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Risk-Based Adaptive Management of Remediation Site Portfolios

This paper develops a methodology to aid remedial project managers in handling cleanup strategies and determining future reuse at Superfund sites. The goal is achieved with the completion of four objectives: 1) avoiding back engineering and decisions that limit future reuse options; 2) understanding all contingencies in the cleanup process; 3) accounting for costs, benefits, scheduling, and performance for all stakeholders including future generations through the creation of an index of reusability; and 4) maximizing the opportunity for learning. Development of the method stems from concepts in risk management previously applied in diverse disciplines. First, reuse contingency trees are developed to describe the potential deviations in the cleanup process that cause increased costs, increased time to reuse, or decreased future use options for a site. Second, a reusability influence diagram is developed to identify the impacts of the contingencies on the various decisions and outcomes of the Superfund cleanup process. Third, an index of reusability is developed in order to compare the reuse benefits to cleanup costs and to herd portfolios of sites along different cleanup strategies. The methodology is unique to any existing study of the Superfund process and the concept of the contingency binds the multiple methods. This paper can support initiatives of the Environmental Protection Agency to change the regional handling of sites to an adaptive portfolio-based approach. Furthermore, the developed methodology has general importance in application not limited to Superfund sites but to all environmentally impaired land.