Balancing the Cost of Short-Term Cleanup and Long-Term Stewardship during Remedial Decision Making

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Background/Objectives. At environmental remediation sites where, cleanup activities will leave behind some measure of residual impacts, future monitoring and management (i.e., Long-Term Stewardship, or LTS) is required to protect human health and secure regulatory closure. Environmental contaminants, like chlorinated solvents, can exist in the subsurface for very long periods of time. Although the reduced initial price tags of less aggressive remedial actions are very appealing, LTS costs can be very high and may keep the future marketability of impacted sites vague. Additionally, the greater the amount of contaminant mass remaining long term, the greater the likelihood of future claims against the responsible party from exposed parties, or damaged property owners. A full analysis of all likely and potential variables during remedial planning may lead to common-sense decisions to remove a larger amount of contamination during initial cleanup activities. The objective of this study was to analyze the notion that an increase in active remediation at chlorinated solvent release sites will result in a decrease in LTS demands and reduce the total lifecycle cost of the remediation project.

Approach/Activities. Point of exposure assessments were conducted for three sites with subsurface impacts of tetrachloroethylene (PCE). In each scenario, multiple regulatory closure and remediation strategies were developed to help identify where remedial and LTS programs would be most effective. The multiple scenarios for each site incorporated inversely proportional degrees of active contaminant mass reduction and LTS. Whether treating the contaminant mass reservoir (soil, groundwater, or vapor) directly or implementing a control system to cut off the pathway, the goals were to eliminate exposure to current and future receptors. Detailed project lifecycle costs were assembled for each iteration, which included nature and extent investigation, contaminant mass removal, LTS, and a monetary estimate of potential future liability risk. The costs of future liability were determined by consulting with experienced attorneys who performed an analysis of similar communities, and then assigned estimated damages to affected parcels that may require financial compensation in exchange for land use restrictions. The potential risk for future bodily injury claims was also considered.

Results/Lessons Learned. As a result of this analysis, in each case the remediation strategy that incorporated a greater amount of contaminant mass reduction and less LTS was selected for implementation due to lower overall lifecycle costs. This is an extremely important finding, which may be intuitive, yet appears to be counter to the actions of many brownfield redevelopers who may have limited upfront capital. With recent developments from the U.S. EPA and individual states regarding long term monitoring requirements of institutional controls, the cost of LTS must be a greater component of remedial planning as an overall cost saving approach.