

**Revised Finding of No Significant Impact  
for  
Biomass Cogeneration and Heating Facilities  
at the  
Savannah River Site**

**Agency:** U.S. Department of Energy

**Action:** Revised Finding of No Significant Impact

**Summary:** The Department of Energy (DOE) prepared an environmental assessment (EA) (DOE-EA-1605, Biomass Cogeneration and Heating Facilities) in August 2008 to evaluate the potential environmental impacts of the proposed construction and operation of new biomass cogeneration and heating facilities located at the Savannah River Site (SRS). Based on the analyses in the EA, DOE determined that the proposed action was not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969 and issued a finding of no significant impact (FONSI) on August 6, 2008.

In the Biomass Cogeneration and Heating Facilities EA and FONSI, DOE presented the proposed action to construct and operate biomass cogeneration and heating facilities at SRS that will consist of two Energy Conservation Measures (ECMs): a new biomass cogeneration facility to replace the existing coal-fired D-Area powerhouse and two new biomass heating plants, one in K-Area and one in L-Area, to replace the existing oil-fired steam plant in K-Area.

Execution of most of the activities proposed began after issuance of the FONSI in August 2008. The biomass cogeneration and heating facilities have been in operation since January 2012, and the fluid bed boilers are currently operating at full capacity, with the average thermal efficiency of 70 percent (which is in alignment with the original task order). The entire volume of steam produced by the existing fluidized bed boilers is currently necessary to meet the Site's steam demands. There is no additional capacity of the current system available for thermal redundancy.

To provide additional security of the thermal (steam) energy and to provide DOE with additional power security, DOE proposes to design and construct a new heating plant to be located adjacent to the existing primary Biomass Cogeneration Facility. The ECM II will include measurement and verification guarantee for the power output of the plant in addition to the steam guarantee of the original ECM I. The new heating plant will include a new biomass boiler and relocation of the existing package boiler to an enclosed building. Construction and operation of the new heating plant and ancillary support structures will occur on approximately one-half acre in the southeast corner of the original 35-acre site.

Based on analysis of the proposed Steam Security Upgrade and Power Optimization for ECM-1, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Implementation of the proposed expansion of the biomass cogeneration facility modification will not add measurably to the cumulative environmental effect of other ongoing actions and operations within SRS and the surrounding area and is less than or equal to those of biomass cogeneration and heating facilities as evaluated in DOE EA-1605. Therefore, the preparation of an environmental impact statement (EIS) is not required, and DOE is issuing a revised FONSI.

**Public Availability:** Copies of the existing EA and FONSI or further information on the DOE NEPA process are available from:

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**Background:** In DOE/EA-1605, DOE assessed the impacts of construction and operation of biomass cogeneration and heating facilities. The original scope addressed in the EA (i.e., DOE/EA-1605) dealt with the fact that a large portion of SRS (F, H, and S-Areas) was supplied with its energy and steam from a coal-fired powerhouse in D-Area, while an oil-fired steam plant in K-Area supplied steam energy to both K and L-Areas. The coal-fired D-Area powerhouse was constructed in the 1950s and the K-Area oil-fired steam plant was installed in 1992. Both were in need of significant modifications to reliably supply energy for DOE's continuing missions and to meet current environmental regulations and air emission restrictions. In addition they represent significant overcapacity relative to current and projected needs. The project described in the EA replaced the two existing facilities with three biomass energy plants. Specifically, DOE's action was the construction and operation of the following facilities: a biomass cogeneration facility to replace the D-Area powerhouse; and two new biomass heating plants at K and L-Areas to replace the K-Area steam plant. The biomass cogeneration facility and heating plants supply energy to the F, H, K, L, and S-Areas of SRS. This project helps SRS meet its energy requirements for an initial term of 18 years, with the potential for many years of continued operation after the initial term.

The project was under the authority and terms of the DOE Biomass and Alternate Methane Fuel Energy Savings Performance Contract number DE-AC26-02-NT41457 and has created significant energy and energy cost (dollar) savings to SRS. The savings resulted from fuel switching, reductions in line losses by placing the steam plants several miles closer to end user facilities, and improved operations with new equipment sized to better match load requirements. In addition to providing for much of SRS's steam needs with a renewable energy source, the project created benefits to the surrounding area. The three plants utilize biomass obtained from the region and use the best available control technology for the reduction of air emissions.

In DOE/EA-1605 and the subsequent FONSI (August 2008), DOE concluded that construction and operation of the new biomass cogeneration facilities and heating plants was not a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA.

**Purpose and Need for Agency Action:** Based on its past operating history, it has been determined that the biomass cogeneration and heating facilities are at risk for unintended shutdown since the primary boilers could be a single point of failure and the package oil-fired boiler cannot provide a full redundant source for steam. To provide additional security of the thermal (steam) energy and to provide additional power security, DOE decided to have a new biomass boiler installed.

**Proposed Actions:** DOE proposes to design and construct a new Heating Plant to be located to the east of the existing primary Biomass Cogeneration Facility. Modifications and upgrades to the existing facilities will improve the long-term steam security for the Site as well as increase the annual green power fed to the grid generated from the existing steam turbine. There are two major components of this proposed modification: (1) relocation and automation of the existing package boiler into a new permanent enclosed building; adding a protective shell cover over the existing biomass cogeneration facility and (2) turnkey installation of a new, independent biomass boiler system into the new heating plant facility; completing the remaining utility interconnections and independent water treatment system; reconfiguration of the existing 3 megawatts diesel generator to provide back-up electrical service; and the addition of a general biomass fuel yard.

The proposed action includes the design and construction of a new heating plant to be located adjacent to the existing primary biomass cogeneration facility in the southeast corner of the original 35-acre site. The new heating plant will have a capacity of 125,000 pounds per hour of steam. This capacity includes the existing package boiler of 70,000, and the new biomass heating system will have a design capacity of 55,000 pounds per hour of steam. The scope will also include additional fuel oil storage, biomass fuel yard, water treatment plant, balance of plant auxiliaries, and utility interconnections. The plant's design will be integrated to work with the existing biomass cogeneration facility to provide more green power. However, the plant will be able to operate independent of the existing biomass plant and provide another level of steam reliability. The new biomass boiler, water treatment, deaerator, and boiler feed pumps will be sheltered in a building as protection from outside elements. The new heating plant will have its own steam tie-in to the 24-inch main header.

Approximately 8-10 additional fuel trucks will enter the Site daily (at staggered times) for deliveries to the Burma Road facility new fuel yard. The trucks will use the existing truck scales for weigh-in and for weigh-out for tracking deliveries. After weigh-in, drivers will merge left onto a new lane and back-up onto a new truck tipper. Once the load has been tipped, the drivers will weigh-out and exit via Old Burma Road and use the existing signal light at C Road to leave the biomass cogeneration facility.

The existing two boilers at the biomass cogeneration facility produce steam for export to SRS facilities and for generation of electricity for the SRS grid. The proposed action increases the two existing boilers' steam production for electricity generation (with backup steam export capabilities) and installs a third boiler to produce steam for export.

Steam export removes water from the biomass cogeneration facility that must be replaced with water from the Savannah River. The discharge associated with steam production for export is small relative to the withdrawal amount because most of the water is converted to steam and exported to SRS facilities.

Water used to produce steam for electricity generation is recycled in the production process. Steam condensate is routed back through the system and combined with treated river water to produce more steam. The discharge associated with steam production for electricity generation is smaller relative to withdrawal because the river water is used multiple times.

The average river water withdrawal for the biomass cogeneration facility over CYs 2013 and 2014 was 524 gallons per minute, while the average National Pollutant Discharge Elimination System outfall discharge was 281 gallons per minute. Steam for export required a withdrawal of 165 gallons per minute and generated an outfall discharge of 40 gallons per minute. Steam for electricity generation required a withdrawal of 360 pounds per hour and generated an outfall discharge of 235 gallons per minute. The remainder of the outfall flow is from rainwater and housekeeping.

Increasing the utilization of the existing two boilers' steam production for electricity generation will require a river water withdrawal of 460 gallons per minute and generate an outfall discharge of 290 gallons per minute. The proposed new boiler that will partially replace 375 pounds per square inch steam production for export will not require a significant change in river water withdrawal because the export steam is not expected to change.

**No Action Alternatives:** Under the No Action Alternative, DOE will continue to operate the existing biomass cogeneration and heating facilities with risk of complications from the current single point of failure.

**Alternatives Considered But Not Evaluated:** For this project, two other options were considered: (1) winterize plant and move existing package boiler into a new building, and (2) install new heating boilers at other locations.

**Environmental Impacts:** The new biomass cogeneration and heating facilities will be located within the footprint of the existing biomass cogeneration and heating facilities. The soil is highly disturbed and not characteristic of an intact series. Based on the previous use of the proposed site, the potential for the construction and operation of the proposed action to impact environmental resources at SRS will be negligible. DOE expects no adverse water quality impacts from the construction and operation of the proposed actions.

DOE expects that air emissions resulting from construction-related activities (e.g., equipment emissions, fugitive dust) at the proposed site will be short-lived and minimal. DOE expects the overall emission levels will decrease, but the emissions of some criteria pollutants will increase. SRS currently operates via a Title V-Part 70 Operating Permit. The South Carolina Department of Health and Environmental Control: Bureau of Air Quality has issued a Synthetic Minor Construction Permit for this work (permit number 0080-0144-CC), and a new operating permit will be obtained to include the new emissions from the new cogeneration facility. Actions that will aid in decreasing the overall impacts of air emissions include limiting when the facility will be operating, and utilizing abatement technologies to help decrease emission levels at the source. The proposed facility's abatement measures include a fabric filter baghouse to reduce particulate matter (PM) and selective non-catalytic reduction (SNCR) to reduce nitrogen oxide formation. Baghouse filters work to curb PM emissions by trapping particulate matter in a fabric bag, similar to the way a vacuum cleaner operates. The filters are cleaned by blowing air through in the reverse direction and collecting the PM. This process effectively removes up to 99.9+ percent of particulate matter. The SNCR method effectively reduces NO<sub>x</sub> emissions via a process of urea injection. Urea will be injected into the steam boiler at temperatures high enough to result in a chemical reaction between water and urea that forms ammonia which in turn reacts with NO<sub>x</sub> and oxygen to form nitrogen and water. In addition, limestone will be injected into the flue gas and, via sorption reactions, reduce NO<sub>x</sub> and sulfur compounds. Air emission modeling determined the addition of the new boiler will not impact SRS compliance with the Standard 2 and Standard 8 for the Title V renewal application.

