PMC-EF2a

(2.04.02)

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

RECIPIENT: University of Idaho **STATE:** ID

PROJECT TITLE : Energy Efficient Integrated FRP-confined Sandwich Roof System

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000621	DE-EE0006117	GFO-0006117-001	

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.
B5.1 Actions to conserve energy or water	(a) Actions to conserve energy or water, demonstrate potential energy or water conservation, and promote energy efficiency that would not have the potential to cause significant changes in the indoor or outdoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, manufacturers, and designers), organizations (such as utilities), and governments (such as state, local, and tribal). Covered actions include, but are not limited to weatherization (such as insulation and replacing windows and doors); programmed lowering of thermostat settings; placement of timers on hot water heaters; installation or replacement of energy efficient lighting, low-flow plumbing fixtures (such as faucets, toilets, and showerheads), heating, ventilation, and air conditioning systems, and appliances; installation of drip-irrigation systems; improvements in generator efficiency and appliance efficiency ratings; efficiency improvements for vehicles and transportation (such as fleet changeout); power storage (such as flywheels and batteries, generally less than 10 megawatt equivalent); transportation management systems (such as traffic signal control systems, car navigation, speed cameras, and automatic plate number recognition); development of energy-efficient manufacturing, industrial, or building practices; and small-scale energy efficiency and conservation research and development and small-scale pilot projects. Covered actions include building renovations or new structures, provided that they occur in a previously disturbed or developed area. Covered actions could involve commercial, residential, agricultural, academic, institutional, or industrial sectors. Covered actions do not include rulemakings, standard-settings, or proposed DOE legislation, except for those actions listed in B5.1(b) of this appendix. (b) Covered actions include rulemakings that establish energy conservation standards for consumer products and industrial equipment, provided that the actions would not: (1) have the potential to cause a significant change in manufacturing infrastructure (such as construction of new manufacturing plants with considerable associated ground disturbance); (2) involve significant unresolved conflicts concerning alternative uses of available resources (such as rare or limited raw materials); (3) have the potential to result in a significant increase in the disposal of materials posing significant risks to human health and the environment (such as RCRA hazardous wastes); or (4) have the potential to cause a significant increase in energy consumption in a state or region.

Rational for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to the University of Idaho (Idaho) to research, develop, and demonstrate an energy efficient integrated Fiber-Reinforced Polymer (FRP) confined sandwich roof system. The proposed FRP-Confined Sandwich Roof (FCSR) would use a FRP shell, as both a supporting structure and a roofing material, to enclose polystyrene foam insulation and concrete into an integrated complete roof system. It would combine the roofing, insulation, and supporting structure into a sandwich modular panel.

Idaho would partner with Purdue University, the City College of New York, and Missouri Structural Composites, LLC to complete the proposed research and development (R&D) project. Funding would be used for R&D activities to design, fabricate, test and analyze FRP and foam insulation materials. Once the FRP and foam insulation materials have been developed, funding would be used to design, fabricate, test and analyze prototype-scaled FCSR panels (specimens). Once the prototype-scaled FCSR panels have been tested and analyzed, full-scale FCSR panels would be fabricated and tested. The above activities would occur indoors within research laboratories and evaluate thermo-physical, solar reflectance, structural strength, water resistance, smoke and toxicity, fire resistance and ultra-violet (UV) resistance properties to ensure compliance with requirements from the International Building Code and relevant ASTM International Standards to ensure the materials can be qualified as building construction materials.

After the full-scale FCSR panels have been analyzed in a laboratory environment, a small-scale outdoor demonstration would occur to test, evaluate and compare the performance of the FCSR system against a traditional roof system. Purdue University would complete this activity and would construct two identical scaled demonstration structures to serve as labs for performance analysis of heat transfer, thermal properties, peak energy, energy consumption, dead load, and rain, snow, and wind load. Both structures would be installed in a previously disturbed, cleared and open area currently used for various testing activities adjacent to the Bowen Large-Scale Civil Engineering Research Laboratory located at 1040 S. River Road West Lafayette, Tippecanoe County, Indiana on the Purdue University campus. The structures would be the size and shape of a small shed (approximately 8 ft. wide by 8 ft. long by 8 ft. high), there would be no excavation involved to build the structures and they would have a temporary electrical connection. To evaluate and compare the performance of the FCSR system against a traditional roof system, one structure would have the FCSR system and the other would have a traditional roof system. The temporary demonstration structures would be removed and properly disposed of after the completion of this grant.

The U.S. Fish and Wildlife Service (USFWS) Endangered Species Program website identifies two species in Tippecanoe County, Indiana; the Eastern Massasauga rattlesnake (candidate) and the Indiana bat (endangered), that may have suitable habitat in the vicinity of the proposed project site. However, due to the lack of potential habitat at the site, previously disturbed condition of the site, the small scope of work, the minimal time associated with the installation of the structures and the passive approach to the data collection and analysis; DOE has determined the proposed scope of work would not adversely affect the threatened and endangered species in the area. Other resources, including wetlands, floodplains and cultural resources would not be adversely affected as they are not known to occur at the proposed location.

Laboratory scale R&D activities would be conducted at following locations:
- University of Idaho – Structures and Materials Laboratory, Roll Research Laboratory, McDonald Research Laboratory; 709 South Deakin Street, Moscow, Idaho
- City College of New York - Grove School of Engineering, Materials Laboratory; 160 Convent Ave, New York, New York
- Purdue University - Bowen Large-Scale Civil Engineering Research Laboratory; 1040 S. River Road West Lafayette, Indiana
- Missouri Structural Composites, LLC. - 400 South Elm Street, Dixon, Missouri

The University of Idaho, Purdue University, the City College of New York, and Missouri Structural Composites, LLC each completed an NEPA R&D questionnaire addressing their protocols for laboratory and facility safety, risk management and waste disposal. The laboratories and facilities comply with standard safety procedures and all processes and procedures are monitored by Environmental Health and Safety staff and proper safety equipment is place. The laboratories and facilities have all applicable permits in place, and would not need additional permits for the proposed activities. All handling and disposal of gases, chemicals, wastes and liquid effluents comply with appropriate regulations.

Based on review of the project information and the above analysis, DOE has determined the research, development, testing and analysis activities associated with the development and small-scale demonstration an energy efficient integrated Fiber-Reinforced Polymer confined sandwich roof system would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with actions contained in DOE categorical exclusions A9 "information gathering, analysis and dissemination," B3.6 "small-scale research and development, laboratory operations and pilot projects," and B5.1 "Actions to conserve energy," and 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 you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

DOE funding: ~$1,499,545
Cost Share: ~$1,499,545
Total Project Cost: ~$2,999,090

Obadiah Broughton 2/20/2013

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 2/20/2013
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