PMC-ND
(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: Southern Research **STATE:** NC

PROJECT TITLE: Demonstration of High-Temperature Calcium-Based Thermochemical Storage System for use with Concentrating Solar Power Facilities

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001186	DE-EE0007116	GFO-0007116-001	

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.
B5.17 Solar thermal systems	The installation, modification, operation, and removal of commercially available smallscale solar thermal systems (including, but not limited to, solar hot water systems) located on or contiguous to a building, and if located on land, generally comprising less than 10 acres within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Southern Research to demonstrate the development of a low-cost, high-temperature thermochemical energy storage system for use with Concentrating Solar Power (CSP) facilities.

The proposed activities would include systems engineering and design, lab testing, data analysis and computer modeling, systems integration, and long-term operation of field demonstration systems. Systems engineering and design, lab testing, data analysis, and computer modeling would be completed at the privately-owned offices and lab facilities of Southern Research Institute (SRNC) in Durham, NC and Precision Combustion, Inc. (PCI) in North Haven, CT. Engineering, installation, integration and long-term operation of field testing systems would be undertaken at Southeastern Solar Research Center's (SSRC) development and demonstration facility in Birmingham, AL and the privately-owned offices of the Electric Power Research Institute (EPRI) in Palo Alto, CA. Each of these facilities is designed for the type of research being completed; therefore, no modifications or new permits, additional licenses and/or authorizations would be necessary.

Pilot-scale demonstrations using field testing systems would be conducted at SSRC's existing facilities, which already include the majority of the required infrastructure such as concrete pads, high-voltage power connections, communications lines, metrological stations, and remote monitoring equipment. The proposed demonstration system to be installed and integrated would consist of an electric immersion heating system, heat exchanger reactor, CO2 compressor, CO2 storage vessel, pressure-controlled flow control valves, and a helium-based heat transfer fluid delivery and circulation system. Once installed and integrated, the system would be commissioned and then operated under a variety of short- and long-term test plans. The facility may be modified slightly to accommodate integration of

demonstration equipment associated with this project; however, no major construction or ground disturbing activities would occur, nor would the mission or operation of the facility be altered.

The proposed project would involve the use and handling of less than 100 kg of non-hazardous solid sorbents and less than 100kg of heat transfer fluids (CO2 and Helium) used in closed loops, and would present the possibility of exposure to high temperature and pressure gases and fluids. All handling of hazardous materials would occur in-lab, and safety protocols and procedures designed to mitigate potentially hazardous exposure risks including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments would be strictly adhered to. All hazardous materials and exposures would be managed in accordance with federal, state, and local environmental regulations. Existing corporate health and safety policies and procedures will be followed. Solid sorbents would be properly discarded as solid waste, CO2 and Helium would be cooled, depressurized, and vented to atmosphere, and reactor materials (primarily stainless steel) will be re-used or recycled. No siting, construction or major expansion of waste storage, disposal, recovery, or treatment actions/facilities would be required.

Based on review of the project information and the above analysis, DOE has determined the proposed project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that this project is consistent with actions outlined in DOE categorical exclusions A9 "Information gathering, analysis, and dissemination", B3.6 "Small-scale research and development, laboratory operations and pilot projects", and B5.17 "Solar thermal systems" and is therefore categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord, 08/12/2015

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 8/13/2015

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager