

**FINDING OF NO SIGNIFICANT IMPACT
FOR THE
THE NATIONAL CARBON CAPTURE CENTER
AT SOUTHERN COMPANY SERVICES'
POWER SYSTEMS DEVELOPMENT FACILITY
NEAR WILSONVILLE, ALABAMA**

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) has completed this second amended environmental assessment (EA) to analyze potential environmental impacts associated with future financial assistance, for a period of 5 years, of both ongoing and future research and development (R&D) project work operations at the National Carbon Capture Center (NCCC) project located at the existing Power Systems Development Facility (PSDF) near Wilsonville, Alabama. The PSDF is owned and operated by Southern Company Services, Inc., a subsidiary of Southern Company, an electric generation and transmission holding company. The NCCC is designed to test and evaluate carbon dioxide (CO₂) control technologies for power generation facilities, including CO₂ capture solvents, mass-transfer devices, lower cost water-gas shift reactors, and scaled-up membrane technologies.

Additionally, the NCCC evaluates methods to integrate CO₂ capture technologies with other coal-based power plant systems by testing both pre-combustion and post-combustion technologies. The NCCC provides the capability to test these systems under a wide range of fuels, including bituminous

and sub-bituminous coals, lignite, and biomass/coal mixtures. The goal of the NCCC project is to accelerate the development, optimization, and commercialization of viable CO₂ control technologies.

No major modifications to existing operational permits for the PSDF are anticipated to be required as a result of the implementation of this proposed action; however, some minor modifications may be needed. No previously undisturbed ground would be developed and no significant adverse impacts are anticipated to result from implementation of the action. The project would primarily involve the installation of new components on existing facilities in order to develop carbon capture technologies, and for the continued operation of the PSDF facility for an additional period of 5 years.

Based on the analysis in the EA, DOE finds that implementing the proposed action is not a major federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. Accordingly, the preparation of an Environmental Impact Statement (EIS) for this proposed action is not warranted and this FONSI will be issued.

BACKGROUND: The initial EA for the development, construction, and operation of the PSDF was issued with a FONSI in 1993. The first amended EA pertaining specifically to the development, construction, and operation of the Carbon Research Center, now known as the National Carbon Capture Center, was issued with a FONSI in 2008.

The PSDF is located on 16.1 acres of land, located 1.5 miles northeast of the town of Wilsonville in Shelby County, Alabama. The PSDF property is located within a utility plant site, Alabama Power Company's E.C. Gaston Generating Plant (Plant Gaston).

The PSDF is a facility designed and built to evaluate advanced coal-based power technologies at a scale large, enough to provide meaningful data for scale-up and under conditions that adequately represent temperature, pressure, and contaminant conditions of a commercial embodiment. The PSDF is operated by Southern Company as a unique R&D test facility under partial financial assistance from DOE, and on behalf of several industrial partners such as American Electric Power, Arch Coal, Inc., Cloud Peak Energy, Duke Energy, Electric Power Research Institute, Luminant, and NRG Energy, Inc. The PSDF project was initiated September 14, 1990. Upon completion of construction and commissioning, the first coal-fired operations began in August 1996. The current funded Cooperative Agreement is currently set to expire on September 30, 2014. However, research and development efforts at the PSDF, in the form of the NCCC, have been awarded to Southern Company Services at the NCCC for another 5 year period.

No major modifications to existing operational permits (air and water) for the PSDF are anticipated to be required as a result of the implementation of the proposed action. No previously undisturbed ground would be developed. The project would primarily involve the continued operation of NCCC at the PSDF facility for a period of 5 years, while new components and carbon capture technologies are installed, tested, and further developed.

PURPOSE AND NEED: The need for the project is for DOE's NETL to continue to carry out research, development, and pilot programs to resolve the environmental, supply, and reliability constraints of producing and using fossil resources, and to develop efficient and effective CO₂ capture systems, which is one of the fundamental goals of NETL's Carbon Capture Technology Program (DOE, 2014; DOE, 2013).

