

Developing Greener Cleanup Metrics at U.S. EPA

Kristin Giacalone, **Carlos Pachon**, Julie Santiago, Karen Scheuermann, and Hilary Thornton
(U.S. EPA)

Background/Objectives. As stated in the U.S. EPA Superfund Memorandum Consideration of Greener Cleanup Activities in the Superfund Cleanup Process, a program goal is to evaluate cleanup actions comprehensively to ensure protection of human health and the environment and to reduce the environmental footprint of cleanup activities. Project managers have been pursuing these efforts at the site level using several approaches, including following technical guidance in remedy-specific greener cleanup fact sheets, and applying ASTM's Standard Guide for Greener Cleanups. Environmental footprint reduction information is often generated and collected at these sites. However, Superfund does not have a simplified footprint metric system, or systematic data collection plan across the 10 regions. In order to fill this gap, a group of experts from across the country formed a Greener Cleanups Metrics Workgroup to develop a template and recommendations for streamlined collection of numerical metrics which may be applied to a variety of cleanup programs, including Superfund and RCRA. The general approach is to develop a standard set of site-specific metrics to serve as an indicator for the environmental footprint of the cleanup, with sufficient resolution to inform site management decisions yet capable of being rolled up to a cross-program indicator of footprint reductions. A sampling of sites where the template is applied could be used to statistically represent program-wide footprints, with potential for representing footprint reductions achieved through the application of greener cleanup practices.

Approach/Activities. In 2016 the workgroup developed a comprehensive series of detailed metrics, based in part on the footprint parameters in the spreadsheets for environmental footprint analysis (SEFA). In 2017 the workgroup found the level of detail was beyond what was needed for most sites and opted to pursue a simpler approach, for which it developed and beta-tested a set of "basic" metrics. A beta-test of the metrics was conducted at twelve projects in 2017 to evaluate operational considerations for going program-wide with the template. Challenges included establishing a protocol for determining parameter baseline values, availability of data, duration of reporting periods, embedded calculations (for example unit conversions), and understanding the potential end-uses of the data.

Results/Lessons Learned. Through the beta testing the workgroup identified a series of suggestions to apply to an updated metric template. The goal is to pilot this updated template voluntarily at a broader suite of sites. For example, while standardizing units and metrics for specific green remediation core elements is a necessary step to evaluate time-series or cross-region footprint reductions, the template can include flexible options in how the data are collected, or even which units or metrics are used. The Team also evaluated the pros and cons of two major approaches to evaluating indicators of footprint reduction; measuring footprint reduction activities (such as number of BMPs implemented) versus quantitative metrics of actual footprint elements, such as pounds of NO_x, gallons of water or units of energy. Through this briefing we will synthesize key lessons learned regarding representative footprint metrics, and operational considerations at a site and programmatic level.