The potential for the proposed action to significantly impact the human environment (e.g., air, aquatic, terrestrial, and biotic resources) will be negligible. The potential for the existing and alternative actions evaluated in the EA to significantly impact archaeological or cultural resources at SRS will be negligible. None of the existing actions evaluated in the EA have had a measurable impact on migratory avian species. DOE expects overall impacts to both vegetation and wildlife to be short-term and minor for the proposed actions. There will be no effect on the population status of any threatened and endangered species within the proposed project areas or on a site-wide level.

The potential for the existing actions evaluated in the EA to result in terrorism-related activity or impacts at SRS have been negligible. The potential for the existing actions evaluated in the EA to result in accidents from operation activities at SRS have been negligible. Impacts to worker health and safety will be negligible due to the use of appropriate safety practices, personal protective clothing and equipment, and the provision of a safe and healthful workplace as required by Federal regulations. Workforce requirements and project costs of implementation of the proposed projects will be minimal when compared to the total SRS budget and employment (approximately \$1.3 billion per year and 11,000 personnel, respectively). The socioeconomic impact(s) of the proposed projects on the human environment will be negligible. Based on the information and analysis presented in the EA, DOE has determined that the proposed construction and operation of the new biomass cogeneration

and heating facilities at SRS did not cause disproportionately high and adverse human health or environmental effects on minority and low income populations in the SRS region of interest. Infrastructure impacts from the proposed actions will be negligible as the new heating facility and associated ancillary structures will be smaller than the existing biomass cogeneration and heating facilities and, therefore, require less infrastructure resources.

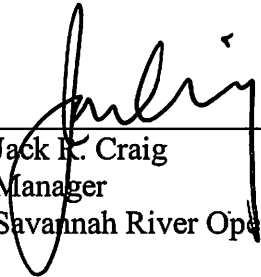
**Cumulative Impacts:** Construction-related activities of implementation of the proposed projects will be short-lived and the potential for any resulting air emissions to interact with other SRS pollutant sources or have a cumulative impact on criteria air pollutants will be negligible. SRS could be in an area declared nonattainment for PM<sub>10</sub>, PM<sub>2.5</sub>, and ozone at some future date. When an area is designated nonattainment for any of the criteria pollutants, the affected State must draft a plan known as a State Implementation Plan (SIP) to improve air quality and outline the control measures the State will take in order to meet National Air Quality Standards (NAAQS). These air pollution control measures include a process called Nonattainment New Source Review (NA NSR) permitting. NA NSR applies to new major sources or major modifications at existing sources for pollutants where the source location is not in attainment with NAAQS. All NA NSR permits require that the proposed air pollution source install the Lowest Achievable Emission Rate (LAER), pollution controls, emission offsets, and provide an opportunity for public involvement. LAER is the most stringent emission limitation derived from either of the following: the most stringent emission limitation contained in the SIP for a similar source or the most stringent emission limitation achieved in practice by a similar source. Also, sources must obtain emissions reductions from existing sources located in the vicinity of the source NA NSR source. The emission reductions, generally called “offsets,” must offset the emissions increase from the new source or major source modification to ensure reasonable progress toward meeting the NAAQS. The emission reductions must also provide a net air quality benefit. DOE concluded that the cumulative impacts of the actions evaluated in the EA on the human environment have been minimal.

**Floodplain Statement of Findings:** A Floodplain Statement of Findings was prepared in accordance with Title 10 Code of Federal Regulations Part 1022. A floodplain and wetlands assessment was incorporated in the EA. With the implementation of all best management practices, to both minimize runoff from the construction site and minimize direct encroachment on the wetlands and their associated floodplains, DOE expects the overall impacts to wetlands and floodplains of Upper Three Runs from the proposed project will be minimal and short-term. No long-term impacts are foreseen.

**Determination:** Based on analysis of the proposed Steam Security Upgrade and Power Optimization for ECM-1, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Implementation of the proposed expansion of the biomass cogeneration facility modification will not add measurably to the cumulative environmental effect of other ongoing actions and operations within SRS and the surrounding area and the impacts are less than or equal to those of biomass cogeneration

and heating facilities as evaluated in DOE EA-1605. With an EIS not required, DOE is issuing this revised FONSI.

Signed in Aiken, South Carolina, this 3rd day of June 2015.



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