Chlorinated Solvent Treatment via In-Situ Oxidant Blending

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- Site history
- Remediation approach and planning
- Remediation implementation
- Remediation monitoring
- Lessons learned
Site History

- Facility manufactured printed circuit boards
- Primary chemical used – TCE
- Remedy – pump and treat system
Site History – SSI

- Collect additional data to evaluate remedial alternatives
- Pumping suspension
- Additional groundwater monitoring – VOCs and geochemistry
- In-situ ERD treatability study
- 14 MIP locations, 55 soil borings
Site History – SSI

- SSI results
- Groundwater
  - Some COC rebound
  - No lateral or vertical expansion of dissolved-phase plume
  - ISB and ISCO viability
- Soil
  - Soil impact / source material is present in multiple areas
Site History – SSI

Notes:
- TCE = trichloroethylene
- Data: smoothed, closest point algorithm
- Contours shown: 3, 7, 20, & 200 mg/kg in white, pink, red, & brown, resp.
Site History – SSI
Site History – SSI

Note:
North-trending profiles of Area 1 FGC TCE model (source depicted in Figure 44)
TCE units: mg/kg
Stripmap swath width 12 ft.
Profile elevation in ft amsl; VE = 1.
Each profile compiled using those borings included within the corresponding stripmap located above each profile. Borings in stripmap are projected onto the corresponding profile.
Remediation Approach

• Treat areas separately
• Evaluate remedial alternatives – technical merit, implementation, and costs
  o Excavation and offsite disposal/treatment
  o Excavation and onsite treatment
  o In situ bioremediation
  o In situ chemical reduction
  o In situ chemical oxidation

• Selected approach – ISCO via in situ soil blending
Remediation Approach

• Phased approach

• Phase I
  o Further define treatment area
  o Monitoring well installation
  o Treatability study

• Phase II
  o Baseline sampling event
  o Blending preparations and implementation
  o Restoration activities

• Phase III
  o Post-treatment monitoring
Remediation Planning
Remediation Planning

• Treatability Study
  o Permanganate and persulfate testing
  o Soil and groundwater from the Site – COCs removal, natural oxidant demand, metals migration potential, metals attenuation

• Treatability Study Results
  o Natural oxidant demand
  o COCs removal
  o Metals migration and attenuation
  o KMnO₄ selected as oxidant
Remediation Preparation

• Baseline sampling event
• Blending preparations
  o Administrative activities
  o Site access and preparation
  o Overburden soil removal
  o Subsurface concrete and debris
Remediation Preparation
Remediation Implementation
Remediation Implementation
Remediation Monitoring

- Restoration activities
- Post-treatment monitoring – VOCs and geochemistry
Remediation Monitoring

SSC-11

TCE (ug/L)

Baseline  PTME-1  PTME-2  PTME-3  PTME-4  PTME-5  PTME-6

1,870  0  0  0  33.6  2,630  0
Remediation Monitoring

![Graph showing TCE (µg/L) over time with a peak at Soil Blending (Dec 12)]
Lessons Learned

- Consider data density
- MIP limitations
- Treatability study can be valuable
- Don’t under estimate NOD
- Blending mechanism with subsurface obstructions
- Understand expectations
Questions?

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