Chapter 2: **Environmental Management System**

The Savannah River Site (SRS) Environmental Management System (EMS) implements the U.S. Department of Energy (DOE) commitment to sound environmental stewardship policy and practices. These safeguards protect air, water, land, and natural resources, as well as archaeological and cultural resources that SRS potentially affects.

The EMS plans and evaluates SRS construction, operations, maintenance, and decommissioning activities to protect public health and the environment, prevent pollution, and comply with applicable environmental and cultural resource protection requirements. The way SRS conducts its actions demonstrates 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 of these attributes are vital components of environmental management. The SRS Site Sustainability Plan contains more information on DOE and SRS goals and the progress made toward achieving these goals.

2020 Highlights

DOE sets objectives 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 program:

- **Pollution Prevention and Waste Minimization**—SRS recycled 48% (278 metric tons) of nonhazardous solid waste.
- **Greenhouse Gas Reduction**—SRS continued to reduce greenhouse gas emissions, exceeding federal goals. The Site has reduced emissions by more than 82% since 2008.
- **Transportation and Fleet Management**—SRS continued to exceed its fleet management goals. More than 87% of the current fleet of light-duty vehicles are hybrid, electric, or vehicles that use E-85 (85% ethanol, 15% unleaded gasoline) fuel.
- **Awards**—SRS received the Department of Energy 2020 Project Management Excellence Award for remediating two coal ash basins and a coal pile basin.

2.1 SRS ENVIRONMENTAL MANAGEMENT SYSTEM

DOE Order 436.1, *Departmental Sustainability*, requires federal facilities to use environmental management systems. SRS implements an EMS using the International Organization of Standardization (ISO) 14001:2015 standard to fulfill compliance obligations and address risks and opportunities. By design, the "Plan-Do-Check-Act" approach of the ISO 14001:2015 standard continually improves environmental performance.

The SRS EMS has two areas of focus: environmental compliance and environmental sustainability. Environmental compliance consists of regulatory compliance and monitoring programs that implement federal, state and local requirements, agreements, and permits. Environmental sustainability promotes and integrates initiatives such as energy and natural resource conservation, waste minimization, green remediation, and using sustainable products and services.

Chapter 2—Key Terms

Environmental impacts *are any positive or negative changes 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 SRS Environmental Policy

The goal of the SRS Environmental Policy is to protect the public and future generations from any impacts from Site operations. SRS commits to this by doing the following:

- Promoting sound environmental stewardship
- Preventing pollution onsite and in surrounding communities
- Conducting science and energy research
- Continuing the national security mission

SRS accomplishes this through:

- Complying with environmental laws and regulations
- Continuing process improvements
- Conducting safe operations
- Communicating with the workforce, public, and stakeholders

2.1.2 Integration with Integrated Safety Management System

SRS incorporates the Integrated Safety Management System (ISMS) with EMS to provide a comprehensive framework under which it manages the environmental, safety, and health programs. This makes it possible for the Site to accomplish all work while protecting the public, workers, and the environment. The integration confirms that SRS can evaluate work and associated hazards, and that the Site adapts standards, practices, and controls in a DOE-approved safety management system. Figure 2-1 depicts the relationship between ISMS and EMS and how both management systems integrate.

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. Likewise, SRS implements ISO 14001 and accomplishes the EMS goals using the **Plan-Do-Check-Act** approach, where:

- **Plan**—encompasses defining work scope and objectives, identifying environmental aspects and analyzing hazards, and developing controls
- **Do**—encompasses implementing these controls and performing the work (operations)
- **Check**—involves evaluating performance (feedback) and management reviews
- **Act**—embodies corrective actions, improvements, and incorporating lessons learned into practices

Figure 2-1 Integrated Safety Management System Continual Improvement Framework within the ISO 14001 Environmental Management System

2.2 EMS IMPLEMENTATION

The Plan-Do-Check-Act approach is interactive and iterative through the various work activities and functions, including policies, programs, and processes. It also is an integral part of the overall management of the Site's environmental compliance and performance.

2.2.1 Plan

The Site establishes environmental goals, objectives, and targets for each project and activity. Before SRS undertakes any actions or projects, it evaluates associated environmental aspects and their impacts (or potential environmental hazards) to ensure that SRS can control or mitigate the hazard or risk to reduce or eliminate impacts to the environment. The Site performs these evaluations against all applicable federal and state regulations, state permits, and local laws. These regulations and permits are the foundation for internal manuals, standard operating procedures, and standard requirement-implementing documents. SRS uses the National Environmental Policy Act (NEPA) planning tool for all federally proposed actions to take place onsite. SRS uses the Environmental Evaluation Checklist to evaluate all activities and projects to ensure the proposed actions consider and mitigate environmental aspects as necessary.

Another aspect of planning involves sitewide training for personnel, as well as training to perform specific tasks and activities within a project's scope. SRS trains all employees annually on various policies and job-related requirements. The Site requires General Employee Training and Consolidated Annual Training at a minimum for every employee so they will be aware of the potential hazards and risks

associated with work onsite. Task- and project-specific training includes skills development and safe-work practices.

Incorporating training and evaluating environmental aspects and their impacts into work planning ensures SRS will perform mission activities in a manner that protects the public, workers, and the environment. Additionally, the Site generates regular and routine employee written and multimedia communications as a reminder of the SRS commitment to sustainability and the environment.

2.2.2 Do

Environmental Compliance Authorities (ECAs) and Environmental Subject Matter Experts (SMEs) support the facilities and programs with identifying and carrying out their environmental responsibilities. The SMEs communicate environmental regulatory requirements and required document submittals to the United States Environmental Protection Agency (EPA), the South Carolina Department of Health and Environmental Control (SCDHEC), and other stakeholders. The ECAs work with the facilities to ensure that they implement the requirements.

