

## Two Innovative Approaches to Implementing Green and Sustainable Remediation (GSR) Best Management Practices (BMPs) per ASTM E2893-16

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**Background/Objectives.** When properly implemented, green and sustainable remediation (GSR) goes hand in hand with accelerating cleanup timeframes and/or reducing costs. ASTM E2893-16 “A Standard Guide for Greener Cleanups” provides a process for identifying, prioritizing, selecting, implementing, and reporting activities to reduce the environmental footprint of a cleanup. This presentation outlines the distinctive paths that two military facilities took while implementing GSR best management practices (BMPs) in accordance with ASTM E2893-16.

**Approach/Activities.** The first military facility developed and implemented innovative, site-specific GSR BMPs, including transitioning an existing pump and treat system to 100% solar power, installing multiple sub-grade biogeochemical reactors (SBGRs) to reduce source area concentrations, and using phytoremediation to treat a large trichloroethene plume.

The second military facility leveraged the power of scale to achieve meaningful GSR goals. At this facility, 20 GSR BMPs were implemented at 42 active Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) sites during all stages of investigations including site assessment, remedy selection, remedy design and implementation, operations and maintenance, monitoring, and optimization. Implementation of these BMPs included using no-purge sampling technologies, coordinating with state regulators to remove a minimum purge volume requirement, and continual optimization of monitoring well network and frequency.

**Results/Lessons Learned.** At the first facility, GSR BMP implementation significantly reduced electricity usage (approximately 790,000 kilowatt hours [kWh] annually, resulting in an over \$50,000 per year reduction in electricity costs) and reduced greenhouse gas (GHG) production (approximately 930 tons of carbon dioxide annually). At the second facility, the implemented practices minimized waste generation and management (avoiding 1,500 gallons of aqueous waste per year and eliminating use of 15,000 feet of sample tubing per year), reduced greenhouse gas emissions related to transportation, reduced electricity usage, and reduced time to site closure.

This presentation will detail the different approaches these two facilities took to develop and implement BMPs, provide examples of BMPs implemented and share lessons learned from the process.