Chapter 2 Environmental Management System

The Savannah River Site (SRS) Environmental Management System (EMS) supports the U.S. Department of Energy (DOE) commitment to implement sound stewardship policy and practices to protect the air, water, land, and other natural, archaeological, and cultural resources that SRS construction, operations, maintenance, and decommissioning potentially affect.

The EMS plans, integrates, and evaluates SRS activities protecting public health and the environment, preventing pollution and minimizing waste, and complying with applicable environmental and cultural resource protection requirements. SRS activities demonstrate the Site's commitment to minimize waste, manage water, foster renewable energy, reduce greenhouse gases, acquire sustainable services, remediate with a focus on sustainability, and observe best management practices, all vital components of environmental management. The SRS Site Sustainability Plan contains more information on DOE and SRS goals and the progress toward achieving those goals.

2016 Highlights

The Department of Energy sets goals for carrying out its mission in an environmentally sustainable manner that supports a policy of national energy security and addresses global environmental challenges. SRS continues to make substantial progress in meeting the goals for the Site. Below are the highlights of the progress cumulative through 2016:

- **Pollution Prevention and Waste Minimization**—SRS diverted 50% (695 metric tons) of nonhazardous solid waste for recycling.
- **Water Management**—SRS continued to reduce drinkable water use. The Site has reduced use by 32% since 2000.
- **Renewable Energy Intensity**—SRS derived 100% of thermal energy and 48% of electricity from renewable energy sources.
- **Greenhouse Gas Reduction**—SRS continued to reduce greenhouse gas emissions. The Site has reduced emissions by 74% since 2008.
- **Transportation and Fleet Management**—More than 96% of SRS light-duty vehicles were hybrid, electric, or use E85 (ethanol) fuel.

  EMS Best Practices—SRS led the DOE complex in identifying climate change and vulnerabilities of workers and buildings.

2.1 SRS EMS IMPLEMENTATION

Chapter 2—Key Terms

Environmental impacts *are any positive or negative change to the environment caused by an organization's activities, products, or services.*

Environmental objectives *define the organization's environmental goals.*

Environmental sustainability *is interacting responsibly with the environment to conserve natural resources and promote long-term environmental quality. It includes reducing the amount of waste produced, using less energy, and developing processes that maintain the long-term quality of the environment.*

2.1.1 Introduction

DOE has chosen the International Organization for Standardization (ISO) Standard 14001 as the framework to employ its Environmental Management Systems (EMS) and its sustainable practices of preventing pollution, reducing waste, and conserving energy. The ISO 14001 standard specifies the EMS requirements that an organization can use to enhance its performance in mitigating environmental impacts and complying with regulations.

ISO Standard 14001 establishes a continuous cycle of developing, planning, implementing, operating, evaluating, and correcting a management system, and then conducting a management review. The SRS EMS also meets the criteria of Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and DOE Order 436.1, *Departmental Sustainability*, which require federal facilities to use environmental management systems.

The EMS integrates protecting the environment into SRS's daily operations. For example, identifying safety and health hazards and managing with quality processes support and enhance protecting the environment. This linked approach to planning, executing, evaluating, and modifying ensures that SRS operates with minimal adverse impact on the environment.

SRS also uses the EMS as a platform to implement the Site Sustainability Plan (SSP), as well as carry out programs with goals and measurable targets that contribute to SRS meeting its sustainability goals. SRS EMS and SSP targets and goals, along with the status of the Site's progress toward meeting these goals, are available on the SRS website. These documents, combined with Site policies and procedures, ensure SRS remains a leader in protecting the environment and is a steward of conserving energy and water.

Savannah River Nuclear Solutions (SRNS), Savannah River Remediation (SRR), Centerra, and Chicago Bridge & Iron (CB&I) Areva MOX Services maintain ISO 14001 credentials, which are valid for three years. Internal and external auditors routinely assess programs to ensure that they conform to the standard's requirements.

