

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Patua Acquisition Company LLC**STATE:** NV

PROJECT TITLE: Increasing Power Generation at the Patua Nevada Geothermal Field through Targeted and Adaptive EGS

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002227	DE-EE0009182	GFO-0009182-001	G09182

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.
- B3.11 Outdoor tests and experiments on materials and equipment components** 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. Covered actions 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. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.
- 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 the Patua Acquisition Company LLC

to develop and demonstrate a reproducible methodology for well stimulation in Enhanced Geothermal Systems. The overall goal of the proposed project is to convert a previously drilled and permitted, idle well (16-29) at the currently operational Patua Geothermal Field (located in Hazen, NV) to an active producer and generate at least an additional 5 MWe at the Patua plant.

The proposed project would be performed in three Budget Periods (BP) over a period of performance of four years. BP1 activities would include planning, permitting, design, data analysis, modeling, laboratory research, site improvements, well testing, and well logging. Installation of monitoring equipment, well work-over using a drilling rig, and hydraulic stimulation would occur during BP2. The project would culminate with the installation of a well pump and permanent pipeline in BP3.

This NEPA Determination reviews all activities associated with BP1 (Tasks 1.0-1.7). A first project "Go/No-Go" decision would be made at the end of BP1 based on the outcome of initial work to investigate the feasibility of the wellbore, site, and technological readiness for field deployment of the proposed methodology. There is insufficient information available at this time to complete a thorough review of project activities and any potential impacts beyond BP1; if the project receives approval to proceed, BP2 and BP3 will be reviewed once associated Tasks/Subtasks have been fully defined.

Office work to support the project would be conducted by the Pacific Northwest National Laboratory (PNNL; Richland, WA) and the University of Oklahoma (OU; Norman, OK) in addition to Cirq Energy and Entalpion, LLC. Laboratory work would be performed at PNNL and OU's Sarkeys Energy Center. Such activities would include rock mechanics testing and petrological/mineralogical/chemical studies on archived core material. No change in the use, mission, or operation of these research facilities would arise out of project efforts.

The surface location of 16-29 is an existing 400 ft. x 300 ft. well pad and sump. The well head is on private land, while the bottom of the hole is located on BLM Lease NVN-075005. Field-based activities at the Patua site during BP1 would include the following:

- Task 1.1 – Site Work: Injection testing and wellbore cooling for temperature-limited logging tools would require a temporary water source. Patua would tunnel a culvert under US 50A to transport water via a new segment of HDPE pipeline which would be installed from the plant's existing injection pipeline to the sump on the 16-29 pad. The sump, with a capacity of at least 1 million gallons, would be cleaned out and relined. During BP1, water would flow from the plant to the sump for cooling prior to its use in the following injection testing and logging activities.

Installation activities would be conducted on an existing 60 ft. wide road and utility easement for geothermal pipelines. All work would be performed in accordance with pertinent state and/or local standards, codes, and ordinances. A legal description and exhibit map for the proposed Nevada Department of Transportation (NDOT) right-of-way crossing has already been prepared as part of the original site construction planning and review process. Patua would identify and obtain any modifications to, or new, permits and/or authorizations from the Nevada Department of Transportation (NDOT) required to perform the proposed tunneling.

- Task 1.2 – Well Evaluation: An air compressor would be mobilized and used to airlift 16-29 to measure current baseline productivity and temperature. Once the flow test is complete, the existing tubing string would be removed so that further well diagnostics can be performed. Patua would evaluate the mechanical integrity of the cased and cemented portion of the well, as well as evaluate and characterize the geothermal reservoir system within the open hole portion of the well, using combinations of standard wireline logging tools. Results would inform the development of a BP2 stimulation plan and subsequent downhole operations.

Patua would notify and obtain approval from the Nevada Division of Environmental Protection (NDEP) for temporary use of adjacent idle well 24-29 to inject fluid produced from 16-29. A temporary pipeline (12 in. diameter; 1800 ft. length) would be run above-ground along an existing 60 ft. wide road and utility easement between the two well pads. Pre-test activities would also include obtaining sundry notice approval for the flow test and well surveys from the Bureau of Land Management (BLM).

