PMC-ND
(1.08.09.13)

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

RECIPIENT: Zyvex Labs LLC **STATE:** TX

PROJECT TITLE : Atomically Precise Manufacturing of 2-D Designed Materials

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001465	DE-EE0008311	GFO-0008311-001	GO8311

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.
B3.15 Small-scale indoor research and development projects using nanoscale materials	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Zyvex Labs to develop 2D designed materials by atomic precision placement of dopant atoms in a single atomic plane of silicon to allow for specific electronic properties to be achieved. Project activities would include initial sample preparation, Scanning Tunneling Microscope lithography, dosing, and molecular beam epitaxy along with sample device inspection which would be performed at Zyvex Labs, in Texas. Surface physics, electrical characterization, and Fourier-transform infrared spectroscopy would be completed at 3D Epitaxial Technologies, also in Texas. The National Institute of Standards and Technology (NIST) laboratory would perform the fabrication and processing of silicon samples in an ultra-high vacuum environment within an existing laboratory at NIST headquarters in Maryland.

The proposed activities would require the use and handling of various hazardous materials, including industrial solvents, chemical compounds and nanoscale material. The handling of these materials would occur in research laboratories and dedicated manufacturing facilities with hazardous material handling and disposal practices including a gas cabinet and a laboratory vented hood, to ensure employee safety,and compliance with federal and state laws. Each location has its own environmental health and safety office that would develop and enforce safety policies, provide protective equipment, maintain controls, and perform monitoring, to reduce risks to employees and the public. Additionally, each facility has previously completed work that is similar to the activities included in the proposed project, therefore no modifications, new permits or change in the use, mission, or operation of any of the facilities would be required.

The nanoscale materials to be used would primarily be silicon which poses minimal health risks. Any trace amount of gas would be trapped on the silicon surface and then would be encapsulated in evaporated silicon all while residing inside a vacuum chamber. The samples would be safe to dispose of in the normal trash or in a sharps container.

Work proposed to be conducted at the NIST laboratory may be subject to additional NEPA review by the cognizant National Institute of Standards and Technology NEPA compliance authority for the laboratory prior to initiating such work. Further, any work conducted at the NIST 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 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.

Insert the following language in the award:

You are required to:
Work proposed to be conducted at the National Institute of Standards and Technology (NIST) laboratory may be subject to additional NEPA review by the cognizant NIST NEPA compliance authority for the laboratory prior to initiating such work. Further, any work conducted at the NIST laboratory must meet the laboratory's health and safety requirements.

Note to Specialist :

This NEPA Determination requires a tailored NEPA provision.
Advanced Manufacturing Office
Diana Heyder 04/05/18

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 4/6/2018

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