SRS contractors had the following audits for ISO 14001 compliance:

- SRNS and SRR had an external conformance audit in March 2015
- Centerra conducted ISO 14001 reregistration in January 2015 and had a review audit in January 2016
- Chicago Bridge & Iron Areva MOX Services had an external conformance audit in April 2016

SRS trains all employees annually on the EMS policies and requirements. Additionally, the Site generates regular and routine employee communications as a reminder of the SRS commitment to sustainability and the environment. The SRS Integrated Safety Management System (ISMS) is a process that integrates safety into management and work practices at all levels so that the Site accomplishes its missions, while protecting the public, the worker, and the environment. The ISMS execution comprises five functions: 1) defining scope of work, 2) analyzing hazards, 3) developing and implementing controls, 4) performing work, and 5) providing feedback and improvement. SRS implements ISO 14001 and accomplishes the EMS goals using the ISMS approach in programs and procedures.

Integrated Safety Management System Continual Improvement Framework

2.1.2 Targets and Goals

Through the EMS, SRS sets targets and goals annually to meet and to support DOE environmental objectives, which include:

- Reducing total energy use
- Increasing renewable energy use
- Reducing water use
- Purchasing environment-friendly, or "green," products and services
- Reducing solid waste generation
- Reducing chemical use
- Increasing the number of sustainable buildings
- Reducing fleet and petroleum use
- Using energy-compliant electronic devices
- Maintaining compliance with requirements

Appendix A presents the goals, identifies the strategies for implementation, and provides the status of SRS's progress toward achieving them. This chapter contains additional information on how SRS is moving forward in supporting DOE environmental objectives.

2.2 SUSTAINABILITY ACCOMPLISHMENTS

The following topics summarize the major accomplishments the SSP discusses. Executive Order No. 13693, *Planning for Federal Sustainability in the Next Decade*, outlines each of these topics.

2.2.1 Greenhouse Gas Reduction

By reducing greenhouse gas (GHG) by 74%, SRS has surpassed the 50% goal to reduce Scope 1 and 2 from a FY 2008 baseline. Scope 1 consists of direct emissions such as onsite fossil-fuel combustion or fugitive GHG emissions; whereas, Scope 2 consists of indirect emissions associated with using electricity, heat, or steam.

The following inventoried sources at SRS currently generate Scope 1 and 2 emissions:

- Purchased electricity
- Wood (biomass)
- Fuel oil
- Propane
- Gasoline
- Diesel
- E85 (ethanol)
- Jet fuel
- Fugitive emissions

Biomass Cogeneration Facility

SRS continued to substantially reduce Scope 1 and 2 greenhouse gas emission during FY 2016 due to the Biomass Cogeneration Facility and operating three additional biomass facilities, one each in A Area, L Area, and K Area. DOE tracks the Site's combining of GHG data from various impact sources (such as Site energy use, alternative workplace arrangements and space optimization, and vehicle and equipment use).

2.2.2 Sustainable Buildings

By 2025, DOE must reduce by 25% the energy per square foot (energy intensity) used in an identified class of buildings using FY 2015 as a baseline. The annual goal is to reduce intensity by 2.5%. DOE expects sites to aggressively strive toward the overall DOE 25% reduction goal, particularly when cost-effective and prudent to do so. SRS has been well ahead of the goal in reducing energy and is continuing to look for ways to reduce energy intensity in its facilities.

Improving energy efficiency has been ongoing at the Site for many years, and additional benefits have come from a wide variety of strategies used to reduce energy and manage utilities, including the following:

- Upgrading utility systems
- Minimizing boiler use for winter heating
- Operating the Biomass Cogeneration Facility
- Operating biomass steam plants in A Area, K Area, and L Area
- Deactivating and decommissioning many facilities, including entire areas, which often comprise multiple buildings, land, and associated waste disposal and decontamination challenges
- Consolidating building space and roles of employees
- Using more setback equipment in facilities (such as lighting timers, lighting sensors, and thermostats)
- Upgrading various small-scale light fixtures

SRS conducted many activities in FY 2016 that reduced energy intensity. Operating the Biomass Cogeneration Facility had the most impact. The following are some additional notable accomplishments supporting this program:

- Conducted a required energy and water audit for 45 facilities, identifying more than 100 measures to conserve energy
- Removed 19 unoccupied and aging trailers, reducing energy consumption and representing 16,000 square feet of footprint reduction
- Installed energy-efficient light-emitting diode (LED) lighting in the 784-7A Biomass Facility
- Replaced remaining fluorescent lighting with LED lighting in 235-H, 248-H, and 264-H
- Installed 27 heating and cooling units with new, higher SEER (Seasonal Energy Efficiency Ratio) units in the Site's administrative areas
- Used cool-roof technology on four roof replacements

SRNS also manages energy efficiency at a facility level with the Peak Alert process, which reduces purchased power. Actions that will reduce the demand for energy include raising the thermostat (summer), lowering the thermostat (winter), and turning off lights when it is safe to do so. SRS used Peak Alerts to manage 11 peak events during FY 2016: three during warm months and eight during cool months.

