

PMC-EF2a

(20402)

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



RECIPIENT: University of Delaware

STATE: DE

PROJECT TITLE : Low cost back contact heterojunction solar cells on thin c-Si wafers: Integrating laser and thin film processing for improved manufacturability

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000492	DE-EE0005314	GFO-0005314-001	GO5314

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:

- B3.6** Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).
- A9** Information gathering (including, but not limited to, literature surveys, inventories, audits), data analysis (including computer modeling), document preparation (such as conceptual design or feasibility studies, analytical energy supply and demand studies), and dissemination (including, but not limited to, document mailings, publication, and distribution; and classroom training and informational programs), but not including site characterization or environmental monitoring.

Rational for determination:

DOE is proposing to provide federal funding to the University of Delaware (UD) to conduct laboratory research demonstrating an interdigitated back contact-silicon heterojunction (IBC-SHJ) solar cell with efficiency >20% on 50 μ m kerfless Si wafers using laser processing.

A team consisting of UD's Institute of Energy Conversion (IEC), Massachusetts Institute of Technology (MIT), and JP Sercel Associates, Inc. (JPSA) would implement IBC-SHJ device architecture. All facilities have completed an R&D questionnaire addressing the protocol in place regarding laboratory safety, risk management, chemical handling and waste disposal.

Laboratory work would be conducted at UD's IEC (451 Wyoming Road, Newark, Delaware 19716). University safety and environmental protocols are monitored through periodic inspections by the UD's Department of Environmental Health and Safety (EHS). Personnel using x-ray generating equipment are screened quarterly for exposure through testing of x-ray sensitive badges that must be worn at all times when operating equipment. IEC is operating under a State of Delaware Health and Social Services, Division of Public Health for use of the x-ray generating equipment (x-ray diffractometers).

Laboratory work would be conducted at JPSA (220 Hackett Hill Road, Manchester, New Hampshire 03102). The facility has a Laser Safety Program established using the American National Standard for Safe Use of Lasers (ANSI Z136.1-2007) as a guide. JPSA's Safety Committee performs periodic inspections of all laboratories and equipment. Specialty training for laser equipment, chemical and gas handling is required. Training for laser operators meets and fulfills ANSI Z136.1 and OSHA's training requirement for employees working around Class 3B and 4 lasers.

Laboratory work would be conducted at MIT (77 Massachusetts Avenue, Cambridge, Massachusetts 02139). The PVLab is comprised of two rooms of processing and characterization equipment, including a class 10,000 cleanroom environment. Safety protocols at MIT are designed and enforced by MIT's Environmental Health and Safety, which meet or exceed OSHA standards. The handling of chemicals, wastewater, and hazardous waste is handled in accordance to EH&S guidelines. This research will not exceed any Threshold Planning Quantities but includes the laboratory use of some chemicals (acids and Nitrogen), which are included in the Institute's SARA 302 reporting. MIT operates under a Title V air permit in which these laboratory scale air emissions are included and considered insignificant. Wastewater discharges are in compliance with an industrial wastewater permit with the MWRA. The research may generate small amounts of D001 ignitable and D002 corrosive hazardous wastes. These will be managed in compliance with MIT's existing practices as a large quantity generator.

Based on this information, DOE had determined the work outlined is consistent with activities identified in categorical

exclusion A9 (information gathering) and B3.6 (indoor bench-scale research and conventional laboratory operations).

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

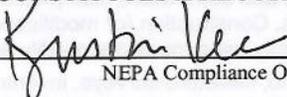
If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Cristina Tyler 10.31.2011

DOE Funding: \$3,300,000
Cost Share: \$1,012,016
Total Project Cost: \$4,312,016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Date: 11/1/2011
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