SRS develops the annual *SRS Environmental Report* for the public to summarize in a single document the Site's environmental performance against various applicable federal and state regulations, state permits, and local laws. Chapter 3, *Compliance Summary,* of this report summarizes SRS's environmental compliance and provides the number of NEPA reviews, the number of SRS construction and operating permits, and the status of key federal environmental laws. Chapter 7, *Groundwater Management Program,* identifies SRS efforts to monitor, conserve and protect groundwater, and to restore contaminated SRS groundwater to EPA drinking-water quality standards while conforming to state and federal laws.

The Site develops and conducts emergency drills and exercises by implementing the EMS and ISMS principles and tools. Some of these drills include local, state, and federal emergency response organizations. Throughout the year, the Site performs safety drills for employees to ensure maximum participation for various weather, nuclear incident, environmental release, and fire scenarios.

2.2.3 Check

SRS assesses and evaluates internal work to ensure that personnel are performing it as planned and that Site operations are not adversely impacting worker and public health and the environment. The environmental monitoring and environmental surveillance programs at SRS follow applicable requirements to collect and analyze samples across SRS and within a 25-mile radius extending from the center of the Site. This ensures the radiation dose to members of the public and radioactive releases to the environment are kept as low as reasonably achievable. Chapters 4, 5, and 6 of this report document the nonradiological environmental monitoring program, radiological environmental monitoring program, and the radiological dose assessment, respectively.

The Site also performs management field observations and program assessments to detect potential issues early to prevent performance shortfalls and to identify processes, practices, behaviors, roles, responsibilities, and organizational expectations that SRS needs to improve. Chapter 8, *Quality Assurance,* documents how SRS ensures the accuracy of its environmental data.

Various regulators also perform external assessments. SCDHEC conducts several inspections and audits annually to verify that the Site is complying with state permits. EPA also participates on Federal Facility Act-driven inspections and, on a determined frequency, participates alongside SCDHEC in compliance evaluation inspections for waste management. Chapter 3, *Compliance Summary,* lists and gives results of the annual external agency audits and inspections of the SRS Environmental Program.

Every three years, as required by the ISO 14001 standard, a qualified party outside the control or scope of the EMS must perform a formal EMS audit. The Savannah River Nuclear Solutions, LLC (SRNS) EMS (which covers Savannah River Remediation [SRR]) conforms to ISO 14001, while Centerra-SRS (SRS's protective force services contractor) is registered to the ISO 14001 standard. An external recertification audit of the Centerra EMS program was conducted in 2020, and a conformity audit of the SRNS program will be conducted in 2021.

In 1995, SCDHEC enrolled in an Agreement in Principle (AIP) program with the Department of Energy at SRS. As a result, the Environmental Surveillance Oversight Program (ESOP) was created. Through the AIP grant, the ESOP evaluates the adequacy of DOE activities related to environmental monitoring and reporting, and confirms that the DOE's activities have not adversely impacted public health and safety and the environment.

2.2.4 Act

SRS enhances environmental performance and the health of the EMS through corrective actions and continual improvement. The Site establishes, implements, and maintains the corrective action program in accordance with an internal manual for contractor assurance. It deals with actual or potential conditions of nonconformity, such as Notices of Violation (NOVs) or findings and opportunities for improvement from internal assessments and audits. Chapter 8, *Quality Assurance,* summarizes annual improvements to the Site's Environmental Monitoring Program and laboratory performance in various proficiency and certification programs.

Communication is vital throughout all operations, environmental concerns, safety, and emergency preparedness in order to facilitate feedback and to incorporate lessons learned for improvement. This report and the accompanying *SRS Environmental Report Summary* also serve as communication tools with stakeholders (such as the public, academia, SRS Citizen's Advisory Board, regulators, and other DOE sites) and to communicate with the public.

2.3 SUSTAINABILITY AND STEWARDSHIP GOALS AND IMPLEMENTATION

DOE Order 436.1, *Departmental Sustainability*, defines DOE Sites' requirements and responsibilities to manage operations and activities necessary for sustainability and ensure that they are carrying out the DOE mission in a manner that addresses energy efficiency goals, greenhouse gas reductions, waste minimization, and pollution prevention. SRS has integrated environmental stewardship projects into many remediation and closure activities, addressing requirements for resource conservation, pollution reduction, and environmental surveillance.

Executive Order No. 13834, *Efficient Federal Operation,* signed in May 2018, sets forth energy and environmental performance goals—based on statutory requirements—for agencies with respect to

managing facilities, vehicles, and operations. Sustainability reporting in this chapter is in accordance with this executive order. The Office of Federal Sustainability issued instructions for this Executive Order in April 2019.

SRS uses the Site Sustainability Plan (SSP) to implement the sustainability goals outlined in DOE's Sustainability Report and Implementation Plan (SRIP). The SRIP is the action plan for DOE to carry out Executive Order 13834, *Efficient Federal Operations*. The goals, which DOE sets annually for all sites, include the following:

- Reducing total energy use
- Increasing renewable energy use
- Reducing water use
- Purchasing environment-friendly, or "green," products and services
- Generating less solid waste
- Increasing the number of sustainable buildings
- Reducing fleet and petroleum use
- Using energy-compliant electronic devices

Sustainability Goals

ISO 14001:2015 requires SRS to establish and document measurable environmental objectives consistent with SRS's Environmental Policy and SRS's strategic direction. Appendix A presents these objectives in the fiscal year (FY) 2020 EMS Goals and Objectives flowchart. This chart names sustainability goals as well as environmental compliance goals for 2020, identifies the related environmental objectives and strategies for implementation, and provides the status of SRS's progress toward achieving them. This chapter contains additional information on how SRS is making progress in supporting DOE objectives.

