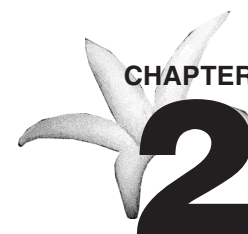

Environmental Management System



Kim Cauthen

Environmental Compliance and Area Completion Projects

Compliance with environmental statutory and other legal regulatory requirements is a fundamental responsibility of all federal agencies. In 2011, 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 SRS Environmental Management System (EMS) as implemented by U.S. Department of Energy (DOE) Order 450.1A, “Environmental Protection Program,” and corresponding Executive Orders.

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 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.

DOE promulgated Order 436.1, “Departmental Sustainability,” in May 2011 that re-established the objectives in Order 450.1A and furthered those goals by adding additional greenhouse gas monitoring and reporting requirements. DOE Order 436.1 was not yet incorporated into contracts of SRS tenant organizations at the end of 2011. Modification of these contracts to include this Order is under evaluation.

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 Savannah River Nuclear Solutions (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.

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 Integrated Safety Management System (ISMS). This approach, rolling environmental regulatory requirements into implementing programs and procedures, is followed by all SRS organizations according to specific work scope, resources, and potential for environmental impact.

Environmental Policy

The commitment to good environmental stewardship is expressed in the SRS Environmental Policy which 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 at SRS.

The policy is reviewed, updated annually, communicated throughout the Site, and posted on http://irmsrv02.srs.gov/general/pubs/envbul/documents/env_mgt_sys_policy.pdf for availability to the communities surrounding SRS.

Objectives, Targets, and Programs

Through EMS, each tenant organization sets goals and targets on an annual basis in support of DOE environmental objectives which include:

- Reduction in energy usage
- Increase in renewable energy usage
- Reduction in water usage
- Purchasing of “green” products and services
- Reduction in solid waste generation

- Reduction in hazardous chemical usage
- Increase in the number of sustainable buildings
- Reduction in fleet and petroleum usage
- Use of energy compliant electronic devices
- Maintenance of compliance with requirements

Thirteen specific objectives and targets were established for Fiscal Year (FY) 2011. A summary is provided in table 2-1.

