Use of a Long-term Air Injection/Soil Vapor Extraction Pilot Study as an Effective Closure Strategy

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Outline

- Site History & Conditions
- Remedial Alternative Evaluation
- Development of a Closure Strategy
- Pilot Study
- Current Status
Site History

- Former railroad maintenance and fueling depot
- Built in the early 1900s
- Taken out of service in early 1980s
- Environmental assessments since 1990s
Regulatory Setting

- LPST Program

Physiography

- Texas Gulf Coastal Plain

Geology & Hydrogeology

- Sands and Clays
Assessment History

- Area of Affected Soil & Groundwater
Assessment History

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- COC - #2 Diesel
- Limited LNAPL on-site
Assessment History

- Area of Affected Soil & Groundwater
- COC - #2 Diesel
- Limited LNAPL on-site
- Affected off-site monitoring well
Benzene in Groundwater MW-8 (downgradient, off-site)
Regulatory Drivers

- Off-site Recalcitrant Benzene
- On-site LNAPL

Risk Management

★ Adjacent Residential Property
Remedial Alternative Evaluation

- **Good Historical Assessment**
  - ~20 Monitoring Wells
  - Soil and Groundwater Sampling
  - Fingerprinting of LNAPL
  - CPT/ROST

- **Pilot Testing**
  - Multiple Events and Technologies
  - Oxygen Depleted Subsurface
Development of Remedial Strategy

- Complicating Site Constraints
- Closure vs. Maintenance
- More Pilot Testing?

...... Full Scale System?

..........or Pilot Study???
Pilot Study

- Conceptual Remedial Plan
  - Stand Alone System
  - Similar Equipment Used During Pilot Testing
  - Low Capital Investment
  - Limited Physical Improvements
  - Addresses Site Constraints
The Technology
The Technology

Contaminated Soil Vapors

Affected Groundwater
The Technology

- RSI CARBURETOR
- PROCESS GAS
- AIR
- FUEL
- COMPRESSIVE THERMAL OXIDATION (CYLINDERS) 3200° F FOR 1/100 SEC.
- TREATED GAS (700°-1100° F)
- RADIATOR
- STACK
- EXHAUST (500°-700° F)
The Technology

- Successful AFCEE Demonstration Project
- ICE technology easily integrated
- Capable of achieving stringent air discharge limitations (> 99.9% destruction efficiency)
- Low cost per pound for TVH
  - $0.04 to $0.46
- Auxiliary fuel required (propane or natural gas)
- Soil vapor extraction flow rate dependent on site conditions
- Weekly O&M required
Hydrocarbon Recovery Rate (lbs/hr)
Hydrocarbon Recovery (lbs)

SVE Cumulative Hydrocarbon Recovery (lbs)

Date

Hydrocarbon Recovery (lbs)

25,000 lbs!
The Long-Term Pilot Study

was successful at:

- Accelerating the natural attenuation process
- Limiting total project expenditures
Points to Take Home

- Reliable Technology
- Good Return On Investment
- Provided Data Identifying Natural Attenuation
  Is An Active Process
- Boosted MNA Process And Thus
  Reduced Total Project Costs

In Closing...