Chlorinated Solvent Treatment via In-Situ Oxidant Blending

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AWMA Environmental Technical Conference 2017

ENVIRONMENTAL WORKS

Chlorinated Solvent Treatment via In-Situ Oxidant Blending

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

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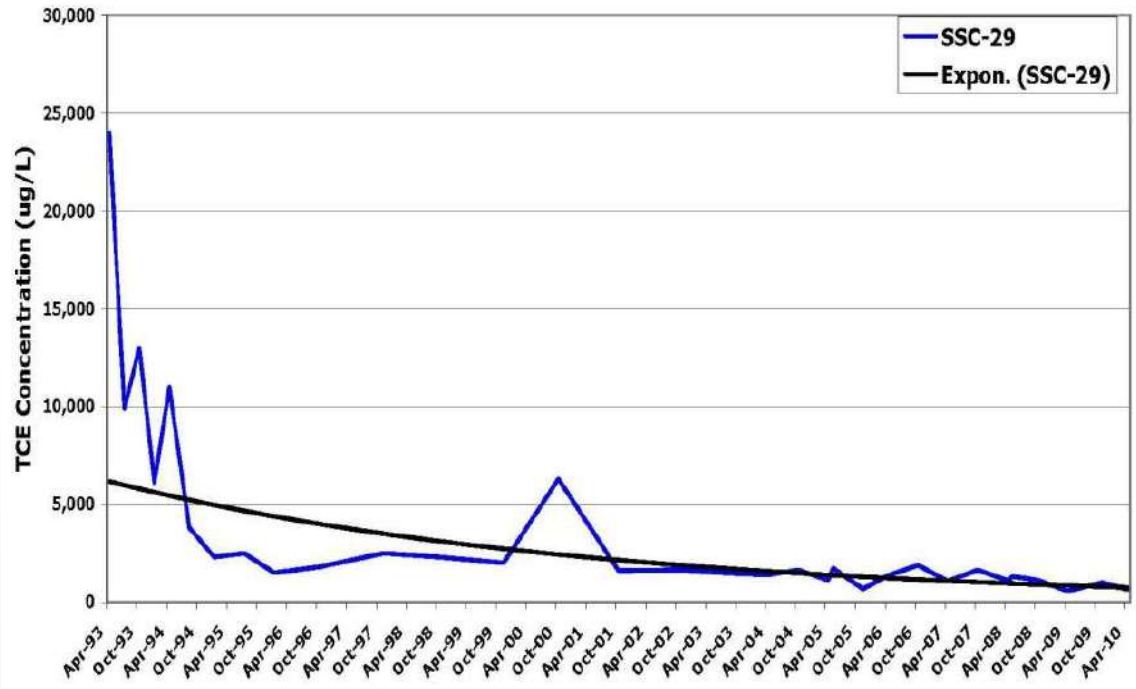
Site History

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



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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

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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

