

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)

Notice of Funding Opportunity Number
DE-FOA-0002219

Procurement Instrument Number
DE-EE0009254

NEPA Control Number
GFO-0009254-004

CID Number
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:

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 the University of Nevada, Reno (UNR) for the INnovative Geothermal Exploration through Novel Investigations Of Undiscovered Systems (INGENIOUS) project which aims to reduce the exploration risk for hidden geothermal systems in the Great Basin Region (GBR). The activities would include a combination of regional-scale data synthesis as well as detailed evaluation of several local-scale study sites that would involve new data acquisition and thermal gradient (TG) drilling. The fourth hidden geothermal system being studied in the project is the Lund study area, located in Lund, Iron County, Utah.

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.

A third NEPA determination identified for TG drilling for Tasks 4.2 through 4.5 at the following project locations: South end of Buffalo Valley and Jersey Summit of Lander County, NV, and Argenta Rise in the Northern Reese River Valley of Lander County, NV (GFO-0009254-003, CXs A9, B3.1, 10/22/2024). This NEPA determination is to review all activities associated with Tasks 4.2 through 4.5 at the proposed Lund study area only.

PROJECT DESCRIPTION

Approximately 8-10 TG holes (TGH) would be drilled on land managed by the Bureau of Land Management (BLM), the State of Utah, and privately owned lands in North Lund, Utah. The final determination of locations for TGH is in progress; however, they would be within a defined study area (please refer to study area map). The specific location of each drillhole would be determined based on conceptual and geological modeling. Since final locations have not been determined, DOE is considering potential impacts to resources of concern within the entire defined study area as part of this review.

Minimal land clearing is expected during the drilling as UNR would not be constructing drill pads for the TG holes and would use truck-mounted rigs. Minor excavation may be conducted to create a small sump for disposal of drill cuttings and any produced fluids. Several cubic yards of cuttings for each TG hole drilled would be disposed of onsite during site reclamation. Rock cuttings are non-toxic and non-hazardous. 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. During the drilling phase of the thermal gradient holes that would likely involve up to 35 days per site, the drill rig, potential small sump or truck-mounted mud system (to be determined once the third-party drilling contractor is confirmed), and accessories would occupy an area of approximately 5-ft by 100-ft. At well completion there would be a 6-inch pipe above ground to a height of approximately 2-ft for up to 6 months prior to well 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.

The U.S. Geological Survey in addition to the National Renewable Energy 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.

IMPACT ANALYSIS

Threatened and Endangered Species

U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) database indicates one mammal species, the Utah Prairie Dog, one bird species, the California Condor, and one flower species, the Ute Ladies'-tresses, have the potential to be present within the project boundary. The project area does not contain critical habitat for any of these species; as such, the Ute Ladies'-tresses is not likely to be present, and the likelihood of the Condor encountering the project is low and would only result in temporary displacement during project activities. In order to ensure Utah Prairie Dog habitats are not affected, UNR would submit final well pad locations to the Bureau of Land Management (BLM) Cedar City Field Office so 1,000-foot buffer zones could be surveyed. If there is a presence of Utah Prairie Dog habitats within the 1,000-foot buffer zone, UNR would either re-site the well pads to locations where Utah Prairie Dogs are not present or enter a formal consultation with the U.S. Fish and Wildlife Service (USFWS), led by the BLM. Under consultation, conservation measures would be developed and implemented to avoid or mitigate impacts. Requirements from the Utah Division of Water Rights are not specific to Utah Prairie Dog habitat and are limited to standard well drilling and water use approvals. For State or private lands, UNR would coordinate with the relevant agencies or landowners to ensure no conflicts with Utah Prairie Dog habitat protections.

IPaC also indicates that two proposed threatened or endangered insect species, the Monarch butterfly and the Suckley's Cuckoo Bumble Bee, have the potential to occur within the project boundary. The project area does not contain suitable habitat for either species, and given the temporary nature of the project it is unlikely that the project would increase the likelihood of either species becoming further threatened or endangered.

For the above reasons, DOE has determined that the proposed project would have no effect on the Utah Prairie Dog, California Condor, or Ute Ladies'-tresses, nor does DOE anticipate any adverse impacts to the Monarch butterfly or Suckley's Cuckoo Bumble Bee.

Other Resource Areas

The USFWS National Wetlands Inventory classifies a portion of the proposed sites as seasonally or temporarily flooded wetlands. 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 Lund study area, including mobilization for drilling, the Recipient is required to obtain all requisite permits and/or authorizations from the Utah Division of Water Rights and the BLM Cedar City Field Office. Further, the Recipient is required to submit copies of all 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 drilling is proposed on the adjacent private land parcels, a written authorization from the landowner would be required.

Water for drilling at the Lund study area would be procured locally and trucked to the site. No more than 2,000 gallons per day would be used during drilling operations, and water would be recirculated and reused to the extent possible. UNR would work with the drilling contractor, Utah Division of Water Rights requirements, landowners, and lease holders to ensure any produced water is managed and disposed of responsibly. Water and drill cuttings would be disposed of on-site during site reclamation in accordance with BLM Cedar City Field Office and Utah Division of Water Rights permitting requirements. Trash would be contained in appropriate receptacles and disposed of offsite. No turbid or contaminated water would be dispersed. Drilling fluids (e.g., bentonite and polymers) would be used and disposed of properly in compliance with BLM and state permits.

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.

For Categorical Exclusion Determinations:

- The proposal fits within a class of actions that is listed in Appendix B to 10 CFR Part 1021 or Appendix B and C of DOE's NEPA Implementing Procedures (June 30, 2025). To fit within the classes of actions listed in Appendix B to 10 CFR Part 1021, or Appendix B of DOE's NEPA Implementing Procedures, a proposal must satisfy the conditions that are integral elements of the classes of actions in Appendix B of both 10 CFR Part 1021 and DOE's NEPA Implementing Procedures.
- 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.
- The proposed action is categorically excluded from further NEPA review.

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 Lund study area)
 - Subtask 4.3: Reservoir/subsurface data analysis (only at the proposed Lund study area)
 - Subtask 4.4: Plug and abandon TG holes (only at the proposed Lund study area)
 - Subtask 4.5: Resource conceptual modeling and resource estimates (only at the proposed Lund study area)
- 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:

If during project activities the recipient or their contractors encounter any cultural materials (i.e. historic or prehistoric), all activities must cease in the vicinity of the discovery immediately. The recipient must inform the DOE Project Officer of the discovery so that an evaluation of the discovery can be completed prior to continuing work.

Notes:

Geothermal Technologies Office

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

NEPA review completed by Emma Luther, 8/22/2025.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



Electronically
Signed By: **Nicole Serio**

NEPA Compliance Officer

Date: 8/22/2025

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: _____