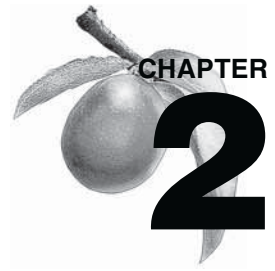

Environmental Management System



Michael E. Roper

Regulatory Integration & Environmental Services

Compliance with environmental statutory and other legal regulatory requirements is a fundamental responsibility of all federal agencies. In 2010, Savannah River Site (SRS) continued to meet or exceed performance expectations with respect to the management of environmental protection activities related to air, water, land, and other important resources.

This chapter focuses on the integration of numerous environmental requirements mandated by existing statutes, regulations, and policies as implemented through the SRS Environmental Management System (EMS). All contractor requirements mandated by U.S. Department of Energy (DOE) Order 450.1A, “Environmental Protection Program,” are considered in the site’s Integrated Safety Management System (ISMS) structure.

A management system is a tool established by an organization to manage its operations and activities in the pursuit of its policies and goals. In the case of the EMS, it is not a stand-alone environmental program or a data management program. Implementation of the EMS enables SRS to clearly identify and establish environmental goals, develop and implement plans to meet the goals, determine measurable progress toward the goals, and take steps to ensure continuous improvement.

Executive Order (EO) 13423, “Strengthening Federal Environmental, Energy, and Transportation Management,” signed January 24, 2007, directs each federal agency to use an EMS as the management framework to implement, manage, measure, and continually improve upon sustainable environmental, energy, and transportation practices. EO 13423 mandates that the EMS shall include corresponding federal agency-specific objectives and targets to meet goals in (among others) energy efficiency and reduction of greenhouse gas emissions, use of renewable energy, water conservation, fleet management, electronics stewardship and purchasing, reduction in the use of toxic and hazardous chemicals and materials, and pollution and waste prevention/recycling.

DOE issued DOE Order 450.1A in June 2008

to delineate responsibilities for carrying out the requirements of EO 13423. This included a requirement that in the initial year of implementation (2009) and every third year thereafter, an independent external audit must be performed to ensure compliance with the order and conformance with the 17 elements of the International Organization for Standardization (ISO) 14001 Standard, “Environmental Management System.” The initial external audit of SRS’s EMS—conducted April 28 to May 1, 2009—concluded that the EMS conformed to both the order and the ISO standard. Savannah River Nuclear Solutions (SRNS)—as the site’s maintenance and operations (M&O) contractor—completed actions necessary to enable the “declaration” of conformance in June 2009.

EO 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” was signed by President Obama in October 2009. As of the end of 2010, DOE had not revised its applicable orders to correspond with EO 13514. As such, the Contractor Requirements Documents (CRDs) of the respective DOE orders are pending modification to reflect the additional requirements. Pending inclusion of the new EO requirements within applicable contracting documents, site contractors and tenant agencies continued to support goals and objectives of the order in 2010 to the extent permitted by approved contracts and agreements.

SRS EMS Implementation

The EMS at SRS is implemented by multiple contractors using documents, programs and strategies tailored to organization-specific resources. DOE–SR oversees the implementation of each strategy to ensure a consistent and integrated site program. The implementation strategy for SRNS, as the M&O contractor, and Savannah River Remediation (SRR), managing

Liquid Waste Operations (LWO), is documented in the “Environmental Management System Description Manual” (G-TM-G-00001). This manual can be viewed via the following internet link: http://irmsrv02.srs.gov/general/pubs/envbul/documents/ems_manual.pdf.

Additional SRS contractor or tenant organization documents describing EMS implementation strategies include the following:

- Wackenhut Services Incorporated–Savannah River Site (WSI–SRS), Procedure Number 1–05
- Parsons – Environmental Management System Program, Q–PLN–J–0100

- Shaw AREVA MOX Services – Mixed Oxide Fuel Project Integrated Environment, Safety and Health Plan, DCS01–AHS–DS–PRG–H–40003–4

Integration of the SRS EMS within ISMS

Figure 2–1 depicts the processes by which environmentally impacting activities performed at SRS are integrated into the ISMS. This approach, whereby environmental regulatory requirements are rolled into implementing programs and procedures, is followed to varying degrees within all SRS organizations to reflect specific work scope, resources, and potential for environmental impact.

