Application of Multiple Remedial Techniques and Approaches (In-Situ/Ex-Situ) at the Ewan Property Superfund Site
Ewan Property Superfund Site

- Burlington County, New Jersey
- Pinelands Area of New Jersey
  - Designated Environmentally Sensitive Area
- Former Disposal Area – Drums, Liquid Wastes and Sludge
- Cohansey-Kirkwood Formation – Drinking Water Supply
- Listed Superfund Site
Response Activities Operable Unit 1

- Buried drums and contaminated soil removed in 1995-1996
- 3,820 drums and 14,000 cubic yards of contaminated soils removed and disposed offsite
- Excavation addressed bulk waste and unsaturated contaminated soils
- Source removal program implemented to address the contaminant source to groundwater
- Wetlands mitigation completed due to OU1 activities
Response Activities Operable Unit 2

- Extraction, treatment and reinfiltration of contaminated groundwater (195 gpm)
- Seven Extraction Wells and Conveyance Lines
- VOCs/SVOCs/Elevated Iron/Low pH
- Residual contaminated soils treated via flushing/in-situ bioremediation
- Prevent migration of dissolved constituents of concern
- Remedial Objectives/Classification Exception Area (CEA) Compliance Criteria
Groundwater Remedy: Recovery and Treatment System

- Equalization
- Aeration (Oxidation)
- Chemical Precipitation
- Sand Filters
- Air Stripping
- Activated Carbon
- Cat OX and HCl Scrubber
- Sludge Thickening
- Filter Press
Remedy Performance Issue: Decrease in Mass Removal

Cumulative Total VOCs Removed by Water Treatment System vs. Time of Operation
Remedy Performance Issue: Iron Fouling
Groundwater Remedy Evaluation: Short-term Recommendations

- Terminated Air Permit Due to Low VOC Mass Recovery (Cat Ox and Scrubber)
- Bypassed Air Stripper Treatment Due to Low VOC Mass Recovery
Groundwater Remedy Evaluation: Long-term Recommendations

- Develop Well & Conveyance Line Rehabilitation Program to Increase Extraction Efficiency using HCl
- Online Performance Improvements
- Supplemental Source Removal
- Conduct Pilot Study of Supplemental Technologies
Supplemental Source Removal Program
Supplemental Source Removal Program

TC-30 Soil Removal Program

- Wet excavation into smear zone to address LNAPL at TC-30
- 1,000 tons of contaminated soil removed and disposed offsite
- LNAPL/groundwater removal and treatment
Supplemental Source Removal Program

TC-32 Soil Removal Program
- Wet excavation to address residual contamination at TC-32
- 600 tons of contaminated soil removed and disposed offsite
- 15,000 gallons of groundwater removed and treated at plant
Supplemental Source Removal Program

2-Methylnaphthalene Concentrations in TC-30
2004 - 2015

Remedial Objective = 15 µg/L
Supplemental Source Removal Program

Toluene Concentrations over Time
TC-32/TC-32R and VE-2

Remedial Objective = 1000 µg/L

Concentration (µg/L)

Date
May-10 Nov-10 May-11 Nov-11 May-12 Nov-12 May-13 Nov-13 May-14 Nov-14 May-15 Nov-15

TC-32/VE-2 Remedial Action

Remedial Objective = 1000 µg/L

TC-32 VE-2 Remedial Objective
In-Situ Pilot Study – Alternatives Considered

- Soil Vapor Extraction
- Bioslurping
- Dual Phase Extraction
- Air Sparging/Soil Vapor Extraction
- Biosparging
In-Situ Pilot Study - High Vacuum Dual Phase Extraction (DPE)

- Groundwater flow = 10 gpm
- Capture Zone = 55 feet
- Radius of Influence = 26 feet
- Significant VOCs recovered
- Effectively enhance migration control
- Mass Recovery Rate = 0.7 lbs/day
Groundwater Completion Strategy

- Terminated Groundwater Recovery, Treatment and Reinfiltiration System (2006)
- Continuous Operation of DPE System (2006-2010)
- Phased-Shutdown of DPE System (2010-2011)
- Monitored Natural Attenuation (2011- Present)
- Site Decommissioning and Restoration (2015-2016)
Site Restoration

- Deed of Conservation Easement – Green Acres
  - Utilities Removal
  - Removal of all infrastructure
    - 4,000 linear feet of underground piping
    - 2,000 linear feet of aboveground piping
    - Septic System & Leach Field
  - Preserved as Greenfields
Site Restoration

Pinelands Restoration Requirements

- Reinfiltration Basin Restoration (5 Acres)
  - Top Soil
  - Native Species Vegetation
  - 600 Indigenous Trees
  - Monitoring Program
Project Status

- Completion of Site Restoration Plan (Spring 2016)
- Completion of Off-site Residential Monitoring Program (Spring 2016)
- Groundwater Monitoring Program (Tri-Annual Sampling)
- Achieve Groundwater Remedial Action Objectives and Associated Cleanup Levels
- Delete Site from the NPL
- Monitored Natural Attenuation with CEA until PL-1 GWQS achieved (NJDEP)
Keys to Success

- Never Assume Status Quo
- Value of Constant Remedy Evaluation
- Supplemental Targeted Remedial Alternatives within Definition of ROD
- Partnering with Regulatory Agency