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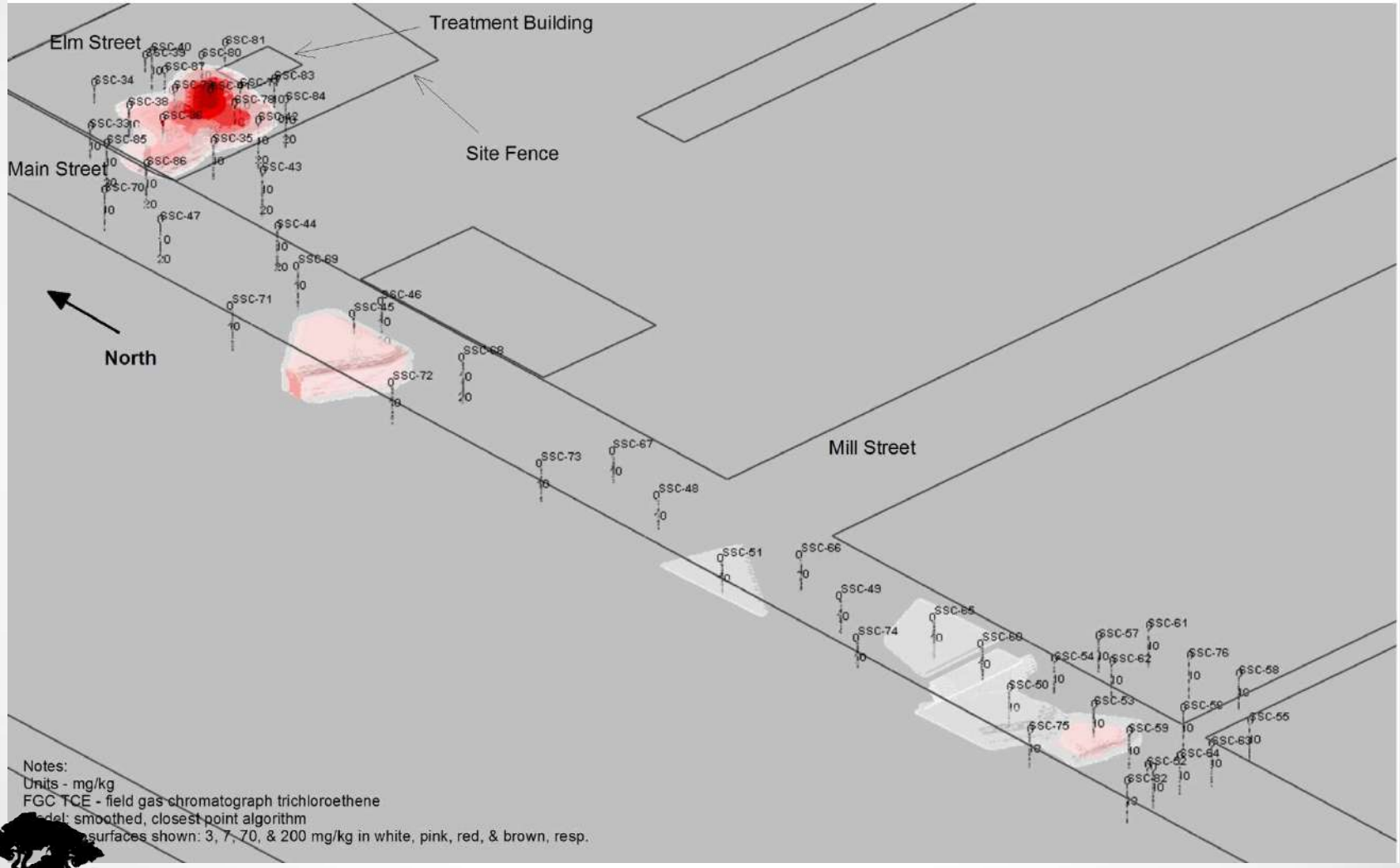
Site History – SSI



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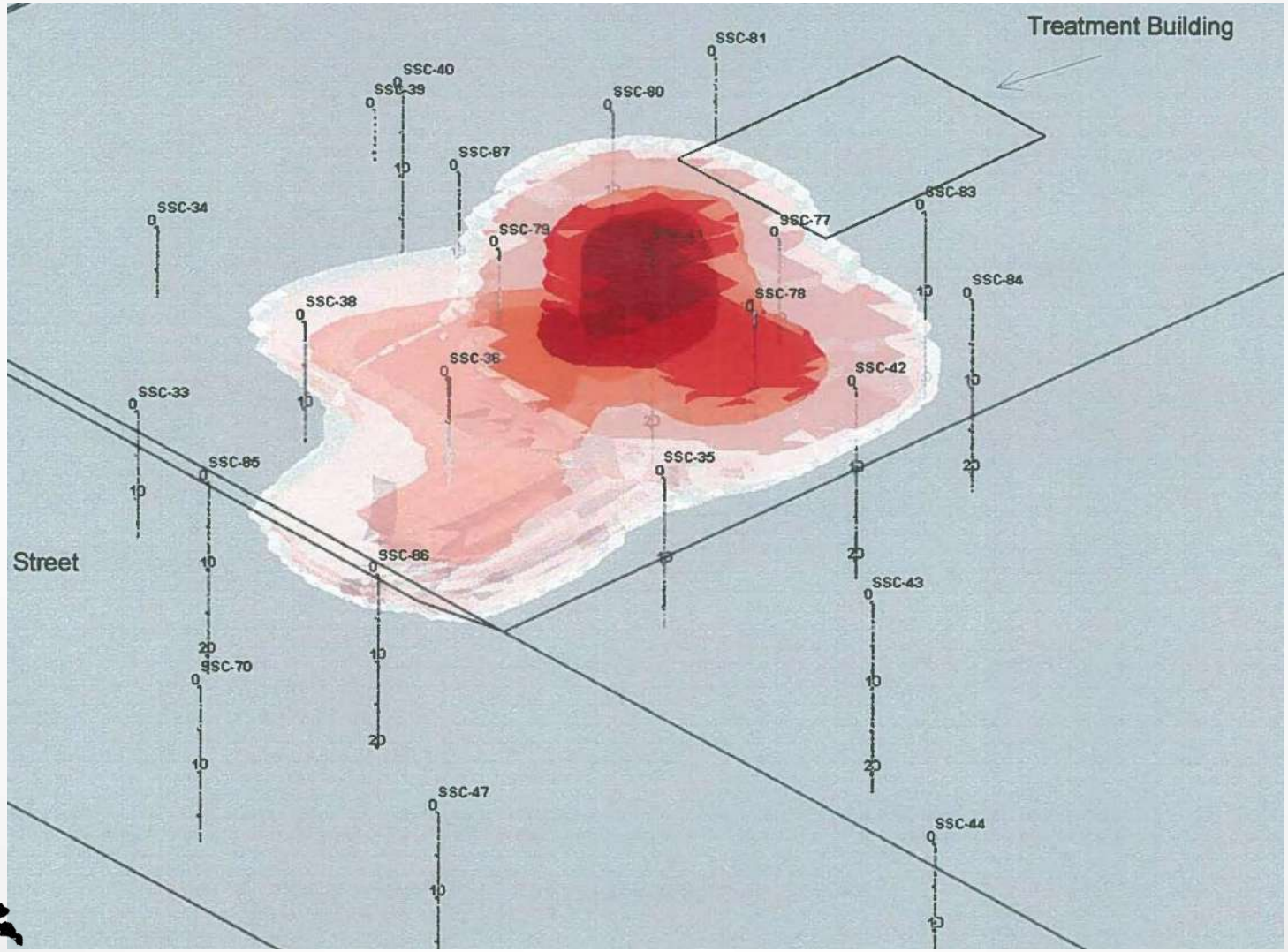
Site History – SSI



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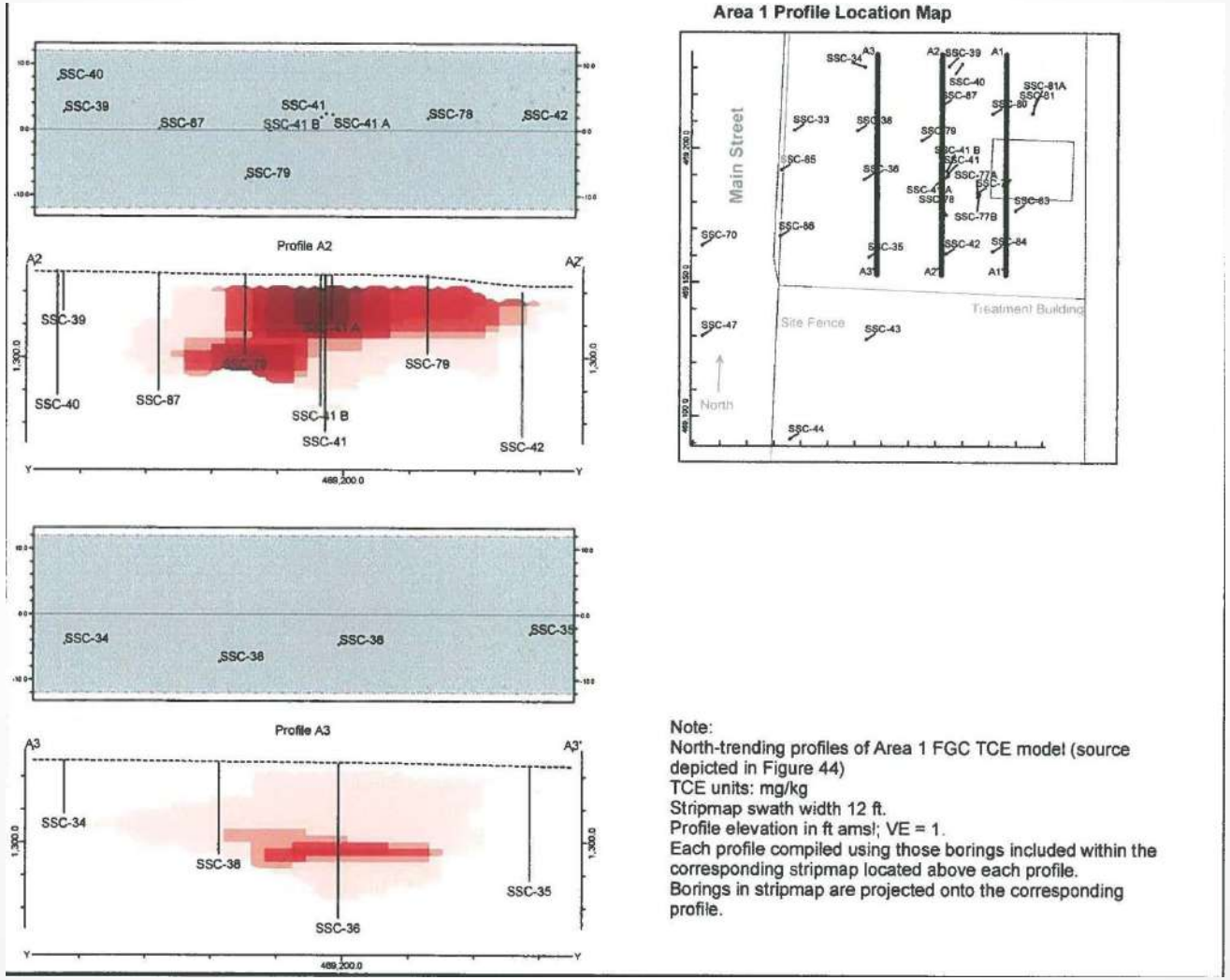
Site History – SSI



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Remediation Approach

- Treat areas separately
- Evaluate remedial alternatives – technical merit, implementation, and costs
  - Excavation and offsite disposal/treatment
  - Excavation and onsite treatment
  - In situ bioremediation
  - In situ chemical reduction
  - In situ chemical oxidation
- Selected approach – ISCO via in situ soil blending

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Remediation Approach

- Phased approach
- Phase I
  - Further define treatment area
  - Monitoring well installation
  - Treatability study
- Phase II
  - Baseline sampling event
  - Blending preparations and implementation
  - Restoration activities
- Phase III
  - Post-treatment monitoring