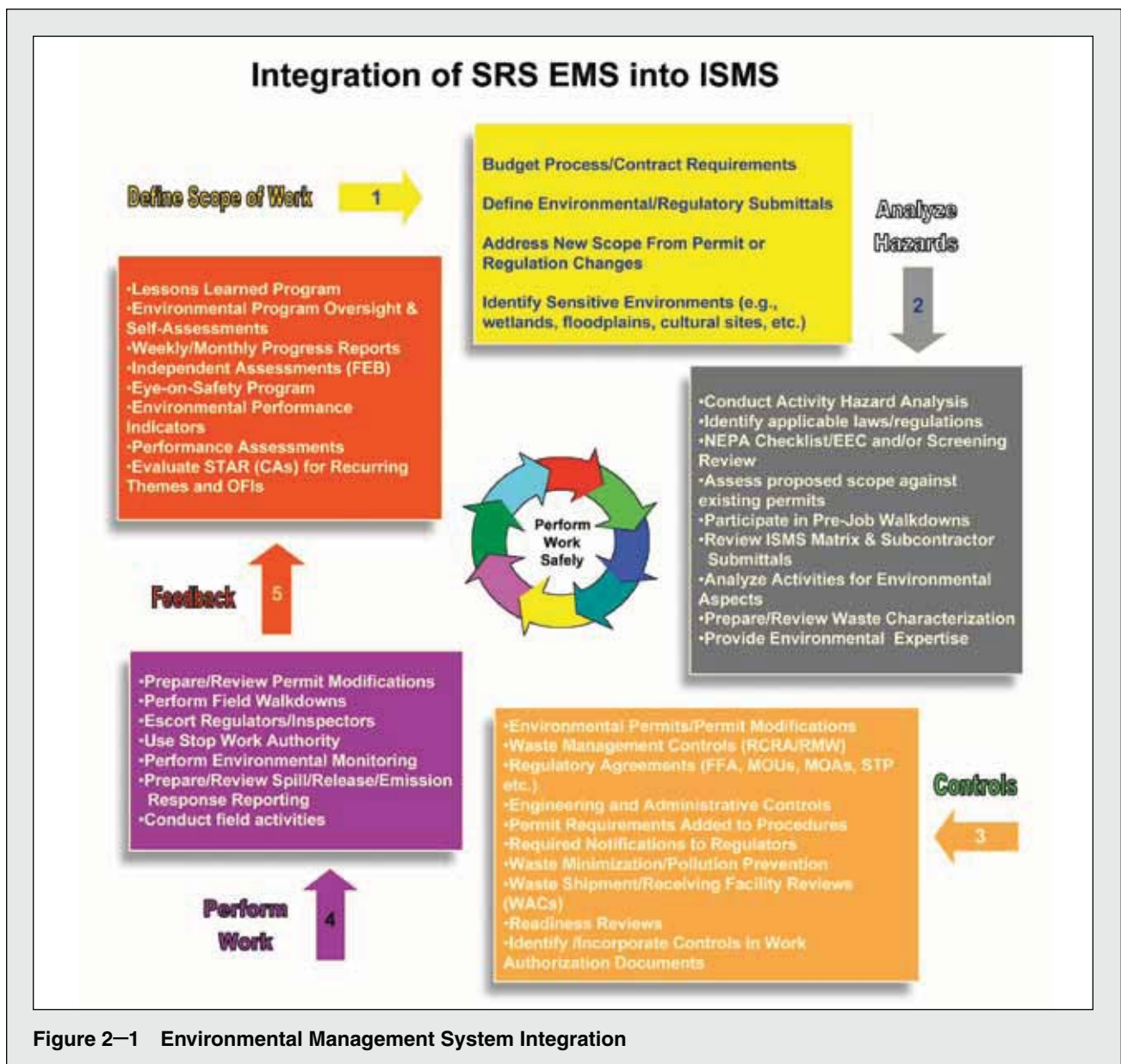


Figure 2–1 Environmental Management System Integration

Environmental Policy

The SRS Environmental Policy is a statement of the site's intent to implement sound stewardship practices that protect the air, water, land, and other natural and cultural resources impacted by SRS operations. The policy's objective is to establish a consistent sitewide approach to environmental protection through the implementation of an EMS as integrated within the site's comprehensive ISMS. The SRS EMS provides for the systematic planning, integrated execution, and evaluation of site activities for (1) public health and environmental protection, (2) pollution prevention (P2) and waste minimization, (3) compliance with applicable environmental protection requirements, and (4) continuous improvement of the EMS.

The policy is updated, published, and communicated throughout the site annually—and is posted to the externally accessible SRS website to foster further dissemination to the surrounding community. The policy letter is posted at http://irmsrv02.srs.gov/general/pubs/envbul/documents/env_mgt_sys_policy.pdf.

Environmental Aspects and Impacts

Determining environmental aspects (elements of activities, products, processes, and services that could have a significant impact on the environment) is critical to the EMS process. It equates to analyzing hazards via the ISMS review protocol. Identifying the SRS environmental aspects is not the end of the process. SRS personnel must evaluate work activities, whether routine or unusual, to determine whether the aspects are impacted by the work activity. This leads to the development and implementation of controls necessary to mitigate the potential that the action will adversely affect the environment. Environmental aspects (as well as goals and targets) are reviewed by senior management during EMS status meetings to keep the aspects current.

As part of the SRS Environmental Evaluation Checklist (EEC) process, the method by which environmental aspects and impacts are identified, evaluated for significance (using a “scoring worksheet”), reviewed by management for validation and determination of mitigative/corrective actions, and documented (including significance determinations) is described in the “Environmental Management System Description Manual.”

Legal and Other Requirements

Regulatory and DOE environmental program and compliance requirements are contained in the site's Standards/Requirements Identification Document

(S/RID), which provides a crosswalk between regulatory and DOE source requirements and the corresponding SRS implementing documents. The S/RID encompasses requirements to protect the environment and the health of the public and employees, including policy management, permitting, monitoring, surveillance and inspections, control standards, pollution prevention, record keeping and reporting, notifications, and key interfaces. Additional information on SRS environmental compliance is contained in chapter 3 (“Compliance Summary”) of this annual *SRS Environmental Report*.

Objectives, Targets, and Programs

Environmental targets are established, implemented, and maintained consistent with and in support of DOE environmental objectives, which include increasing energy efficiency, reducing greenhouse gases (GHG), using renewable energy, water conservation, pollution prevention initiatives, petroleum conservation and alternative fuel use, and incorporating sustainable building standards. Objectives and targets are established to 1) achieve full compliance with applicable environmental requirements, 2) devote resources to specific pollution prevention initiatives, and 3) ensure responsible stewardship of natural and cultural resources at SRS.








The targets and goals are developed and endorsed by senior managers responsible for each of the functional areas associated with the objectives. Once approved, lead responsibility for achieving the goals and targets is assigned to a specific organization. Lead points of contact are designated and execution schedules are established and tracked. Annual targets and corresponding performance measurements that reflect progress are posted to the internal EMS website, and are available upon request.

Seven specific objectives and targets encompassing seven significant environmental aspects were established for FY10. The targets for each objective were either met or exceeded through FY10. [Data table 2-1](#) (see “SRS Environmental Data/Maps” on the CD accompanying this report) summarizes objectives/targets, actions taken, and progress/success. A summary of the table (2-1) can be found on page 2-4.

Competence, Training, and Awareness

The purpose of the SRS environmental training program is to ensure that personnel whose actions could have environmental consequences are properly trained and made aware of their responsibilities to

Table 2-1 FY10 SRS EMS Goals (Summary)

EMS Goal/Objective	“Stoplight” Indicator	Status
Reduce building energy intensity (BTU/GSF) by 3% annually or by 30% by the end of FY15		Site energy intensity increased slightly in FY10 versus FY09 (3.3%). This is due primarily to major weather impacts, increased ARRA work/staffing, and across-the-board increases in production/mission energy use. In spite of the 3.3% FY10 increase, the site is ahead of the overall energy intensity reduction goal of a 30% reduction during the period FY03 to FY15. A summary report detailing how to comply with HPSB requirements in existing buildings was issued to DOE-SR in September 2010. Construction on three new biomass facilities proceeded well in 2010.
Purchase 3% of facility electrical energy from renewable sources, 50% of which must have been placed into service after 1/1/1999		Construction of the new Biomass Cogeneration Facility near F Area remained on schedule. Construction of the K Area and L Area biomass boilers was completed in FY10.
Reduce water consumption by 2% annually or by 16% by the end of FY15		The C Area-to-K Area domestic water supply line project was completed in February 2010. K Area well pumping was terminated as planned. As a result, site combined domestic and process water use was reduced by 11% versus FY 2009. This reduction would have been greater if not for associated ARRA/stimulus impacts.
Reduce the use of hazardous materials and toxic chemicals		<ol style="list-style-type: none"> 1) In FY10, SRS avoided generating 838 cubic meters of radioactive and hazardous waste, exceeding the FY10 goal by 110%. Twenty-three (23) projects contributed to the avoidance efforts, resulting in a cost avoidance of \$1.5 million. 2) The FY10 routine sanitary waste recycle rate was 38.8%. 3) The Chemical Management Center redistributed 84,773 pounds of excess chemicals in FY10, avoiding \$1.2 million in waste and acquisition costs.
Construct or renovate buildings in accordance with sustainability strategies; Incorporate sustainable practices in 15% of existing federal capital asset building inventory by 2015		A 62-page summary report detailing how to comply with HPSB requirements in existing buildings was issued to DOE-SR in September 2010. The SRS Ten-Year Site Plan included an overview of HPSB efforts.
Reduce consumption of petroleum products by 2% annually through FY15		SRS petroleum consumption increased by nearly 21% (combined gasoline and diesel) in FY10 versus FY09—due primarily to an increase in ARRA/stimulus staffing and scope. In addition, DOE-HQ mandated use of approximately 60 hybrid gasoline vehicles at SRS, which also negatively impacted this metric. Hybrids cannot use blended E85 fuel; rather, they require unblended gasoline. However, the site is on track to meet the overall goal, having realized a 10% petroleum reduction through FY10 when compared to the FY05 baseline year.
Increase fleet nonpetroleum-based fuel consumption by 10% annually		During the past 10 years, SRS has increased use of E85 fuel by 350%, far exceeding the end-state goal of a 10% annual increase.

competently protect the environment, workers, and the public. All SRS employees have been informed of EMS requirements, especially those whose responsibilities include environmental protection and regulatory compliance. All employees are responsible

for supporting and complying with EMS programs and processes. This includes complying with legal requirements, understanding pollution prevention/waste minimization techniques, and continuously improving operating practices to enhance and protect the site’s

workers, the environment, and the public.

