PMC-ND
(1.08.09.13)

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

RECIPIENT: University of Oklahoma **STATE:** OK

PROJECT TITLE: Developing Advanced Lost Prevention Methods and Smart Wellbore Strengthening Materials for Geothermal Wells

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001880	DE-EE0008602	GFO-0008602-001	

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 University of Oklahoma (OU) to develop wellbore strengthening materials (i.e. lost circulation materials – 'LCMs') and prevention methods to reduce the occurrence of drilling fluid flowing into geothermal basins when drilling geothermal wells (i.e. lost circulation). Various materials, including expandable and programmable polymers, degradable thermoplastic composites, and ceramics mixed with conventional LCMs, would be synthesized, characterized and tested in order to identify materials optimized for use in geothermal drilling. The project would be divided into two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities for BP1 include a materials selection/review (e.g. shape memory polymer (SMP) LCMs and degradable thermoplastic materials), material characterization/synthesis, hydraulic fracture testing on core block samples, high temperature high pressure drill testing, fluid loss testing, and wellbore strengthening testing. BP2 activities would include wellbore hydraulic fracture testing, rheology and flow experiments, analysis of LCM polymer grain size and morphology change, computer modeling and simulations, and completion of feasibility studies on casing while drilling and controlled pressure drilling. All project work, including drill testing, hydraulic fracture testing, and wellbore testing, would be completed indoors, in laboratory settings, using machinery designed to simulate the dynamics experienced in real-world drilling scenarios.

Testing activities would be completed by OU at its Well Construction Technology Center, an existing, purpose-built laboratory and test facility at its campus in Norman, OK. Additional support would be provided by sub-recipients Pennsylvania State University (PSU) and Louisiana State University (LSU). PSU would perform computational modeling to simulate LCM pumping. LSU would perform synthesis and characterization of SMPs. Each university would complete these activities at existing, purpose-built facilities at their campuses in University Park, PA and Baton Rouge, LA, respectively.

An existing, high temperature flow loop at OU would be modified for testing of LCMs. The modifications would be

limited to equipment upgrades in which high temperature accessories would be incorporated into the flow loop. No changes in the use, mission, or operation of existing facilities would be required, nor would any additional permits or authorizations need to be obtained.

Project activities would include the use and handling of polymers, thermoplastic composites, ceramics, and industrial chemicals, as well as the use of industrial machinery. Risks associated with the handling of these materials/equipment would be mitigated through adherence to established health and safety rules and regulations. Protocols would include employee training, the use of personal protective equipment, engineering controls, monitoring, and internal assessments. OU 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:

Geothermal Technologies Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 01/22/2019

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.
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: Casey Strickland Date: 1/22/2019

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