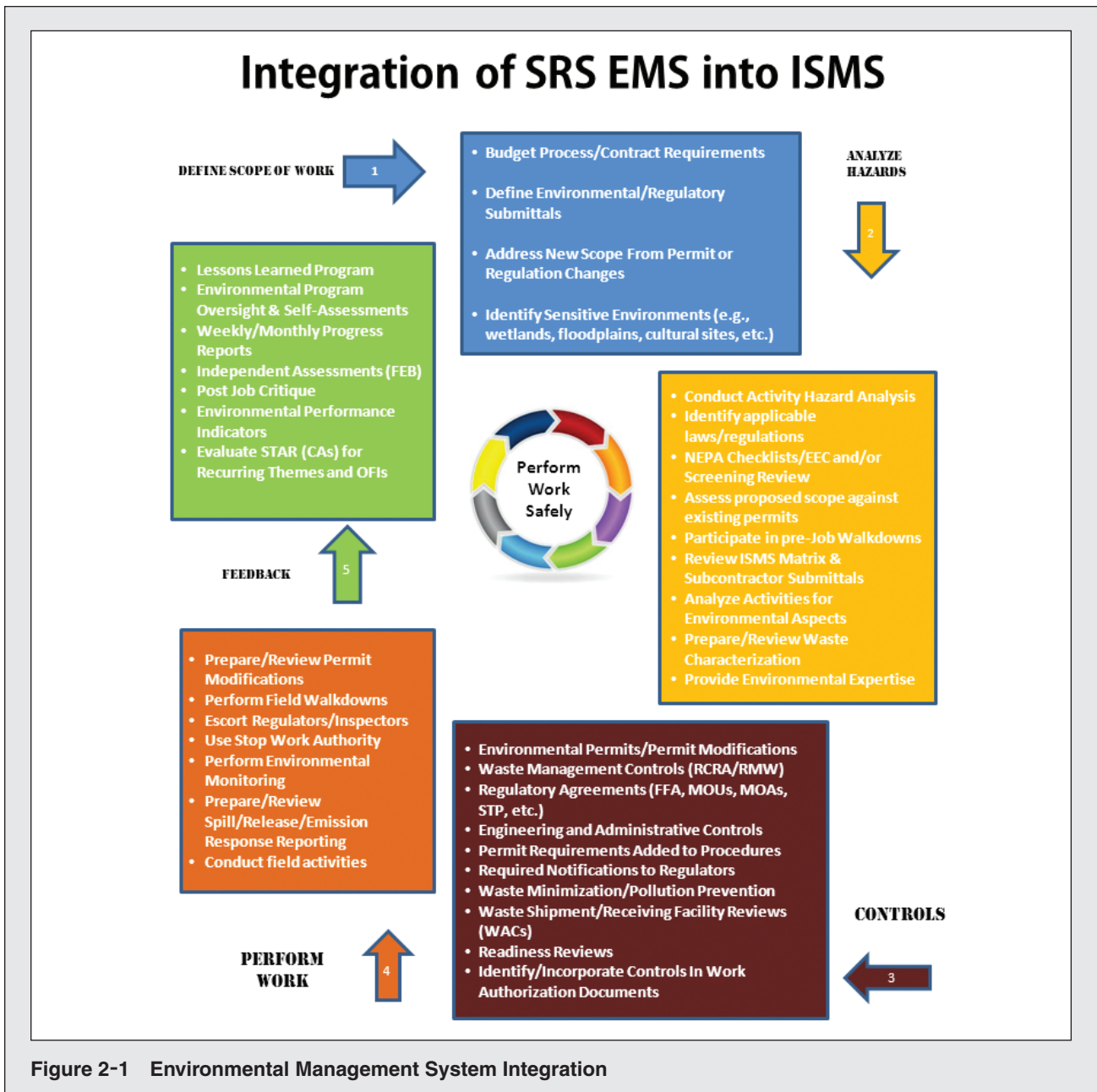


Figure 2-1 Environmental Management System Integration

Table 2-1 FY2011 SRS EMS Goals (Summary)

EMS Goal/Objective	Status
Reduce building energy intensity (British Thermal Units per Gross Square Foot, BTU/GSF) by 3% annually or by 30% by the end of FY2015	Energy intensity decreased by about 2.5% in FY2011 versus FY2010. The Site remains ahead of the FY2015 30% reduction goal with energy intensity having been reduced by 22.5% through FY2011 versus the FY2003 baseline. Planned High Performance Sustainable Building (HPSB) activities such as energy audits and American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) evaluations in thirteen facilities, installation of chilled water BTU meters in six B-Area facilities, and electric meters in four facilities were completed.
Purchase 3% of facility electrical energy from renewable sources, 50% of which is from renewable sources placed into service after 1/1/1999	To meet this goal, SRS has been constructing biomass plants onsite. Construction of the Biomass Cogeneration Facility is on schedule for first quarter FY2012 completion. The 20 MW plant will assist SRS in meeting this goal.
Reduce water consumption by 2% annually or by 16% by the end of FY2015	Process water use was decreased by nearly 19% in FY2011 versus FY2010 due to a well shutdown in K-Area and subsequent extension of the domestic water system in K-Area. Potable water consumption was reduced by 5% during FY2011, contributing to a cumulative reduction of 10.2% since FY2000. Water Conservation Reports (indoor and outdoor) were completed and submitted to DOE in FY2011.
Expand purchases of environmentally preferred products	The Business Process Modernization Project (BPMP) has entailed the incorporation of a mapping process for tracking of Environmentally Preferred Products (EPPs), which will allow tracking from a systems perspective starting FY2012. The BPMP was completed and functional as of October 1, 2011. SRS achieved success in the acquisition of EPP products in the area of custodial products (towels, cleaners, and trash bags), office products (toner, cartridges, and paper) and construction materials (lighting and adhesives).
Reduce the use of hazardous materials and toxic chemicals by <ol style="list-style-type: none"> 1. Reducing the volume of hazardous and radioactive generated waste by 10% (357 m³) 2. Achieving a minimum of 35% recycle rate for routine sanitary waste 3. Reducing the purchase of chemicals with hazard rating 3 or 4 by 5% 	<p>Almost 2,009 cubic meters (m³) of waste generation was avoided with an associated cost avoidance of roughly \$2.4 million.</p> <p>SRS achieved a 35.5% recycle rate for the routine sanitary waste stream in FY2011.</p> <p>The Chemical Management Center (CMC) reduced the number of high-hazard chemical procurements; from 2,526 procurements in FY2010 to 2,358 procurements in FY2011, a reduction of 6.65% versus a goal of a 5%. The CMC distributed for reuse more than 35,300 pounds (lb) of chemicals in FY2011, avoiding more than \$234,000 in chemical acquisition and waste management costs.</p>
Construct or renovate buildings in accordance with sustainability strategies Incorporate sustainable practices in 15% of existing federal capital asset building inventory by 2015	<p>SRS's Mixed Oxide (MOX) Fuel Fabrication Facility administration facility received U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) Gold certification in 2010. MOX will be seeking LEED® Gold certification for the Technical Services Building and the Secure Warehouse Building that are currently under construction.</p> <p>No existing onsite buildings meet all of the Guiding Principles for HPSB. SRS has identified specific buildings in which to focus incorporation of sustainable practices. Evaluation of the buildings against the Guiding Principles was initiated in FY2010 and continued through FY2011.</p>
Reduce consumption of petroleum products by 2% annually through 2015	The Site continues to maximize use of E85 as much as possible. The Site was directed by HQ to lease over 70 electric hybrid vehicles in place of E85 vehicles in FY2011. Also, the site took action in September 2011 to utilize gasoline in ethanol pumping stations in an effort to clean ethanol residue out of the equipment. These two major factors increased petroleum consumption and reduced E85 use. FY2011 vs FY2010 resulted in a decrease in E85 use of 19%. However, it should be noted that FY2010 saw an increase in E85 due to ARRA activities. A portion of the decreased use of ethanol in FY2011 is due to this reason. Combined ethanol and gasoline consumption was down in FY2011 approximately 50K gallons versus FY2010.

Table 2-1 FY2011 SRS EMS Goals (Summary) *continued*

EMS Goal/Objective	Status
Purchase at least 95% of electronic products that meet Electronic Product Environmental Assessment Tool (EPEAT) standards	EPEAT standards currently apply to computers and monitors. All laptop computers and desktop monitors acquired for use by SRNS meet EPEAT standards and are listed on the EPEAT website. Current copier lease agreements utilize Energy Star models.
Increase fleet non-petroleum-based fuel consumption by 10% annually while decreasing total consumption of petroleum-based fuels	The Site continues to maximize use of ethanol fuel, E85, as much as possible, although a reduction in usage was experienced in FY2011. Adding electric hybrid vehicles to the fleet (which cannot utilize E85 fuel) and temporarily using gasoline in ethanol pumping stations to clean ethanol residue from the equipment contributed to this reduction in E85 usage.
Evaluate planned work and conduct environmental studies to ensure off-site impacts from SRS activities are minimized	Off-site monitoring to assess impacts, if any, continued during FY2011. The program is continuously reviewed to ensure the appropriate environmental media are sampled and reported. NEPA evaluations and decisions concerning planned activities at SRS were completed in 2011 and are discussed in detail in Chapter 3 of this report.
Prevent occurrence of and minimize severity of spills through proper handling and controls for radioactive and hazardous materials and wastes	No reportable spills occurred during 2011. Details of the spill response program are provided in Chapter 3.

Competence, Training, and Awareness

General environmental awareness training is provided to all SRS employees. Training in specialized environmental and waste management topics is developed and offered by SRS subject matter experts.

Regularly scheduled classes in the environmental training program offer environmental program-related training courses 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 identifying 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. SRS solicits input from interested parties such as community members, activists, elected officials,

regulators and community members. As an example, the SRS Citizens Advisory Board (CAB) provides advice and recommendations to DOE in many areas of Site operations including environmental matters.

Additional forums associated with environmental issues include:

- Senior Environmental Managers Council (SEMC), composed of senior-level environmental managers (from all SRS contractors) who share information on environmental concerns and regulatory matters
- DOE-Savannah River (SR) 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
- SRS Regulatory Integration Team (SRIT), consisting of DOE-SR, the U.S. Environmental Protection Agency (USEPA) Region 4, and South Carolina Department of Health and Environmental Control (SCDHEC) representatives who address issues that are crosscutting and require high-level agency collaboration
- 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 are in place and implemented. From an environmental protection perspective, one of the more significant operational controls is the consistent use of the Environmental Evaluation Checklist (EEC) process. When a new process or activity is considered and when a change to an existing operation is proposed, an EEC is initiated. The EEC process ensures that regulatory requirements and potential impacts on the environment are identified in a timely manner.

Emergency Preparedness and Response

Emergency plans are established, implemented, and maintained as documented in the SRS Emergency Plan. 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.

Monitoring and Measurement

Air emissions and liquid discharges from SRS operations are examined regularly. This includes effluent monitoring (radiological and nonradiological), compliance assessment, performance assessment, and equipment/facility monitoring (e.g., calibration of instruments). Additional information on environmental monitoring, environmental surveillance, and groundwater monitoring is in Chapter 4 (“Effluent Monitoring”), Chapter 5 (“Environmental Surveillance”), and Chapter 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 evaluating its compliance with relevant environmental regulations. 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 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. Instances of nonconformance identified by assessments and evaluations are recorded and dispositioned according to established procedures. Additional QA information is 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.

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.

EMS Implementation

In accordance with the requirements of DOE Order 450.1A¹, an audit of the EMS was conducted by a qualified outside party, culminating in a June 23,

¹ DOE promulgated Order 436.1 in May 2011 to replace DOE Order 450.1A. DOE Order 436.1 was not yet incorporated into contracts of SRS tenant organizations at the end of 2011. Modification of these contracts to include this Order is under evaluation.

2009, “declaration of conformance.” The next audit is scheduled for 2012.

Sustainability Accomplishments

Pollution Prevention / Waste Minimization

SRS’s primary objective with respect to pollution prevention (P2) and waste minimization is to prevent or reduce pollution and waste generation at its source whenever feasible. In FY2011, the site’s 10 percent waste reduction goal for hazardous and radioactive waste equated to 357 m³, based on forecast generation rates. During the year, P2 projects were documented, resulting in 2,009 m³ of hazardous and radioactive waste avoidance or diversion. Annual cost avoidance resulting from the projects is nearly \$2.5 million. Table 2-2 shows a summary of the FY2011 P2 and waste minimization contributions.

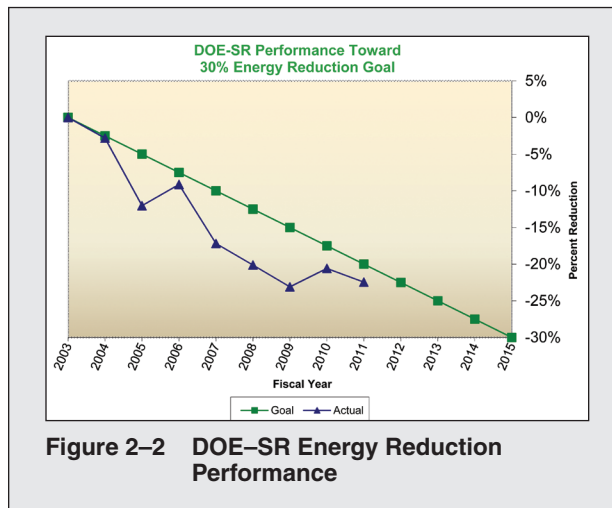
Concurrently, SRS annually establishes a recycle performance target for its routine sanitary waste stream. A routine sanitary waste recycle target of 35% was established for FY2011. SRS documented a recycle rate of 35.5% for this stream, equal to 813 metric tons of routine sanitary waste diverted to recycle markets. SRS diverted 107 metric tons of shredded wood waste, 889 metric tons of scrap metal, 63 metric tons of scrap electronics, 165 metric tons of metal from spent transformer recycle, 20 metric tons of transformer oils, and 103 metric tons of scrap furniture. Additionally, the Chemical Management Center (CMC) distributed for reuse more than 35,300 lbs. of chemicals in FY2011, thus avoiding more than \$234,000 in chemical acquisition and waste management costs.

Table 2-2 2011 SRS Pollution Prevention Activities (Summary)

Description	Waste Type Prevented	Life Cycle Savings
Bagging Reactor Process Water De-Ionizers for Disposal	Low Level Waste (LLW)	\$95,850
Lead Blanket Reuse	Mixed LLW	\$6,499
Used Oil Declared Non-Hazardous	Haz RCRA	\$943
Liquid Waste Operations Pre-Fab Hut Use	LLW	\$661,610
Rollback of CLE Storage in E-Area	LLW	\$402
Recycle Lithium Batteries K-Area	Haz RCRA	\$920
Lead Recycle K-Area	Haz RCRA	\$8,680
Acid Recovery Unit Column Abatement Waste Avoidance	LLW	\$10,816
Lead Recycle H-Canyon	Haz RCRA	\$7,400
H-Canyon Rollbacks of the Dinky Charging Station, Shack and 3rd Level Section 11	LLW	\$57,660
Unconditional Release of 2 Large Lead Acid Batteries out of Contamination Area for Recycle	Mixed LLW	\$840
<i>In situ</i> Disposal of LLW at 105-P	LLW	\$930,800
<i>In situ</i> Disposal of LLMW lead at P-Area	LLW	\$5,060
<i>In situ</i> Disposal of LLW at 105-R	LLW	\$560,400
<i>In situ</i> Disposal of LLMW lead at R-Area	Mixed LLW	\$20,500
Brass Fillings Recycle Versus Disposal	HW	\$1,625
Oily Water Treatment	Sanitary	\$2,785
Segregation of Tritiated Job Control Waste	LLW	\$82,050
Radiological Area Rollbacks in K-Area	LLW	\$9,303
Reactor Viewing Window <i>In situ</i> Disposal	LLW	\$5,475