The following topics summarize the major accomplishments the SSP discusses. Updated annually, the SRS SSP outlines the strategies in place and identifies the Site's contributions toward meeting DOE's sustainability targets outlined in the SRIP. DOE maintains an online graphical dashboard that tracks the progress of facilities in the complex in meeting their sustainability goals. The DOE's Sustainability Dashboard is the source of the goal performance information in Table 2-1. This table summarizes specific metrics and SRS's FY 2020 performance against the sustainability goals to complement the more general discussion in the text that follows.

Table 2-1 FY 2020 Sustainability Goals, Metrics, and SRS Performance

Energy Management	
Goal: 25% energy intensity reduction by FY 2025 from FY 2015 baseline	**Goal on Track**—Energy intensity dropped 17%. The increase in telework due to the COVID-19 pandemic contributed to this reduction.
Interim Target (FY 2020): 1% reduction from FY 2019	**Interim Target Met** *Contributing Activities*: SRS conducted Energy Independence and Security Act of 2007 (EISA) energy and water audits on 16 buildings and identified 21 Energy Conservation Measures (ECMs). SRS implemented 28 ECMs, including 320 LED lighting upgrades, 23 heating and cooling unit replacements with higher Seasonal Energy Efficiency Ratio (SEER) units, and 4 rightsizing projects.
Renewable Energy	
Goal: Not less than 7.5% renewable energy as a percentage of total agency electric use by FY 2013 and each year thereafter	**Goal Met** —34.4% of electric consumption in FY 2020 is from renewable resources (Biomass Cogeneration Facility).
Interim Target (FY 2020): 30%	**Interim Target Met**
Water Management	
Goal: 20% reduction in potable water intensity by FY 2015 from FY 2007 baseline	**Goal at Risk**—10.8% potable water intensity from FY 2007. Continued reducing nonpotable water intensity by using the Biomass Cogeneration Facility and WaterSense® products
Interim Target (FY 2020): 0.5% reduction from FY 2019	**Interim Target Not Met**
Performance Contracting	
Goal: Evaluate performance contracting with energy provider for utility scale solar panel farm.	**Goal Met**—SRS determined that cost of installing a solar panel farm was prohibitive given current technology and did not pursue a performance contract. SRS has ongoing Energy Saving Performance Contracting projects with Ameresco to provide steam and electricity through biomass facilities.
Sustainable Buildings	
Goal: 15% of owned existing buildings comply with Guiding Principles for Sustainable Buildings by FY 2021.	**Goal at Risk**—1.4% of SRS's buildings (two buildings) qualify as sustainable.
Interim Target (FY 2020): 15%	**Interim Target Not Met**

Waste Management	
Goal for Solid Waste: Divert at least 50% of nonhazardous solid waste (excluding construction and demolition [C&D] debris)	**Goal for Solid Waste Not Met**—579 metric tons of office and municipal type waste generated, 278 metric tons (48%) recycled. This was due to the COVID-19 pandemic and an increased number of teleworkers.
Interim Target (FY 2020): 50%	**Interim Target Not Met**
Goal for C&D Waste: Divert at least 50% of C&D material and debris	**Goal for C&D Waste Not Met**—C&D diverted 2.8% of waste from the onsite C&D landfill by recycling items such as metals and office furniture identified in Table 2-2.
Interim Target (FY 2020): 50%	**Interim Target Not Met**
Fleet Management	
Goal for Petroleum Reduction: 20% reduction in petroleum use by FY 2015 and thereafter relative to FY 2005 baseline	**Goal for Petroleum Reduction Exceeded**—SRS reduced petroleum use by 79.7%.
Interim Target (FY 2020): 2% Year Over Year	**Interim Target Met**
Goal for Alternative Fuel Use: 10% increase in alternative fuel use and thereafter relative to FY 2005 baseline	**Goal for Alternative Fuel Use Exceeded**—SRS increased alternative fuel use by 21.4%.
Interim Target (FY 2020): 10%	**Interim Target Met**
Goal for Greenhouse Gas Emissions: 30% reduction in per-mile greenhouse gas emissions from FY 2014 baseline	**Goal for Greenhouse Gas Emissions Exceeded**—SRS reduced per-mile greenhouse gas emissions by 74.6%.
Acquisition and Procurement	
Goal: 95% of new contract actions for products and services meet sustainable acquisition requirements.	**Goal Met**—SRS reviewed 100% (7,718) purchase-order line descriptions of eligible contract actions to determine if the products met the BioPreferred® definition.
Interim Target (FY 2019): 95%	**Interim Target Exceeded**

Electronics Stewardship	
Goal for Environmentally Sustainable Electronics Acquisition: 100% of eligible electronics procurements must be environmentally sustainable (for example, Electronic Product Environmental Assessment Tool [EPEAT]).	**Goal for Environmentally Sustainable Electronics Acquisition on Track**—99.2% of eligible electronics procured (including 4,127 computers purchased) are environmentally sustainable, meeting EPEAT standards
Interim Target (FY 2020): 95%	**Interim Target Met**
Goal for Disposal of Electronics: 100% of electronics disposed through government programs and certified recyclers	**Goal for Disposal of Electronics Met**—100% of used electronics were recycled by authorized recycling companies.
Interim Target (FY 2020): 100%	**Interim Target Met** ***Note***: SRS recycled 112,950 pounds of scrap electronics in calendar year (CY) 2020.
Goal for Power Management: 100% of eligible computers (desktops and laptops) and monitors implement and actively use power management features.	**Goal for Power Management Met**—100% of eligible desktops, laptops, and monitors have power management enabled.
Interim Target (FY 2020): 100%	**Interim Target Met**
Goal for Duplex Printing: 100% of eligible printers implement and actively use duplex printing features.	**Goal for Duplex Printing Met**—All eligible computers and imaging equipment are set up to automatically print on both sides of paper.
Interim Target (FY 2020): 100%	**Interim Target Met**
Data Center Efficiency	
Goal: Implement practices that promote energy efficient management of servers and federal data centers.	**Goal on Track**—SRS is establishing power usage effectiveness (PUE) for data centers that have meters to obtain a baseline of energy-use effectiveness.
Resiliency	
Goal: Enhance the resilience of the federal infrastructure and operations and enable more effective accomplishment of its mission.	**Goal Met**—SRS utilized an Active Risk Manager tool to prioritize risks and opportunities so that strategies and executable plans could be established. In response to the COVID-19 pandemic, SRS also established the SRS Infectious Disease Response Team to update and guide Site employees during the pandemic.
Greenhouse Gas Management	
Goal for Direct GHG Emissions: 50% reduction in direct greenhouse gas (GHG) emissions by FY 2025 from FY 2008 baseline	**Goal for Direct GHG Emissions Exceeded**—SRS reduced direct GHG emissions by 82.4%.
Interim Target (FY 2020): None set	
Goal for Indirect GHG Emissions: 25% reduction in indirect GHG emissions by FY 2025 from FY 2008 baseline	**Goal for Indirect GHG Emissions Exceeded**—SRS reduced indirect GHG emissions by 89.4%.
Interim Target (FY 2020): None set	