2.2.3 Renewable Energy

DOE's Clean Energy goal requires the percentage of an agency's total electric and thermal energy coming from renewable and alternative energy in FY 2016–17 to be at least 10%, increasing to 25% by FY 2025. Additionally, DOE's Renewable Electric Goal requires that renewable electric energy account for at least 10% of a total agency electric consumption in FY 2016–17, working toward 30% of total agency electric consumption by FY 2025. SRS has exceeded these goals with current performance rates of 100% of thermal energy and 48% of electricity being produced from renewable energy sources. SRS no longer uses coal to generate energy. Using clean and renewable energy at the Site is a high-level priority.

The Biomass Cogeneration Facility is in its fourth year of fully operating and has played a significant role in supporting these renewable and alternative energy goals. In 2016, an additional biomass heating plant came online to back up the existing boilers in the case of an outage. The new biomass plant represents a subsequent modification to DOE's original Energy Savings Performance Contract executed in 2009 for constructing the 20-megawatt biomass cogeneration facility, which Ameresco currently operates and maintains at SRS.

The Savannah River National Laboratory (SRNL) supports DOE's clean energy goal by developing cutting-edge technologies in the following areas:

- hydrogen
- solar
- wind
- environmental
- natural gas
- bioenergy

2.2.4 Water Use Efficiency and Management

Executive Order No. 13693, *Planning for Federal Sustainability in the Next Decade*, stipulates that by FY 2025, DOE as an agency will reduce the gallons of drinkable water used per square foot of building area by 36%, relative to a FY 2007 baseline. SRS has an FY 2016 target goal to reduce this ratio by 18%. The ratio is known as water intensity.

The Site has been significantly decreasing its water use over many years. In 1996, for example, the Site installed a new SRS primary domestic water system. The new system, along with replacing old and leaky piping, saved the Site several hundred million gallons of water annually. SRS also installed water meters on the main supply lines and periodically conducts a water balance to monitor use and help detect leaks.

Compared to the current baseline (FY 2007), SRS has reduced drinkable water intensity through FY 2016 by 20.3%. Over a longer timeframe, since FY 2000, the Site has reduced drinking water use by 31.9%. It will be harder for the Site to reduce water use more because it has already achieved the large decreases. Drinking water use fluctuates from year-to-year based on various factors such as the number of employees and the amount of drinkable water used for nondrinkable uses.

During FY 2016, SRS continued to benefit from the use of WaterSense® products and other water-conserving products, including low-flow toilet flush valves, low-flow urinal flush valves, and low-flow faucets. In recent years, the Site has replaced several hundred faucets and flush valves with reducers or low-flow units.

2.2.5 Fleet Management

SRS Vehicle Fleet

The primary goal for DOE transportation and fleet management is to use less petroleum and more alternative fuel. SRS has met and exceeded these goals since FY 2000. SRS installed two E85 fueling stations in October 1999 and added a third in FY 2015. In FY 1999, the year prior to installing the fueling stations, the Site consumed more than 700,000 gallons of unleaded fuel and no E85 alternative fuel. In FY 2016, the Site consumed approximately 91,000 gallons of unleaded fuel, 39,000 gallons of diesel fuel, and more than 400,000 gallons of E85 alternative fuel. In addition, the Site completed its Vehicle Allocation Methodology Plan in July 2016. The Vehicle Allocation Methodology is a protocol that helps organizations eliminate from their fleets unnecessary, oversized, or fuel-inefficient vehicles. SRS updates its plan at least every 5 years. SRS has reduced its fleet-wide per mile greenhouse gas emissions goal by 17% toward a 30% goal.

