PMC-EF2a

(2.06.02)

U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION

RECIPIENT: Brayton Energy

STATE: MA

PROJECT TITLE: High-Efficiency Low-Cost Solar Receiver for use in a Supercritical CO2 Recompression Cycle

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000595	DE-EE0005799	GFO-0005799-001	GO5799

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.

Rational for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Brayton Energy LLC to perform laboratory research and development activities to develop a high efficiency solar receiver compatible with supercritical CO2 cycles (s-CO2) for utility scale concentrated solar power (CSP) applications.

The design and engineering would be performed at Brayton Energy facilities located at 75B Lafayette Rd., Hampton, New Hampshire 03842. The prototype efficiency testing would be performed at Sandia National Lab located at 1515 Eubank SE, Albuquerque, New Mexico 87123.

Researchers would design, fabricate and test a new solar receiver that utilizes s-CO2 as the heat transfer fluid. The receiver would be designed to withstand higher operating pressures and temperatures than current technology. The research team would perform analytical modeling to enable selection of the most efficient system configuration. This would include s-CO2 engine cycle, heliostat field and extended-surface tubes (EST). The EST would be designed based on the modeling, this would include scaled testing of materials and shapes to achieve the most efficient result. Component models would be used in a system thermal model that includes predicted solar flux input, heat transfer and flow distribution within the tubes, and solar radiation. Samples would be tested in a radiant flux test rig to validate thermals models and ensure a comprehensive design. The receiver design would be completed and delivered for fabrication at Brayton. The prototype would be shipped to Sandia National Lab to conduct efficiency tests. Prototype testing of the receiver would occur at Sandia National Lab in Albuquerque, New Mexico. For all work conducted at DOE laboratories, project activities may be subject to additional NEPA review by the cognizant NEPA Compliance Officer at the lab.

Brayton completed an R&D questionnaire addressing the protocols for laboratory safety, risk management, chemical handling and waste disposal. Brayton complies with standard laboratory safety procedures and has appropriate safety equipment available in all Brayton laboratories. Brayton has all applicable permits in place to conduct research on site. No additional permits are needed for project activities. The laboratory general safety procedures would be followed and have assigned safety managers.

Based on review of the project information and the above analysis, DOE has determined the research and prototype development would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with the actions contained in DOE categorical exclusion A9 "information gathering, analysis, and dissemination," and B3.6 "small-scale research and development," and is

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 :

Diana Scott 8.22.2012

DOE Funding: $1,600,000
Leveraged Funds: $1,600,000
Total Project Cost: $3,200,000

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 8/22/2012

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