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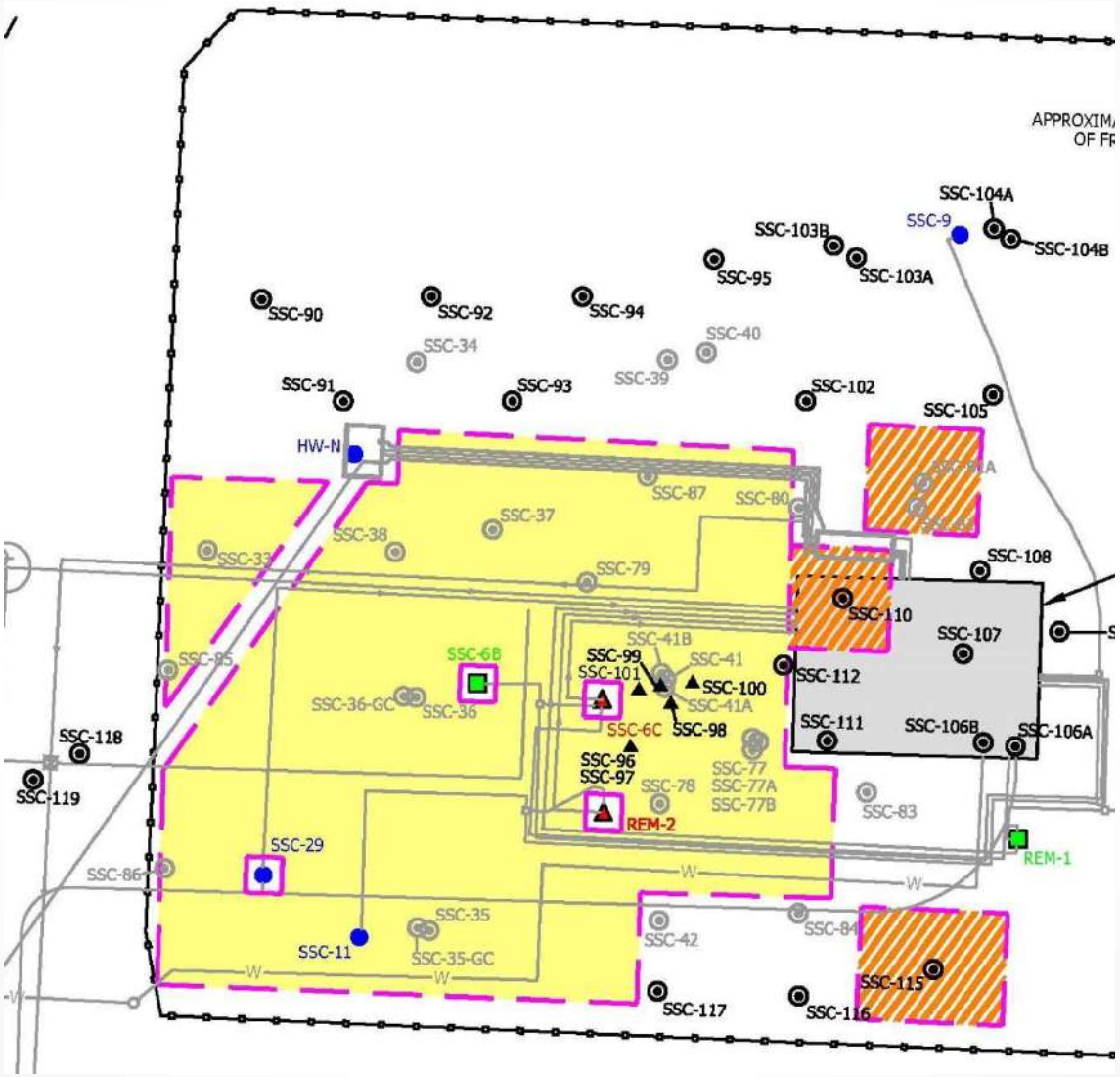
Remediation Planning



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Remediation Planning

- Treatability Study
  - Permanganate and persulfate testing
  - Soil and groundwater from the Site – COCs removal, natural oxidant demand, metals migration potential, metals attenuation
- Treatability Study Results
  - Natural oxidant demand
  - COCs removal
  - Metals migration and attenuation
  - $KMnO_4$ selected as oxidant

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Remediation Preparation

- Baseline sampling event
- Blending preparations
  - Administrative activities
  - Site access and preparation
  - Overburden soil removal
  - Subsurface concrete and debris