Energy Intensity

DOE Order 450.1A requires a 30% reduction in energy intensity (energy consumption per gross square foot of building space, including industrial and laboratory facilities) by FY2015 compared to the FY2003 baseline year. SRS is on track to meet or exceed the 30% goal, having realized a 22.5% decrease from FY2003 through FY2011. The 22.5% decrease includes a decrease of 2.4 % from FY2010 to FY2011. Figure 2-2 illustrates this comparison against the current baseline. As SRS's MOX Fuel Fabrication Facility and Salt Waste Processing Facility become operational, the site's efforts to meet the energy intensity goal will be challenged. SRS conducted many activities in FY2011 that impacted energy intensity, including the following notable accomplishments:



- Completed start-up of new K-Area & L-Area biomass plants and utilized the new units for the winter heating season
- Completed the installation of about 100 heating, ventilating and air conditioning (HVAC) units with new, higher Seasonal Energy Efficiency Ratio (SEER) units
- Improved operation of A-Area biomass plant to reduce fuel oil use
- Conducted energy audits and building commissioning evaluations in 13 buildings as part of sustainable building efforts
- Installed new chilled water BTU meters in six buildings as part of HPSB
- Installed new electrical meters in four buildings as part of HPSB requirements

- Replaced the A-Area cooling tower associated with the chilled water plant
- Utilized cool roofs on roof replacements
- Continued with D-Area steam plant enhancements and operated the plant as efficiently as possible
- Replaced air compressors and dryers in Building 775-A
- Issued the SRS Metering Plan

The Tritium Facilities (in H-Area) made notable progress in reducing energy intensity in FY2011. An Energy Manager (engineer) role was specifically created in recent years to enhance energy intensity reductions and sustainability, and many benefits have consequently been realized:

- Completed construction of new Tritium Programs Project Support Building that allowed deactivation of inefficient Building 232-1H and relocation of engineering personnel from trailers. The new building is expected to lower Tritium Programs energy intensity with the additional 11,200 square feet of more energy efficient space
- Completed construction of new Tritium Extraction Facility (TEF) warehouse. The new warehouse is expected to lower Tritium Programs energy intensity with the additional 6,000 square feet and low energy consumption
- Evaluated energy reduction idea of right-sizing 218-H secondary chilled water pumps. The initiative replaces existing 200 horsepower pump motors with 150 horsepower (or lower)
- Cleaned 750-ton HVAC chiller evaporator and condenser tubes to improve heat exchanger efficiencies
- Confirmed blowdown for cooling towers meets industry standards. This was a water conservation measure
- Cleaned condenser tubes associated with 264-6H HVAC chillers (three each) to improve heat exchanger efficiency
- Cleaned condenser tubes associated with 264-6H Process chillers (two each) to improve heat exchanger efficiency
- Issued a feasibility study for piloting installation of ice storage chilled system supporting 234-7H and began engineering scope development of this effort
- Replaced rooftop HVAC units for Building 246-H for improved efficiency and reliability
- Initiated project to install electricity meters for two 248-H data centers and the H-Area New Manufacturing facility (HANM) tritium (T2) switchgear

- Repaired steam leaks at HANM and in the area's high pressure steam line
- Created energy models for four administrative buildings using Quick Energy Simulation Tool (eQUEST)

Renewable Energy

SRS has three biomass steam plants in permanent operation to service A-Area and the Savannah River National Laboratory (SRNL), L-Area and K-Area. Construction of a new Biomass Cogeneration Facility near F-Area continued, with start-up expected in FY2012. The new Biomass Cogeneration Facility will generate an estimated 77,500 MW-hours of electricity in its first year of operation. This production rate will be well above the 7.5% statutory goal for energy consumption that must come from renewable energy sources for FY2013 and thereafter.

Use of renewable energy at the SRS is being prioritized at the highest levels. In October 2008, the design and construction of a new steam plant for A-Area and the SRNL were completed and the facility placed online. The new thermal-only steam plant utilizes biomass as the primary fuel source. Early 1950's vintage coal-fired boilers were replaced with new state-of-the-art boilers and emission controls while maintaining steam availability around-the-clock at minimum cost. This new plant was installed utilizing the existing Energy Savings Performance Contract (ESPC) in place at the site. The total cost of the project is \$13.8 million and the annual savings average over \$1.5 million. The facility will be paid for (term of the contract) in nine years.

The renewable and environmental aspects of the project are plentiful:

- Utilization of coal is being reduced by over 12,000 tons annually
- Utilization of biomass is being increased by nearly 27,000 tons annually
- Particulate emissions are being reduced. Particulate Matter (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 (SO₂) emissions are being reduced from 1,836 tons/year to 4.38 tons/year
- Oxide of nitrogen (NO_x) emissions are being reduced from 256.7 tons/year to 35 tons/year
- Carbon monoxide (CO) emissions are being reduced from 120.8 tons/year to 105.1 tons/year
- Ash generation and disposal are being reduced



A-Area Biomass Steam Plant

- Compliance with Clean Air Act and Clean Water Act standards are achieved

Ameresco Federal Solutions will complete construction and start-up of two new biomass plants at the Biomass Cogeneration Facility in 2012 and will be reimbursed from actual cost savings generated during the 15-year debt service payback period. The energy savings result from replacement of the site's old and inefficient coal-fired plant with a high-tech biomass facility, switching from coal to biomass as the fuel source, locating the new facility closer to the end users, and experiencing improved operational efficiencies with new equipment better matched to site load requirements. The community also receives the health and environmental benefits associated with the reduction in greenhouse gas emissions.



Aerial View of the Ameresco Biomass Cogeneration Facility

Some of the benefits of this major renewable energy project include:

- Reducing over 161,000 tons of annual coal consumption and 300,000 gallons of fuel oil consumption
- Utilizing 322,000 tons of biomass and bio-derived fuels
- Reducing emissions:
 - 400 tons/yr - particulate matter
 - 3,500 tons/yr - SOx
 - 2,500 tons/yr - NOx
 - 100,000 tons/yr - carbon dioxide (CO₂)
- Reducing over one billion gallons of water from the Savannah River annually
- Reducing greenhouse gas emissions by about 100,000 tons per year, significantly decreasing the carbon footprint of SRS (due to coal, a major contributor to greenhouse gases, being completely eliminated while maximizing the burning of wood)
- Meeting and exceeding all SRS renewable energy goals in federal directives, (serving as a key project for assisting DOE with achieving complex-wide renewable goals)
- Helping SCDHEC to continue with local "Attainment Status"
- Supporting DOE Initiative to be the Lead Federal Agency in Renewable Energy Goals
- Allowing SRS to permanently deactivate inefficient coal-fired boilers in the SRS D-Area

Greenhouse Gas Reduction

SRS is committed to reducing Greenhouse Gases (GHG) Scope 1 & 2 emissions by 28% by FY2020 from a FY2008 baseline. Scope 1 consists of direct emissions such as onsite combustion of fossil fuels or fugitive GHG emissions, whereas Scope 2 consists of indirect emissions associated with the consumption of electricity, heat, or steam. Sites are expected to aggressively strive toward the overall Departmental goal of a 28% reduction, particularly when cost-effective and prudent to do so. Actual targets are being defined by DOE taking into account new mission growth and other factors.

The site has seen progress in FY2011 on GHG emission reductions primarily by considering potential impacts that these reductions will have in future Site operations. The combining of GHG data associated with the various impact sources, such as Site energy use and vehicle/equipment use, is being organized, thus allowing

for development of a comprehensive inventory and subsequent management of it.

Scope 1 and 2 GHG emissions are currently generated and inventoried from the following source types at SRS:

- Coal (although FY2012 is anticipated to be the last year of this source)
- Purchased electricity
- Wood (biomass)
- Fuel oil
- Propane
- Hydrofluorocarbon (HFC) fugitive emissions
- Gasoline
- Diesel fuel
- E85 (ethanol) fuel
- Jet fuel

SRS will greatly reduce GHG emissions via the new biomass projects either already completed or currently being constructed. This is primarily a result of transferring to a biomass-based energy supply versus the previous coal-based supply. Construction and start-up of the major new Biomass Cogeneration Facility will be completed and the plant will become fully operational in FY2012. The Site has a transition plan whereby the existing coal-fired facility will continue to operate on a limited basis until the new biomass plant has proven to be reliable. Consequently, the FY2013 and following fiscal years will see even greater GHG benefit than will be realized in FY2012 while both plants are operating.

Water Management

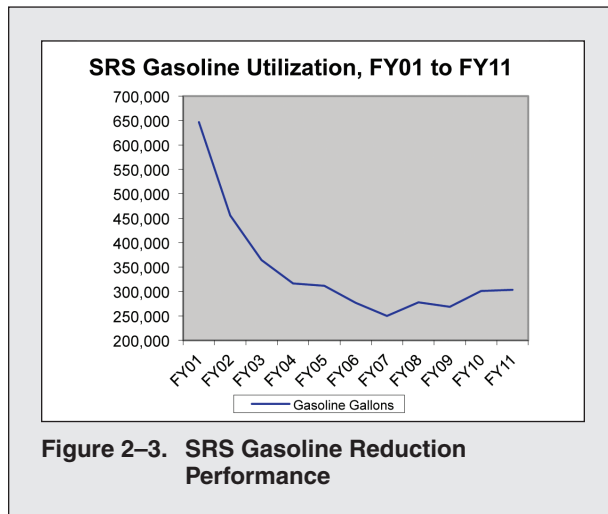
Potable water consumption was reduced by 10.2 percent through FY2011 as compared with the baseline year of FY2000, and nearly 5 percent between FY2010 and FY2011. The following summarizes FY2011 accomplishments:

- Conducted walk-downs in 13 facilities (see Water Conservation description in section 3.1) to determine the number, type and water usage requirements for existing plumbing fixtures in each of the buildings
- Determined water consumption for each building utilizing the LEED-EB water calculator
- Identified actions to reduce water usage to achieve HPSB or LEED-EB goals, such as installing more efficient commodes or urinals or retrofitting sinks with flow restricting aerators
- Performed cost and payback period calculations to determine the cost effectiveness of potential modifications

Transportation/Fleet Management

The primary DOE transportation and fleet management goals are to decrease fleet petroleum consumption by 2 percent annually by FY2020 from a FY2005 baseline and increase alternative fuel consumption by 10 percent annually by FY2015 relative to a FY2005 baseline.

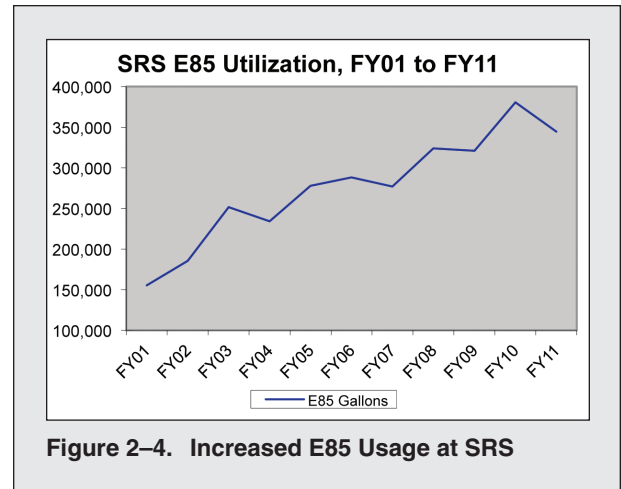
The use of alternative fuels at SRS has increased dramatically in recent years as shown in Figure 2-3. Approximately 80% of vehicles in the light duty fleet currently utilize E85 or are gasoline hybrids. The site works to ensure the use of alternative fuels remains high by prioritizing use of flex fuel and hybrid vehicles. In FY2011, this consumption total rose to over 321,000 gallons (see Figure 2-4).



Contracts & Concession Agreements

SRS encourages acquisitions that comply with environmental requirements as evidenced through various contract-related documents, including (but not limited to) the “Terms and Conditions” document (the paragraph entitled “Environmental Compliance”) and the “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 2011, most EPP 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 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.



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 pre-project 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 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 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 FY2010. 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 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.

Ameresco Federal Solutions is currently constructing the administration facility portion of the new Biomass Cogeneration Facility with the intent of achieving LEED® certification following completion. Design features for the new office space include a 6,000 gallon rainwater storage tank to reduce potable water usage for flushing fixtures and irrigation, permeable pavers in the parking lot to help control the volume of storm water runoff, and the specification of materials containing recycled content to improve the building's green footprint. Energy savings will be realized through efficient lighting and equipment, a variable speed drive for the water pump, and increased building insulation.

Electronic Assets Management

SRS continued to purchase EPEAT and other energy efficient electronic products during the year. Leasing of many of the personal computers allows for the return and redeployment of devices no longer needed at SRS. In 2011, excess personal computers (PCs) were distributed to schools throughout the local region. Purchased by SRS, many of these computers were provided directly to schools in Aiken, SC; Martinez, GA; Lincolnton, GA; and Waynesboro, GA.

A new process was put into place during 2011 to allow excess PC assets to be accounted for and redeployed quickly to end users as demand dictates. This will provide better physical accountability of assets and quicker delivery times to the end user as well as reduce waste associated with "searching" and "retrieving" single PCs scattered across the SRS areas.

EMS Best Practices / Lessons Learned



Sustainability Campaign

In August of 2011, a campaign "One Simple Act of Green," was introduced at SRS that targeted specific items of sustainability and environmental stewardship that promote individual action by connecting SRS employees to information, tools and programs that make a difference to our environment. During FY2011 several specific recommendations were provided to SRS employees including:

- Using reusable shopping bags
- Reporting leaky faucets
- Using energy efficient light bulbs
- Reducing emails printed
- Turning off lights in unused rooms

Additional ideas and recommendations will be provided in 2012.

Chemical Management Center (CMC)

The Chemical Management Center 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 on-site inventory. Hazardous and nonhazardous chemicals are reutilized onsite, returned to vendors when possible, sold through sealed bid sales to approved vendors, and donated to local government institutions to promote good community service while reducing waste generation. The CMC distributed for reuse more than 35,300 lbs. of chemicals in FY2011, avoiding more than \$234,000 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.

SRS received Environmental Sustainability (EStar) awards for two projects growing out of technology research, development and application at SRNL. One award, for Renewable Technology Development, Deployment and Education in South Carolina, is a collaboration between SRNL and the Economic Development Partnership (EDP) of South Carolina. SRNL has shared expertise and knowledge of renewable energy technologies with the EDP, which in turn has leveraged existing relationships with industry to identify and evaluate specific opportunities. The results have ranged from emissions reductions (through deployment and staging of hydrogen and wind energy technology) to community education programs.

The second award recognized a project to remediate tritium-contaminated debris in an innovative, cost-effective way by using a high heat source called a “thermal detritiation unit.” The treated soil and concrete debris can be disposed at an onsite excavation site rather than sent offsite for disposal, reducing transportation, packaging and disposal costs. Over \$1.6 million in transportation cost savings and an avoidance of 400,000 truck miles were realized from the deployment.

Additionally, Shaw AREVA MOX Services was recognized by the SCDHEC for outstanding environmental leadership with its recent acceptance into the organization’s South Carolina Environmental Excellence Program (SCEEP). Shaw AREVA MOX Services is responsible for the design and construction of NNSA’s MOX Fuel Fabrication Facility at SRS.

SCEEP is a voluntary program recognizing South Carolina facilities that have demonstrated environmental performance through P2, energy and resource conservation, and the use of an environmental management system. Shaw AREVA MOX Services was invited and accepted into the program because of its effective implementation of a strong environmental management system and the absence of any violations from environmental regulators during the more than five years of the site work and construction of the MOX project.

SRS received the Information Management Conference Technical Excellence Award for the Green Information Technology Initiative, which reduced the Site’s carbon footprint by decreasing energy consumption in the Central Computing Facility more than 30% by reducing

space requirements for hardware and improving energy use.

Ongoing Environmental Enhancement Projects

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 FY2012 to reduce petroleum consumption, increase alternative fuel use, and increase the number of alternative fuel vehicles. The Site will realize sizeable petroleum reductions over the upcoming years due to a reduction plan that will result in significantly fewer vehicles. SRS has submitted a “Vehicle Reduction Plan, FY2012 – FY2015” with a targeted reduction of 35% (consisting of 15% by the end of FY2012, 10% by the end of FY2013, and 10% by the end of FY2014) that has been established based on the defined baseline of FY2005. Petroleum consumption will continue to decrease unless mandates require less use of E85 fuel.

Computer Acquisition

SRS continued to purchase energy efficient computer products in 2011. 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 FY2007, the final model became compliant in FY2009. The power reduction features of the personal computers and monitors are set to efficient levels upon receipt of the equipment.

SRNL Filter Design Reduces Waste Treatment Costs

The redesign of a filtration system by SRNL is expected to help DOE drastically reduce cost and infrastructure for the treatment and permanent disposal of its inventory of high level radioactive waste. Removing solids would allow large quantities of radioactive salt waste to be decontaminated for disposal and also concentrate the solids, leaving a much smaller volume requiring expensive treatment and disposal as high-level waste.



SRS Employee Showing the Finished Product of the Detritiation Unit, With the Unit in The Background



Redesigned Rotary Microfilter

SRNL examined different filtration methods and found that a rotary microfilter patented by SpinTek offered filtration rates that were higher than those of a traditional cross-flow filter. As originally designed, however, the rotary microfilter was not suited for use with radioactive waste, so SRNL adapted the system for deployment within the DOE complex.

The redesign consolidates internal parts of the system, allowing an entire stack of 25 filter disks and other parts to be removed as a single piece.

The initial need for the filtration system was to treat the SRS salt waste solutions. SRNL, in collaboration with Oak Ridge National Laboratory and the SRS's liquid waste operations contractor, Savannah River Remediation (SRR), designed a module that allows two or four rotary microfilter systems to be inserted into an existing waste tank. This module eliminates the need to construct a new facility for the filtration process. As the system filters the waste, the liquid filtrate is transferred out of the tank for treatment and disposal, and the concentrated solids are returned to the tank.

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 engaging in activities and projects with overlapping interests. More specific instances in which an EMS can benefit DOE's mission are below.

- Policy development and program planning facilitate 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 and consistent flow down of expectations and compliance framework in contracting documents
- Clear articulation of DOE complex-wide 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 Kim Cauthen at kim.cauthen@srs.gov.

