SRS

Fact Sheet

Environmental Restoration Division

The Savannah River Site's (SRS) Environmental Restoration Division (ERD) achieves cleanup results. Over the years, SRS environmental engineers have worked diligently with the Department of Energy (DOE), the U.S. Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) to prioritize and accelerate waste site cleanup activities.

In the past eight years alone, the SRS ERD has achieved more than $80 million in cost efficiencies. These cost savings are largely attributable to the site's comprehensive cleanup plan promoting the utilization of innovative technologies, exchanging expertise and process improvements, and streamlining documents. This strategy has resulted in 306 of the total 515 waste units either completed or in some phase of remediation including over one million pounds of solvents having been removed from soils and groundwater.

The SRS ERD program routinely shares its experience and expertise with other DOE sites to help increase cost effectiveness and decrease cleanup schedules. In 2001, an Environmental Restoration (ER) Technology Integration Panel was created to increase the exchange of information and maintain a database of ER technologies and monitoring systems.

Field Remediation

From capping waste sites to installing more efficient groundwater treatment units, the program keeps fieldwork as a top priority. Fieldwork currently underway includes in situ soil stabilization and the placement of low permeability soil covers atop the K-Area Reactor Seepage Basin and the C-Area Reactor Seepage Basins. Major groundwater cleanup systems are also operating in A/M, C, F, H, and TNX areas, as well as the Mixed Waste Management Facility (MWMF), and Nonradioactive Waste Disposal Facility.

Technology Deployment

SRS utilizes state-of-the-art technology to increase remediation effectiveness and efficiency. For example, SRS has replaced traditional kaolin clay capping, previously used as a protective cover over waste sites, with a new geosynthetic cap closure technology. The geosynthetic cap is more effective in preventing rainwater infiltration and is more cost effective as well.

Since 1995, SRS has used an innovative vacuum extraction technology to accelerate groundwater cleanup in A/M Area. The vacuum extraction systems remove solvents

from the vadose zone, the layer of unsaturated soils above the groundwater, and thereby, reduce the potential for more groundwater contamination. Additionally, vacuum extraction reduces cleanup costs, expedites remediation, and increases public and regulatory acceptance.

BaroBall, a passive remediation device designed by Savannah River Technology Center researchers, has been deployed in A/M Area to remove contaminated soil vapor from the subsurface. BaroBallä uses natural atmospheric pressure fluctuations to expedite vadose remediation and to prevent further migration of contaminants into underlying groundwater aquifers. This innovative technology reduces cleanup costs and compresses the remediation schedule.

In July 2000, SRS deployed yet another innovative technology in the A/M Area. Dynamic Underground Stripping (DUS), developed by Lawrence Livermore National Laboratory, combines Steam Enhanced Extraction with Electrical Resistance Tomography. DUS enhances the recovery of solvents from the subsurface by using steam injection and soil vapor/groundwater extraction. The DUS technology makes it possible to extract the Dense Non-Aqueous Phase Liquid (DNAPL) contamination from the subsurface 15 times more efficiently than soil vapor extraction units and 60 times more efficiently than conventional groundwater pump and treat systems.

An integrated system, that combines Air Sparging and Soil Vapor Extraction, has been installed at the C-Area Burning/Rubble Pit to prevent further migration of a volatile organic compound (VOC)-contaminated groundwater plume. The air sparging system strips solvent contamination from the groundwater, and the soil vapor extraction system vacuums the VOC contamination from the vadose zone.

SRS is currently deploying other passive technologies as part of its remediation program. For instance, SRS is in the early stages of implementing phytoremediation (utilization of natural processes occurring in vegetation) to mitigate tritium and trichlorethylene (TCE) contamination in groundwater. Surface water runoff containing tritium from the MWMF is diverted from Fourmile Branch by containing the water behind a small sheet pile dam and using it to irrigate an adjacent pine forest area. The water is evapotranspired into the atmosphere, thereby reducing environmental risk. Similar pine tree plots are being used in A/M Area Southern Sector and D-Area to destroy TCE in contaminated groundwater.

SRS is also utilizing the indigenous microbe population in the subsurface to remediate groundwater. Under certain circumstances, naturally occurring microbes will destroy chlorinated organic compounds in the groundwater. This process, known as Monitored Natural Attenuation, is accepted by the regulators and has been successfully deployed at the D-Area Oil Seepage Basin and the K-Area Burning/Rubble Pit. Other deployments are planned for the future.

Cost-Effective Management

The SRS program achieves significant cost efficiencies through the use of innovative technologies, fixed-price subcontracting and streamlining. Examples of achievements include:

- Deployed 82 innovative technologies which resulted in over $450 million in life-cycle reductions;

- Over $80 million in cost savings were achieved over the past eight years against the respective Annual Operating Plans;

- Negotiated cost-effective natural remediation remedies such as phytoremediation and monitored natural attenuation; and

- By developing and using the "Principles of Environmental Restoration", substantial schedule time has also been reduced.

Regulatory Commitment

SRS works closely with USEPA and SCDHEC to determine which waste sites require cleanup. Together they prioritize, select, and schedule cleanup activities.

The site's 515 waste units range in size from a few cubic feet of soil to tens of acres, and waste types include solid waste, radioactive waste, hazardous waste, and mixed waste (a mixture of hazardous and radioactive waste.) An assessment of the human health and environmental risks associated with the waste site is a factor in determining its cleanup priority.

If preliminary evaluations show that a waste unit may be a candidate for cleanup, an investigation and site characterization are conducted. The investigation involves looking at existing unit data and then developing a work plan that prescribes how to characterize the unit. If the investigation determines that there is a risk to human health or the environment, cleanup alternatives are evaluated, selected (with public input) and implemented. If the investigation finds that the waste unit does not pose a significant risk to human health or the environment, and USEPA, SCDHEC and the public agree with this finding, no further action is required.

The entire cleanup process is driven by two major federal statutes that govern how waste is handled at SRS. The Resource Conservation and Recovery Act (RCRA) establishes a system for tracking and managing hazardous wastes from generation to disposal. RCRA also requires corrective action for releases of hazardous waste from active or inactive waste units and treatment, storage, or disposal facilities. The Comprehensive Environmental Response Compensation and Recovery Act (CERCLA), also known as Superfund, addresses the protection and cleanup of the environment. CERCLA established a National Priority List of sites targeted for assessment and, if necessary, restoration. SRS was placed on this list December 21, 1989.

In addition to these two statutes, SRS waste unit remediation and closure is subject to the requirements of various settlement agreements, consent decrees and a Federal Facility Agreement (FFA) between DOE, USEPA Region IV, and SCDHEC. The FFA, effective August 16, 1993, specifies how SRS will address contamination or potential contamination at waste units in accordance with the RCRA and CERCLA requirements. The FFA is required under CERCLA.

Public Involvement

Once a unit has been fully characterized, cleanup alternatives have been evaluated, and a preferred method has been selected, SRS solicits comments from the general public. During the public comment period, SRS also seeks comments from its Citizens Advisory Board (CAB). The CAB, an independent group of citizens, regularly makes recommendations to the DOE, USEPA, and SCDHEC regarding remediation actions and prioritization of waste units. Once comments from the public and the CAB are considered, a Record of Decision specifying the accepted remediation method is issued.

Safety

The SRS ERD continually demonstrates its commitment to providing a safe environment for coworkers and the public. The program continues to achieve record setting safety performance, including more than one thousand consecutive days worked on projects and operations without a lost workday case.

Conclusion

SRS is a National Environmental Research Park. Ecosystems and wildlife preservation are high priorities and are factored into every ERD Remedial decision.