PMC-EF2a

(2.04.02)

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

RECIPIENT: United Technologies Research Center **STATE:** CT

PROJECT TITLE: Optimization of hybrid-water/air-cooled condenser in an enhanced turbine geothermal ORC system

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-PS36-09GO99018	DE-EE0002738	GFO-10-367	GO2738

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:

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.

B3.6 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:

United Technologies Research Center (UTRC) would develop a hybrid water/air cooled condenser and an enhanced turbine for geothermal-based Organic Rankine Cycle (ORC) power production systems. Project work would take place in three locations: UTRC's ORC Lab in East Hartford, CT; the Power plant laboratory at Chena Hot Springs Resort in Alaska; and the Mechanical Engineering Laboratory at the University of Illinois at Urbana-Champaign.

The project is divided into multiple tasks with sub-tasks:

1. Hybrid-Water/Air-cooled Condenser Development – sub-tasks within this task include defining and prioritizing experimental and modeling tasks, developing mist evaporative pre-cooling and mist deluge evaporative cooling models, developing hybrid-water/air-cooled condenser model and validating the model by experimentation.
2. Enhanced Turbine Technology Development – sub-tasks include the evaluation and design of variable nozzles; evaluation and design of boundary layer suction in the diffuser; design, procure, and demonstrate the enhanced turbine technology.
3. System Design and Optimization – sub-tasks include integration of the models from tasks 1 and 2 into the geothermal ORC system model and providing an optimized design for the geothermal ORC system for evaluation.
4. Feasibility Analysis of Geothermal-Driven Liquid Gap Membrane Distillation (LGMD) Pure Water Supply
5. Project Management and Reporting – Reports and other deliverables would be provided in accordance with the Federal Assistance Reporting Checklist following the instructions included therein.

According to the R&D Laboratory Questionnaires, all required permits are in place and no new permits would be needed. No air pollutants would be created by the project work. All laboratories involved have applicable safety protocols in place.

**NOTE: Prior to this NEPA determination, DOE obligated DOE funds in the amount $119,993 for expenditure by UTRC. The following tasks were covered in the blanket CX for the Limited release of Funds modification:

Task 1 Hybrid-Water/Air-cooled Condenser Development

Task 1.1 Trade space definition for hybrid-water/air-cooled condensers

All remaining tasks of this project (Tasks 1.2 through 5) are comprised of information gathering, data analysis, document preparation; and conventional laboratory operations/small-scale research and development; therefore the DOE has categorized this proposal into Categorical Exclusions A9 and B3.6.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

None Given.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 5/5/10

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.

☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager