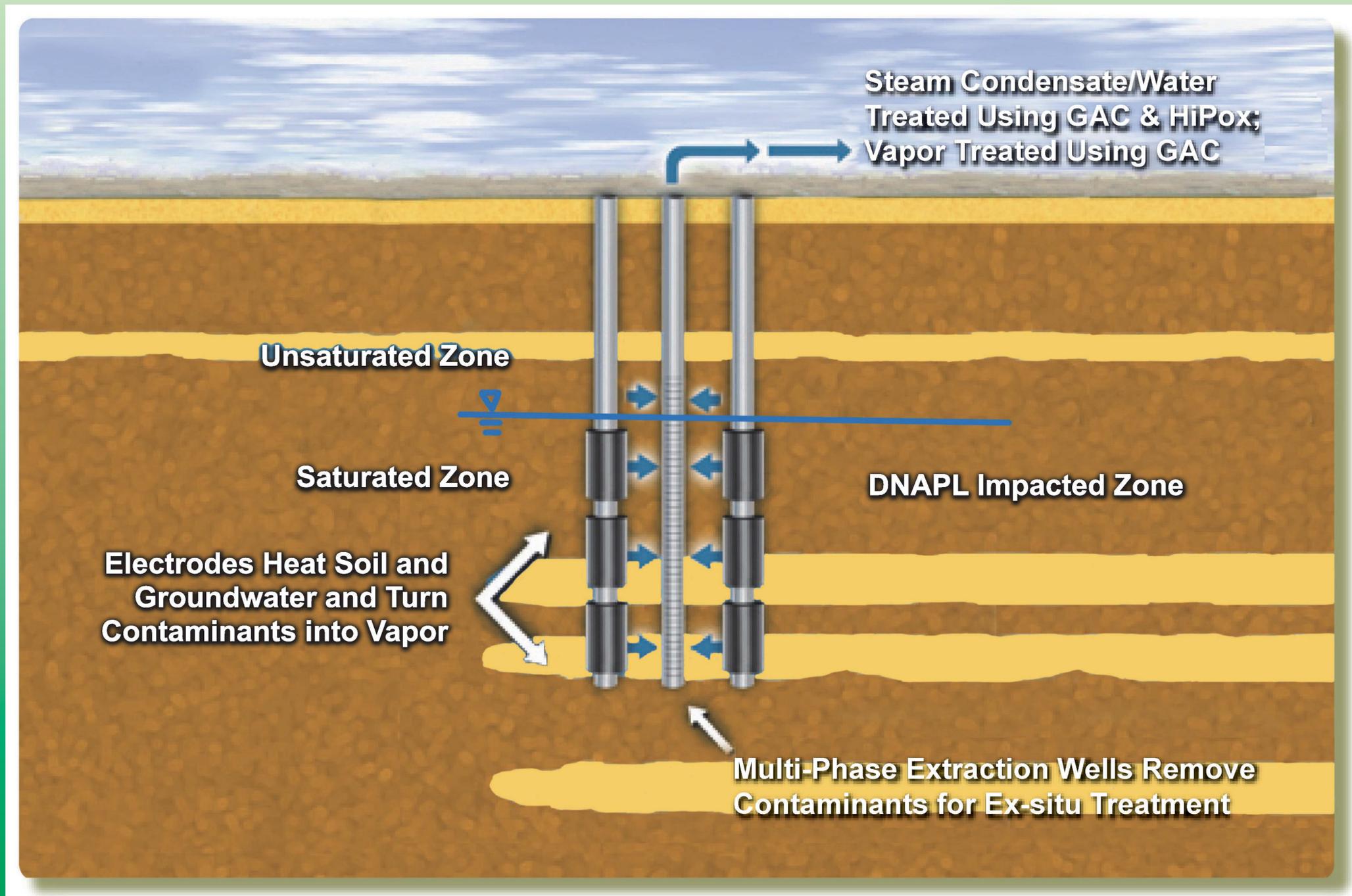
#### At a Glance:

- Removes large amount of contamination
- Requires large use of electricity
- Handles contaminated vapors above ground
- Intrusive



# MONTROSE DENSE NON-AQUEOUS PHASE LIQUID (DNAPL) WORKSHOP

## ERH



# MONTROSE DENSE NON-AQUEOUS PHASE LIQUID (DNAPL) WORKSHOP

## Preferred Remedy

National Contingency Plan (NCP) Criterion	1 No Action	4A Hydraulic Displacement with Untreated Water Injection	4B Hydraulic Displacement with Treated Water Injection	5A Steam Injection, Focused Treatment Area	5B Steam Injection, Entire Treatment Area	6A ERH, Focused Treatment Area (Preferred Alternative)	6B ERH, Entire Treatment Area
Protective of Human Health and the Environment	○	●	●	●	●	●	●
Compliance with ARARs	○	○	●	●	●	●	●
Long-Term Effectiveness	○	⊙	⊙	●	●	●	●
Reduction of Toxicity, Mobility, and Volume	○	⊙	⊙	●	●	●	●
Short-Term Effectiveness	○	●	●	●	⊙	●	⊙
Implementability	○	○	●	⊙	⊙	●	⊙
Total Cost ( \$ million NPV)	●	●	⊙	⊙	○	⊙	○
Capita Cost	\$0	\$11.0-\$12.2	\$18.0-\$20.1	\$22.3-\$32.4	\$50.8-\$84.0	\$18.6 - \$25.0	\$46.2-\$69.5
O&M Cost	\$0	\$5.2- \$5.5	\$6.0-\$6.4	\$12.0-\$12.7	\$23.5-\$26.1	\$10.2-\$10.8	\$24.7-\$27.3
State Acceptance	DTSC concurred with EPA's preferred alternative						
Public Acceptance	Community acceptance of the preferred alternative will be evaluated after the public comment period						
<b>Relative Remediation Alternative Ranking:</b>							
<span style="display: inline-block; width: 1em; height: 1em; background-color: blue; border-radius: 50%; margin-right: 0.5em;"></span> = Meets Criterion <span style="display: inline-block; width: 1em; height: 1em; border: 1px solid blue; border-radius: 50%; margin-left: 1em; margin-right: 0.5em;"></span> = Partially meets criterion <span style="display: inline-block; width: 1em; height: 1em; border: 1px solid blue; border-radius: 50%; margin-left: 1em; margin-right: 0.5em;"></span> = Does not meet criterion							