

PMC-EF2a

(2.01.02)

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



RECIPIENT: ClimateMaster

STATE: OK

PROJECT TITLE : Development of Design and Simulation Tool for Hybrid Geothermal Heat Pump System

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
0000116	DE-EE0002799	GFO-10-134	GO2799

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.

Rational for determination:

ClimateMaster (CM) would develop a modeling system for hybrid and/or water to water ground geothermal heat pump (GHP) systems. The project would produce a computer model, which could be used in the planning and design of stimulation techniques to create engineered GHP systems. The work would take place at the existing ClimateMaster office, 7300 S.W. 44th Street, Oklahoma City, Oklahoma. The project would be divided into four tasks:

Task 1 would develop the eQUEST modeling software to:

- Allow coupling of the water-to-water heat pump to horizontal and vertical well fields.
- To more accurately simulate water-to-water heat pump units, the existing model would be improved to account for the impacts of varying condenser and/or evaporator water flow rate on the capacity and efficiency.
- The fan coil algorithm would be enhanced to better model the relatively low heating supply temperature provided by a water-to-water heat pump.
- The 3-loop chiller (simultaneous heating and cooling) would also be modified to allow coupling to horizontal and vertical well fields.

Task 2 would develop the following capabilities to eQUEST modeling software:

- Perform real multi-year simulation, with each year utilizing the actual loading history calculated in the simulation of previous years
- To accelerate the computation speed of the multi-year simulation, a new algorithm to aggregate the loading history would be investigated and implemented
- Selected reports in eQUEST would be expanded to allow outputting of simulated performance of conventional and hybrid GHP systems over multi-year period.

Task 3 would develop the the following capabilities to eQUEST modeling software:

- The ability to couple either a cooling tower, fluid cooler, or dry cooler to a ground-loop heat exchanger. This device may be piped in parallel with the ground loop heat exchangers (GLHE), or may be piped in series; either upstream or downstream.
- The ability to couple a boiler to a GLHE. Similar to cooling, this device may be piped in parallel with the GLHE, or may be piped in series downstream of the GLHE.
- The ability to model the most common temperature control sequences for hybrid systems.

Task 4 would consist of reporting and other deliverables as required by DOE.

This proposed action includes gathering, analysis, and dissemination of data via reports, publications, and the development of computer software. This proposal comprises conventional laboratory operations, data analysis, and

actions to promote the research and development of more efficient geothermal technologies; therefore this project is categorized as CX A9.

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: 2/24/10
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