2.2.6 Sustainable Acquisition

SRS Procurement has established sustainable practices related to purchasing environmentally preferable products (EPP). For FY 2016, SRS reviewed applicable purchase-order line descriptions to determine if the product meets the definition of U.S. Department of Agriculture (USDA) BioPreferred®. The EPP procurements have led to several practices, as outlined below:

- The SRS Chemical Management Center reviews and approves chemical acquisitions. This review monitors using hazardous chemicals and, where appropriate, recommends EPPs.
- Electronic stewardship has led to procuring and leasing desktops, laptops, and monitors that meet Electronic Product Environmental Assessment Tool (EPEAT) standards and copiers that are ENERGY STAR®-compliant.
- EPP substitutions have been procured under various new and existing contracts, including bulk janitorial supplies (for example, cleaners, paper products) and safety items (for example, earplugs, filters).

SRS implemented a system to monitor and track EPP procurements. This new business system will enable SRS to develop an EPP baseline and track spending on EPP items and materials.

2.2.7 Pollution Prevention and Waste Reduction

In accordance with the Pollution Prevention Act of 1990, SRS's primary objective is to prevent or reduce pollution at the source whenever practical. Pollutants and wastes that cannot be prevented through source reduction will be diverted from entering the waste stream through environmentally safe and cost-effective reuse or recycling. Pollution prevention is the SRS preferred approach to reducing waste, mitigating health risks, and protecting the environment. The Pollution Prevention Program provides SRS a safe, effective, and environmentally responsible strategy to implement specific waste-reduction techniques based on current and projected information on waste generation, waste characteristics, and costs associated with managing waste. Pollution prevention is a key component of the SRS EMS.

The goal for FY 2016 was to divert at least 50% of nonhazardous solid waste, excluding construction and demolition debris, for recycling or reuse. SRS uses the North Augusta Material Recovery Facility (NA-MRF) for typical office and municipal-type waste recycling. In FY 2016, SRS recycled about 50% of this stream, 695 metric tons of the 1,380 metric tons of waste that it shipped. SRS worked with the subcontractor, NA-MRF, to improve the process to attain a 50% recovery rate. Other efforts include initiating a vendor contract to purchase plastic waste bags and revising operating procedures to improve recovery rates. In addition, SRS uses NA-MRF to recycle most of the waste from its area cafeterias and building kitchenettes. The Site segregates the main cafeteria's waste due to there being very little material suitable for recycling or composting. SRS continues to monitor this waste stream for opportunities to recycle materials.

2.2.8 Energy Saving Performance Contracts

SRS has Energy Saving Performance Contracts (ESPC) through two separate contractors—Honeywell Building Solutions and Ameresco Federal Solutions—for several projects to conserve energy and water.

Ameresco Federal Solutions, tasked with the DOE's largest-ever ESPC, operates the Biomass Cogeneration Facility located on SRS. This facility produces steam and electricity on a 24-hour, full-time basis.

The contracts included the following work in 2016:

- Ameresco continued operating the Biomass Cogeneration Facility, which includes three biomass boilers for steam and electricity
- Ameresco also operated steam-only biomass plants for heating buildings in two other areas at SRS
- Honeywell Building Solutions installed more-efficient lighting in several Site buildings
- Honeywell continued monitoring the efficiency of operating a biomass boiler that provides steam to the SRNL complex

2.2.9 Electronics Stewardship

SRS is implementing many electronics stewardship strategies to reduce energy use and waste, and their associated costs. In FY 2016, SRS continued exemplary performance and met sustainable electronics purchasing and disposal goals. SRS purchased Electronic Products Environmental Assessment Tool (EPEAT) and registered ENERGY STAR®-qualified products for all eligible laptops, desktops, and monitors. SRS has 431 leased copiers, which all are ENERGY STAR®-certified. More than 99% of the eligible electronics SRS acquires meet EPEAT standards.

2.2.10 Climate Change Resilience

SRS ensures that federal operations and facilities can continue to protect and serve citizens in a changing climate. SRS uses global climate model projections and data as the starting point to assess the impact of climate change to Site buildings and outdoor workers. SRS sent the assessment results to a climate scientist at the University of South Carolina for external review in June 2016. SRS continues to assess the effects of climate change on preserving forests, maintaining water levels in Site ponds and lakes, and the ability of a Site energy plant to "dump" heat to the environment.

2.3 EMS BEST PRACTICES

2.3.1 Sustainability Campaign

SRS continued to implement its "One Simple Act of Green" environmental awareness campaign. The program empowers SRS employees with the information, tools, and programs needed to reduce our footprint on the environment. Employees practice simple acts, such as turning off lights when leaving a room or workspace, which promote positive actions toward environmental stewardship.