Using the USEPA’S Triad Approach for Accelerated Characterization at the Assunpink Creek Brownfields Sites In Trenton, New Jersey

Katherine Linnell
Langan Engineering and Environmental Services, Inc.
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PRESENTATION OUTLINE

• Project Background

• Use of the Triad Approach

• Case Studies
  – Crescent Wire Site
  – Freight Yards Site

• Conclusions
PROJECT BACKGROUND

• Several Brownfields sites in Trenton, New Jersey

• Located within floodplain of Assunpink Creek

• Goal to redevelop into a recreation area
PROJECT BACKGROUND

Assunpink Creek
PROJECT BACKGROUND
USE OF THE TRIAD APPROACH

Benefits

• Expedites redevelopment process
  – Limits sampling events

• Reduces uncertainty of characterization
  – Provides greater certainty to cleanup costs

• Generates necessary information to integrate cleanup with redevelopment
USE OF THE TRIAD APPROACH

Overview

• Systematic Planning
  – Develop project objectives
  – Site Conceptual Model
  – Obtain stakeholder input

• Develop and implement a Dynamic Workplan
  – Outline work scope
  – Identify decision rules

• Real-time analysis
  – Field analytical methods
USE OF THE TRIAD APPROACH

• Effective at
  – Characterizing large areas
  – Delineating contaminants
  – Finding unknown source areas

• Requires
  – Limited initial site data
  – Stakeholder input
USE OF THE TRIAD APPROACH

Certain areas of the Trenton project

- The Crescent Wire Site
  - Area with PCB/Oil Impacts
- The Freight Yards Site
  - Soil Impacts across the Rail Area
  - Above Ground Storage Tank
  - Areas of Fuel Oil Spills
  - Areas of Distressed Vegetation
  - PAH “hot spot”
USE OF THE TRIAD APPROACH

Field Analytical Methods

- Selected based on project objectives

- Field Analytical Methods (FAMs):
  - Screening Techniques: Test kits
  - Non-Standard Analytical Methods: GC/MS
  - Standard Analytical Methods: GC/MS SW846 8270
CRESCENT WIRE SITE

Site Conceptual Model

• PCB/Oil Impacts
  – Impacted at and below the water table
  – Possible source mechanisms
    • Released from upgradient location
    • Placed directly into the subsurface
    • Infiltrated before placement of soil fill
CRESCENT WIRE SITE

Objectives

- Delineate impacts laterally and vertically in soil
- Identify potential source areas
- Evaluate potential for impacts to Assunpink Creek
- Determine need for monitoring wells and sediment sampling
Field Analytical Methods Selected

- Immunoassay
  - PCBs
  - TPH
- X-ray Fluorescence
  - Selected Metals
CRESCENT WIRE SITE

Mobile Laboratory
Crescent Wire Site

Dynamic Workplan

- Rely on field analytical method results
- Step out sampling per decision rules
  - TPH > 1,000 ppm
  - PCBs > NJDEP Soil Cleanup Criteria (0.49 mg/kg)
- Identify ‘Source Areas’ by relative spatial trends
- Collect limited certified laboratory data for confirmation
Results

• Mapped extent of PCB/Petroleum Hydrocarbon smear zone
• Determined impacts extend to Assunpink Creek
• Enhanced certainty regarding absence of on-site source
  – Reduced groundwater and sediment investigation requirements
CASE STUDY
FREIGHT YARDS SITE

RAIL AREA
Assunpink Creek
Taylor Ave
Chambers Street
North Olden Avenue
Site Conceptual Model

- **Contaminant Impacts in Rail Area**
  - Black, surficial fill impacted with metals, PAHs, and PCBs
  - No impacts to underlying fill and native soil

- **Several “hot spot” areas**
  - The AST Area
  - Areas of Fuel Oil Spills
  - Areas of Distressed Vegetation
  - PAH “hot spot”
Objectives

- Determine the continuity of the black surficial fill
- Delineate the black surficial fill to the northwest
- Characterize potential impacts to underlying soils and groundwater
- Identify potential unknown soil “hot spots”
- Delineate “hot spots”
FREIGHT YARDS SITE

Sampling Grid in the Rail Area
FREIGHT YARDS SITE
Results

- Characterized site wide impacts
  - Found impacted surficial black fill site wide
  - Vertically delineated impacts
- Delineated “hot spots”
  - Identified previously unknown hot spots
  - Characterized potential impacts to groundwater
CONCLUSIONS

PROJECT EXPERIENCE WITH THE TRIAD APPROACH
Field Analytical Method (FAM) Reliability

- Spatial trends from FAMs improved site characterization process
- Certified laboratory data verified clean zones
- FAMs provided “ballpark numbers”
- Exceedances of standards were generally consistent
CONCLUSIONS

Realized benefits of the Triad Approach

- Reduced site characterization uncertainty
- Expedited remediation process
  - Identified source areas and contaminant distribution in one mobilization
    - One week at Crescent Wire Site
    - Four weeks at the Freight Yards Site
- Increased confidence in establishing remediation scope and budget