

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



**RECIPIENT:** University of Nevada, Reno

**STATE:** NV

**PROJECT TITLE:** INnovative Geothermal Exploration through Novel Investigations Of Undiscovered Systems (INGENIOUS)

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002219	DE-EE0009254	GFO-0009254-003	G09254

**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:

<b>A9 Information gathering, analysis, and dissemination</b>	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.)
<b>B3.1 Site characterization and environmental monitoring</b>	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 the University of Nevada, Reno (UNR) to reduce the exploration risk for hidden geothermal systems in the Great Basin Region (GBR). This would be accomplished by quantifying resource potential, uncertainty, and degree of exploration at several geothermal prospects in the GBR and by developing new geothermal favorability maps, data products, software tools, and a geothermal developers' playbook that integrates the project findings and facilitates easy access for external stakeholders. The project would be completed over three Budget Periods (BPs) with a Go/No Go Decision Point between each BP.

Previously, DOE reviewed this project and issued a conditional NEPA determination for Tasks 1 through 3, 4.1, and 6 through 9 (GFO-0009254-001, CXs A9, B3.1, 12/11/2020). At the time, sites had not been selected for temperature gradient (TG) drilling in Tasks 4.2 through 4.6 or slimhole drilling in Task 5. Therefore, those tasks were restricted. Since that time, slimhole drilling (previously Task 5) was removed from the project as well as Task 4.6 (recommendations for slimhole sites). Remaining tasks were renumbered accordingly and, as such, the number of tasks was reduced from 9 to 8. The original NEPA determination still applies to all project activities with the exception of TG drilling (Tasks 4.2-4.5):

- Subtask 4.2: TG drilling to provide information on the subsurface thermal profile, lithologies, water chemistry, and

mineralogical characteristics of subsurface formations.

- Subtask 4.3: Reservoir/subsurface data analysis, collect downhole temperature logs in new TG holes, and analyze new data.
- Subtask 4.4: Ensure TG holes are appropriately plugged and abandoned according to state and federal regulations.
- Subtask 4.5: Use new subsurface datasets from TG holes to update conceptual model of the geothermal system(s) at each detailed study area and revise resource estimates.

A second NEPA determination reviewed the first of up to five project locations identified for TG drilling, Granite Springs Valley in Pershing County, NV (GFO-0009254-002, CXs A9, B3.1, 7/7/2022). Tasks 4.2 through 4.5 at any other selected location were conditioned for further NEPA review. UNR has now identified two additional GBR locations and submitted relevant site information to DOE, including geographical coordinates of potential TG drill holes. Therefore, this NEPA determination is to review all activities associated with Tasks 4.2 through 4.5 at the following project locations only.

1) South end of Buffalo Valley and Jersey Summit of Lander County, NV. All work would occur on land managed by the Bureau of Land Management (BLM). UNR has identified five areas of interest within this region. Up to ten specific locations for TG holes would be determined based on conceptual and geological modeling.

2) Argenta Rise in the Northern Reece River Valley of Lander County, NV. UNR has provided the coordinates of 23 potential TG holes, among which two to ten would be selected based upon conceptual and geological modeling. Drilling would occur on land managed by the BLM and/or adjacent privately owned parcels. UNR would obtain written authorization from the landowner(s) where applicable.

All TG hole sites require permits from the Nevada Division of Minerals (NDOM). A Geothermal Resource Development Permit for each location would be submitted to NDOM at least 60 days prior to drilling. In addition, a Notice of Intent would be submitted to BLM for all TG drilling activities within BLM-administered land. If drilling sites on adjacent private land parcels are considered, written authorization from the landowner would be required prior to drilling. UNR would not begin any Task 4 activities, nor would they mobilize to the study areas until such time as NDOM and BLM complete their reviews and provide written authorization to proceed.

The following description of proposed project activities and impacts analysis applies to both proposed TG drilling locations:

TG holes would be drilled to maximum depths of 1000 feet (ft), with the final depths determined by the encountered geology, drilling conditions, value-of-information analysis, and budgetary constraints. UNR may collect core and water samples for geochemical analysis if feasible. Each site would be occupied for approximately three to five weeks during the drilling phase and only occasionally afterwards while measurements are conducted. The total duration of the drilling campaign would depend on the number of sites actually drilled, and therefore may last between 3 to 6 months. Drilling operations at each site would require running 2 to 3 non-road diesel engines for approximately 12 to 24 hours per day. Active drilling operations are expected to run for up to 35 days at each site. At each site, there would be a 6 inch pipe above ground to a height of approximately 2 ft for up to 6 months prior to abandonment, while the well equilibrates and temperature is logged. All TG holes would be plugged and abandoned by qualified third-party drilling contractors in accordance with applicable federal and state regulations and location-specific permitting requirements. All equipment and remaining materials would be removed, and the sites would be restored to a natural condition. No further development would take place.