2.3.1 Energy Management

Executive Order No. 13834, *Efficient Federal Operations*, directs agencies to meet statutory requirements regarding reducing the amount of energy per square foot (energy intensity) used in an identified class of buildings and to establish an agency target for decreasing energy intensity annually.

In order to reduce energy intensity, SRS has implemented a wide variety of energy-efficient strategies. These include upgrading utility systems; minimizing boiler water use for winter heating; operating the Biomass Cogeneration Facility and the biomass steam plants in A Area, K Area, and L Area; using more energy-efficient equipment in facilities (for example, lighting timers, lighting sensors, and programmable thermostats); and upgrading various small-scale light fixtures to light-emitting diodes (LEDs). SRS has also reduced the overall square footage of the Site by deactivating and decommissioning many facilities, including entire areas (such as TNX), multiple buildings, land, and associated waste disposal areas. Additionally, SRS has consolidated employee-occupied office space into fewer buildings.

Another effective strategy SRS uses to improve energy intensity is conducting energy audits of buildings under Section 432 of the Energy Independence and Security Act of 2007 (EISA). Under this program, SRS has identified 63 Site buildings that are responsible for 76.3% of the Site's energy consumption. Focusing on these buildings allows EISA audits, which identify energy conservation measures (ECMs), to be most effective.

During 2020, SRS implemented a review in the contract bidding process for each new planned roof installation to determine if a cool roof may be cost effective to install. No cool roofs were installed during 2020.

By the end of FY 2020, SRS reduced energy intensity by 10.7% from FY 2019, thereby meeting the interim target for reducing energy intensity by 1% year-over-year. While the strategies discussed—such as timers, sensors and programmable thermostats, and cool roof installations—contribute to reducing energy intensity, these actions did not play a major role reducing energy use in 2020. SRS's response to the COVID-19 pandemic played a significant role in meeting the interim energy intensity reduction goal. Transitioning most Site employees during the second half of FY 2020 to teleworking in response to the COVID-19 pandemic equated to less use of energy in the buildings. This explains the major shift from the interim goal being at risk in FY 2019 to being ontrack in FY 2020.

2.3.2 Renewable Energy

Executive Order No. 13834, *Efficient Federal Operations,* directs agencies to meet statutory requirements relating renewable energy and electricity consumption. As identified in the DOE Sustainability Performance Division Sustainability Dashboard, the goal is for SRS to increase renewable energy as a percentage of total agency electric consumption. SRS has exceeded the renewable energy goal by generating power onsite from biomass. SRS no longer uses coal to generate energy. Using renewable energy at the Site is a high-level priority. The Biomass Cogeneration Facility, which uses wood chips as its primary fuel source and fuel oil and tires as a secondary fuel source, is in its eighth year of fully operating and plays a significant role in supporting renewable goals.

2.3.3 Water Management

Executive Order No. 13834, *Efficient Federal Operations*, requires agencies to reduce potable and nonpotable water use and to comply with stormwater management requirements. The Site has been significantly decreasing its potable water use over many years. By installing a new SRS primary domestic water system and continuing to replace old and leaky piping, the Site has saved 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.

The FY 2007 baseline for the water management sustainability goal does not account for potable water conservation measures such as the new primary domestic water system installed prior to 2007. It will be more difficult for SRS to decrease potable water usage in the future because it has already achieved large decreases in the programs that have the biggest impact. Potable water use fluctuates from year-to-year based on various factors, such as the number of employees and the amount of potable water used for nonpotable purposes.

SRS has been using 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 substituted several hundred less-efficient faucets and flush valves with more-efficient low-flow units as they needed replacing.

Executive Order No. 13834 requires DOE as an agency to reduce nonpotable water consumption—mostly industrial, landscaping, and agricultural (ILA) water—but there are no specific targets. DOE has achieved long-term reductions in ILA water due to the biomass facility operating, which consumes significantly less water than the previously used coal-fired power plant. For example, in FY 2010 when the coal-fired power plant was operating, SRS consumed more than 2.3 billion gallons of nonpotable or potable water, compared to only 596 million gallons in FY 2020.

As previously indicated, the number of employees onsite affects the amount of potable water used, and, therefore; it is logical to anticipate potable (drinking) water use to decline with the decrease of onsite population due to COVID-19 pandemic-related teleworking in the second half of FY 2020. However, potable water use increased 4.5% from FY 2019 to FY 2020. The amount of water used is also dependent on facilities such as H Canyon, Tank Farms, Savannah River National Laboratory, and Salt Waste Processing Facility, which have processes that require potable water. Site missions and processes continued during the COVID-19 pandemic, which is a likely a factor in the lack of a decrease in potable water use.

