

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** [Upflow Limited](#)**STATE:** [Mult](#)**PROJECT TITLE:** [Geothermal Operational Optimization with Machine Learning \(GOOML\)](#)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001956	DE-EE0008766	GFO-0008766-001	

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 (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.)

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Upflow Ltd. to develop machine learning algorithms to increase geothermal operational efficiency. Field production data would be sourced from existing geothermal fields in New Zealand, California, and Nevada. This data would then be used to develop algorithms which could identify opportunities for increased geothermal efficiency, detect hazards/risks, and enable predictive scenario modeling. Data gathering would be limited to steam field operations (e.g. well flows, separation pressures and mass flow), and would not include drilling operations or exploration activities. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities for BP1 would consist of data curation, standardization, and validation (e.g. data would be obtained from project partner Ormat Technologies' fields sites at the locations described above), as well as development/training of machine learning algorithms using the curated data. BP2 activities would consist of algorithm testing using historical data, real-time testing of algorithms against Ormat's field operations, and dissemination of findings (e.g. publications, presentations, workshops, etc.).

All project activities would be performed by Upflow, in coordination with Ormat Technologies. Development of machine learning algorithms would be performed at the National Renewable Energy Laboratory (NREL) in Golden, CO. Real time testing of algorithms would be performed by Upflow using their computers/hardware and the algorithms developed, while comparing the efficiency of the algorithms with Ormat's operational data at a selected geothermal site. The algorithms developed would not be installed on Ormat's computers, nor would they control real-time operations. Project activities would be limited to data gathering/algorithm development and would not involve laboratory testing or field operations. Accordingly, no significant health or safety risks are anticipated. Upflow and its project partners would adhere to all relevant Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

[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.](#)

Notes:

Geothermal Technologies Office

This NEPA determination does not require a tailored NEPA Provision. Please include the standard DOE laboratory language in the award.

NEPA review completed by Jonathan Hartman, 07/15/2019

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.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

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: 7/16/2019

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: _____