

Focusing Remedy Transition at a Former Fuel Terminal Located in a Cold Weather Climate on Using Green and Sustainable Strategies

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Background/Objectives. Remediation efforts at a former bulk fuel terminal had primarily been reactionary based on impacts observed at the site. Petroleum (TPH-d and benzene) and fuel additive (1,2-dichloroethane [EDC]) contaminants are detected in groundwater and soil. The groundwater flow direction from the site resulted in the plume migrating toward downgradient community with private residential drinking water wells and a further downgradient river. Initial remediation efforts consisted of an air sparge system along the downgradient property boundary; and later a groundwater extraction, treatment, and reinjection system to provide hydraulic control. Due to the cold weather climate the systems were operated seasonally from approximately May through October. Over the past few years, Andeavor has implemented a strategy to transition to sustainable remediation to reduce the environmental footprint of cleanup activities while still meeting remedial objectives.

Approach/Activities. The presentation will focus on the process to transition to green and sustainable remedies using an iterative approach. The process involved:

- Assessing the sustainability performance of the existing remedies to better understand each activity and the associated impact on the environmental footprint. The result was to focus on the groundwater extraction remedy.
- As a result, historical groundwater data were evaluated using Ricker Plume Analytics to better assess the effectiveness of the groundwater extraction system. Results were able to demonstrate that the groundwater extraction system was no longer enhancing remediation and could be shut down.
- A supplemental investigation was performed to identify the extent of EDC in soil as it was the primary driver for operating the air sparge system. A passive soil gas survey was conducted and identified the primary hot spot near the former Truck Loading Rack.
- Recently, a phytoremediation system was installed with the purpose of both remediating the EDC in the vadose zone and providing a hydraulic barrier to control and remediate the groundwater.
- Vent wells were installed at the former Rail Loading Rack located upgradient of the terminal to enhance biodegradation by delivering oxygen to the subsurface via barometric pumping using one-way baroball well caps.

Results/Lessons Learned. Assessing sustainability at the remediation phase led to developing a remedy transition strategy with agency engagement. The process identified that remedy effectiveness could be improved and the remediation lifecycle reduced. The iterative approach identified footprint reduction and social engagement opportunities. The tools and techniques have been shared with the agency for wider use in the state. The local university is involved in research opportunities associated with the phytoremediation system with the intent of expanding its use at contaminated sites.