Ellis Property Superfund Site
Integrated, Performance-Based Design Approach for Combined Excavation/In-Situ Thermal Remediation Remedy

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Site Summary

- 36-acre parcel located in Evesham Township, Burlington County, New Jersey
- Approximately four (4) acres historically used for a drum storage and reconditioning operation
- Subsurface soil and the groundwater contaminated with VOCs primarily TCE
Site Regulatory History

- Drum removal in **1983** and **1989**
- ROD in **1992**
- Removal of 1,400 CY of contaminated soil in **1997**
- Installation of groundwater collection and treatment system in **2000**
- In **2006** the EPA performed a Remediation System Evaluation of the Site operations. Based on the results of the RSE it was recommended that additional enhancements be implemented to improve the performance of the groundwater C&T system.
- A ROD Amendment was issued in September **2013**.
ROD Amendment

The ROD Amendment included:

- Excavation and off-site disposal of TCE contaminated soil in the source and plume area;
- Implementation of in-situ treatment, where appropriate, to complement excavation;
- Continued operation of the existing C&T system for a period of time (estimated to be one year) to evaluate the effectiveness of remedy.
- Look for ways to reduce the amount of truck traffic as per public comment.
PDI Completed in 2014

Delineation of soil contamination and investigation of aquifer characteristics
- 35 borings up to 90 ft bgs
- 105 soil samples
- 72-hour pump test

PDI Results
- Contamination was detected deeper than initially thought
  - Increasing the complexity and cost of excavation remedy
- An aquifer pump test identified a relatively low permeability
In-situ Technology Selection

- In-situ component to the remedy to reduce vehicle traffic
- The deeper contamination increases the complexity and cost of excavation remedy. In-situ technology can target deeper impacted soils.
- Low permeability aquifer will cause difficulty in distribution of an injection type in-situ technology
- The deeper central portion of the contamination was selected for ISTT and the shallower perimeter areas were selected for excavation.
Remedial Technology Areas

Excavation Area

ISTT Area

Excavation Area
Remedial Design Considerations

Combination between performance and prescriptive design
- Excavation – Prescriptive Delivery
- ISTT – Performance Delivery

What about the site led to a performance design?
- Technology (Does it lends itself to either type of design?)
- Certainty of the CSM
- Procuring it – PRAC
- Contract mechanism – lump sum versus unit price or combination
Prescriptive Design - Excavation

- Established technology and can provide work breakdown of individual cost items
- Relatively well defined areas/volumes - some increase based on post excavation sampling
  - Unit rate lines items can accommodate
- Large number of contractors can bid on this type of RA
Performance Design – In-Situ Thermal

- ISTT vendors provide turnkey service including design of system and supply of specialized equipment
- Design aspects (time, temperature, and spacing of heater elements) are best left to vendor to allow for optimization
- Comprehensive specification that a prime contractor can hand to an ISTT subcontractor
- The turnkey type service lends itself to a lump sum performance based type contract mechanism
In-situ Performance Specification Considerations

- Target clean up goal vs. time/temperature requirement
  - Soil clean up goal of 1 mg/kg
- Variety of methods to heat subsurface
  - Conductive versus Resistive heating
- Capture and treatment (typical above grade) of vapors prior to release to atmosphere
- Monitoring reporting requirements
- Confirmation/End Point sampling requirements
In-situ Confirmatory Sampling Program
In-situ Performance Specification Highlights

- Target design temperature
- Heating element layout/spacing
- Approach/basis for vapor/liquid treatment equipment
- Modeled estimates of energy needs for optimal temperature and duration necessary
- Estimated amount of energy, water, fuel, and other consumables (GAC) to operate system
- Permits
- Monitoring requirements
- Electrical service drop
- Period of performance