

Accelerating Cleanup, Reducing Costs, and Increasing Sustainability at Travis Air Force Base

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Background/Objectives. When properly implemented, green and sustainable remediation (GSR) strategies go hand-in-hand with accelerating cleanup timeframes and reducing costs. The Travis Air Force Base (AFB) installation-wide cleanup efforts under two consecutive performance-based contracts have been made faster, cheaper, and more sustainable by optimizing existing groundwater treatment systems and developing innovative in situ treatment approaches. Multi-year technology demonstration projects have been used to verify the effectiveness of these innovative and sustainable treatment strategies, to acquire the data needed to obtain regulatory acceptance, and to develop realistic performance metrics for remedial designs.

Approach/Activities. Significant reductions in electrical consumption and greenhouse gas (GHG) production were realized through five key methods: 1) improving the performance of existing remediation systems, 2) introducing solar power to existing treatment system components, 3) developing and implementing use of solar-powered subgrade biogeochemical reactors (SBGRs) for treatment of source areas and recirculation of in situ amendments in large groundwater plumes, 4) installing in situ biobarriers, and 5) applying enhanced phytoremediation where appropriate.

Some key GSR practices that successfully increased the sustainability of remediation systems include: 1) the use of solar-powered groundwater pumping, locally sourced farm and tree byproducts, reclaimed construction materials and other recycled, non-refined, or waste products during SBGR construction; 2) shutdown of groundwater extraction to minimize freshwater consumption in areas where monitored natural attenuation or enhanced attenuation is more effective; 3) the use of local staff, transport of supplies by rail when feasible, and selection of local vendors to minimize transportation-related GHG emissions; and 4) the preservation of natural resources through recycling and reduced consumption of materials.

Results/Lessons Learned. Using a combination of sustainable technologies, Travis AFB reduced its electrical consumption by over 790,000 kilowatt hours per year and reduced GHG emissions by over 930 tons per year, while accelerating cleanup timeframes that are expected to achieve site closure of up to 19 sites by the end of 2017. The optimization activities also resulted in significant cost savings, reducing the combined operations and maintenance costs from two sites alone by over \$260,000 per year. To document these GSR achievements, in 2016, Travis AFB became the first United States Department of Defense installation to complete the ASTM Greener Cleanups self-declaration process. This work also supported Travis AFB recently winning the General Thomas D. White and United States Secretary of Defense awards for environmental restoration.