- Task 1.4 – Evaluate Readiness of Innovative Zonal Isolation and Stimulation Methods: In preparation for deployment of the proposed methodology in BP2, a pilot test of the prototype zonal isolation system would be conducted because this tool has not yet been deployed in a downhole environment. (It is currently in development under project DE-EE0008487, "Fully Retrievable, High Temperature Packer System Utilizing Thermally Degradable Expanding Foam for Zonal Isolation.") The system utilizes thermally degradable swellable elastomers (TDSE) which would be placed around a downhole tool (e.g., frack string). If TDSE packers are not ready after pilot scale testing or the risk of borehole obstruction is deemed to be unacceptable, commercially-available packers would also be evaluated for use.

In conjunction with pilot testing of the TDSE packer system, a standard Diagnostic Fracture Injection Test (DFIT) pressure test would be performed with an expected break down pressure below 6000 psi and a flow rate of 0.5-1 barrel per minute. A coiled tubing rig would be deployed to install a temporary cased hole packer system and test the

casing up to the maximum pressure expected during the moderate pressure hydraulic stimulation portion of the project. The amount of standby rig time needed for these subtasks is expected to be less than a week.

Prior to initiating work on the idle wells, Patua would check for hydrogen sulfide (H₂S) in the well gas caps and implement appropriate mitigation techniques if necessary, in accordance with Cyrq's H₂S safety procedures and protocols. The project would not introduce any unique health and safety hazards beyond those typical of an operating geothermal field; proposed activities are covered under established site-wide environmental, health and safety plans. Existing site policies as well as industry best practices would be followed at all times by project personnel.

Any non-hazardous construction waste generated by the proposed project would be disposed of in accordance with existing site practices. Air emissions resulting from diesel generators used on site would be in compliance with Patua's current Air Quality Operating Permit. The permit includes a requirement that if more than 5 acres of land are disturbed during a future construction activity, a surface area disturbance permit is required. If the proposed project requires this additional approval, Patua would initiate the process with NDEP during BP1.

The BLM Carson City District Office (CCDO) Stillwater Field Office (SFO) prepared an Environmental Assessment in 2011 ("Gradient Resources Inc. Patua Geothermal Project Phase II Geothermal Unit N-85168X", DOI-BLM-NV-CO10-2011-0501-EA) to analyze potential impacts to the human and natural environment resulting from construction and operation of a geothermal power plant, geothermal well pads and wells, geothermal fluid pipelines, and associated access roads at the Patua geothermal field. Based on the information presented in this EA, BLM issued a Finding of No Significant Impact (FONSI), allowing the Project to proceed with further development. DOE has reviewed project documents in addition to the 2011 BLM EA/FONSI and has confirmed that BP1 activities are expected to be bound by the environmental impact analysis contained in this EA and its respective FONSI.

Based on a previous cultural resource inventory, BLM determined that historic properties are present within the Area of Potential Effects (APE) of the Patua Geothermal Project. Any and all known cultural resources would be avoided by the proposed project in accordance with the present State Protocol Agreement between the BLM and the Nevada State Historic Preservation Office, as described in the 2011 BLM EA/FONSI.

Project activities would not affect wetlands, floodplains, or prime farmlands. According to the U.S. Fish and Wildlife Service Endangered Species Program website (IPaC), there are no federally listed threatened or endangered species or critical habitat expected to occur in the proposed project area. IPaC identifies one candidate species, the Monarch Butterfly, with a potential geographical range that includes the project area. However, considering that the proposed field work would be conducted on ground that has been previously disturbed or developed, the project would not have the potential to meaningfully impact monarch habitat.

There are no migratory birds of conservation concern expected to occur at this location; regardless, a migratory bird nesting survey shall be completed if project activities involving ground disturbance occur between March 15 and September 15. If nests or eggs are found, the area would be cordoned off with a proper buffer until nestlings fledge.

NEPA PROVISION

DOE has made a conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

Budget Period 1

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

Budget Period 2 and Budget Period 3

Include the following condition in the financial assistance agreement:

The Recipient must complete a migratory bird nesting survey if project activities involving ground disturbance occur between March 15 and September 15.

Notes:

Geothermal Technologies Office
This NEPA determination requires a tailored NEPA Provision.

NEPA review completed by Whitney Doss Donoghue, 3/16/2021

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:  Casey Strickland Date: 3/17/2021
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