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Remediation Preparation

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Remediation Implementation

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Remediation Implementation

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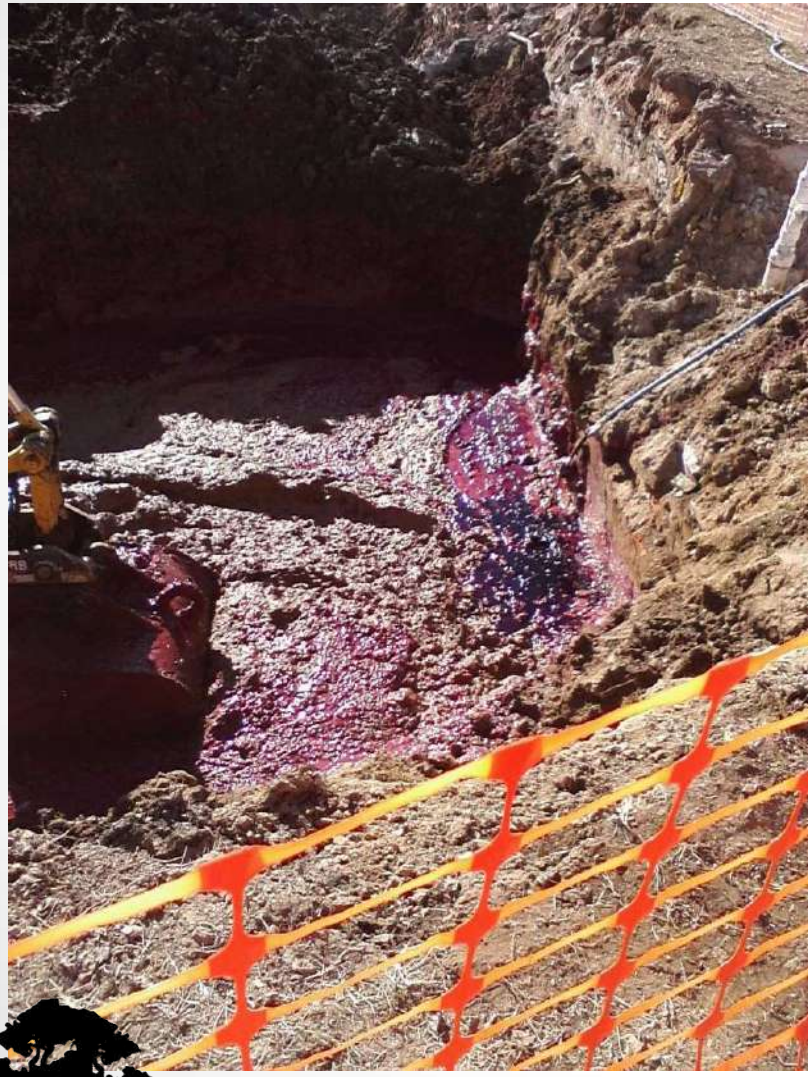
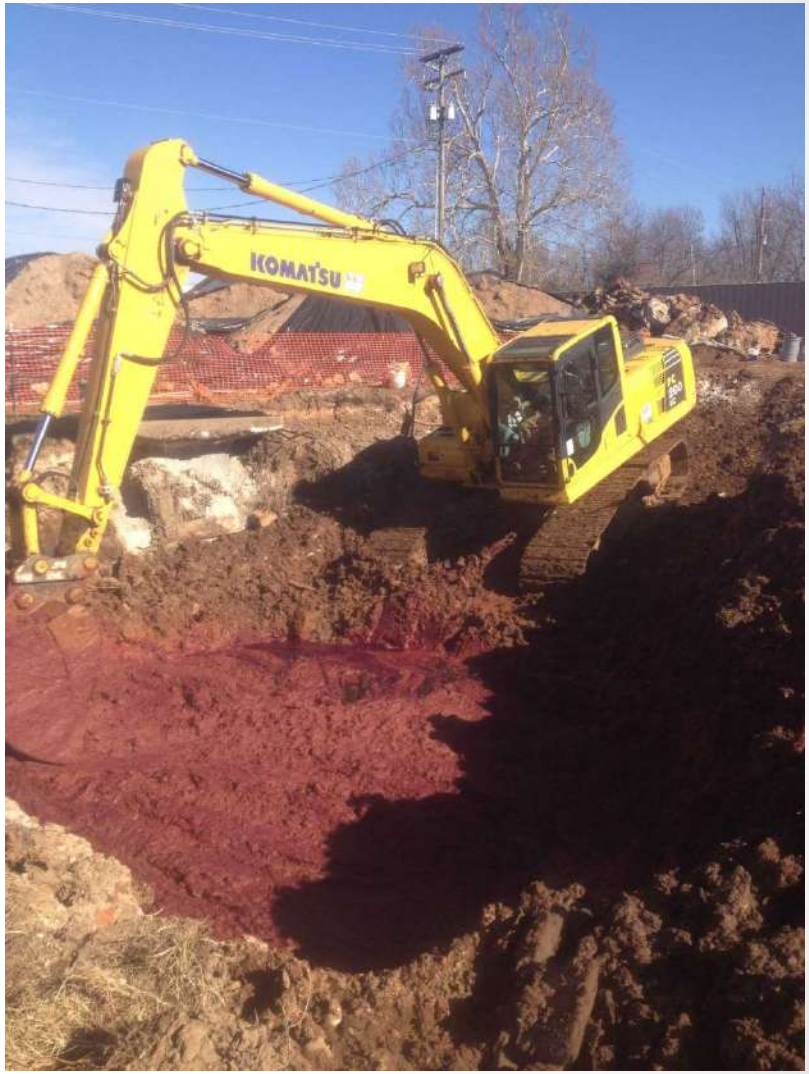
Remediation Implementation