2.3.4 Performance Contracting

Executive Order 13834, *Efficient Federal Operations*, requires agencies to utilize performance contracting to achieve energy, water, building modernization, and infrastructure goals. The Executive Order requires agencies to set annual targets for the number of contracts they award and the investment value each fiscal year.

SRS has used Energy Saving Performance Contracting (ESPC) to engage Ameresco Federal Solutions in several projects that conserve energy and water. ESPC funds energy- and water-saving building improvements with future energy savings. Ameresco Federal Solutions operates the Biomass

Cogeneration Facility at SRS. This facility produces steam and electricity on a 24-hour, full-time basis. Through an ESPC project, Ameresco also operates steam-only biomass plants for heating buildings in two areas at SRS.

2.3.5 Sustainable Buildings

Executive Order 13834, *Efficient Federal Operations*, requires agencies to ensure that new construction and major renovations conform to applicable building energy-efficiency requirements and sustainable design principles, consider building efficiency when renewing or entering into leases, implement space utilization and optimization practices, and annually assess and report on building conformance to sustainable metrics.

The Executive Order requires SRS to prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of its mission. In general, SRS's aging buildings are not cost-effective to upgrade. However, the SRS emphasis on maintenance, repairs, and energy conservation measures identified in EISA audits (for example, LED lighting upgrades and more efficient heating ventilation, and air conditioning [HVAC] systems) support the goals detailed in the directive.

2.3.6 Waste Management

Executive Order 13834, *Efficient Federal Operations*, requires agencies to implement waste prevention and recycling and comply with all federal requirements for solid, hazardous, and toxic waste management and disposal.

Pollution prevention is a commitment in the SRS Environmental Policy as required under the ISO 14001:2015 standard. Environmentally safe and cost-effective reuse or recycling diverts pollutants and wastes from the waste stream. Pollution prevention at SRS reduces wastes, mitigates health risks, and protects the environment.

SRS uses the North Augusta Material Recovery Facility (NA-MRF) to recycle office paper and municipal-type waste. In addition, SRS contracts with a vendor to shred and recycle sensitive office paper. SRS continues to work with NA-MRF to enhance the process to attain and improve upon a 50% recovery rate. SRS continues to monitor this waste stream for opportunities to recycle materials. Overall, waste generation was down in FY 2020 relative to FY 2019 (579 metric tons versus 843 metric tons, respectively), likely due to employee teleworking in response to the COVID-19 pandemic. Similarly, with more teleworking, the Site generated only 4 metric tons of sensitive office paper in FY 2020, compared to 103 metric tons in FY 2019. This had a significant impact on the recycling rate of 48% in FY 2020, which is below the 50% recovery rate goal.

Other waste streams at SRS include construction and demolition (C&D) debris and universal waste. C&D debris includes waste generated from constructing, remodeling, repairing and deconstructing buildings, roads, bridges, and drainage and sewage systems. This debris is often concrete, asphalt, glass, metal, plastic, and land-clearing scrap. SRS has improved the diversion rate of waste streams from the C&D landfill by initiatives such as recycling nonradioactive scrap metal, scrap furniture, and used storage

drums. Universal waste includes batteries, mercury-containing equipment, and light bulbs. It must be recycled when generated by businesses, otherwise the waste must be sent to a Resource Conservation and Recovery Act-permitted facility. Table 2-2 breaks down the recycled waste amounts for FY 2020.

Table 2-2 SRNS Recycling and Sustainability in 2020 by Amount

Items Recycled Onsite in FY 2020	Amount Recycled
Silver Fixative	70 gallons
Rechargeable Batteries	6,399 pounds
Lead Salvage	8,140 pounds
Fluorescent Tubes	10,860 pounds
Batteries (lead acid)	89,632 pounds
Furniture and Cabinets	164,620 pounds
Mixed Metal	2,073,020 pounds
Mixed Paper	612,885 pounds
Used Tires	23,980 pounds
Used Motor Oil	20,000 gallons
Consumer Electronics (including cell phones)	112,950 pounds
Toner Cartridges	17,910 pounds
Industrial Sludge (land applied)	168 cubic yards
Universal Waste Mercury Containing Devices	18.5 pounds

2.3.7 Fleet Management

Executive Order 13834, *Efficient Federal Operations*, instructs agencies to meet statutory requirements related to energy and environmental performance of vehicles in a manner that increases efficiency, optimizes performance, and reduces waste and costs.

The primary goal for DOE fleet management is to use less petroleum and more alternative fuel, as Figure 2-2 demonstrates. SRS has met and exceeded these goals since FY 2000. Figure 2-3 shows SRS FY 2020 performance in meeting key fleet-management goals.

SRS installed two E-85 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 gasoline and no E-85 alternative fuel. As Figure 2-2 shows, over time SRS has continued to reverse this trend and consume more E-85 while decreasing unleaded gasoline and diesel use. Overall gallons consumed (for all three fuel types) is less than that of the FY 1999 unleaded gasoline consumption.

SRS continues to implement the Site Vehicle Allocation Methodology Plan completed in 2016. This plan helps organizations eliminate fleet vehicles that are unnecessary, oversized, or not fuel-efficient. SRS updates its plan at least every five years. Each year, SRS emphasizes leasing alternative fuel vehicles in

the light-duty fleet. In FY 2020, more than 90% of the light-duty fleet ordered used 85% ethanol (E-85). At the end of FY 2020, SRS managed an inventory of 915 vehicles for DOE, SRNS, and SRR; 835 (87% of the fleet) are either E-85, hybrid, or electric. In FY 2020, SRS ordered 135 vehicles with 120 of these being E-85; however, due to COVID-19 pandemic and impacts to global logistics, more than 80% of the vehicles had not been delivered at the end of FY 2020.