General environmental awareness training is provided to all SRS employees. Specialized training opportunities are developed by and offered through a centralized training organization that relies heavily on the functional-area subject matter expertise within the environmental organization for the development and presentation of environmental and waste management curricula.

From a process improvement perspective, the environmental training program underwent a major revision in 2010 to more clearly define and clarify evolving roles, responsibilities, authority, and accountability (R2A2) for environmental personnel. Training requirements to support applicable R2A2s were identified, evaluated, and documented. Training plans were developed for all managerial, professional, and subject matter expert positions, and qualification records were developed for technician positions. An existing automated tracking mechanism was leveraged to facilitate management, supervisory, and employee awareness of progress toward achieving and maintaining requisite training expertise.

Regularly scheduled classes in the environmental training program cover such topics as Environmental Laws and Regulations, Hazardous Waste Worker Responsibilities, Hazardous and Radiological Waste Characterization, Management of Polychlorinated Biphenyls, and Environmental Compliance Authorities. More than 60 environmental program-related training courses are listed in the site training database, and individual organizations schedule and perform other facility-specific, environment-related training to ensure that operations and maintenance personnel, as well as environmental professionals, have the knowledge and skills to perform work safely and in a manner that protects the environment in and around SRS.

Resources, Roles, and Responsibilities

All SRS employees have specific roles and responsibilities in key areas, including environmental protection. Environmental and waste management technical support personnel assist site operating organizations with developing and meeting their environmental responsibilities. SRS maintains detailed manuals on resources, roles, responsibilities, and authority to assist employees in performing their duties.

Communications

SRS continues to maintain and improve internal and

external communications on environmental issues. Many policies and procedures guide communications at the site, ranging from the general site policy to forms and techniques addressed in facility-specific procedures. Additionally, SRS solicits input from interested parties such as community members, activists, elected officials, and regulators. The SRS Citizens Advisory Board provides advice and recommendations to DOE on environmental compliance, remediation, waste management, facility decommissioning, and related issues. Ex-officio members from DOE–SR, the U.S. Environmental Protection Agency (EPA) Region 4, the South Carolina Department of Health and Environmental Control (SCDHEC), and the Georgia Department of Natural Resources participate in board activities. At the core of the communication and community involvement programs are the SRS Environmental Policy (previously discussed) and the SRS Federal Facility Agreement Community Involvement Plan (WSRC–RP–96–120, Rev 5, July 2006), which is an administrative record file available for viewing at any designated SRS Public Reading Room. The ultimate goal of environmental communications is to improve stakeholder understanding and the site’s overall environmental performance.

Additional forums for the dissemination of information associated with environment issues include the Senior Environmental Managers Council (SEMC), comprised of senior-level environmental managers (from all SRS contractors) who share information on environmental concerns, regulatory matters, SRS operational issues, and upcoming changes to improve the SRS environmental compliance program; DOE–SR’s Environmental Quality Management Division (EQMD), which convenes regular meetings with SRS contractors and the DOE environmental oversight staff to discuss issues relevant to environmental protection and compliance; the SRS Regulatory Integration Team (SRIT), consisting of DOE–SR, EPA Region 4, and SCDHEC representatives who address issues that are cross-cutting and require high-level agency collaboration; and the Challenges, Opportunities, and Resolution (COR) Team, consisting of regulatory compliance representatives of SRNS and other major SRS contractors who discuss (1) emerging compliance or implementation challenges and (2) opportunities to develop and coordinate resolutions.

Operational Controls

Operational controls help ensure that environmental policy-related activities of regulatory compliance, pollution prevention, and continuous improvement

by SRS management are in place and implemented. Consistent with both the policy and the objectives/targets, operations activities are identified, planned, and executed to ensure that they are carried out within appropriate controls. From an environmental protection perspective, one of the more significant operational controls is the consistent use of the EEC process previously mentioned. As each new process/activity or proposed revision/modification to an existing operation is considered, preparation of an EEC is initiated for that activity to ensure that environmentally impacting considerations are factored into final decisions.

Emergency Preparedness and Response

Emergency plans are established, implemented, and maintained as documented in the SRS Emergency Plan and other references. The Emergency Plan specifies procedures to facilitate the identification of emergency situations and accidents with the potential to impact the environment, and provides definitions of appropriate responses and reporting criteria.

SRS emergency plans and programs include occurrences categorized as environmental emergencies. Procedures and documents that guide the Emergency Preparedness Process are specified in the EMS Description Manual (internet link previously provided).

Monitoring and Measurement

Monitoring and measurement means that the environmental impacts of SRS operations are sampled and examined regularly. This includes effluent (radiological and nonradiological), compliance, performance, and equipment/facility monitoring (e.g., calibration of instruments). Numerous procedures and processes, many of them listed in the EMS Description Manual, support this requirement. Additional information on environmental monitoring, environmental surveillance, and groundwater monitoring is contained in chapters 4 (“Effluent Monitoring”), 5 (“Environmental Surveillance”), and 7 (“Groundwater”), respectively, of this site environmental report.

Evaluation of Compliance

Specific environmental laws and regulations are evaluated and assessed on a program- or facility-specific basis. SRS has established a process for periodically evaluating its compliance with relevant environmental regulations. This process is captured primarily in the S/RID, the Source and Compliance Document (SCD-4),

and various site implementing manuals and procedures. Compliance evaluations and assessments are integrated into operating organizations’ environmental, safety, and health inspection process, which is performed in a prioritized fashion by a team of experts—including one on environmental regulatory issues. Periodically, environmental support organizations conduct regulatory assessments in selected topical areas to verify compliance. Finally, external regulatory agencies and/or technical experts may perform independent compliance audits. Additional information on environmental compliance is contained in chapter 3 of this site environmental report.

Nonconformance; Corrective and Preventive Actions

Nonconformance and corrective and preventive actions include EMS nonconformance as a part of the site’s quality assurance (QA) program. The application of QA procedures, therefore, supports the total EMS process. For example, use of the nonconformance report form applies to environment-related equipment, instruments, facilities, and procedures. Also, instances of nonconformance identified by assessments and evaluations are recorded and dispositioned according to established procedures. Additional QA information is contained in chapter 8 (“Quality Assurance”) of this environmental report.

Control of Records and Documents

The identification, maintenance, and disposition of environmental records and documents, required by environmental regulations and DOE directives, are reflected in the SRS EMS. The site’s records management program satisfies the requirement for environmental records. Specific documentation—such as records of correspondence with regulatory agencies, environmental training records, and EECs—is addressed in department-level procedures. For example, Regulatory Integration and Environmental Services maintains records of correspondence with regulatory agencies. Environmental training records are maintained by the line organization requiring and conducting the training, as well as by the SRS Training Department. EECs completed by facilities for specific activities are forwarded to and maintained by SRNS. A listing of the significant records and document management procedures in use at SRS is provided in the EMS Description Manual.

Internal Audits

SRS audits are incorporated into the DOE and

contractor assessment programs to verify that the site's EMS is functioning as intended. Performance assessments include performance objectives and criteria for management system review. Self-assessments are conducted in accordance with senior management-approved assessment plans. SRS utilizes a Facility Evaluation Board to conduct independent performance-based assessments of site programs to satisfy contractual and regulatory obligations.

Management Review

The SRS EMS Policy requires periodic evaluations of EMS effectiveness. Guidelines are intended to focus the management review on continuous improvement. Oversight of SRS's annual EMS review is the responsibility of DOE-SR's EQMD. Senior management reviews the EMS to ensure its continuing suitability, adequacy, and effectiveness. Reviews include assessing (1) opportunities for improvement and (2) the need for changes to the EMS. Records of management reviews are retained in accordance with applicable procedures.

Consistent with declarations contained in the SRS Environmental Policy letter and the EMS Description Manual, senior management reviews of improvement opportunities and progress toward sustainable program goals are required. Implementation of this requirement is demonstrated via (1) numerous management forums—including those conducted by the SEMC, EQMD, SRIT, and the COR Team—and (2) periodic departmental/project performance reviews and reports.

Sustainability Accomplishments

EMS Implementation

In accordance with the requirements of DOE Order 450.1A, an audit of the EMS was conducted by a qualified outside party, culminating in a June 23, 2009, "declaration of conformance." Along with the identification of five noteworthy practices, a formal corrective action plan was developed to address one minor nonconformance, three opportunities for improvement, and two observations. All corrective actions were entered into the site commitment tracking system. From that EMS audit (and as reported in the 2009 site environmental report), the final open action item was closed during the 2010 reporting period, resolving the process whereby significant environmental aspects are evaluated. A formal process was developed, documented in the EMS Description Manual and implemented via a revision to the EEC. As previously noted, the EEC is an automated tool for documenting the evaluation of environmental impacts of proposed site

operations.

Pollution Prevention / Waste Minimization

SRS's primary objective with respect to pollution prevention (P2) and waste minimization is to prevent or reduce pollution at its source whenever feasible. In FY10, the site's 10-percent waste reduction goal for hazardous and radioactive waste equated to 399 cubic meters, based on forecast generation rates. Using a modified pollution prevention opportunity assessment process (referred to as Pollution Prevention Activity Forms – PPAF) approved by DOE-SR, 23 P2 projects were documented and approved for credit, resulting in 838 cubic meters of hazardous and radioactive waste avoidance and/or diversion. This exceeded the site goal by 110 percent while avoiding more than \$1.5 million in labor, materials, and waste management costs. [Data table 2-2](#) (see "SRS Environmental Data/Maps" on the CD accompanying this report) summarizes FY10 pollution prevention and waste minimization contributions. A summary of the table (2-2) can be found on page 2-8.

Concurrently, SRS annually establishes a recycle performance target for its routine sanitary waste stream. A routine sanitary waste recycle target of 35 percent was established for FY10, with a contract stretch goal of more than 40 percent. SRS documented a recycle rate of 38.8 percent for this stream, equating to 1,022 metric tons of routine sanitary waste diverted to recycle markets. SRS diverted 594 metric tons of shredded wood waste, 1,346 metric tons of scrap metal, and 103 metric tons of scrap furniture. Additionally, the Chemical Management Center (CMC) distributed for re-use more than 84,773 pounds of chemicals in FY10, thus avoiding more than \$1.2 million in chemical acquisition and waste management costs.

Energy Intensity

With regard to the current DOE directive to meet or exceed a 30-percent reduction in energy intensity (energy consumption per gross square foot of building space, including industrial and laboratory facilities) by FY15 compared to the FY03 baseline year, SRS is on track to meet or exceed the 30-percent goal, having realized a 20.6-percent decrease from FY03 through FY10. The 20.6-percent decrease factors in an increase of 3.3 percent from FY09 to FY10, which reflects major regional weather impacts, increased American Reinvestment & Recovery Act (ARRA) work and staffing levels, and across-the-board increases in production and mission-support energy use during the period. As SRS's Mixed Oxide (MOX) Fuel Fabrication Facility and Salt Waste Processing Facility become operational, the site's efforts to meet the energy intensity

Table 2–2 2010 SRS Pollution Prevention Activities (Summary)

Description	Waste Type	Life Cycle Savings
Culvert Opening Area Cleanup Waste	Mixed Low-Level Waste (LLW)	\$43,520
Reuse of Asbestos Gaskets from K Area	LLW	\$848
Rollback 105–L 910 Fan Room	LLW	\$21,330
Modular Caustic-Side Solvent Extraction Unit (MCU) Debris to Seven Springs Landfill Avoids LLW	LLW	\$200,550
Segregation and Recycling of Circuit Boards	Hazardous Waste (HW)	(\$770)
SmartPlant Foundation (SPF) Tuff Tank (Polyethylene Tank for Liquid Storage and Transport) Frames to Sanitary Special Waste	LLW	\$1,172
Polychlorinated Biphenyls (PCB) Waste Reduction – K Area Complex (KAC) Shuffler Project	Mixed Toxic Substances Compliance Act (TSCA) Waste	\$15,857
Recycling of Lead X-Ray Sheets	HW	\$2,305
H–12 Outfall Experimental Peat Bed D&R	LLW	\$26,211
Reuse of Concrete Culverts Avoids Use of 24 New B–25 (Storage and Transport) Containers per Year	Sanitary	\$161,400
Polychlorinated Biphenyls (PCB) Tool Decontamination and Reuse	Mixed TSCA	\$112,030
Radioactive Liquids Managed as Scavenger Wastewater	LLW	\$8,336
Bagging Process Water Deionizers @ K Area	LLW	\$63,900
Recycle DOE-Suspension Nonradioactive Lead	HW	\$53,810
Recycle DOE-Suspension Radioactive Contaminated Lead	Mixed LLW	\$236,318
Large Steel Box (LSB) Dewatering Savings	Mixed LLW	\$83,252
Liquid Waste Tank Farm Debris to Seven Springs Landfill	LLW	\$82,950
776–A Area Rollbacks from Contaminated Areas (CA) to Radiological Buffer Areas (RBA)	LLW	\$124,830
Admin Controls Improve LLW Segregation	LLW	\$14,490
Legacy TRU Waste Segregation to LLW	TRU	\$701,380
Bagging Reactor Process Water Deionizers for ILV Waste Disposal	LLW	\$95,850
RCRA Satellite Accumulation Area (SAA) Reduction at Tritium Operations	LLW	\$78,966
Radioactive Lead Recycled by LWO	Mixed LLW	\$271,240
Tritiated Soil and Debris Remediation	LLW	\$610,500

goal will be challenged. Figure 2–2 illustrates this comparison against the current baseline.

Renewable Energy

SRS has one biomass steam plant in permanent operation to service A Area and the Savannah River National Laboratory (SRNL). The site completed construction and startup of two additional biomass boilers in K Area and L Area in FY10. Construction on a new Biomass Cogeneration Facility near F Area

continued, with startup expected in FY12. With respect to renewable energy certificates, SRS consumed more than 313,000 megawatt-hours of electricity in FY07. The new Biomass Cogeneration Facility will generate an estimated 77,500 megawatt-hours of electricity in its first year of operation. This production rate will be well above the 7.5-percent statutory goal for energy consumption that must come from renewable energy sources for FY13 and thereafter.