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Remediation Monitoring

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

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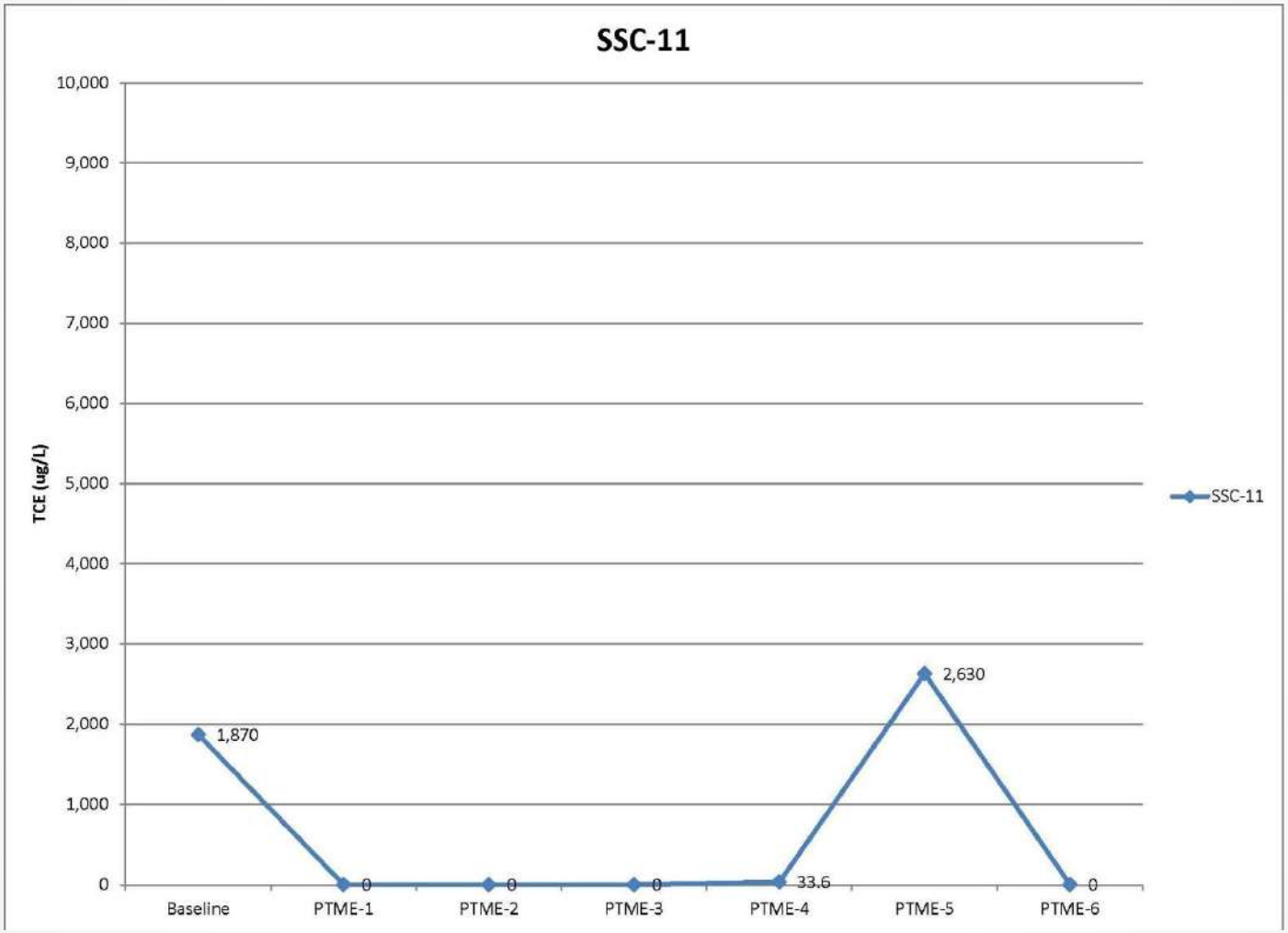
Remediation Monitoring