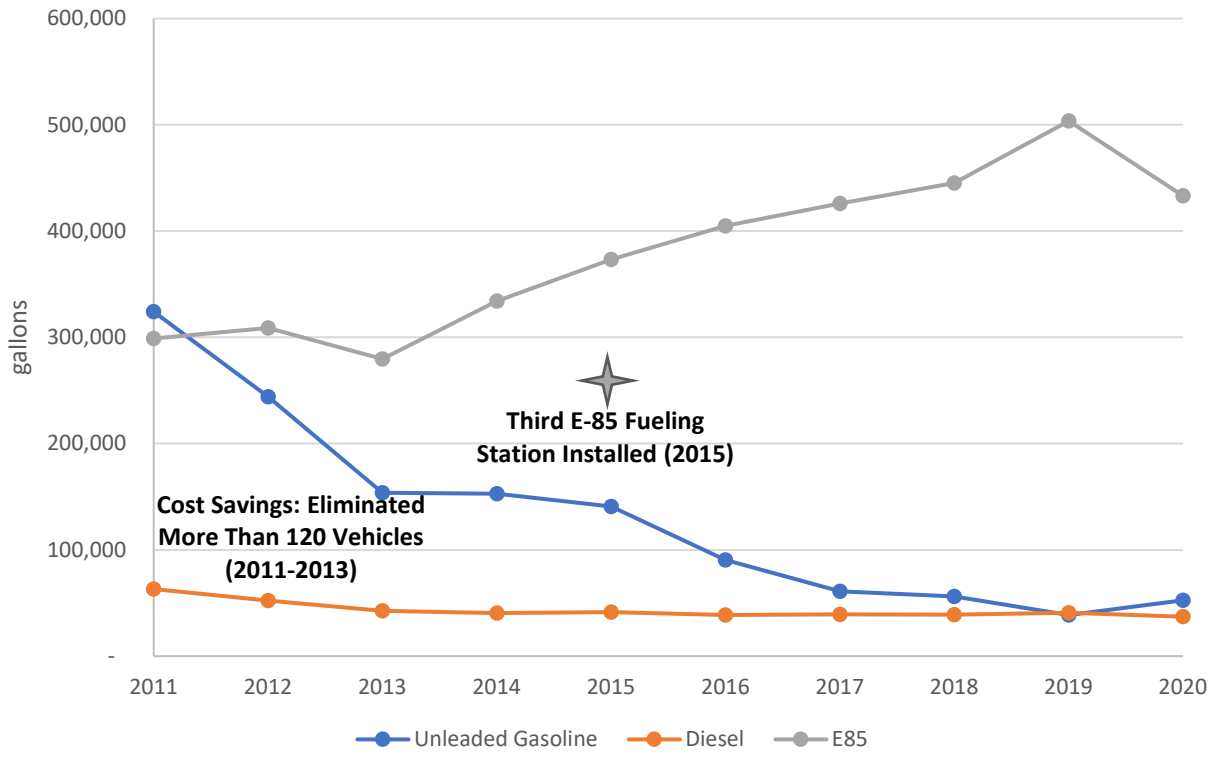

Figure 2-2 GSA Fuel Consumption by Type, FY 2011 to FY 2020

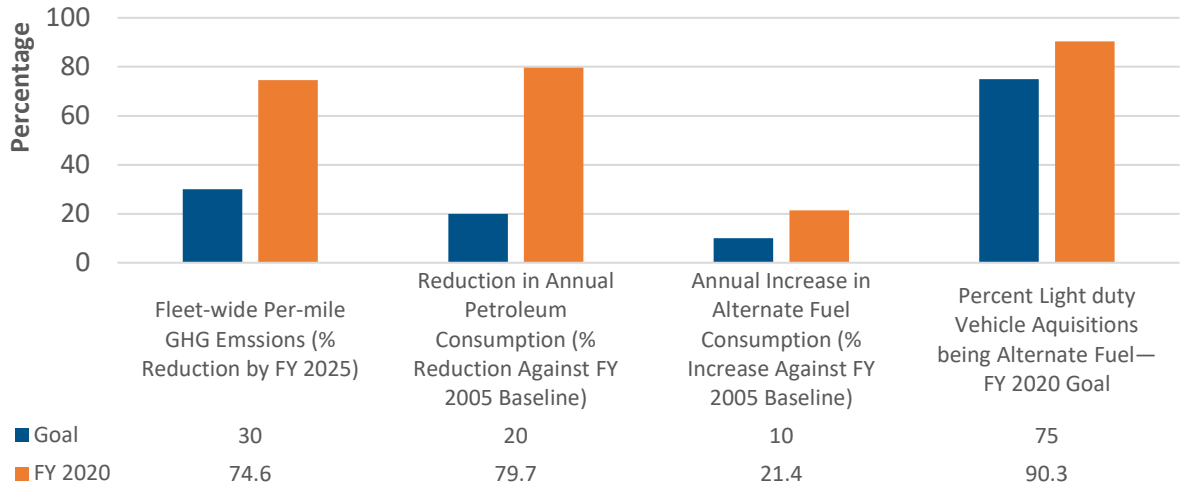

Figure 2-3 SRS Performance in Meeting Fleet Management and Transportation Goals

2.3.8 Acquisition and Procurement

Executive Order 13834, *Efficient Federal Operations*, requires agencies to acquire, use, and dispose of products and services (including electronics) according to statutory mandates for purchasing preference, federal acquisition regulation requirements, and other applicable federal procurement policies. The DOE goal is to track and make improvements with targets to be determined. These statutory mandates require purchases to include:

- Products that meet minimum requirements for recycled content as the EPA identifies
- Products that the United States Department of Agriculture (USDA) designates as biobased or BioPreferred®
- Products that the U.S. EPA'S ENERGY STAR® program or the Federal Energy Management Program designate as having the potential to generate significant energy savings

Agencies must also maximize substituting alternatives to ozone-depleting substances identified under the EPA's Significant New Alternatives Policy (SNAP).

