Lessons Learned: Treatment of a New Jersey CVOC Plume in Urban Geology with Combined Remedy Approach

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Former Lock Manufacturing Site
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Former Lock Manufacturing Site

• CVOCs (PCE/TCE) and associated daughter products

• Hot Spot Concentrations before treatment
  (PCE - 25 PPM and TCE - 23 PPM)

• Groundwater Plume extends 71 acres
2014 Treatment

• February and March 2014 – 19 tons of PersulfOx was injected in 25 days. Hot Spot treatment and adjacent to a neighboring building.

• Initially the PCE/TCE concentrations dropped by 65-80% but the concentrations had rebounded (PCE - 3.1 PPM and TCE – 37 PPM) within 2 years.
2017 Treatments

• 5.5 tons PersulfOx – “Hot Spot” Treatment

• 30 tons PlumeStop - treatment barriers (liquid activated carbon sorption)

• 5 tons HRC - electron donor

• Total of 92 direct push injection points and 4 injection wells

• Work completed in 18 work days
2017 Injection
Injection Wells

2018 Design and Construction Issues at Hazardous Waste Sites
Lessons Learned

• Issues
  • Geology
  • Active Site/Urban Area
  • Weather
Geology

• Issues
  • Heterogeneity (fill)
  • Buried Former Structures
  • Highly varied bedrock depth
  • Weather rock thickness
  • Day Lighting
Solutions for Geology Issues

Heterogeneity (fill) and Day Lighting
- Multipoint injections - Split injections

Former Slab
- Pre-Drilling injection points

Bedrock depth and Weather rock thickness
- Differing Drilling techniques
- Different injector points
- Skilled Drillers with good feel
Active Urban Site

• Issues
  • Source Area – Active Loading Dock Area
  • Injections in an active Parking Lot (Pseudo Street)
  • Lots of utilities (many unmapped)
  • School across the street
Active Urban Site

Tenants and Occupied Work Areas
Weather

• **Issues**
  - April and May 2017 was much better than February and March 2014
  - Freezing Temperatures
  - Viscous Products
Out Come

• The project successfully completed on-time and within project budget even though significant design modifications were required to achieve desired objectives.

• Significant reductions in CVOC concentrations, especially beyond the barrier

• Strong evidence of increase biological activity

• Plume appears to be shrinking
General Lessons Learned

• If possible inject in warmer weather (huge difference)

• Big difference between a driller that does injections and an injection contractor

• Multi-port injections are the way to go

• Using a driller with multiple types of machines and multiple machines

• Be Flexible and make sure your contractors are too, more tools, techniques, rigs, and gadgets available the better