PMC-EF2a

(2.04.02)

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

RECIPIENT: CSI Technologies **STATE:** TX

PROJECT TITLE : Temporary Bridging Agents for Use in Drilling and Completion of Engineered Geothermal Systems

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-PS 36-09GO99018	DE-EE0002795	GFO-10-276	0

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 (including, but not limited to, literature surveys, inventories, audits), data analysis (including computer modeling), document preparation (such as conceptual design or feasibility studies, analytical energy supply and demand studies), and dissemination (including, but not limited to, document mailings, publication, and distribution; and classroom training and informational programs), but not including site characterization or environmental monitoring.

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

B3.11 Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components), under controlled conditions that would not involve source, special nuclear, or byproduct materials. Covered activities may include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests

Rational for determination:

CSI Technologies would develop and field test non-damaging sealants for temporary sealing of fractures encountered in drilling and completion of Engineered Geothermal System (EGS) wells with emphasis on two specific EGS applications. The first application of the materials developed would be as a temporary Lost-Circulation Material (LCM) used during drilling of EGS wells. The second application would be to improve the effectiveness of hydraulic stimulation operations for EGS by developing a diverter that could be injected to bridge in fractures to divert fluid flow causing multiple fractures to be opened. Project work would take place at CSI Technologies located at 2202 Oil Center Court, Houston, Texas and at the University of Utah located in Salt Lake City, Utah.

The project consists of multiple tasks:

1.0 Identification of Candidate Material or Processes
1.1. Literature review of high-temperature material development
1.2. Identify and rank possible LCM/Diverter systems
2.0 Preliminary Screening of Materials
2.1 Determine each potential LCM/Diverter's thermal stability
2.2 Categorize each potential LCM/Diverter's rate of degradation
3.0 Fabricate Static Slot Testers to simulate fractures
4.0 Optimize Particle Size Distribution (PSD) for Different Fracture Apertures
4.1 Measure Diversion Efficiency of the various PSD Diverters
4.2 Empirical correlation of PSD vs. Diversion Efficiency
4.3 Confirm correlation
4.4 Repeat Task 4.0 process with other materials with other mechanical properties to correlate performance to Young's Modulus.
5.0 LCM/Diverter Durability/Degradation Kinetics under Static Conditions
5.1 Degradation at static reservoir temperature
5.2 Diversion Efficiency and Durability at temperature
6.0 Design and fabricate a lab-scale prototype dynamic model for testing LCM/diverters.
7.0 Test Performance of Successful Materials in Field Applications
8.0 Project Management and Reporting – Reports and other deliverables will be provided in accordance with the Federal Assistance Reporting checklist following the instructions included therein. All non-proprietary data collected during the project period would be provided to the National Geothermal Database.

According to the R&D Laboratory Questionnaire, no permits will be needed. All liquid effluent solvents and chemicals

would be stored in specially designated plastic bottles and transferred to containers for disposal according to state waste-management protocols. No air pollutants would be created by the project. Laboratory safety standards meet or exceed OSHA requirements.
This project is comprised of information gathering, data analysis, document preparation; conventional laboratory operations; and outdoor tests and experiments for the development, quality assurance, or reliability of materials; therefore the DOE has categorized this proposal into Categorical Exclusions A9, B3.6, and B3.11.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

None Given.

SIGNATURE OF THIS MEMORANDUM ~~CONSTITUTES~~ A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 3/29/10

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