

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** SwRI**STATE:** TX

PROJECT TITLE: High-Temperature Dry-Gas Seal Development and Testing for sCO₂ Power Cycle Turbomachinery

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001840	DE-EE0008740	GFO-0008740-001	

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), 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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Southwest Research Institute (SwRI) to develop and demonstrate a high-temperature dry-gas seal (DGS) for application to supercritical carbon dioxide (sCO₂) power turbines. Project work would be completed in a staged development process relying on detailed analysis and an experimental testing regimen to demonstrate the capability of developed components and, ultimately, the DGS system at its design temperature, pressure, and shaft speed.

Proposed project activities include the design, fabrication, and laboratory testing of DGS components and system prototypes, as well as the commissioning of a small-scale test stand and validation rig. Commissioned equipment would be assembled in-lab at SwRI and used to modify an existing sCO₂ test loop so as to facilitate the demonstration of DGS performance. Design, fabrication, and DGS system testing using sCO₂ would be performed at the SwRI research and development (R&D) campus located in San Antonio, TX. DGS component fabrication and testing would take place in Wolfratshausen, Germany at an engineering R&D facility operated by subrecipient Eagle Burgmaman (EB). Other, strictly computer-based, analytical modelling tasks would be carried out by subrecipient the University of Virginia in Charlottesville, VA.

The facilities in which project work would occur are purpose-built for the type of activities being proposed. No change in the use, mission or operation of existing facilities would arise out of this effort. SwRI and subrecipients have all applicable permits in place, and would not need additional permits to perform designated project tasks.

Proposed activities at SwRI and EB would involve the operation of manufacturing equipment, high-pressure high-temperature (HPHT) testing, and the use of sCO₂. Such work is performed on a routine basis at these facilities by the experienced personnel who would be conducting respective project activities. Existing health and safety policies would be followed, including employee training, the use of personal protective equipment (PPE), engineering controls, test loop monitoring and appropriate commissioning tasks, and internal safety assessments.

At SwRI, approximately 800 pounds of Inconel (pipe, fittings, structural) would be required for the proposed modifications to the existing sCO₂ test loop and installation of the DGS system. Approximately 4 tons of CO₂ will be used during the performance testing regimen, which would be properly vented to the atmosphere from the process loop. This predicted volume of emissions would remain within allowable permit levels. EG would utilize a total of approximately 50-60 pounds of Inconel, stainless steel, and other materials to fabricate the DGS components.

The proposed project would not involve the use, handling, or disposal of hazardous materials. No major sources of non-hazardous waste are associated with project activities at any location. Standard paper products, packaging waste, and minimal amounts of excess metallic materials would either be recycled or disposed of according to established procedures at each facility. Commissioned equipment is expected to be maintained at SwRI for potential future research.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Whitney Doss, 08/05/2019

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:



Casey Strickland

NEPA Compliance Officer

Date:

8/5/2019

FIELD OFFICE MANAGER DETERMINATION

Field Office Manager review not required

Field Office Manager review required

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

Field Office Manager's Signature: _____
Field Office Manager

Date: _____