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Treatment Train Approach as an Expedited Site Closure Strategy at a Long-Term Superfund Site Impacted with CVOCs and Heavy Metals

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Background/Objectives. The site is a former industrial wastewater processing and metals reclamation facility placed on the NPL in 1985. Contaminant sources consisted of wastewater treatment lagoons, abandoned tankers and drums. Historical exceedances of VOC and metals exist in soil and groundwater extending from source area to surface water body downgradient of the site. Site geology consists of Coastal Plain sediment including unconsolidated sands, gravels and clays that make up three water-bearing zones with the shallow zone being the primary concern. Groundwater (GW) flow is to the southwest toward the river and lateral flow in the shallow aquifer is 1 ft/day. Impacts includes chlorinated ethanes, ethenes and low levels of heavy metals including Cr (+6) and mercury

Approach/Activities. A series of bench- and field- scale in situ remedial approaches including phytoremediation and in situ chemical reduction (ISCR) have been conducted between 2011-2013 in addition to an optimized P&T system to improve capture and treatment. Post-injection monitoring continued until 36 months' after injections. CVOCs were reduced by over 80% in two of the three treatment areas but elevated background sulfate concentrations acting as an "electron sink" hindered CVOC and metals reduction. Natural acidic conditions also inhibited biotransformation processes. The final phase of remediation in 2016 involved injecting a combination of ERD-ZVI substrates in the areas where residual CVOCs remain and using an inorganic blend of treatment mechanisms based on iron, iron sulfides, and other iron-bearing minerals which do not rely on microbiological processes and have significant advantages due to lower solubility and greater stability of iron-bearing mineral precipitates formed with heavy metals.

Results/Lessons Learned. The focus of the presentation will be on treatability and field-scale studies conducted using different treatment mechanisms and long-term fate and transport of CVOCs and heavy metals discharging into surface water.