PMC-EF2a
(2.04.02)

# U.S. DEPARTMENT OF ENERGY
## EERE PROJECT MANAGEMENT CENTER
## NEPA DETERMINATION

**RECIPIENT:** NREL **STATE:** CO

**PROJECT TITLE :** ESIF Subsurface Exploration Program for Geothermal Potential; NREL Tracking No. 10-037

| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
|---|---|---|---|
| | | NREL-10-037 | GO10337 |

**Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:**

**CX, EA, EIS APPENDIX AND NUMBER:**
Description:

| | |
|---|---|
| **DOE/EA-1440-S-II** | Final Supplement-II to Final Site-Wide Environmental Assessment of the National Renewable Energy Laboratory's (NREL) South Table Mountain Complex (November 2009) |
| **A9** | Information gathering (including, but not limited to, literature surveys, inventories, audits), data analysis (including computer modeling), document preparation (such as conceptual design or feasibility studies, analytical energy supply and demand studies), and dissemination (including, but not limited to, document mailings, publication, and distribution; and classroom training and informational programs), but not including site characterization or environmental monitoring. |
| **B3.1** | Onsite and offsite site characterization and environmental monitoring, including siting, construction (or modification), operation, and dismantlement or closing (abandonment) 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. Activities covered include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. Specific activities include, but are not limited to: |
| **B3.6** | Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). |

Rational for determination:

The proposed project would be for a geothermal test boring associated with the Energy Systems Integration Facility (ESIF) construction activity located at the National Renewable Energy Laboratory's (NREL) South Table Mountain (STM) Complex, City of Golden, County of Jefferson, and State of Colorado. DOE funding would be used to drill one 5 1/2 inch bore hole to collect samples of underlying bedrock for analysis. The samples would be analyzed to investigate the feasibility of establishing a geothermal HVAC system for the ESIF building. A geothermal HVAC system would further NREL's goals of utilizing renewable energy sources on the STM site to demonstrate its technologies and to become a more sustainable institution. Per information from NREL, the HVAC system being conceptualized would be a closed loop system to accept and store waste heat from the planned super computer at the ESIF. The proposed test bore would be drilled within the future footprint of ESIF, northwest of the Visitor's Center and between the East Arroyo and the Science and Technology Facility (S&TF) in Site Development Zone 4 – Central Campus. The approximate coordinates of the ESIF are 39.7425°N 105.1703°W. The location proposed of the borehole is depicted in a figure uploaded to the PMC.

The construction of the ESIF was included as part of the Proposed Action analyzed within the November 2009 Final Supplement-II to Final Site-Wide Environmental Assessment of the National Renewable Energy Laboratory's South Table Mountain Complex (DOE/EA-1440-S-II). However, this analysis did not include geothermal resource assessments or development within its scope. The scope of this EF2a is only for the test bore and its associated sample testing, analysis, and reporting.

The drilling would take approximately 2 days but may continue for up to 7 days, and would utilize a combination of air and mud rotary and conventional NQ coring methods to attempt to obtain at least three (3) five-foot long core samples of the underlying bedrock formations. The core runs would be retrieved from approximate depths of 175, 225, and 300 feet below existing grades but would ultimately depend on the actual materials encountered at the time of drilling. Based on the core sample analysis and various downhole geophysical and hydrophysical methods, geologists and engineers would be able to analyze the feasibility of geothermal HVAC. Samples would be analyzed by Colorado School of Mines - Advanced Mineralogy Research Center (AMRC) performing petrographic analysis to evaluate the porosity of the bedrock core samples. Three (3) samples would be analyzed by the AMRC using a state-of-the-art

Quantitative Scanning Electron Microscope (QEMSCAN) to analyze and quantify the porosity of the cored bedrock materials. Additional testing of subsurface materials to evaluate additional engineering characteristics include moisture content, natural density, unconfined pressures, three (3) permeability tests, and gradation analysis. In addition, at least three (3) one-point thermal conductivity tests (thermal conductivity, thermal diffusivity, and specific heat capacity) would be performed on the recovered core samples. AMRC would analyze the results of the field and laboratory studies to develop geotechnical considerations such as site conditions, subsurface conditions, excavation considerations, and thermal properties of the bedrock materials.

The test bore would comply with construction standards and plugging, sealing and abandonment standards specified drilled in 2 CCR 402-10 State of Colorado Rules and Regulations for Permitting the Development and Appropriation of Geothermal Resources Through the Use of Wells and 2 CCR 402-2 Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction. As the total area of land disturbance would be far less than one acre, a Notice of Intent (NOI) with US EPA Region VIII for storm water associated with construction activity would not be required. However, NREL and drilling contractor would abide by NREL Laboratory Level Procedure 6.2-15 - Storm Water Pollution Prevention for Construction Activities: South Table Mountain Site. No dredge or fill of Waters of the U.S. (WOUS) including wetlands or seeps is anticipated as the U.S. Army Corps of Engineers identified no jurisdictional wetlands and no WOUS at the STM site in a recent Jurisdictional Determination. There would be no historic properties affected by this proposed action. The development of this area, within Site Development Zone 4, was scoped within the 2003 Final Site-Wide Environmental Assessment (SWEA) of the National Renewable Energy Laboratory's South Table Mountain Complex (DOE/EA-1440) as well as the November 2009 DOE/EA-1440-S-II, which included formal consultations with the Colorado State Historic Preservation Officer (SHPO). This proposed action would not impact the National Historic Register listed amphitheatre, foot bridge, or ammunition igloo. No federally listed threatened or endangered species, or designated critical habitats have been indentified at the STM. The drilling of the boring would require the utilization of mobile point emission sources (e.g. drill rig, support vehicles), but these emissions would be negligible given the size and duration of the activity. No generation of hazardous materials or waste is anticipated. NREL and all contractors would abide by established protocols and procedures for the management of munitions of concern and other potentially hazardous artifacts from former Camp George West activities/operations. Furthermore, NREL and all contractors would follow all federal, state, local safety and security regulations.

Per the analysis of the DOE/EA-1440-S-II and its Finding of No Significant Impact (FONSI) and the information provided above, this proposed project would qualify for Categorical Exclusions A9, B3.1(f), and B3.6. Any subsequent development of geothermal resources for the ESIF would require further evaluation and determination under NEPA.

**NEPA PROVISION**

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:
Installation of any geothermal wells and associated system components.
This restriction does not preclude you from:
Drilling of the geothermal test bore and subsequent resource assessment testing/analysis/reports.
If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

EF2A prepared by Rob Smith on 08/13/2010

**SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.**

NEPA Compliance Officer Signature: _____ Date: 8/13/10

NEPA Compliance Officer

**FIELD OFFICE MANAGER DETERMINATION**