SRS procurement personnel review purchase-order line descriptions of eligible contract actions to determine whether the product meets the USDA's definition of BioPreferred®.

Procurement has established sustainable practices related to purchasing environmentally preferable products (EPP) to meet sustainable acquisition requirements. The EPP purchases have led to practices, as outlined below:

- The SRS Chemical Management Center reviews and approves chemical acquisitions. This review monitors hazardous chemicals use and, where appropriate, recommends EPPs.

- SRS has procured EPP substitutions under various new and existing contracts, including bulk janitorial supplies (cleaners, paper products) and safety items (earplugs, filters).

2.3.9 Electronics Stewardship

Executive Order 13834, *Efficient Federal Operations*, instructs agencies to manage electronics to reduce energy and environmental impacts.

SRS implements many strategies to reduce energy use, waste, and costs associated with electronics by:

- Purchasing computers rather than leasing
- Procuring desktops, laptops, and monitors that meet Electronic Product Environmental Assessment Tool (EPEAT) standards and copiers that are ENERGY STAR-compliant
- Setting up all eligible computers and imaging equipment to automatically print on both sides of paper (duplex printing)
- Programming all eligible desktops, laptops, and monitors to default to power-save mode when in standby

The Site either recycles or reuses electronics in an environmentally sound manner by donating to schools and nonprofit organizations or by recycling through authorized vendors. SRS recently extended the "workstation refresh cycle" from three to five years. This is the timeframe for replacing a computer. A longer timeframe reduces the number of computers being retired and the amount of generated scrap electronics.

2.3.10 Data Center Efficiency

Data centers are energy-intensive operations that contribute to agency energy and water use and costs. Executive Order 13834, *Efficient Federal Operations*, encourages implementing practices that promote managing servers and federal data centers energy-efficiently.

One measure of energy efficiency for data centers is power-usage effectiveness (PUE), which is the ratio of total energy used by a computer data center facility to the energy delivered to the computing equipment. While no specific target PUEs have been set, agencies are collecting data. Of the nine data centers at SRS, two have established PUEs. Other data centers do not have electrical meters, so determining PUE is not yet possible.

2.3.11 Resiliency

Executive Order 13834 directs agencies to prioritize actions that enhance the resilience of federal infrastructure and operations. Resilience is the ability of an agency to adapt to changing conditions and withstand or recover from disruptions. 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 and has developed studies that describe its specific threat to Site operations. The SRS Emergency Response Organization also has regularly scheduled facility and sitewide drills and exercises involving accidents,

spills, and natural disaster scenarios to better respond and recover from such disruptions should they occur.

2.3.12 Greenhouse Gas Management

Executive Order 13834, *Efficient Federal Operations*, directs agencies to track and report on a variety of performance measures, including greenhouse gas (GHG) emissions. The DOE goal is to continue to track and reduce GHG.

SRS reduces GHG as reported in previous years' *SRS Environmental Reports*. Scope 1 GHG emissions consist of direct emissions from sources that DOE owns or controls, such as onsite combustion of fossil fuels and fleet fuel consumption. Scope 2 GHG emissions consist of indirect emissions from sources that DOE owns or controls, such as emissions from generating electricity, heat, or steam DOE purchases from a utility provider. Scope 3 GHG emissions are from sources DOE does not own or directly control but are related to DOE activities, such as employee travel and commuting.

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

- Purchased electricity
- Wood (biomass)
- Fuel oil
- Propane
- Gasoline
- Diesel
- E-85 (ethanol)
- Jet fuel
- Fugitive emissions

Biomass Cogeneration Facility

SRS continues to substantially reduce Scope 1 and 2 GHGs due to Biomass Cogeneration Facility and three additional biomass facilities, one each in A Area, L Area, and K Area. DOE tracks GHG data from various impact sources (such as Site energy use, alternative workplace arrangements and space optimization, as well as vehicle and equipment use). SRS continues to reduce Scope 3 GHG emissions by such efforts as using webinars and conference calls to reduce business travel and by promoting employee carpooling. Increased employee teleworking due to the COVID-19 pandemic also contributed to reducing Scope 3 GHG emissions.

2.4 EMS BEST PRACTICES

2.4.1 2020 Department of Energy Project Management Excellence Award

DOE awarded SRS the 2020 Project Management Excellence Award in July for remediating two coal ash basins and a coal pile basin (90-acre area consolidating more than 400,000 cubic yards of coal ash). SRS completed the project, which started in 2014, in 2019, a year ahead of schedule and $8 million under budget.

2.4.2 Sustainability Campaign

SRS continues 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 the Site's footprint on the environment. Employees practice simple acts, such as turning off lights when leaving a room or workspace, which promote environmental stewardship. SRS EMS and Sustainability personnel also participated in Aiken Technical College's (ATC) Second Annual Sustainability Expo to share with ATC staff and students the sustainability programs SRS is implementing, such as biomass and sustainable remediation.

SRS Employees Participate in Aiken Technical College's Second Annual Sustainability Expo.

2.4.3 Earth Day

As in recent years, SRS made plans to host an onsite Earth Day celebration in April to include exhibits from both onsite and offsite organizations. SRS chose the theme "SRS Earth Day: 70 Years of Environmental Stewardship," tying in the 70th anniversary of the Site to the SRS commitment to protect public health and environment. Due to the COVID-19 pandemic, SRS was unable to hold event, but contributed to DOE Headquarters' 50th anniversary of Earth Day, which included videos pertaining to environmental work and best practices from sites around the DOE complex. The SRS video featured interviews with four SRS DOE and contractor employees, who shared the foundation of the environmental culture and commitment at SRS.

