

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Cornell University**STATE:** NY

PROJECT TITLE: Ground-Truthing: Exploratory Borehole Characterization and Modeling to Expand Techno-Economic Evaluation of Earth Source Heat at Cornell University, 2219-1508

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002219	DE-EE0009255	GFO-0009255-001	G09255

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.
- B3.6 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 Cornell University ('Cornell') for a practical working demonstration project that would enact and test the recommendations of a prior geothermal energy feasibility report (prepared under DOE award number DE-EE0008103) by drilling an exploratory borehole on-campus in Ithaca, NY. The purpose of the proposed project is to collect data to verify regional subsurface conditions and quantify the costs and benefits of using deep direct-use geothermal heat to meet a percentage of Cornell's annual campus heating demand.

The proposed project would consist of two 18-month Budget Periods (BP). Drilling and borehole measurements would occur in BP1. Fieldwork is expected to last for the full duration of BP1, and would be followed by another 18 months of office- and laboratory-based modeling, analysis, and reporting. This NEPA Determination applies to all Tasks of BP1

and BP2 as defined in the current Statement of Project Objectives. Project activities and locations associated with BP1 and BP2, respectively, are reviewed below.

Budget Period 1

Initial BP1 activities would be to plan, design, permit, and procure services for the drilling and testing program. Drilling activities would include coring, logging, and casing the borehole to a depth of approximately 10,000 ft. Borehole pressure and flow tests and fluid sampling would be conducted, along with the installation of monitoring equipment (fiber optic cables and a seismometer). The drilling period would be around 90 days.

The proposed drill site is within an approximately 8-acre gravel parking lot adjacent to campus storage and service facilities. This area is part of extensive continuous campus land holdings exclusively owned and controlled by Cornell. Up to 4 acres of the parking lot (effectively the southern half) would be used for the totality of operations during well construction. Once drilling is complete, the well head would be fenced off and a trailer would be installed next to the borehole for support of research in the field. The drill pad together with temporary site amenities would occupy less than one-quarter acre of the lot.

The defined project area is an existing fill site that has been used for over a decade as a parking lot and construction staging area for Cornell capital projects. The proposed drilling and testing activities would occur entirely on previously developed land and would not expand the area of previous disturbance. The drill site is directly accessible via roads maintained by Cornell (off a NY state highway) and has access to Cornell electric and water utilities, public sewer, and other needed infrastructure.

The proposed project would utilize an electric-power drill rig (Cornell Utilities have over 4 MW of power available at the site) and would not require water trucking (the campus water system supplies the site with sufficient amounts for drilling operations). Air emissions sources would therefore be reduced to minor diesel equipment used during site preparation and vehicles used to transport the drill rig, supporting equipment, and waste. The Cornell campus is within an attainment area. Drilling performed with an electrically-operated drill rig would also allow for significantly lower construction noise compared to diesel-power rigs, although intermittent noise above ambient levels would be generated during well construction. Noise impacts would be assessed and mitigated if necessary to comply with local noise ordinances.

The type of exploratory borehole that would be drilled is not classified as an injection well under U.S. Environmental Protection Agency regulations. Permitting and approval of the proposed project would be at state and local level:

- Local: The proposed drill site is within a Town of Ithaca development parcel specifically zoned for academic and research development, so the project is not anticipated to require a local Site Plan Approval. However, Cornell has provided information regarding the project to municipal officials and would make a formal application for site plan review and approval if requested by the Planning Board.
- State: The permitting authority for geothermal wells deeper than 500 ft. is the New York State Department of Environmental Conservation (NYSDEC) Division of Mineral Resources. Cornell has initiated the process for approval of Exploratory Drilling and consulted onsite with NYSDEC staff. The well permit application would be completed once a drilling contractor is selected and under contract. Site-specific conditions would be attached to the NYSDEC permit to mitigate potential impacts related to the natural features present in the project area. Special, more restrictive conditions are required for wells to be drilled through primary and principal aquifers.

The proposed project would procure commercially-available steel casing, cement, drilling mud ingredients, and other standard materials associated with exploratory drilling at this scale. The exact types and quantities of materials used by the proposed project would be determined during the planning phase of BP1 and detailed on the NYSDEC well permit application. Any hazardous chemicals would be used as approved by local NYSDEC regulators as well as the Cornell Department of Environmental Health and Safety and Risk Management (EHS).

