PMC-ND
(1.08.09.13)

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

RECIPIENT: Arizona State University **STATE:** AZ

PROJECT TITLE: 15%-efficiency (Mg,Zn)CdTe solar cells with 1.7 eV bandgap for tandem applications

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001387	DE-EE0007552	GFO-0007552-001	

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 federal funding to Arizona State University (ASU) to design, fabricate, and test photovoltaic (PV) cells in order to demonstrate a 15%-efficient (Mg,Zn)CdTe PV cell with a bandgap of 1.7–1.9 eV.

Proposed activities would include deposition of thin films to form the contacts and electrodes of the PV cells, fabrication of PV cells, and measurement of power output. Deposition of thin films would be completed by ASU in their Macro Technology Works facility on campus in Tempe, AZ. Fabrication using molecular beam epitaxy, and power output measurement would occur at ASU in their Engineering Research Center on campus in Tempe, AZ. Fabrication using close-space sublimation, and power output measurement would be undertaken by the National Renewable Energy Lab (NREL) at their Science and Technology facility in Golden, CO. The facilities in which this lab work would occur are purpose-built for the type of activities being proposed; therefore, no new or modified permits, construction of new facilities or physical modifications to existing facilities would occur as a result of the proposed project.

The proposed project would necessitate the use and/or handling of potentially hazardous acids, bases, and semiconductor solid precursors and process gases. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations. Both facilities have established health and safety policies that all faculty, staff, and students must adhere to. At ASU, buffered oxide etchant containing hydrofluoric acid would be used during cleaning of silicon wafers and potassium hydroxide would be used during saw-damage removal. These hazardous acids and bases would be disposed of at the MacroTechnology Works facility at ASU. This facility is equipped with an industrial waste processing plant to neutralize acids. Acids arrive at this plant via industrial waste drains in the labs, and are then neutralized. This disposal method is in accordance with all federal, state, and local regulations.

Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of 10 CFR 1021 subpart B 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.

Insert the following language in the award:

You are required to:
Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Note to Specialist :

Solar Energy Technology Office
This NEPA determination requires a tailored NEPA provision.
Review completed by Rebecca McCord 07/21/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 7/25/2016
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