NETL is a DOE national laboratory which devotes the majority of its financial assistance to R&D partnerships with industry, university, and other government entities. NETL is committed to addressing the challenges put forth by the National Energy Policy, which include enhancing America's energy security; advancing clean fossil energy technologies and use; increasing the competitiveness and reliability of U.S. energy systems; and ensuring a robust U.S. energy future (DOE, 2014).

DESCRIPTION OF THE PROPOSED ACTION: DOE's proposed action is to provide approximately \$150 million in financial assistance, through a 60-month cooperative agreement with Southern Company Services, Inc., to continue operations of the NCCC at the PSDF near Wilsonville, Alabama, which serves the purpose of accelerating the development, optimization, and commercialization of viable CO₂ control technologies for coal-based power generation facilities. The Proposed Action will support continued R&D activities at the PSDF for a period of 5 years. If approved, DOE's financial and technical R&D project assistance would aid in testing components and advanced power systems, including carbon (in the form of CO₂) capture technology, under realistic conditions using coal-derived gas streams. A small component of the

NCCC project, the Post-Combustion Carbon Capture Center (PC4), is located adjacent to the E.C. Gaston Electric Generating Plant.

The demand for electric power in the U.S. and around the world shows continued, steady growth. According to DOE's Energy Information Administration (EIA) Annual Energy Outlook, coal remains the largest source of electricity generation, but its share of total electricity generation, which was 51 percent in 2003, is expected to decline from 42 percent in 2011 down to 35 percent in 2040 (EIA, 2013). Both the U.S. and world economies are linked to an abundant, reliable and cost-effective supply of electricity. While efforts are being expanded to manage the pace of electricity demand growth by energy efficiency and conservation programs, it is clear that new sources of electricity generation will be needed. While nuclear, natural gas and renewable sources of generation will be utilized going forward, the size of the U.S. demand for low-cost electricity will mandate continued and expanded use of domestic coal-based power generation.

Public concerns about the use of coal's environmental impact, including the amount of carbon dioxide, CO₂, emitted per unit of power generation warrants continued research to further carbon capture technologies. Many link CO₂ emissions to concerns over global climate change. Because of the growing concentration of greenhouse gases in the atmosphere, there is a growing sense of urgency to legislate restrictions on the emissions of CO₂. Cost-effective technologies that will enable continued coal usage with reduced emissions of CO₂ are not commercially viable or available without further research. To keep coal as part of the U.S. generation mix, significant advancements in CO₂ capture technologies from coal-based power generation are needed. The Proposed Action aims to develop cost-effective CO₂ capture technologies that can be

economically integrated into coal-based power generation and to demonstrate reliable operations of the integrated system.

The objective of the proposed action is to operate and maintain existing test facilities to offer third party technology evaluation to reduce the cost of advanced power plants with CO₂ capture. The NCCC offers the capability of providing multiple and simultaneous slipstream testing of bench scale and pilot scale third-party advanced CO₂ capture and gasification technologies, both domestically and internationally, along with the ability to research diverse fuel sources at commercially relevant process conditions. Components will be tested using actual flue gas from existing coal-fired units for the post-combustion testing and actual syngas for the gasification and pre-combustion technology systems. Testing facilities are designed to promote and conduct the evaluation of advanced technologies to identify and resolve environmental, health and safety, operational, component, and system development issues in collaboration with the technology developer. Technology development will be supported at the NCCC through the design, procurement, construction, installation, operation, data analysis, and reporting required in meeting the objectives of the project managers and technology developers. A review of DOE sponsored projects, projects from industry, universities, and other collaborative institutions will provide a full spectrum of technologies to be tested under the expertise of NCCC staff. Subsequently reports generated will be provided to DOE with information required to further CO₂ capture technologies to meet the objective of 90 percent capture with 95 percent CO₂ purity at a cost of \$40/ton of CO₂ captured in advanced coal-fired power plants by 2020 and to commercialize by the 2025 timeframe.

ALTERNATIVES CONSIDERED: The Proposed Action, providing financial assistance for the continued operation of the NCCC at the PSDF, is consistent with DOE's goal to reduce CO₂ emissions from coal-fueled power plants. The NCCC is designed to test and evaluate CO₂ control technologies, including CO₂ capture solvents and sorbents, mass-transfer devices, lower cost water-gas shift reactors, and scaled-up membrane technologies. The NCCC would also evaluate means to integrate CO₂ capture technologies with other coal-based power plant systems by testing both pre-combustion and post-combustion technologies. The NCCC would provide the capability to test these systems under a wide range of fuels, including bituminous and sub-bituminous coals, lignites and biomass/coal mixtures. The goal of the NCCC project is to accelerate the development, optimization, and commercialization of CO₂ control technologies.