2.4.4 Reuse or Recycling of Equipment and Materials

SRS is partnering with Savannah River Site Community Reuse Organization (SRSCRO) to turn excess equipment and material into money to benefit the Aiken, Allendale, and Barnwell counties in South Carolina and Richmond and Columbia counties in Georgia. Surplus material includes the following:

- Small items such as office equipment, valves, and glassware for laboratory experiments
- Large items of potentially much greater value such as electrical turbines, diesel-powered pumps, and fire engines

- Hundreds of thousands of tons of metal

SRSCRO is the interface organization that takes in items that the Site no longer needs through the Asset Transition Program and Asset Removal Projects. The SRSCRO sells these items and uses the proceeds for the economic good of numerous businesses throughout the large region surrounding SRS. In FY 2020, SRS dispositioned to SRSCRO more than $7.6 million in usable assets for reuse and recovery. Based on SRSCRO's 2020 annual report, the program and projects this partnership assisted generated approximately $278,243 during the SRSCRO's fiscal year (July 1, 2019—June 30, 2020).

2.4.5 Sustainable Environmental Compliance and Environmental Remediation

SRS continues to excel in sustainable remediation. Of the 40 remediation systems currently operating, 21 are completely passive, requiring no energy to implement, and 14 are low-energy systems. These low-energy systems use sustainable technologies (such as solar-powered MicroBlowers and barometric pressure-driven BaroBalls™) to pump volatile organic contaminants from the subsurface, thus reducing contamination. SRS is also using the HydraSleeve sampling methodology for more than 240 wells, which significantly reduces the volume of purge water managed as waste.

In 2020, SRS continued monitoring to ensure the effectiveness of the lower-energy, innovative methods to address groundwater cleanup implemented in 2019. These included:

- Injecting a vegetable-oil microbe mixture into the subsurface to intercept a groundwater plume and break down trichlorethylene (TCE)
- Injecting recycled iron into a series of wells to form a permeable reactive barrier that intercepts the groundwater plume and breaks down TCE

A Special Vacuum-equipped Truck was Used to Remove Water, Exposing a Layer of Sludge Containing Silver to be Recovered.

In both examples, using the permeable reactive barrier concept utilizes the natural flow of the groundwater plume so the systems are low energy and do not require pumps or equipment to move groundwater. SRS anticipates the vegetable oil to be effective for three to five years before it needs to reinject again into the subsurface, and the iron by design is effective for decades with little maintenance.

In 2020, SRS closed an industrial wastewater tank that historically received waste from photographic film developing and managed the waste in a more sustainable and cost-effective manner. The process used before digital photography involved silver. As a result, sludge in the tank accumulated silver in concentrations high enough that it needed to be disposed as hazardous waste. However, SRS was able to avoid this by reclaiming the silver as allowed by regulation. The sludge was shipped to the DOE Business Center for Precious Metals Sales and Recovery where the silver was reclaimed. The process

reclaimed 38.461 Troy ounces of silver and 0.49 Troy ounces of palladium, with the proceeds going to the U.S. Treasury.

SRS deploys innovative methods to address compliance efforts. Initiated in 2018, SRS continues to implement a commercially available Comprehensive Environmental Permits Linking Tool (CEPLT) to ensure SRS meets regulatory and DOE commitments. Features of the CEPLT include tracking permit requirements and conditions and associated regulatory commitments, notification of upcoming regulatory documents and reports due, and display of permit requirements and tasks on a map at the associated compliance point (for example, outfall, landfill). Initially implemented by SRNS, DOE and SRR began using the CEPLT in 2020.

SRS continues to use remotely operated devices (drones and wireless stormwater sampling equipment) discussed in the 2018 *SRS Environmental Report*. Not only do these devices address environmental compliance, improve worker safety, and increase productivity, but they also decrease vehicle and fuel use, thereby supporting fleet management goals.

2.4.6 Challenges and Barriers to Implementation

In 2020, SRS continued to conserve and manage resources to meet the sustainability goals in the Site Sustainability Plan. However, infrastructure continually presents challenges to initiating sustainable projects. Achieving new goals is becoming significantly difficult with the high cost of implementing sustainability upgrades at SRS's many aging facilities (administrative, shops, laboratories, warehouses). SRS reduces potable water use by continuing to install water-efficient toilet systems when repairs indicate the need. However, site-wide retrofitting with low-flow flush valves and faucets is not cost-effective. Likewise, SRS reduces energy intensity when possible in maintenance and repair situations through such actions as replacing fluorescent lighting with more efficient LED lighting, replacing HVAC systems with higher Seasonal Energy Efficiency Ratio (SEER) units, and rightsizing pumps. Retrofitting entire buildings or systems is not typically cost-effective. Sustainability efforts related to energy management will require additional guidance as SRS conducts EISA audits for Site infrastructure and performs feasibility studies on possible energy projects with limited resources and competing priorities. While the interim energy intensity goal was met in FY 2020, this is likely largely due to the impacts of the COVID-19 pandemic and teleworking. Following the return of the workforce onsite after COVID-19, it is expected that meeting reduction of energy intensity goals will continue to be a challenge as they were before the COVID-19 pandemic.

While successfully implementing the latest version (2015) of the ISO 14001 standard in 2018, SRS identified program challenges with the 2015 standard. These include engaging Site leadership in the EMS program to communicate the importance of the system to all personnel. This work continued in 2020 as SRS integrated and promoted awareness of EMS principles in daily work practices.

The Site will continue to study, track, and discuss the sustainability requirements of Executive Order 13834, *Efficient Federal Operations,* to ensure implementation. For example, as discussed previously, while SRS is inserting sustainable acquisition clauses in all applicable solicitations, there is work to be done tracking sustainable acquisition purchases (BioBased, SNAP, and others). SRS continues to determine and implement ways to increase end-user awareness of sustainable acquisitions.

The EMS program will require ongoing multidisciplinary (environmental compliance, procurement, sustainability) involvement to facilitate further awareness at the working level and to increase the value of the management system in Site business practices.