PMC-ND
(1.08.09.13)

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

RECIPIENT: Advanced Cooling Technologies, Inc. **STATE:** PA

PROJECT TITLE: Loop thermosyphon enhanced solar collector

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001778	DE-EE0008398	GFO-0008398-001	

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, 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.)
B3.6 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 funding to Advanced Cooling Technologies (ACT) to develop a novel solar collector which would integrate a loop thermosiphon for heat transfer. The collection system would utilize light-absorbing nanofluids and would be capable of collecting and transferring up to 1.5 kW/m2 solar thermal energy for steam generation from brackish water. The project would include fabrication and testing of a full-scale prototype system.

The proposed project would be completed over three Budget Periods (BPs). BP1 would assess component-level technologies and confirm that they function independently. BP2 would focus on integration of component-level technologies and would confirm dependent functionality. Continuous long-term reliability tests would also be performed. BP3 would center on fabrication and testing of a full-scale prototype system, as well as market/commercial analysis. Proposed project activities would include data anlysis, computer modeling, materials analysis/characterization, nanofluid synthesis, nanofluid reliability testing (e.g. life cycle testing), solar receiver development, component performance testing (e.g. thermal cycling testing), corrosion testing, stakeholder engagement/market research, and development/fabrication of sub-scale and full-scale prototypes.

Design, fabrication, and testing of the solar collector would be performed at ACT's facility in Lancaster, PA. ACT's project partner, the University of Maryland (UMD), would carry out the design, synthesis and testing of the nanofluid to be used in the loop thermosiphon at its College Park campus in College Park, MD. Both locations are existing, purpose-built facilities in which similar work is regularly performed. No changes in the use, mission or operation of existing facilities would be required as part of this project. No additional permits would be required in order to perform the project work activities.

The project would involve the use and handling of various hazardous materials, including metal components (approximately 200 kg of copper and stainless steel) and industrial solvents. The nanofluid would be composed of a non-toxic mixture of approximately 100 kg of water and 1 kg of graphene. Both ACT and UMD would handle all

hazardous materials and perform laboratory work in accordance with each entity's existing corporate health and safety policies and procedures. Additional policies and procedures would be implemented as necessary as new health and safety risks are identified. ACT and UMD would adhere to all local, state, and federal health, safety and environmental regulations.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410(2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Jonathan Hartman on 8/21/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Electronically Signed By: Kristin Kerwin Date: 8/21/2018

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