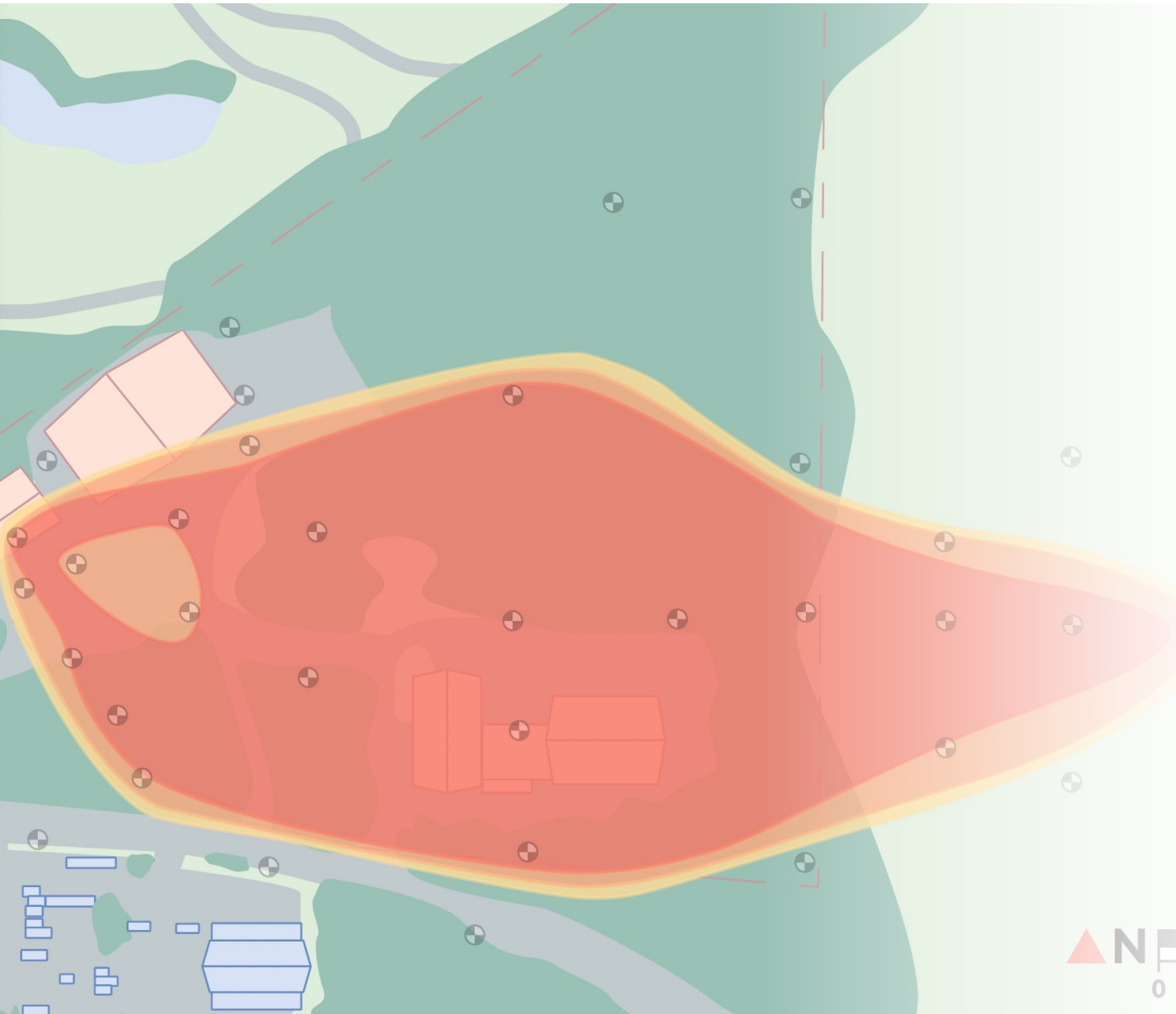




Case study: Former food processing plant Indianapolis, IN (USA)

