PMC-ND
(1.08.09.13)

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

RECIPIENT: Montana State University **STATE:** MT

PROJECT TITLE: Efficient Thermal Energy Storage with Radial Flow in Packed Beds

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002243	DE-EE0009384	GFO-0009384-001	

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.)
A11 Technical advice and assistance to organizations	Technical advice and planning assistance to international, national, state, and local organizations.
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 Montana State University to design, fabricate, model, and test a packed bed thermal energy storage unit with radial flow. The project will develop design guidelines which would incorporate a radial flow method into different packing structures with different heat transfer fluids.

Proposed project activities would include computer modeling, fabrication and design of pipes, lab-scale testing, and the creation and dissemination of guidelines. The project would design and fabricate two new radial pipe configurations for testing, each with different hole patterns. Computer models would aid in design and illustrate temperature distribution in the bed, insulation, and steel and determine the system pressure over space and time. Both designs would be tested at four different flow rates, measuring the pressure drop and temperature of the bed. Further studies would be done to understand how segments of the bed could be controlled to alter the flow of gas. The final lab-scale design would be assessed for performance characteristics including temperature, mass flow rate, storage duration, pressure drop, and outlet temperature required in charge and discharge. Design guidelines would be established for radial flow packed bed thermal energy storage designs and these guidelines would be made public.

Montana State University would oversee the project. They would design, model, and test the radial hole configuration in packed bed thermal energy storage testing. They would also perform data analysis and writing. Southwest Research Institute, a subrecipient, would fabricate radial flow pipes and present to a professional engineer for review. All project activities would occur in dedicated labs. There would be no change in the use,

mission, or operation of existing facilities required as part of this project or additional permits required in order to conduct any of the work activities.

Project work would include the use of heavy machinery and work under high temperatures. Associated risks would be mitigated through adherence to established health and safety policies and procedures. Protocols would include safety training and the adherence to established safe operating procedures. All waste products would be disposed of by licensed waste management service providers. Montana State University and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 1/25/21.

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.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 1/26/2021

NEPA Compliance Officer

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: _____ Date: _____

Field Office Manager