

## U.S. EPA Superfund Optimization: Progress and Outcomes

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**Background/Objectives.** EPA defines optimization as: “Efforts at any phase of the removal or remedial response to identify and implement specific actions that improve the effectiveness and cost-efficiency of that phase”. Such actions may also improve the remedy’s protectiveness and facilitate progress towards site completion. Optimization efforts were recognized and reinvigorated through the EPA Administrator’s 2017 Superfund Task Force recommendations. Under its optimization program, EPA’s Superfund completes 25-30 optimization evaluations per year, which typically result in up to 10 full recommendations each. By conducting an analysis of the optimization evaluations and the implementation of the recommendations, EPA seeks to document the benefits from optimization, such as increasing remedy effectiveness, improving technical performance, reducing costs, moving sites towards completion, and lowering the environmental footprint of remediation activities at cleanup sites.

**Approach/Activities.** In FY 2018, EPA collected information from site project teams on the status of the optimization recommendations from the evaluations at approximately 70 projects conducted between 2015 and 2018, and updated the implementation status of recommendations at another 30 projects completed before 2015. The analysis of the approximately 700 individual recommendations made over the four years include the technical nature of the recommendations, the implementation status, and anticipated outcomes of their implementation. The in-depth analysis of the data is yielding insightful information on how optimization practices are moving “upstream” to the early phases of projects, and which beneficial outcomes are typically incurred in each phase.

**Results/Lessons Learned.** Based on preliminary analyses, and from previous experience, EPA is finding a high percentage of the recommendations are being implemented, a key indicator of the positive impact the efforts are having. We are also learning about which technical practices are helping us achieve the optimization goals. Several tools and techniques were common to the optimization evaluations, and could be categorized in the following groups: (1) improvements to the conceptual site model, (2) streamlined or improved monitoring, (3) improved system engineering, and (4) a change in the remedial approach. The outcomes of implementing the recommendations resulted in improvements in five main areas; remedy effectiveness, cost reduction, technical improvement, site closure, and green remediation.