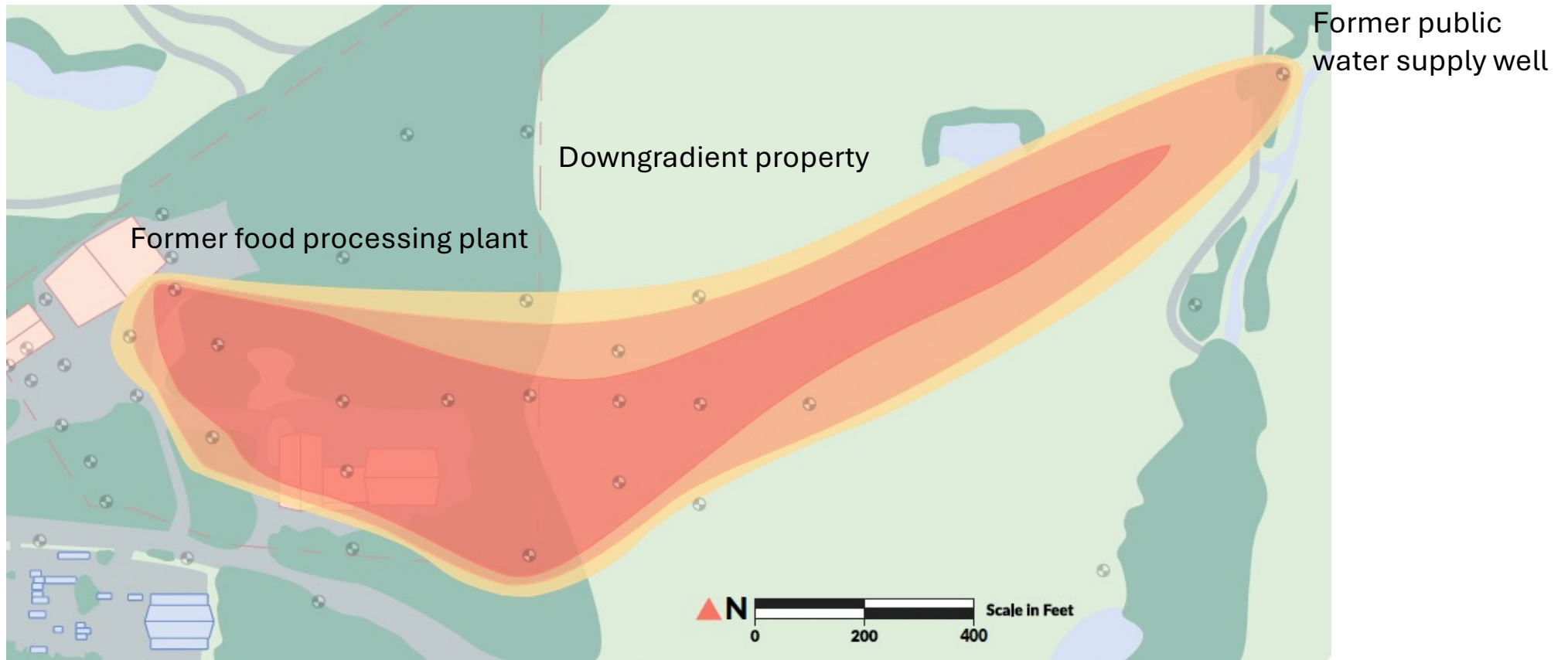
Rizlan Bernier-Latmani
September 25th, 2024



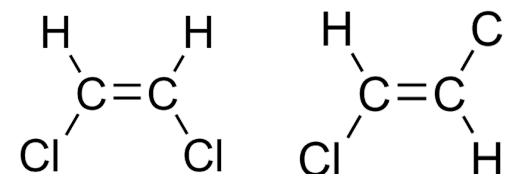
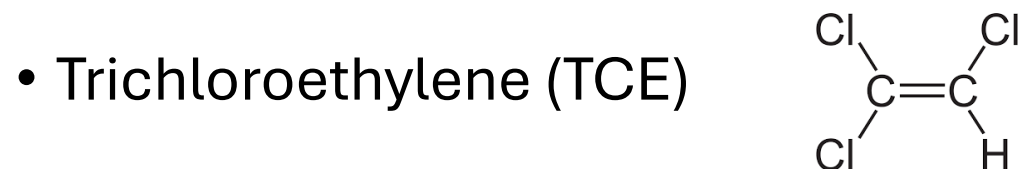
Site background

- Former food processing plant (Indianapolis, IN)
- Operated from 1890-1950
- Major employer in the region (seasonal)
- Chlorinated solvents identified downgradient from the property
- An investigation showed that the contaminants had migrated from the former food processing plant
- Buildings were leased to several tenants; it is unclear which business was responsible for the release of chlorinated solvents
- Large plume being pulled towards a former public water supply well

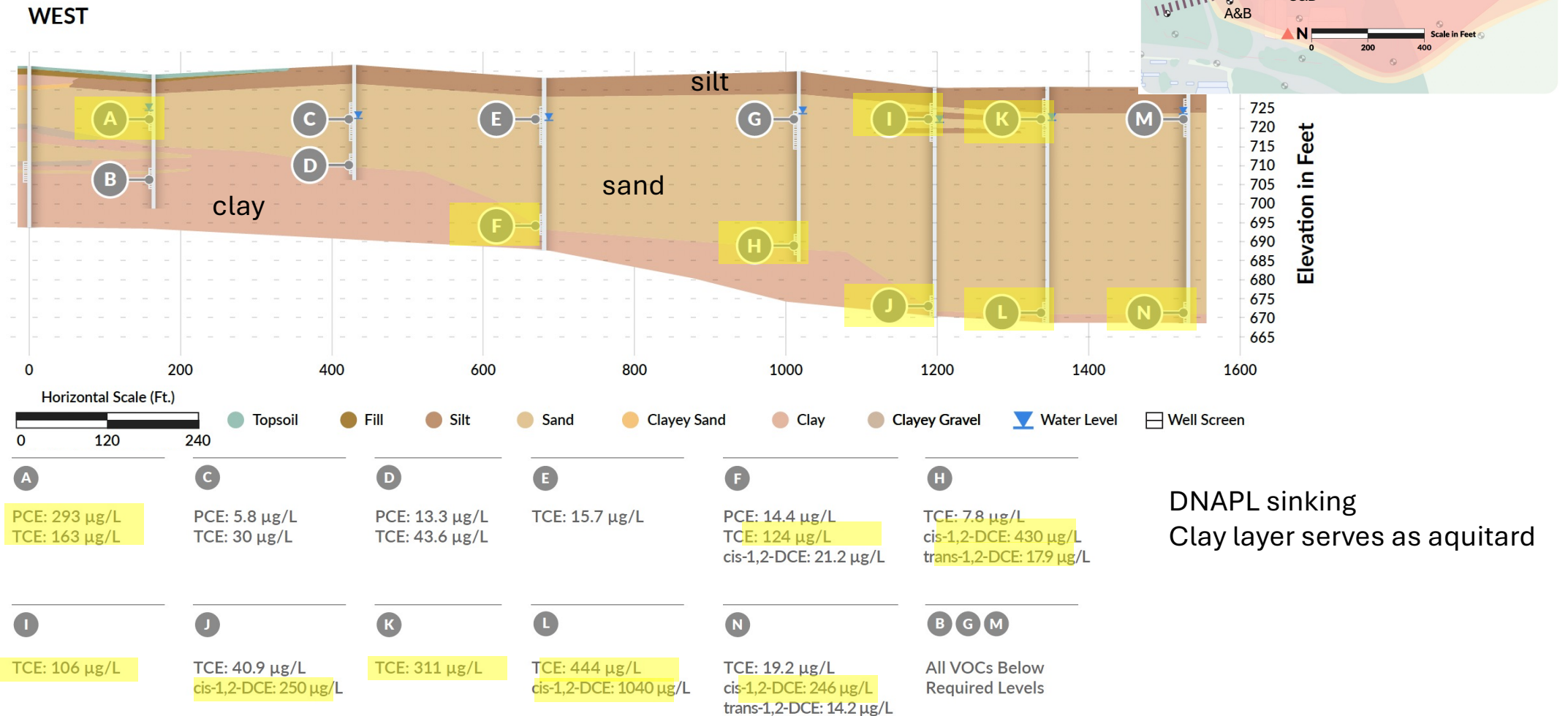
Site background



Contaminant characteristics



Extent of the contamination



Techniques considered and selected

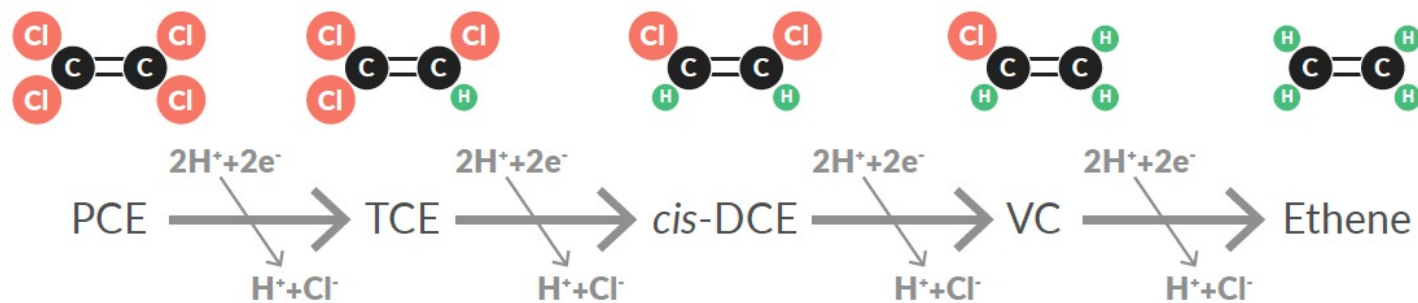
- Goals:
 1. Reduce concentrations to below level from the Remediation Closure Guide in Indiana
 2. Demonstrate plume stability via Monitored Natural Attenuation
 3. Long-term, reduce concentration to below drinking water standards (5 microg/L)
- Techniques considered:
 - Pump and treat
 - Air sparging and soil vapor extraction
 - In situ chemical oxidation + reductive dichlorination (RD)
 - PlumeStop (commercial product) + reductive dichlorination (RD)

Remediation design

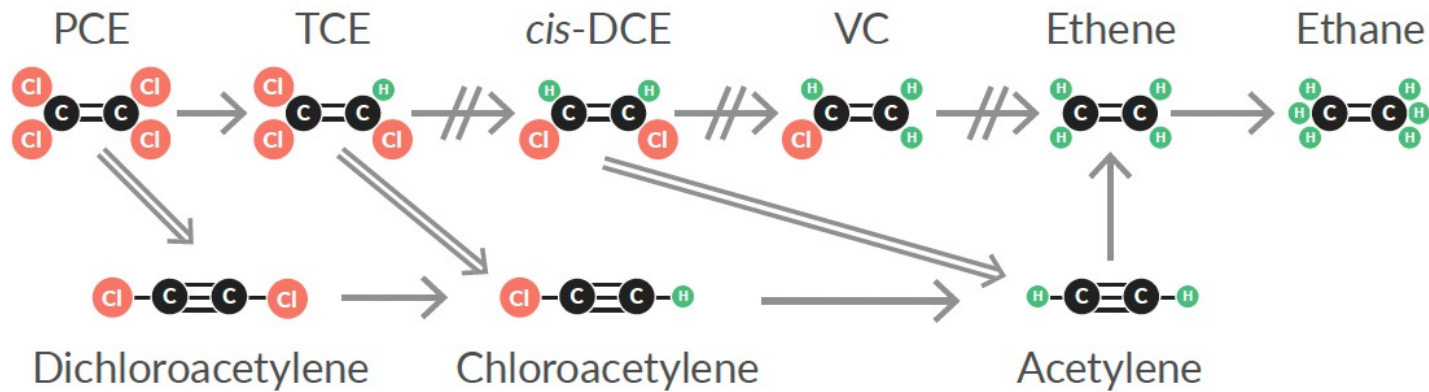
- Permeable reactive barriers (PRBs):
 - to treat the source zone and
 - to limit off-site migration
- Amendments to enhance biotic and abiotic degradation processes in the plume