Wastes generated by the proposed drilling and testing activities would include soil, drill cuttings, and wastewater. Some amount could potentially be classified for special handling or disposal rules. Drilling fluids and solid wastes would be tested for naturally-occurring radioactive materials from native bedrock formations and contamination from contact/mixing with natural substances in the subsurface (e.g., brines) and/or chemical additives. Uncontaminated soils and drill cuttings would be locally deposited as fill within the site or hauled to an approved and lawful Contractor site. Wastewater would be stored onsite in tanks, tested, and disposed of at licensed treatment facilities.

Although the precise nature and quantity of contaminated wastes (if any) cannot be quantified at this time, requirements for the segregation, storage, and disposal of such materials would be incorporated into the final work plan. Cornell EHS would provide comprehensive oversight and assist in ensuring compliance; the primary waste handling, central controls, and emergency response office of the department is adjacent to the drill site. Any hazardous materials encountered during the drilling process would be properly reported.

During drilling, the site would be occupied by members of the Cornell project team and sub-contractors for site oversight and construction. The terms of contracts between Cornell and any drilling services companies utilized for the project would require adherence to all applicable Federal, state, and local rules and regulations. Individuals working at this location could be exposed to physical and chemical hazards associated with drilling and well construction. Potential health and safety risks would be managed through a site-specific worker safety and emergency response plan developed and overseen by expert personnel with experience in substantial drilling operations. Once the well is constructed and crews are demobilized, the relatively lower risks related to subsequent testing activities would be managed in accordance with health and safety rules promulgated and overseen by Cornell EHS.

Borehole construction would have limited impacts to the surface environment beyond the footprint of drilling operations, which would be confined to an area of extensive previous disturbance. Project activities would not affect cultural resources, wetlands, floodplains, or prime farmlands. Coring, casing, and other best practices would be implemented as obligated by NYSDEC permit conditions to protect subsurface water resources and prevent migration of fluids from one stratum to another.

The U.S. Fish and Wildlife Service Endangered Species Program website (IPaC) identifies one federally listed species, the Northern Long-eared Bat (NLEB), believed to occur in the project area vicinity. However, according to a town-level database maintained by the NYSDEC Bureau of Wildlife, there are no known summer or winter occurrences of the species within Tompkins County. Since there is no evidence for the presence of NLEB, and the project area lacks probable roosting habitat, DOE has determined that the proposed project would have no effect on listed species. Bald and Golden eagles in addition to 16 migratory bird species of conservation concern, as identified in IPaC, may be present seasonally within the project area. Given the extent of previous development, there are no suitable habitats in the project area and site preparation and drilling activities would not disrupt any vegetation. Accordingly, DOE has determined the proposed project would not impact eagles, migratory birds, or their nests.

Budget Period 2

Project tasks to be completed in BP2 would include data analysis, computer modeling, laboratory research, and project reporting. Fluid and rock samples would be analyzed at Cornell College of Engineering facilities. Core samples would be sent to the National Science Foundation's Continental Scientific Drilling Coordination Office (CSDCO; Minneapolis MN) for analysis. The National Renewable Energy Laboratory (NREL; Golden, CO) would develop subsurface models of geothermal reservoir performance. 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.

Laboratory tasks would occur in facilities designed for this type of research; therefore, no modifications or new permits, additional licenses and/or authorizations would be necessary. Sample analyses would involve the use and handling of various hazardous chemicals. Existing health and safety policies and procedures would be followed, including employee training, proper protective equipment, engineering controls, and monitoring. No change in the use, mission or operation of existing facilities would arise out of these efforts.

Upon completion of the proposed project, Cornell intends to maintain the borehole as an observational well for future geothermal energy research and development projects. The well would eventually be closed and sealed in accordance with NYSDEC inactive well closure regulations, permit conditions, and all other applicable rules and requirements for this process and its timeframe. The site would be returned to its prior use, construction staging.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

Before undertaking any Task 2 ("Drill and log exploratory borehole") activities, Cornell University is required to obtain all requisite permits and approvals from the Department of Environmental Conservation (NYSDEC) Division of Mineral Resources and Town of Ithaca Planning Board. Further, Cornell University is required to submit a copy of all NYSDEC and Town of Ithaca permits and approvals to the DOE Project Officer prior to commencing Task 2 activities, and must comply with any and all associated terms and conditions.

Notes:

Geothermal Technologies Office

This NEPA determination requires a tailored NEPA Provision.

NEPA review completed by Whitney Doss Donoghue, 9/22/2020

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: 9/23/2020**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: _____