Ending the O&M Cycle

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Hazardous waste sites often get stuck in a perpetual operation & maintenance (O&M) phase. The yearly O&M costs are usually low enough that the sites fall under the radar and continue on this path even though the activities arent bringing the site closer to closure. The long-term cumulative costs of O&M are sometimes not considered at the feasibility stage. Another concept that is not always fully considered at the feasibility stage is that changing regulations may have more of an impact to costs for open/temporarily closed sites than to permanently closed sites.

This discussion will present a site overview, site challenges, a feasibility analysis, and implementation of the remedial action at the subject site.

The subject site is located adjacent to an active railroad right-of-way (ROW) in the City of Leominster, Massachusetts. The railroad ROW is confined on the north and west sides by a steep embankment and dense vegetation that limits vehicular access. An unnamed perennial stream runs through the subject site from a box culvert under the rail embankment. Metals-impacted fill material with concentrations above state regulatory criteria was identified at the subject site at concentrations that classify it as a hazardous waste.

In 2003, the subject site achieved temporary closure under the Massachusetts Contingency Plan (MCP), but required semi-annual monitoring in pertuity. In 2011, after several years of semi-annual O&M, a detailed engineering review was performed to evaluate remedial options to achieve permanent site closure. Based on the engineering evaluation, it was clear that natural attenuation would likely take decades and cost several hundreds of thousands of dollars in O&M costs over time. As part of the engineering review, a feasibility analysis and bench-scale treatability study were also conducted to evaluate long-term O&M costs against active remediation and to evaluate two methods (Maectite' and Enviroblend) of stabilizing soluble metals (specifically lead and cadmium) to reduce costs. The analysis indicated that active remediation (in this case excavation), soil stabilization, and off-site disposal was ultimately the most cost-effective path to permanent closure.

The implementation of the remedial alternative included the excavation and off-site disposal of approximately 1,000 tons of metals-impacted soil as non-hazardous waste. Prior to off-site transportation, the impacted soils were treated using Maectite' and Enviroblend amendments to reduce leachable concentrations of metals (cadmium and lead) to below applicable hazardous waste criteria, which resulted in reducing the project costs by approximately $600K. Substantial remedial costs were also avoided by requesting access to the adjacent property through the state enforcement program. Creative engineering included site restoration program that allowed for slot trench excavation within an approximate 30-foot embankment slope (approximately 1V:1.5H) to remove metal-impacted soils while not completing mass removal of the embankment and disturbing sensitive habitat in the adjacent wetland area.

Pending the results of post-remediation groundwater water monitoring planned for 2016, the subject site will achieve a permanent solution or permanent site closure under the MCP.