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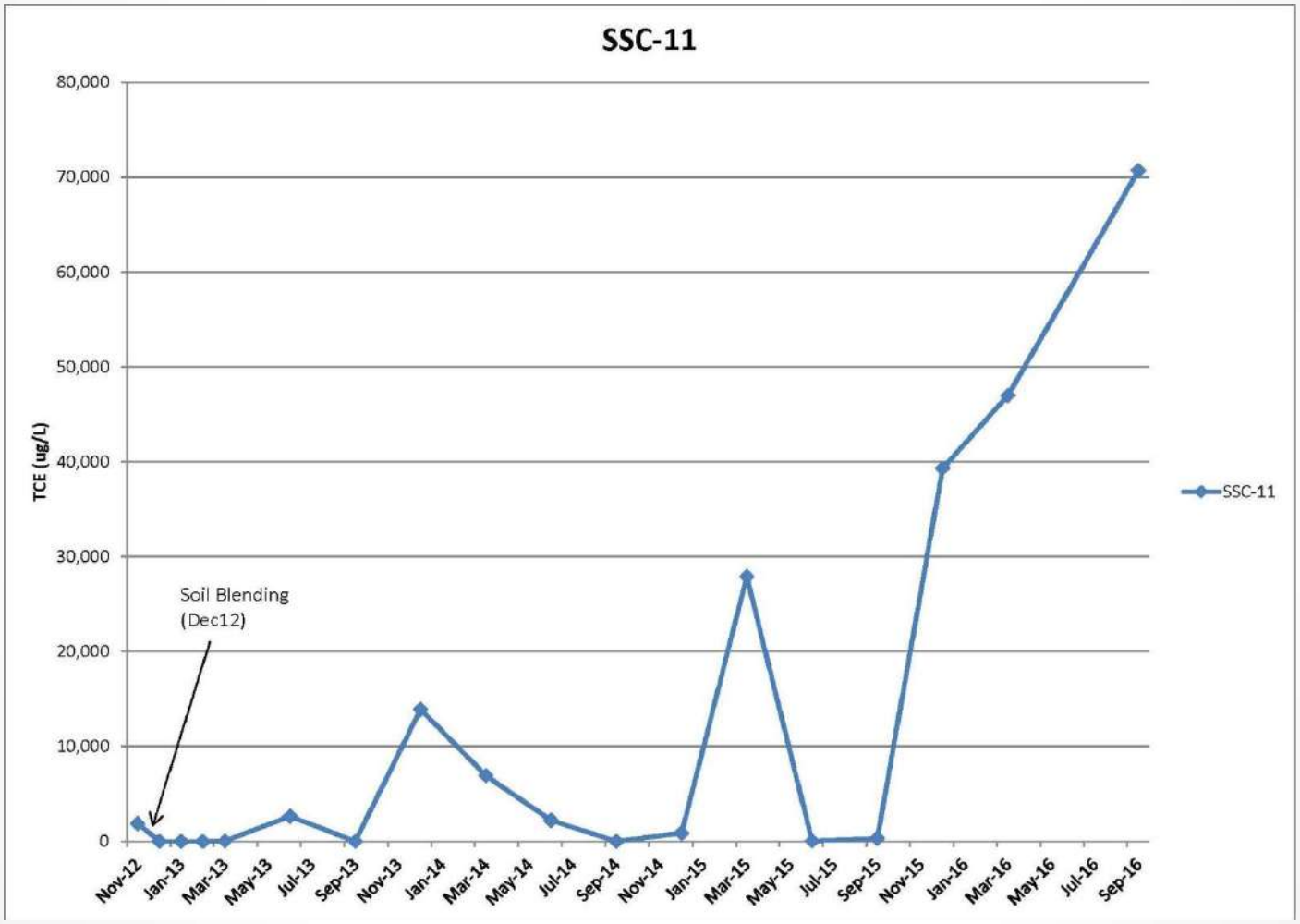
Remediation Monitoring



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Lessons Learned

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

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Questions?

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