PMC-ND
(1.08.09.13)

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

RECIPIENT: TIAX LLC **STATE:** MA

PROJECT TITLE: Waste Heat-to-Power Using Scroll Expander for Organic Rankine Bottoming Cycle

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000560	DE-EE0005767	GFO-0005767-002	GO5767

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.)
B3.11 Outdoor tests and experiments on materials and equipment components	Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to TIAX LLC to develop a novel, scalable scroll expander for organic Rankine cycle (ORC) waste-heat-recovery systems that can be used to convert medium-grade waste heat to electric power in a wide range of advanced manufacturing industries, and to then test that expander in laboratory and field environments.

This award previously received a NEPA determination (GFO-0005767-001; CX-A9, CX-B3.6; 7/3/2013) for information gathering, data analysis, laboratory research and development activities (Tasks 1-12, 14, and 16-18) as described in the Statement of Project Objectives (SOPO). The SOPO associated with this phase of the project has had tasks re-arranged. Task 15 was originally restricted and now appears as Task 17. Task 13 was originally restricted and now appears as both Task 13 and Task 16. For the purposes of this review we will regard Task 15 as permitted activities and Tasks 16 and 17 as restricted activities. Therefore, this NEPA determination will review deployment and field testing activities associated with Tasks 13, 16, and 17 as described in the SOPO.

Activities associated with Tasks 13 and 16 include the deployment and testing of an organic Rankine cycle on the roof of Green Mountain Coffee Roasters located in Essex Junction, Vermont. A complete system would be shipped and installed in a coffee roaster at Green Mountain Coffee Roasters under the supervision of engineers from TIAX. Initial validation tests would be conducted and compared with the performance baseline as measured in the TIAX laboratory. Staff would also be trained in the operation of the ORC system and in accessing the operating data. The key performance parameters such as power generated, expander efficiency and heat exchanger effectiveness would be monitored and recorded over 1 year of operation using waste heat from a thermal oxidizer. Task 17 would involve performance monitoring, data collection and measuring of product degradation.

The equipment would be installed on an existing roof framework of a building within a large industrial complex. This equipment consists of a 15' x 6' x 5' high condenser unit, a 3' x 5' x 5' high central equipment package, and a 2' x 2' x 2' high boiler which would be mounted into an existing exhaust stack. Hoisting equipment onto the roof would necessitate the use of a crane for one day. The crane would be parked in a parking lot adjacent to the building. This

equipment would generate approximately 20-25 kW of electricity and an electrical permit would be required to tie the equipment into the building electrical system. No other site operation permits are necessary for system operation. There would be no other physical modification to or change in the use, mission, or operation of existing facilities. According to local code there is a limit of 50 dBA measured instantaneously at the property line. Objectionable and intermittent tones would be avoided and equipment would have sound attenuating enclosures to meet the requirement. Due to the rooftop nature of the installation, there would be potential for visual impact. Materials would be chosen to blend in with existing industrial equipment on the roof to minimize any visual impact. Due to the proposed activities location at an existing commercial facility and the temporary nature of the field testing, DOE has determined that there would not be any adverse effects to resources of concern as a result of the proposed project.

Approximately 120 lbs. of R 245fa refrigerant and 5 gallons of polyolester oil (POE) would be utilized during the course of this project. DOT-approved containers would be used in transporting and storing these materials. Disposal and recovery of refrigerant and oil would be carried out in accordance with Federal, State, and local regulations. Upon concluding these field testing activities, the R 245fa and POE oil will be recovered using methods approved by the U.S. Environmental Protection Agency (EPA) and recycled at an EPA-approved facility. No siting, construction or major expansion of waste storage, disposal, recovery, or treatment actions/facilities would be required.

Based on review of the project information and the above analysis, DOE has determined the proposed project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that this project is consistent with actions outlined in DOE categorical exclusion A9 "Information gathering, analysis, and dissemination" B3.11 "Outdoor tests and experiments on materials and equipment components" and is therefore 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 :

Advanced Manufacturing Offices
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord, 02/25/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 3/3/2016

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