Remediation design

Biological RD Pathway



Abiotic RD Pathway



Remediation design



Slurry of particles with high surface area resulting in adsorption of contaminants (removal from groundwater)



Zerovalent iron that chemically reduces contaminants



Bacteria that reductively dehalogenate chlorinated solvents



Electron donor that stimulates the biological reductive dichlorination of chlorinated solvents

Remediation design

Onsite Treatment Area

- 1 2,500 Linear Foot PRB



- 2 850 Linear Foot PRB



Offsite Treatment Area

- 3 650 Linear Foot PRB



PRB (blue): onsite

- stimulates microbial degradation and chemically degrades contaminants
- Perpendicular to water flow

PRB (red): onsite

- Prevents plume migration
- Chemically degrades contaminants
- Designed to contain the plume

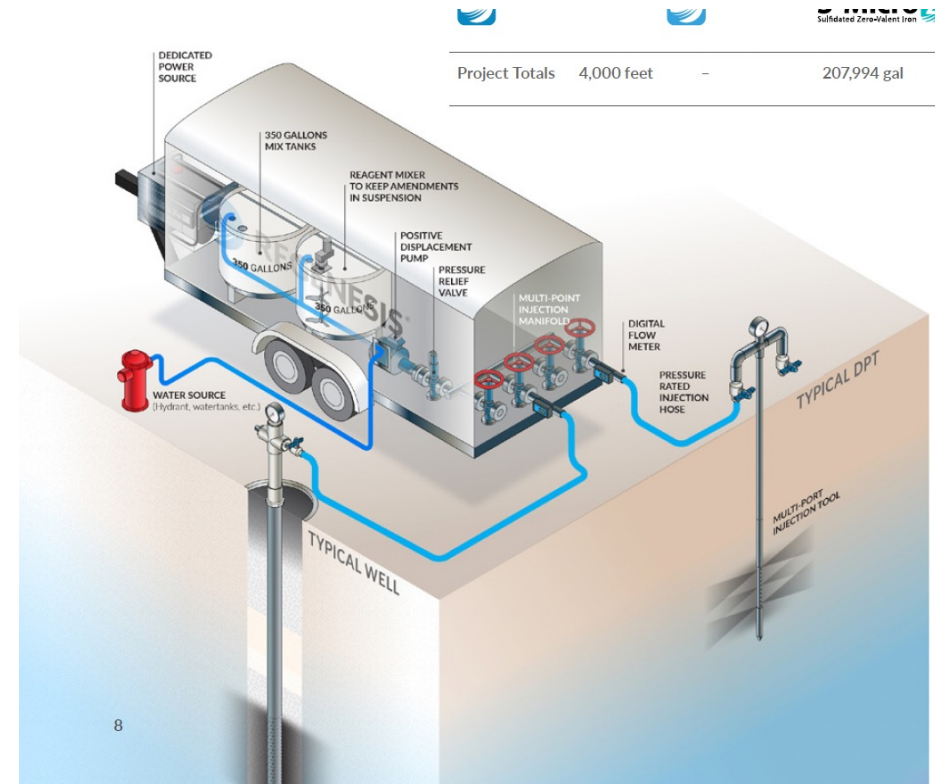
PRB (blue): offsite

- stimulates microbial degradation and chemically degrades contaminants
- parallel to water flow

Remediation implementation

In Situ Groundwater Remediation Design Summary

Treatment Area	Barrier Length	Treatment Depths	Injection Volume	Injection Points
Onsite	2,500 feet	10-30	70,242 gal	313
  				
Onsite	850 feet	10-30	91,664 gal	142
  				
Offsite	650 feet	10-60	46,088 gal	81
  				
Project Totals	4,000 feet	-	207,994 gal	536



Results of the remediation

- Successful remediation but no details on the measured concentration
- Fall/Winter 2021: probably 6-9 months

Conclusions

- Very intensive remediation strategy
- A good example of chlorinated solvent contamination (DNAPL)
- Combination of techniques
- Challenges:
 - Wooded area
 - Depth distribution
 - Contamination off the primary site
- Limited information due to the commercial nature of the document