Minimal land clearing is expected as UNR would not be constructing drill pads for the TG holes and would use truck-mounted rigs. The drill rig, potential small sump or truck-mounted mud system (to be determined once the drilling contractor is confirmed), and accessories would occupy an area of approximately 50 by 100 ft. UNR plans to use a truck-mounted drilling rig that is capable of traveling overland, although the work area at each site would be accessed by existing two-tracks or roads to the extent possible. Minor excavation may be conducted to create a small sump for disposal of drill cuttings and any produced fluids. UNR anticipates several cubic yards of rock cuttings to be produced by the drilling of each TG hole. These materials would be non-toxic and non-hazardous. Water for drilling would be procured locally and trucked into the site. No more than 2,000 gallons per day is expected to be required and UNR would recirculate and reuse water. Produced water, cuttings, and industry standard drilling fluids (e.g., bentonite and polymers) would be used and disposed of appropriately during site reclamation according to permitting requirements. The proposed activities would generate minimal emissions from vehicle travel and from the drill rig itself. Short term operations like those being proposed (less than 12 months occupation and operation) do not trigger air permitting requirements from the Nevada Division of Environmental Protection.

The proposed project would continue to operate under Occupational Safety and Health Administration standards, and all customary university and corporate health and safety precautions would be taken while drilling, including the use of personal protective equipment and continual site monitoring. The U.S. Geological Survey in addition to the National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory would assist UNR with data collection and technical assistance. Any work proposed to be conducted at a federal facility may be subject to additional NEPA

review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) database indicates that one candidate insect species, the Monarch butterfly, has the potential to occur within the project boundary. Based on the Western Monarch Crucial Habitat Assessment Tool (CHAT), the proposed project area does not rank highly as crucial habitat for conservation of monarch butterflies. Considering this information and that project activities would be temporary and occur in a small area, DOE has determined that work in Tasks 4.2-4.5 would not affect crucial habitat or result in a decline in monarch distribution or abundance, therefore would not lead to increased likelihood of this candidate species becoming further threatened or endangered. UNR would follow BLM requirements to ensure protection of wildlife species, including Sage Grouse and their habitat. The USFWS National Wetlands Inventory classifies a majority of the proposed sites as seasonally or temporarily flooded wetland. However, project work would only occur during dry seasons, would not require dredge or fill, and would not result in a long-term change to the ecosystem. Based on timing of the project and above considerations, DOE does not anticipate impacts to resources of concern.

Before undertaking any Task 4 activities at the Lander County, NV study areas, including mobilization for drilling, UNR is required to obtain all requisite permits and/or authorizations from BLM and NDOM. Further, UNR is required to submit copies of all BLM and NDOM permits and/or written approvals required for TG drilling to the DOE Project Officer prior to commencing field work and must comply with any associated terms and conditions set forth by these agencies.

## NEPA PROVISION

DOE has made a conditional NEPA determination.

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

Task 1 - Regional-scale data compilation and synthesis

Task 2 - Local-scale play data collection at priority sites

Task 3 - Conceptual modeling and resource assessment

Task 4.0 - Thermal gradient hole drilling:

Subtask 4.1 - Drilling program specifications and permitting

Subtask 4.2: TGH drilling (only at the proposed study areas in Pershing County and Lander County, NV)

Subtask 4.3: Reservoir/subsurface data analysis (only at the proposed study areas in Pershing County and Lander County, NV)

Subtask 4.4: Plug and abandon TG holes (only at the proposed study areas in Pershing County and Lander County, NV)

Subtask 4.5: Resource conceptual modeling and resource estimates (only at the proposed study areas in Pershing County and Lander County, NV)

Task 5 - Exploration workflow development and optimization

Task 6 - Outreach

Task 7 - Project management and reporting

Task 8 - Geoscience data management and delivery

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

Subtask 4.2: TGH drilling (for remaining locations not yet identified)

Subtask 4.3: Reservoir/subsurface data analysis (for remaining locations not yet identified)

Subtask 4.4: Plug and abandon TG holes (for remaining locations not yet identified)

Subtask 4.5: Resource conceptual modeling and resource estimates (for remaining locations not yet identified)

Include the following condition in the financial assistance agreement:

Before undertaking any Task 4 activities at the Pershing County and Landers County study areas, including mobilization for drilling, the Recipient is required to obtain all requisite permits and/or authorizations from the Bureau of Land Management (BLM) and Nevada Division of Minerals (NDOM). Further, the Recipient is required to submit copies of all BLM and NDOM permits and/or written approvals required for Temperature-Gradient (TG) drilling to the DOE Project Officer prior to commencing field work and must comply with any associated terms and conditions set forth by these agencies.

If during the course of project activities cultural or archaeological artifacts are encountered, the Recipient and their staff

must stop the site installation immediately and inform BLM and the DOE Project Officer of the discovery so that an evaluation of the discovery can be completed prior to continuing work. The affected work must be relocated to another nearby site.

Notes:

Geothermal Technologies Office (GTO)

This NEPA determination requires legal review of the tailored NEPA provision.

Review completed by Whitney Donoghue on 7/2/2024 and revised on 10/22/2024.

#### 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: \_\_\_\_\_

  
NEPA Compliance Officer

Date: 10/22/2024

#### 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: \_\_\_\_\_

Field Office Manager

Date: \_\_\_\_\_