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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 SEISMICEXPLORATION AND MONITORING VIA AMBIENT SEISMIC NOISE INTERFEROMETRY

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001445	DE-EE0007699	GFO-0007699-003	GO7699

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.)
B3.1 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.

A previous NEPA Determination (GFO-0007699-001; CX A9, B3.1; 08/25/2016) reviewed all Budget Period 1 activities. A second NEPA Determination (GFO-0007699-002; CX A9, B3.1; 11/17/2017) reviewed activities associated with Budget Period 2 (BP2) Task 5 “Construct 130 Additional RaPiER Nodes” and Task 7 “Reporting and Publications” but restricted Task 6 “Large-scale Field Test 150 RaPiER Nodal System at a Site to Be Determined in Nevada” pending identification of the testing location and number of seismic lines to be deployed. Since that time, the required information has been submitted for further NEPA review of BP2 Task 6. This final NEPA Determination applies to all remaining project activities.

Proposed work would involve the short-term (11 days based on current project plans) deployment and testing of a two-dimensional seismic array. The system would utilize standard passive ambient seismic noise survey equipment augmented with a specialized distributing computing processor. Specific activities associated with the various subtasks of Task 6 would include outdoor seismic equipment installation, testing, and in-field data analysis followed by office-based project reporting at Baylor University (Waco, TX) after site demobilization.

The proposed survey would be located at the San Emidio Geothermal Field (NV) adjacent to an existing geothermal power plant currently owned and operated by Ormat. The Recipient has received a letter of support from Ormat demonstrating full cognizance of project intent, deployment plan, instrument locations, and dates of installations. Project activities would not interfere with routine operations of the San Emidio facility. Project participants have agreed to abide by all Ormat operational directives, including taking part in a corporate health and safety training exercise prior to commencing the proposed deployment.

Although geothermal resource rights in the project area are currently held by Ormat, the proposed activities would occur entirely on a parcel of surface land administered by the U.S. Bureau of Land Management (BLM) Winnemucca District. Consequently, the Recipient was required to submit a Notice of Intent to Conduct Geothermal Resource Exploration Operations (NOI), and subsequently received written confirmation from the BLM Black Rock Field Office that no permit is required for the proposed work. Upon review of the NOI, project activities were found to be consistent with the “casual use” provision of BLM regulations due to extensive previous studies utilizing similar techniques, nearby industrial installations, and the small physical impact this deployment would entail.

The project would be sited within the footprint of a larger seismic survey conducted prior to this award. Station spacing for the proposed linear seismic array would be 15 meters (m) for a total length of 2,235 m. Survey width would be approximately 1 m (i.e. each RaPiER node has a total footprint of approximately 1 square m.) Instrumentation for each station would consist of a seismic digitizer/recorder, geophone, 12-volt battery, small solar panel, charge controller, and Raspberry Pi processor. The instruments and sundry cables would be largely confined within an all-weather 35 gallon box resting on top of the ground. Ancillary equipment placed along the survey line would include thin cables strung along the ground surface to connect the nodes, as well as WiFi antennas and repeaters mounted on stands up to 12 feet (ft.) tall. Ground disturbance would be limited to shallow burial of the geophones. 4 in. spikes attached to each geophone would be pushed into the ground at the bottom of a small hole (approximately 6 in. deep by 6 in. diameter; representing approximately 1-2 shovelfuls of soil) dug by hand. The geophone would then be covered with the small quantity of soil removed and tamped down by foot.

Two standard 5-ton panel trucks would be employed to transport the equipment from Baylor University to a central staging/array monitoring area situated near the midpoint of the seismic line. Here, subsets of equipment would be reloaded on either pickup trucks or jeeps for distribution to the installation sites. Transportation via the larger trucks would be solely along existing roads. For logistical purposes, existing all-weather roadways would be utilized as much as possible for both access to the distributed station sites as well as equipment deployment. Short distances of off-road travel would only be necessary for a portion of the proposed deployment. Isolated and transient sources of emissions from the use of up to six vehicles for less than two weeks would have negligible impact on ambient air quality.

Upon completion of site-based activities, all equipment and materials would be removed from San Emidio and the majority of instruments would be retained for future research. Used batteries along with non-hazardous waste typical of small-scale field work (e.g. electrical and duct tape, zip ties, and packing material) would be collected for offsite disposal or recycling in accordance with local requirements. Minor ground disturbance resulting from project activities would be restored to the extent feasible. Site reclamation efforts would include the refilling/releveling of every geophone hole using the originally excavated soil.

According to the U.S. Fish and Wildlife Service Endangered Species Program website (IPaC), there are no threatened or endangered plant or wildlife species believed to occur in the vicinity. The project area does not contain any critical habits or wetlands. DOE has therefore determined the project would have no effect on federally listed species. Further, given the minimal and temporary project footprint, consistency of proposed activities with past and ongoing use of this location, deliberate selection of installation sites on or contiguous to previously disturbed tracts of land, and availability of existing roadways for access, DOE has concluded that no adverse impacts to any sensitive resources are to be expected.

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 Whitney Doss, 04/10/19

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: 4/11/2019

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