

PMC-ND
(1.08.09.13)

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



RECIPIENT: Dana-Farber Cancer Institute

STATE: MA

PROJECT TITLE : DNA Strand Displacement driven Molecular Additive Manufacturing (DSD-MAM)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001465	DE-EE0008310	GFO-0008310-001	GO8310

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 the Dana-Farber Cancer Institute (hereafter 'Dana-Farber') to develop and demonstrate two-dimensional molecular printers assembled from DNA molecules that would function as integrated nanosystems for molecular additive manufacturing (MAM). The development of nanoscale printers for MAM would help advance the use of new tools and processes that would reduce the energy and materials costs of manufacturing at the atomic level.

Two different architectures for DNA-based 2D printers ('stack' and 'wrap') would be developed and tested, in order to validate each architecture's respective performance in patterning (i.e. writing) on DNA-origami canvases. Throughout the project, Dana-Farber would work with sub-recipient Oxford University on the development of these tools, with each entity focusing on one of the two architecture types. Project activities would include the design and validation of individual printer parts (e.g. monomer and other biological subunits formed into functional parts including stacks, sliders, wraps, and rails), the assembly of 2D printers, testing of programmable movement of printer parts, and testing and demonstration of 2D nanoprinting.

All project activities would be carried out at the research laboratories of Dana-Farber in Boston, MA and Oxford University in Oxford, UK. Both laboratories are dedicated, purpose-built facilities that regularly carry out testing and experiments similar to the activities proposed as part of this project. No change in the use, mission, or operation of existing facilities would arise as a result of this project.

Project materials would include DNA oligonucleotides and agarose gel, as well as small amounts of hazardous materials including ethidium bromide, SYBYR Safe (cyanine), and uranyl formate. Project activities would be carried out in aqueous environments that would not generate emissions into the ambient air. Any potential hazards presented by the use of the project materials would be addressed by each entity's respective health, safety and waste

management policies. These include employee training, the use of proper protective equipment, engineering controls, monitoring, and internal assessments. All hazardous materials would also be managed in accordance with Federal, State, and local environmental regulations.

Based on the review of the proposal, DOE has determined that activities associated with the proposal fit 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. All activities associated with this proposal are categorically excluded from further NEPA review. Further, DOE has determined that the work to be carried out at Oxford University is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

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 Office
This NEPA determination does not require a tailored NEPA Provision
NEPA review completed by Jonathan Hartman, 5/22/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Date: 5/22/2018
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