PMC-ND
(1.08.09.13)

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

RECIPIENT: Massachusetts Institute of Technology **STATE:** MA

PROJECT TITLE: Ceramic Castable Cement Tanks and Piping for Molten Salt

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001697	DE-EE0008375	GFO-0008375-001	

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 Massachusetts Institute of Technology (MIT) to design, develop, fabricate, and test castable cement tanks and piping for high temperature molten salt (capable of withstanding temperatures greater than 750°C). Testing and materials development would focus on optimizing the castable cement composition's corrosion and penetration resistance to molten salt. Testing would also seek to demonstrate the functionality of the cement tanks under flow conditions.

Proposed project activities would include computer modelling (e.g. heat transfer simulations, stress analysis), data analysis, cement tank development and system design, casting/curing the cement tank and pipe sections, performance testing, materials testing, cost modeling, and system optimization.

Performance/component testing would be performed using a closed loop system. The loop would measure approximately 5 ft. x 4 ft. x 3 ft. It would be installed in-lab, inside of a vacuum chamber at the ASE Laboratory at MIT's main campus in Cambridge, MA. The loop would consist of a pump, piping, a tank and a flow meter. It would be thermally insulated and have heaters and thermocouples for monitoring. The loop would be installed in existing facilities, using off-the-shelf components.

As part of this project, modifications would be made to MIT's facilities in order to renovate a dedicated laboratory space for testing. Modifications would be limited to facility upgrades and would not involve new construction (e.g. digging or demolition). Upgrades would include routing power, measuring 480 V and 208 V, to the third floor (where the laboratory would be established) via an existing column in one corner of the building; adding water lines to an existing main on the third floor; and adding approximately 4-5 exhaust ports (snorkels) to supplement an existing fume hood. The space to be modified measures approximately 800 sq. ft., with an additional 100-200 sq. ft., contiguous to the area in question, which may also be included as part of the area to be modified. The estimated start date of the facility upgrades would be in September, 2018. The modifications would take approximately 3 months to finish.

Additional testing, analysis and materials characterization would be conducted by MIT's project partner, Purdue University. Specifically, Purdue University would test castable cement compositions using controlled atmosphere furnaces. All testing would be performed at Purdue's Sandhage Laboratory (Lafayette, IN) using existing facilities and equipment that are purpose-built for these types of work activities.

Fabrication of test tank and pipe components would be carried out by Westmoreland Advanced Materials (WAM) at its Manufacturing and Testing Facility in Charleroi, PA. Materials testing and cement composition formulation activities would also be performed. WAM's facility is a dedicated commercial production and testing facility that specializes in the production and analysis of the materials to be used as part of this project.

The project would involve the use and handling of various hazardous materials, including metals, gasses and industrial solvents. All such handling would occur in-lab, at existing, dedicated facilities in accordance with Federal, state, and local environmental regulations. MIT and its project partners would adhere to existing health and safety policies and procedures, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Additional policies and procedures would be implemented as necessary as new health and safety risks are identified.

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.
NEPA review completed by Jonathan Hartman, 08/17/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 8/17/2018

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