

# BOS 200+ TECHNOLOGY APPLICATION AT ACTIVE BULK STORAGE FACILITY

## ABSTRACT

The subject site is an active pipeline and petroleum storage site in the Gulf Coast Region where a leaking AST created a large dissolved and NAPL plume. BOS 200+, a modified version of BOS 200®, was applied over a large area during a 6-month period in 2017. Results to date indicate that NAPL levels have been eliminated or significantly reduced. In addition, TPH concentrations have been reduced more than one order of magnitude. A No Further Action determination has been requested and is pending.

## PROJECT SNAPSHOT

### KEY DATES

- **February 2017** - Remedial Design Characterization (RDC)
- **Summer/Fall 2017** - Injection of BOS 200®+
- **No Further Action (NFA) Determination:** Pending

**Treatment Area** = 93,000 ft<sup>2</sup>

**Lithology** = Varied across the large area but consisted mainly of silty clay to clay over weathered shale with some sand and gravel.

**Depth to Water** = 5 to 25 ft bgs (variable)

**Contaminants** = NAPL and TPH

**Implementation Method** = Direct push and Pre-Drill injection

## APPROACH

- One-thousand one-hundred and ten (1,110) soil samples were collected as part of a large Remedial Design Characterization (RDC) in early 2017. The sample results were used to create an optimized and surgical BOS 200+ design. All samples were analyzed at the RPI Project Support Laboratory at no cost.
- Injection specifications
  - 93,000 ft<sup>2</sup> Treatment Area
  - >1,000 Injection Locations
  - 361,000 lbs BOS 200+
- The majority of the injection locations were completed using direct push injection techniques. In one area, shallow refusal was encountered (weathered shale) and the Pre-Drill technique was used to reach the target treatment depth.

## CHALLENGE AND OBJECTIVES

- Principal Objective: Elimination of measurable LNAPL.
- The challenges for this project included the following: active petroleum storage, pipelines and sub-surface electrical, shallow groundwater table (western treatment area), and shallow DPT refusal in one area required a Pre-Drill injection technique.

## RESULTS

- NAPL
  - The total number of wells with measurable NAPL prior to remediation: 15
  - Post-remediation NAPL statistics
    - No measurable NAPL: 9
    - Sheen: 5
    - Measurable NAPL: 1
- Dissolved Total Volatile Petroleum Hydrocarbons
  - The average dissolved TPH concentration in the monitoring wells prior to remediation: 20.9 mg/L
  - Post-remediation average concentration: 1.63 mg/L (92% reduction)
- Post treatment analytical support provided by the RPI Project Support Laboratory at no cost.

**Figure 1.** Site Map Depicting BOS 200+ Western Treatment Area, RDC Locations Noted as Squares