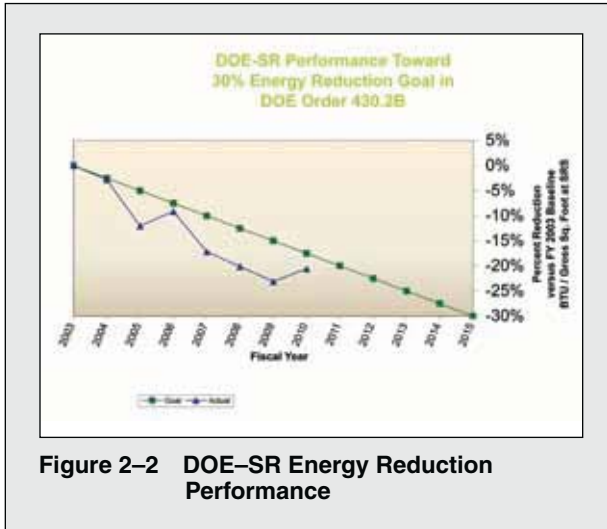


Figure 2–2 DOE–SR Energy Reduction Performance

The four SRS biomass plants were funded using energy savings performance contracts. The operational A Area plant’s total project cost was \$13.8 million, with an annual savings average of more than \$1.5 million. The facility return-on-investment period (term of the contract) is 9 years.

The positive renewable and environmental impacts of the A Area/SRNL project during 2010 were as follows:

- Coal utilization reduced by more than 12,000 tons
- Biomass utilization increased by nearly 27,000 tons
- Particulate matter (PM) emissions reduced (PM from 411 tons/year to 7.36 tons/year, and PM (10 microns) from 300 tons/year to 4.38 tons/year)
- Sulfur dioxide emissions reduced from 1,836 tons/year to 4.38 tons/year
- Nitrous oxide emissions reduced from 256.7 tons/year to 35 tons/year
- Carbon monoxide emissions reduced from 120.8 tons/year to 105.1 tons/year
- Ash generation and disposal reduced from 2,260 tons/year to 300–600 tons/year
- Compliance with Clean Air and Water Act standards facilitated

Water Management

Potable water consumption was reduced by 27 percent in FY10 compared with the baseline year of FY00, and by nearly 2 percent between FY09 and FY10. When combining total potable and process water use, SRS realized a consumption decrease of approximately 12.3 percent from FY09 to FY10, despite increases in ARRA staffing and projects (see figure 2–3).

Alternative Fuel

E85 (85% ethanol) fuel accounted for 54.5 percent of SRS’s E85 and gasoline usage in FY10. About 81 percent of the site’s light-duty fleet consists of E85 vehicles or hybrids. In the initial year of alternative fuel use (FY00), SRS consumed about 80,000 gallons of E85. By the end of FY10, this consumption total had risen to more than 368,000 gallons. The result is an increase of 350 percent since initiation of this fuel choice, which far exceeds the end-state goal of a 10-percent annual increase. Figure 2–4 visualizes the increased use of alternative fuel use since FY01.

Transportation/Fleet Management

Since FY99, SRS has reduced fleet petroleum use by 46 percent (Note: FY10 fuel data was determined using pre-Federal Automotive Statistical Tool inputs). Since the new base year for reporting (FY05), SRS has reduced fleet petroleum use by 9.76 percent—a decrease of about 1.5 percent through FY09. SRS petroleum consumption (combined gasoline and diesel) increased

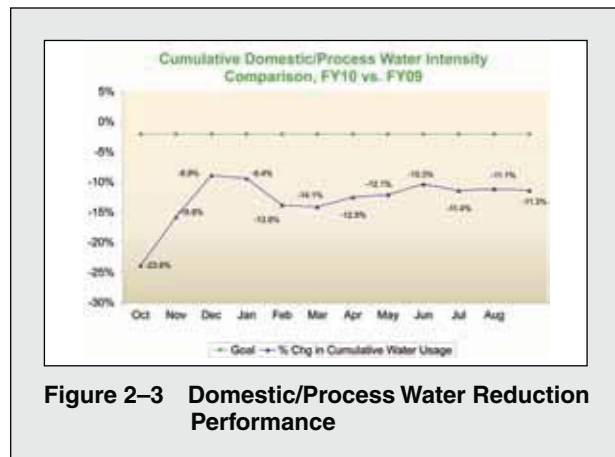


Figure 2–3 Domestic/Process Water Reduction Performance

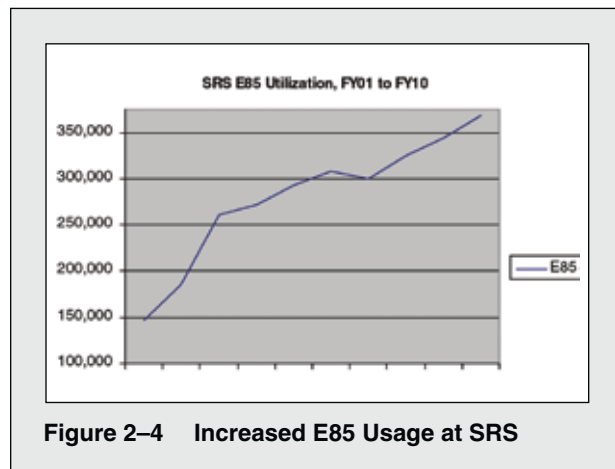


Figure 2–4 Increased E85 Usage at SRS

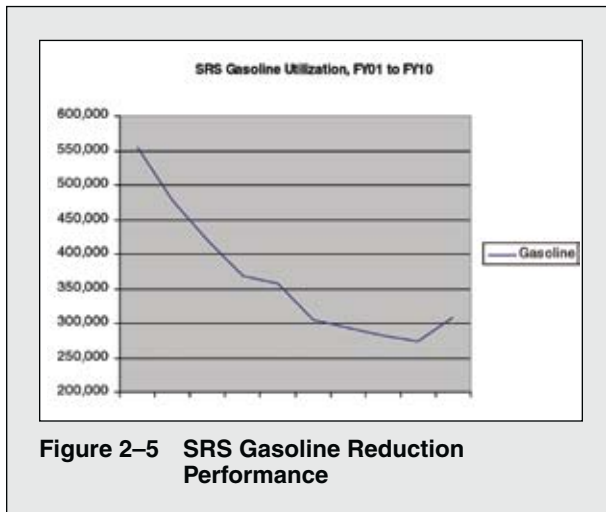


Figure 2-5 SRS Gasoline Reduction Performance

by nearly 21 percent from FY09 to FY10, primarily due to an increase in ARRA/stimulus staffing and scope. An additional contributor to the increase was a DOE–HQ mandate to use approximately 60 hybrid gasoline vehicles at SRS. Because the hybrid vehicles cannot use blended E85 fuel, this mandate increased the site’s use of unblended gasoline. However, the site is on track to meet the overall DOE reduction goal of 2 percent annually through FY15, having realized a 10-percent petroleum reduction through FY10, compared to the FY05 baseline year. Figure 2-5 demonstrates the reduction in SRS gasoline use since FY01. (NOTE: The FY10 increase is attributable to an increase in fleet size and use associated with ARRA/stimulus activities.)

Contracts & Concession Agreements

The SRNS Procurement Department has implemented procedures to encourage acquisitions that comply with environmental requirements as evidenced through various contract-related documents, including (but not limited to) “Terms and Conditions” document (the paragraph entitled “Environmental Compliance”) and “Request for Proposal” document (the paragraph entitled, “Environmentally Preferred Products”). Additionally, internally published procedures are documented in the site’s Procurement Specifications Manual and Chemical Management Manual, and a number of procurement requirement documents are available on the SRS external website to facilitate understanding of SRS environmentally friendly requirements by current and/or potential vendors and subcontractors. As of the end of 2010, most Environmentally Preferred Product procurement initiatives have yielded success—primarily in the acquisition of janitorial support and safety functions.

The Procurement Department has not implemented

a dedicated campaign to complete a comprehensive evaluation of existing contracts. Rather, its timeline regarding modification(s) to “appropriate contracts” is to address emergent environmental requirements as the contract(s) come up for renewal or rebid while reviews of defined roles and responsibilities are routinely conducted during the course of services delivery.

Either improvements to, or replacement of, existing Procurement databases must be completed to capture data detail that supports tracking/trending and process improvement initiatives. A campaign is under way to upgrade all automated business systems and among those are the Procurement applications, which are scheduled for implementation in October 2011.

High-Performance Sustainable Buildings – New Construction

DOE Order 430.2B (“Departmental Energy, Renewable Energy, and Transportation Management”) stipulates that all new buildings and major renovations in the stages of preproject planning (approval of mission need) through conceptual design (approval of preliminary baseline range) that have not obtained preliminary design approval—and that have a value exceeding \$5 million—must achieve the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED®) Gold certification. Also, to the extent possible, and in consideration of life-cycle cost factors, such buildings must meet the Guiding Principles for Federal Leadership in High-Performance and Sustainable Buildings (“HPSBs”). Any buildings below or equal to the \$5-million threshold also must meet the Guiding Principles.

Support for these objectives is evident in the MOX Fuel Fabrication Facility administration building, which received LEED® Gold certification in FY10. This marks a major milestone, and the facility is the first at SRS to achieve this certification status. Additionally, the MOX-associated technical support building, which will be used for entry control/security and administration associated with the primary process building, is in the design stage and is incorporating LEED®-Gold certification requirements as part of its design.

SRS developed and submitted three Critical Decision Packages for DOE–HQ approval during FY10, as follows:

- *Approve Alternative Selection - Pit Disassembly and Conversion Project* – proposes alternatives for constructing the Pit Disassembly and Conversion Project within existing facilities at SRS, primarily in the K-Area Complex.

- *Mission Need Package - Vacate Building 703-A Project (Savannah River Site Operations Center/ Emergency Operations Center; SRSOC/EOC)* – proposes to construct a new SRSOC/EOC in a modern structure of approximately 20,000 square feet, housing and consolidating the SRS emergency response organization and the SRS 24/7 Fire, Medical, and Law Enforcement emergency response activities in one location.
- *Mission Need Package - Modernization of Mission Critical Infrastructure (MMCI) for Savannah River National Laboratory* – proposes to construct the new Multiuse Technology Deployment Center to focus on reducing DOE–EM’s highest risk and life-cycle cost projects while incorporating a design that (a) provides the flexibility to serve emerging non-DOE–EM missions and (b) facilitates sharing common infrastructure and critical skills.

EMS Best Practices / Lessons Learned

Savannah River Site Alternative Energy Research Initiatives

Draft Legislation – House Resolution 5136 would authorize the Secretary of Energy to “Facilitate development of energy parks on defense nuclear facility reuse property through the use of collaborative partnerships with state and local governments, the private sector, and community reuse organizations.” SRNL is actively assisting DOE–EM in the energy park concept. Energy park concepts are becoming a key focus area to respond to the nation’s energy needs; SRS and SRNL are working closely with the Savannah River Community Reuse Organization and local economic development boards to move forward on an energy park. Energy parks can be characterized as a facility or group of facilities developed to promote energy security, environmental sustainability, economic competitiveness, and energy sector jobs. The concept works to redeploy under-utilized DOE assets to produce diverse, green, domestic energy sources such as solar, wind, biomass, geothermal, nuclear, clean coal, hydrogen, smart grid, storage, and efficient manufacturing. The energy park concept also encourages pilot programs, demonstration projects, or commercial projects with respect to energy generation, energy efficiency, and manufacturing technologies that will contribute to the stabilization of atmospheric greenhouse gas concentrations through the reduction, avoidance, or sequestration of energy-related emissions.

Geothermal Performance-Optimized Datacenter

In 2010, SRNL acquired a Performance-Optimized

Datacenter (POD) (to house high-performance scientific computing equipment) that will utilize groundwater cooling resources at SRS.

The POD, the size of a standard 40-foot shipping container, will provide the equivalent of 4,000 square feet of traditional data center space and will be used to demonstrate cost-savings and energy-efficient technologies supporting DOE goals. More specifically, it will use a geocooling technique that eliminates the need for chilled water normally used in the traditional data center. The POD will be populated with next-generation cloud and graphical processing unit computing hardware that allows thousands of new processors to be incorporated into the same space as hundreds of previous traditional CPU processors. This technology is essential to meeting future SRNL simulation and visualization demands. The containerized computing environment, combined with the latest computing technologies, places SRNL in a strategic position to study and evaluate new power and cooling technologies for datacenter environments, as well as for many other applications. It is anticipated that this technology could lead to new opportunities for collaboration with other national laboratories, research institutions and universities, and industries.

Chemical Management Center

The CMC provides centralized control of chemical materials procurement and of excess chemical materials management with goals to reduce the volume and toxicity of chemical procurements, reduce chemical inventories and waste, and improve tracking and communication of chemicals currently in onsite inventory. Hazardous and nonhazardous chemicals are reutilized on site, returned to vendors when possible, sold through sealed bid sales to approved vendors, and donated to local-area government institutions to promote good community service in order to reduce waste generation. As previously noted, the CMC distributed for reuse more than 84,773 pounds of chemicals in FY10, avoiding more than \$1.2 million in chemical acquisition and waste management costs.

Awards and Recognitions

SRS believes that significant contributions to site missions that positively impact the local and surrounding environment should be recognized. As such, site activities and projects across the site are evaluated for noteworthy practices, implementation of new and emerging technologies, and insightful approaches to resolving environmental stewardship issues. To that end, SRS received two DOE National Pollution Prevention

Awards in 2010: one in the category of Waste/Pollution Prevention and the other in the category of Sustainable Design/Green Buildings.

Detoxification of Outfall Water Using Natural Organic Matter

The first award was presented for development of a technology that protects streams and rivers from the toxic effects of outfall discharges—a significant national priority. Traditional treatment systems are based on standard water treatment techniques to remove the toxic contaminant(s). An SRS project team developed and applied for a patent in January 2009 for an entirely new “detoxification” approach to address contaminants such as copper and implemented the new technology in June 2009. This system amends outfall water with natural organic matter to bind copper and mitigate toxicity, protecting the sensitive species in the ecosystem. The system does not generate any waste requiring removal, treatment, and/or disposal. The amendments are commercial products that are naturally rich in humic acids and are commonly used in organic agriculture. For the SRS H-12 outfall and similar facilities where this innovative “green” technology will be viable, the detoxification system protects the environment while reducing energy use, land disturbance, and costs. Cost avoidance is estimated at more than \$10 million for the life of the project. The construction permit for the system was approved by state regulators in September 2008, and the new technology is believed to offer significant benefits over traditional treatment systems.