Under the No Action alternative, the DOE would not provide financial assistance to establish the NCCC. If DOE's financial assistance were eliminated to the NCCC, the possible outcomes could include reduction in scope of work of the NCCC, procuring other financial assistance sources, or discontinuing the project. The most likely scenario, and the only scenario considered reasonable for the purposes of the EA analysis, is that the NCCC project would be cancelled. There is no other facility available that could provide the flexibility and system integrated demonstration information at its size range that the NCCC would produce. Project cancellation would mean this facility is not available to provide accelerated development for lower cost and more efficient CO₂ capture solutions for coal-based power generation.

ENVIRONMENTAL CONSEQUENCES: Environmental consequences associated with both development and operations of the Proposed Action were considered in the EA. Air quality was

a major consideration in this project's EA review process. Based on the facility's potential to emit, the PSDF is a major emissions source which holds a current facility wide Title V permit. The Title V PSDF air permit would not be affected by the proposed project. However, a modification or add-on to the existing facility air permit may be necessary. While a need to seek minor modifications may become necessary, it is anticipated that no increase in emission limits to the existing permit would be sought. All air emissions from the development and operation activities of the NCCC are expected to be below the applicability threshold for all criteria pollutants, and would not be regionally significant.

The proposed project components would be constructed on previously disturbed areas of the PSDF and Plant Gaston sites. Negligible impacts to geology and soils, water resources, biological resources, waste and hazardous materials management, and cultural resources would occur. Development and operation of the proposed project would not be expected to impact any Federal- or state-listed threatened or endangered species. No changes in noise levels or land use would be expected as a result of the proposed project. Minor economic benefits would be derived indirectly during construction of the project.

PUBLIC AVAILABILITY: DOE encouraged public participation in the NEPA process. Comments were invited on the draft EA from June 6, 2014 to July 16, 2014 via publication of the Notice of Availability in two local newspapers; *The Birmingham News* and the *Shelby County Reporter*. Copies of the draft EA were also available within the Harrison Regional Library System at select locations chosen by the regional library director, and, at the NCCC facility. No

comments were received by members of the public during the comment period. Agency comment letters which were received during the EA review period are summarized below.

On June 16, 2014, the Alabama State Historical Commission stated that the project as proposed will have no effect on any known cultural resources listed on or eligible for the National Register of Historic Places, and that the State Historic Preservation Officer (SHPO) concurred with the proposed project activities. However, the SHPO also stipulated that should any artifacts or archaeological features be encountered during project activities, all project work shall cease and the State SHPO office will be contacted immediately.


On June 17, 2014 comments were received from EPA Region 4 concerning general facilities operations associated with hazardous waste management, air emissions permits, and local community involvement. These comments have been noted and addressed by Southern Company Services Environment Office in a letter of response to NETL dated July 24, 2014. This correspondence can be found in Appendix B – Agency Correspondence within the Final EA.

This FONSI and EA will be distributed to persons and agencies known to be interested in, or potentially affected by this Proposed Action. Additional copies of the EA and FONSI can be obtained from NETL at: <http://www.netl.doe.gov/library/environmental-assessments>, or can be obtained by sending a request to:

Mr. John Ganz
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road
P.O. Box 0880
Morgantown, WV 26507-0880
Email: John.Ganz@netl.doe.gov

DETERMINATION: Based upon the information and analysis provided in the EA, DOE has determined that the proposed action, to provide partial financial assistance of approximately \$150,000,000 through a 60-month cooperative agreement with Southern Company Services, Inc., for the continued development of the NCCC Project at the PSDF facility, does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an EIS is not required and DOE is issuing this Finding of No Significant Impact.

Issued in Pittsburgh, PA this 1 day of August, 2014



Scott M. Klara
Acting Director
National Energy Technology Laboratory