

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



**RECIPIENT:** Geysers Power Company

**STATE:** CA

**PROJECT TITLE :** Evaluation of Physics-Based Drilling and Alternative Bit Design at The Geysers

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002656	DE-EE0010445	GFO-0010445-001	GO10445

**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.)

**B3.11 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.

**B3.7 New terrestrial infill exploratory and experimental wells**

Siting, construction, and operation of new terrestrial infill exploratory and experimental (test) wells, for either extraction or injection use, in a locally characterized geological formation in a field that contains existing operating wells, properly abandoned wells, or unminable coal seams containing natural gas, provided that the site characterization has verified a low potential for seismicity, subsidence, and contamination of freshwater aquifers, and the actions are otherwise consistent with applicable best practices and DOE protocols, including those that protect against uncontrolled releases of harmful materials. Such wells may include those for brine, carbon dioxide, coalbed methane, gas hydrate, geothermal, natural gas, and oil. Uses for carbon sequestration wells include, but are not limited to, the study of saline formations, enhanced oil recovery, and enhanced coalbed methane extraction.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Geysers Power Company (GPC) to evaluate and improve historical drill programs at The Geysers Geothermal Field ("The Geysers"), California. Comprising 45 square miles along the Sonoma and Lake County border, The Geysers is the largest complex of geothermal power plants in the world. GPC and its partners from industry, DOE National Laboratories, and academia would deploy innovative drilling technology and methodologies to increase drilling rates by at least 25%. Project activities would be performed concurrently with the preplanned drilling of new infill geothermal injection wells within a developed and operating steamfield. Specifically, the proposed project would procure and test new drill bits using varying methods over a range of temperatures and conditions in a "limiter redesign" workflow process to identify drilling rate limitations and mitigate them through an iterative design process.

The types of activities associated with the proposed project would include outreach, data analysis, computer modeling, field testing of equipment, and the drilling of two new infill geothermal injection wells. GPC would leverage an independently funded drilling campaign to support the proposed project. None of the proposed project activities would impact normal site operations or the overall drilling campaign; the proposed project would fall within the scope of GPC's ongoing effort to construct and operate approximately 6-7 new infill wells, with the addition of the use of new design drilling bits. Federal funds provided to GPC under this award would support the testing of experimental bits to evaluate geothermal well drilling rates in addition to aspects of the completion of two of the planned infill wells.

The proposed project has an expected duration of 24 months. GPC would first conduct a review of historical data from past drills, then select, acquire, and mobilize commercially-available drilling equipment (e.g., bits, hammers) that have

not been used at The Geysers. GPC would test the ability of these bits to improve the rate of penetration during the completion of the two new wells. Based on current drilling program plans, the wells to be utilized by the proposed project are expected to be drilled in December 2023 and February 2024. Only a portion of the drilled wells would employ the experimental bits and GPC expects to use 5-10 new bits at each well to determine what works best for the specific location and depth. GPC is responsible for all aspects of well drilling and completion for their previously defined campaign. Part of that responsibility would include selecting a drilling subcontractor that would engage in the proposed limiter redesign trial for the two holes identified for proposed project activities.

The locations of the two holes proposed for concurrent project activities are in Sonoma County. The new infill wells would be drilled on preexisting well pads alongside operational geothermal wells. Drilling activities would disturb less than 1 acre. The proposed project would use existing roads, rights-of-way, utilities, and staging areas. The new wells would connect to existing pipelines that convey secondary and tertiary treated wastewater for injection. The project wells would be drilled within a developed field with known and mapped faults; there is an active micro-seismic network at The Geysers for seismic monitoring.

The proposed activities are consistent with existing geothermal operations and as such would function under local Use Permit requirements. An Authority to Construct permit from the Northern Sonoma County Air Pollution Control District (NSCAPCD) would be required to drill the campaign wells in Sonoma County. The new wells would be incorporated into the existing Title V Clean Air Act permit for the steamfield. GPC's Air Quality Engineer would make the requisite permit application to the NSCAPCD approximately 180 days in advance of the proposed drilling. Approximately 60 days prior to drilling of an exploratory well, a Notice of Intent would be filed with the California Geologic Energy Management Division (CalGEM) by GPC's Drilling Manager. No other permits/authorizations are expected to be required to complete project-related activities.

Well construction and equipment testing activities would involve the use of drilling fluids and muds that are typical to geothermal wells and operations at The Geysers. At the proposed project's site in Sonoma County, there are two permitted Waste Management Units that allow for discharge of non-hazardous drilling muds and fluid. Berms exist to contain fluids that may discharge onto the ground. GPC utilizes certified waste haulers for transport of solid hazardous waste generated by drilling (geothermal debris; 40 cubic yards annually). The proposed project's waste stream would also consist of used personal protective equipment and other items that may have been contaminated with geothermal constituents such as mercury, arsenic, etc. Such waste would be stored in closed and lined 20 yd metal bins prior to appropriate offsite disposal. At the conclusion of the proposed project, used drill bits would be refurbished and reused for future work if possible. Any bits that require disposal would be handled based on GPC's existing waste management procedures. Disposition of equipment and materials would be consistent with the Sonoma County Use Permit requirements associated with decommissioning. No siting, construction, or expansion of waste storage, disposal, recovery, or treatment actions/facilities would be required to accommodate the proposed activities.

GPC would conduct environmental health and safety (EH&S) oversight over all project activities taking place on GPC leases at The Geysers to ensure continued compliance with pertinent state and local regulations required for operating in California. GPC has a robust contractor safety management program that includes vetting of all contractors' safety programs and site safety orientation. Existing corporate EH&S policies and procedures would be followed by project participants, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. The Geysers is in a remote area with no public access (gated entries).

DOE has considered the scale, duration, and nature of the proposed activities within the context of The Geysers to determine potential impacts on sensitive resources, including those of an ecological, historical, cultural, and socioeconomic nature, and found no effects that would be expected to result from the proposed project activities. 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.

## **NEPA PROVISION**

DOE has made a final NEPA determination.

Notes:

Geothermal Technologies Office (GTO)  
Review completed by Whitney Donoghue on 04/18/2023.

## **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

NEPA Compliance Officer

Date: 4/20/2023

**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: \_\_\_\_\_