SRS Constructed Wetlands Reduce Environmental Impacts

The second award was presented for use of constructed wetland treatment systems to reduce pollution discharges to streams from two operational facilities in A Area and H Area. These systems eliminate the need for both power and chemicals normally associated with wastewater purification. Two self-sustaining wetland treatment systems were placed into operation in September 2000 (A Area) and January 2008 (H Area) to eliminate toxicity and reduce the discharge of heavy metals into onsite streams. The gravity flow design of these treatment systems eliminates the need for power-consuming pumps for moving wastewater through the systems. The scientific selection of plant species for colonization eliminates the need for harvesting, while annual dieback of plant shoots renews the metal binding surfaces in each wetland system and develops a peat bed over time. Thus, no chemicals are needed for chemical precipitation, and no sludge is generated that requires disposal. Energy to operate the systems is

provided by the sun to grow the plants, which cycle back into the systems as beneficial organic detritus. In 2010, the wetland systems greatly reduced the construction, operating, and maintenance expenses associated with water treatment, and did not produce secondary waste that would require further treatment or disposal. Savings of more than \$570,000 were realized in 2010 due to selection of the wetland systems over conventional water treatment facilities. The use of wetlands for water treatment represents the essence of sustainable design principles requiring minimal maintenance and minimizing energy usage and pollutant discharges.

Ongoing Environmental Enhancement Projects

The environmental projects and accomplishments identified below are additional examples of the scale and scope of improvement opportunities being implemented at SRS—and were submitted for national award consideration in 2010.

Tritiated Debris Remediation Project

SRS successfully piloted, received regulatory approval and continued expanding implementation of a thermal treatment process in 2010 to remediate tritium contaminated debris to allow return of the debris for placement back in the remediation site, while meeting regulatory limits. SRS demonstrated that functional, reusable treatment cells can be readily fabricated using common, inexpensive construction materials and commercially available process control and heating equipment. A pilot cell and three new cells will be used to treat 3,500 cubic yards (equivalent to 200 trailer-truck loads) of contaminated concrete and soils that would have required packaging and shipment to offsite disposal. This is expected to avoid more than \$1.6 million in transportation costs (exclusive of any additional packaging and handling requirements), including more than 400,000 truck miles. The remediation site has become a living laboratory, allowing development, proof-of-principle, and implementation of a cost-effective technology now available for use at other SRS and DOE remediation sites.

SRS Vehicle Energy and Emissions Reduction

SRS has been successfully implementing multiple fleet management fuel reduction and inventory strategies since the mid-1990s, and has surpassed reduction goals from previous baselines. Various approaches have been undertaken, and will continue in FY11, to reduce petroleum consumption, increase alternative

fuel use, and increase the number of alternative fuel vehicles. In FY10, SRS also accepted the challenge to reduce health risks associated with vehicular exhaust emissions at the site and in the surrounding three counties. With the 3,000 jobs created through the ARRA, SRS has experienced an increase in both commercial and personal site-associated travel, which in turn has increased traffic and vehicular air pollution during peak ozone periods. In an effort to maintain and even reduce harmful vehicular air emissions, SRS retrofitted older site vehicles with emission control technologies, implemented a policy restricting the idling of commercial vehicles, and reduced personal vehicle miles traveled by encouraging carpooling. These efforts are summarized below.

- *Fleet Acquisition Petroleum Reduction* – Although the SRS fleet size rose slightly in FY10 due to increased vehicle demand resulting from the 3,000 jobs created by ARRA/stimulus efforts, the Site is still on track to meet the overall goal requirement of 2-percent annual petroleum use reduction through FY15. The SRS fleet is provided by the General Services Administration (GSA). In FY10, 81 percent of the existing light duty fleet at SRS consisted of alternative fuel vehicles (AFVs) or hybrid vehicles, including 514 E85 AFVs and 82 hybrids in the light duty fleet. The site expects to receive an additional 14 replacement hybrid vehicles in FY11. A full 100 percent of the heavy-duty fleet operates on diesel fuel versus gasoline. Since FY99, SRS has reduced fleet petroleum use by 46 percent. Since the new base year for reporting (FY05), SRS has reduced fleet petroleum use by 9.76 percent despite a slight increase in FY10 usage due to ARRA work scope. The site continues on track to meet the overall goal requirement of 2-percent annual petroleum use reduction through FY15. In FY10, E85 consumption rose to more than 368,000 gallons—an increase of 350 percent since initiation of this fuel choice in FY00. E85 fuel made up about 54 percent of the fuel consumed in gasoline/E85 vehicles. SRS has established a fuel card system whereby E85/flex-fuel vehicles cannot utilize gasoline pumps. Consequently, nearly 100 percent of all AFVs operate on E85.
- *DERA Grant* – In September 2009, SRS was awarded a State of South Carolina Diesel Emission Reduction Act (DERA) Grant that enabled the site to install emission reduction equipment on nine of the 13 emergency vehicles owned and operated by the SRS Fire Department. The nine diesel vehicles were manufactured between 1979 and 1995, and had traveled an average of 3,500 miles per year. All nine were retrofitted with EPA-verified control equip-

ment in FY10. The retrofitted vehicles reduce carbon monoxide emissions by 30 percent, volatile organic compounds by 50 percent, and PM emissions by 20 percent.

- *Site “No Idling” Policy* – SRS has voluntarily implemented practices to comply with South Carolina’s “Idling Restrictions for Commercial Diesel Vehicles” law. The “No Idling” language was included in the General Provisions section of all outgoing contracts for work beginning in August 2009. In FY10, SRS adopted the statute as a sitewide policy to encourage all vendors entering SRS for business to reduce the amount of time they idle while waiting to be loaded and unloaded. This effort reduces ozone precursor emissions from diesel exhaust. “No Idling Zone” signs were posted in various onsite loading and unloading areas, which serve approximately 40 to 45 commercial vehicles a week.
- *SRS Car Pool Web Page* – SRS unveiled its own carpool webpage in FY10 for all site personnel interested in carpooling. Information from both Georgia’s *Clean Air Campaign* and South Carolina’s *Take A Break From The Exhaust* program are accessible from the webpage. Other notable information regarding proposed local “Park and Ride” facilities and vanpooling opportunities also are available as links. The webpage continues to facilitate ridesharing between co-workers interested in reducing their vehicle miles traveled by carpooling and/or vanpooling. Since conception, the tracked South Carolina residents’ ridesharing participation has increased by 196 participants, while Georgia residents’ participation has increased by 309 participants.

Recycling Wastewater Benefits SRS Waste Tank Closure Process

LWO personnel continue to deploy new technologies and approaches to traditional operational practices for radioactive liquid waste processing for savings in both waste volume and life cycle cost avoidance. While continuing to deploy robotics and remote operations for tank clean-up, LWO is accelerating implementation of a unique wastewater recycling program at SRS.

By recycling wastewater and chemicals used in cleaning radioactive high-level waste tanks, LWO is moving away from adding new water and chemicals into the system. In 2010, after just over a year of operations using these new process improvements, more than 2.8 million gallons of wastewater and 100,000 gallons of 50-percent sodium hydroxide solution had been reused in tank cleaning and waste removal processes. The site’s objective is to clean out 22 old-style liquid waste tanks

in eight years. Dissolving the salt waste and mobilizing the sludge waste to transfer them to pretreatment and treatment facilities is expected to require millions of gallons of inhibited process water and to consume more than the currently available tank space in both the F Area and H Area tank farms. Efforts continued in 2010 to allow for tank cleaning while maintaining tank space for operational flexibility.

Lessons learned from these process improvements have the potential for similar savings at DOE's Hanford Site in Richland, Washington, during that facility's tank closure operations.

SRS Electronic and Data Center Optimization

SRS continued its work during 2010 to optimize energy management associated with data centers and electronic computing equipment. In FY10, SRNS Information Technology (IT) and DOE-SR personnel worked with a DOE-EM team, led by Lawrence Berkeley (California) National Laboratory, to measure, monitor, and improve data center energy efficiency. Based on the identified and implemented improvements, the data center achieved an average net savings of 166.3 kilowatts, equating to a reduction of 30.7 percent in energy use. The "Power Usage Effectiveness," a metric that depicts the ratio of a facility's total power consumption divided by the power going to IT equipment, showed a substantial improvement—from 3.75 to 2.60. Moreover, these changes were essentially "free." In addition to the data center efforts, computer leases for the site continued to meet Energy Star, Electronic Procurement Environmental Assessment Tool (EPEAT), and low-standby power requirements.

Other data center/electronic computing equipment best practices include

- continuation of server virtualization (currently at 30 percent)
- implementation of thin client technologies for offsite access from employee-owned personal computers instead of DOE-owned laptops
- replacement of obsolete chiller units

Computer Acquisition Energy efficient computer products continued to be purchased at SRS in 2010. Most site computers are provided to employees via lease agreements, which are leveraged for the needs of multiple site companies and specifically state that all computers must be Energy Star compliant and must meet low standby power requirements. While most models being leased have been EPEAT compliant since

FY07, the final model became compliant in FY09. The pre-EPEAT models have continued to be replaced with EPEAT-compliant models as their 36-month leasing cycles expired. The 2 percent remaining are scheduled to be replaced through early CY11. The power reduction features of the personal computers and monitors are set to efficient levels upon receipt of the equipment.

Renewable Energy Technology Development, Deployment and Education in South Carolina

SRNL and the Economic Development Partnership of South Carolina (EDPSC) have collaborated to develop and deploy renewable energy technologies within the local community and the state of South Carolina. Through this collaboration, SRNL has shared its expertise and knowledge of renewable energy technologies with EDPSC, which in turn has leveraged existing relationships with industry to identify and evaluate specific opportunities. The collaboration has assisted local industry in lowering harmful emissions through deployment of these technologies, and has led to the establishment of public education and outreach to the community on the topic of renewable energy technologies. The collaboration was conceived by SRNL researchers working to deploy dual-use hydrogen technology developed during the Cold War. The EDPSC recognized the economic potential of the SRNL technology and convinced a local government (Aiken County) to fund a public/private research and development laboratory focused on deploying renewable energy technologies with South Carolina. This collaboration has led to a number of successful projects and has established South Carolina as a leader in hydrogen technology development and deployment. It also initiated the characterization and development of South Carolina offshore wind resources, which has led to the creation of a statewide wind energy team. The SRNL-EDPSC collaboration also has deployed fully integrated wind, solar, hydrogen, and smart grid educational platforms designed to educate K-12 students and to train future South Carolina installers of renewable energy technology. More than \$15 million in private and/or local government funding has been invested or leveraged by this collaboration to further the deployment of renewable energy technologies, including the installation of new wind turbines in 2010.

Project Results to Date: Renewable Energy Projects in South Carolina

The cornerstone of the SRNL-EDPSC collaboration has been the 2006 opening of the Center for Hydrogen Research (CHR), a 60,000-square-foot facility that provides research and development space for more than 80 engineers and scientists from

SRNL, commercial companies (e.g., Toyota) and universities (e.g., University of South Carolina-Aiken). Funded by Aiken County through private investment, the CHR mission is to develop and deploy hydrogen and renewable energy technologies for local, state, and national missions. Since the opening of the CHR, SRNL and the EDPSC have successfully completed the following list of projects, which primarily leverage private, local, and state funding sources:

- In 2009, a 1,500-square-foot public Educational, Training & Development Center with a fully integrated solar, wind, hydrogen, and smart grid training platform was opened to develop and demonstrate clean regenerative power systems. The training venue, supported by private funding, has educated more than 60 students from local K–12 schools and technical colleges on renewable energy technologies. The system includes a 15-kilowatt solar panel system, an electrolyzer, a 2-kilogram solid state hydrogen storage fuel cell, and smart grid electronics to allow load balancing and power source switching.
- Through industrial funding sources, 68 hydrogen-fuel-cell-powered fork lift trucks were deployed at two local manufacturing facilities (Bridgestone-Firestone in 2009–2010 and Genco Distribution Center in 2010).
- One hydrogen-powered Chevrolet Silverado truck and two hydrogen powered Ford 15-passenger vans were deployed in 2010 to service the local community within 150 miles of SRS.
- An automotive/industrial hydrogen refueling station was installed near I-20 in Aiken County to allow refueling of vehicles up to 350 bar (a standard of measure for quantifying atmospheric pressure).
- The nation’s first multiuse industrial park fueling station to supply hydrogen for industrial, commercial, and government use was developed/deployed near Aiken in 2010. The park includes hydrogen storage, pipelines, and metering systems, which supply local manufacturing facilities.
- Work on the Regenerative Fuel Cell Project was begun at Fort Sumter National Park to provide backup power to the park.
- Through a grant from the EDPSC, SRNL has deployed advanced offshore wind characterization technology on the South Carolina coast and in nearby coastal waters. With a \$500,000 grant from the State of South Carolina and its partners, the deployment of “Sodar” technology in the state’s coastal waters is expected to lead to offshore wind

development along the Southeastern coast. SRNL-EDPSC also has initiated a small wind characterization project within South Carolina that will characterize and test turbines specifically designed for low-velocity winds. This effort led in 2008 to the formation of a statewide wind energy development team, which in 2009 won a \$98 million grant (\$48 million from DOE and \$50 million from the State of South Carolina and partners) to build a wind turbine drive train test facility in North Charleston, South Carolina.

Offshore wind energy developments have led South Carolina to becoming an east coast leader in such energy. The early success of activities in this collaboration led to the formation of a statewide team that won a \$500,000 grant from DOE to create a policy framework and regulatory environment to enable gigawatt-scale clean-energy capacity. Based on this team’s efforts, the South Carolina legislature passed Act 318 of 2008 (an amendment to S.C. Title 48, “Environmental Protection and Conservation”), which created a committee to review, study, and make recommendations regarding the feasibility of wind turbine farms in the state.

Research conducted by SRNL and partially supported by EDPSC has led to a national DOE hydrogen program award and an International Energy Agency award.

EMS Benefits to Agency Mission

Although methods of execution vary from site to site and contractor to contractor, implementation of an EMS provides an understood and recognized structure to standardize the evaluation of, preparation for, and execution of activities and projects having environmental implications within distinct and separate organizations that are engaging in activities and projects with overlapping interests. More specific instances in which an EMS can benefit DOE’s mission are provided below.

- Policy development and program planning facilitates to enhance integration of environmental compliance programs
- Promotion of environmental stewardship throughout the project planning cycle (cradle to grave)
- Solid waste offsite contract evaluation to ensure that best management practices and appropriate stewardship protocols are built into contracts
- Enabling a clear/consistent flowdown of expectations and compliance framework in contracting documents

2 - Environmental Management System

- Clear articulation of DOE complexwide EMS requirements to promote consistency in contract specifications and environmental management expectations

For Further Information Should additional information be required relative to this chapter, contact Michael Roper at michael.roper@srs.gov.