

PMC-ND
(1.08.09.13)

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



RECIPIENT: Baylor University

STATE: TX

PROJECT TITLE : Development of a novel, near real time approach to geothermal seismic exploration and Monitoring Via Ambient Seismic Noise Interferometry

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
0001445	EE0007699.0000	GFO-0007699-001	

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.)
B3.1 Site characterization and environmental monitoring	Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to: (a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing; (b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools); (c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells; (d) Aquifer and underground reservoir response testing; (e) Installation and operation of ambient air monitoring equipment; (f) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes); (g) Sampling and characterization of water effluents, air emissions, or solid waste streams; (h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources); (i) Sampling of flora or fauna; and (j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Baylor University to build and test a Raspberry Pi Enhanced REF TEK (RaPiER) seismic nodal system that is capable of acquiring, transmitting, and processing seismic data in near real-time. This study is intended to develop a novel technology for characterizing geothermal sites by extracting information from ambient seismic noise surveys.

The proposed project involves two separate deployments of a passive seismic surveying system. A small-scale field test of 20 RaPiER nodes would be conducted during Budget Period 1. A large-scale field test of 150 RaPiER nodes at a different site is planned for Budget Period 2. The number of seismic lines to be deployed for the 150 RaPiER system and the testing location is not known at this time. This NEPA review only applies to activities associated with Budget Period 1 of the proposal, which includes site selection for the larger field test (Task 4.1). Additional NEPA review will be required for Budget Period 2 activities.

Proposed activities would include: project planning/reporting; data analysis; construction and initial testing of individual RaPiER units and small arrays; development, fabrication, and field testing of a 20 RaPiER system; and site selection for field testing of a 150 RaPiER system. Paper studies related to survey planning, analysis, and reporting would take place at Baylor University in Waco, TX in addition to the offices of 3rd party geophysical contractors. Initial tests of the

functionality and interoperability of RaPiER units and 5-20 node arrays would be performed at Baylor University on athletic fields located adjacent to the Science Building. These tests would occur as needed and their durations would be a few minutes to several hours. Field testing of the 20 RaPiER system would be conducted at the Soda Lake Geothermal Field, an industrial site in a desert setting north-west of Fallon, NV. The duration of this test would be on the order of one week. The Soda Lake Geothermal area is operated by Cyrq Energy (not a project subrecipient) and located on land administered by the Bureau of Land Management (BLM). Prior to initiating any field activities at the Soda Lake site, the appropriate BLM District Office would be requested to issue a Notice of Intent to Conduct Geothermal Resource Exploration Operations permit for the proposed deployment.

The Soda Lake 20 RaPiER system test would be deployed along a line approximately 1.4 km long that has been surveyed previously by means of traditional reflection seismic methods in an area with active geothermal wells. The stations for the RaPiER test would be spaced at roughly 70 m intervals and co-located with existing active survey stations, which required the temporary emplacement of geophones nearly identical to the type being proposed. Deployment activities would therefore require little or no further disturbance at each station site. The footprint of each seismic node would be approximately 1 square meter consisting of: a RaPiER unit, 4.5 Hz three-component geophone, REF TEK 130 digitizer/recorder, 12-volt deep-cycle battery, charge controller, 85-watt solar panel, and sundry cables. Components would be contained in a 35-gallon Rubbermaid ActionPacker (50.3 x 45.0 x 65.5 cm) or equivalent, which would sit on top of the ground. The solar panel (120.9 x 53.6 x 5.1 cm) would be placed on top of the ActionPacker and connected by cables to equipment inside the container. A single cable would rest on the ground during deployment, extending from the ActionPacker to the geophone. The geophone would be a Geospace Y-28/GS11-3D (~10.2 x 11.4 x 6.4 cm with 7 cm ground spikes) or similar model.

Disturbance at each station would be limited to the temporary removal of one or two shovelfuls of dirt to accommodate the geophone, resulting in an approximately 15 cm hole which would be tamped down by foot then re-filled. Upon demobilization, the geophone would be pulled from the hole by its cable, and the surface re-leveled by foot. The equipment would be delivered to the test site by truck, and a set of All-Terrain Vehicles (ATVs) would be used to deploy and demobilize nodes along the survey line following existing roads and right of ways. Upon completion of the seismic survey all equipment would be removed and the land reclaimed within a maximum of 10 days.

Due to the previously disturbed nature of the Soda Lake test site in conjunction with the minimal disturbance and short duration of the proposed small-scale deployment, DOE has determined that no adverse impacts to sensitive resources are to be expected. During the installation of field equipment, if cultural or archaeological artifacts are encountered, the recipient would cease work immediately and inform the DOE Project Officer of the finding.

Based on the review of the proposal, DOE has determined the tasks within Budget Period 1 fit within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410(2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. Tasks and subtasks within Budget Period 1 are categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:

All tasks and subtasks associated with Budget Period 2.

This restriction does not preclude you from:

All tasks and subtasks associated with Budget Period 1.

If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

Insert the following language in the award:

You are required to:

During the installation of field equipment, if cultural or archaeological artifacts are encountered, the recipient must cease work immediately and inform the DOE Project Officer of the finding.

Note to Specialist :

Geothermal Technologies Office

<http://energy.gov/eere/renewables/geothermal>

This NEPA determination requires a tailored NEPA Provision.

NEPA review completed by Whitney Doss, 8/25/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____

Electronically
Signed By

Lori Gray

NEPA Compliance Officer

Date: 8/29/2016

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: _____

Field Office Manager

Date: _____

