PMC-ND
(1.08.09.13)

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

RECIPIENT: Lumen Bioscience (Matrix Genetics) **STATE:** WA

PROJECT TITLE : SOFAST: Streamlined Optimization of Filamentous Arthrospira/Spirulina Traits

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001628	DE-EE0008120	GFO-0008120-001	

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.
B5.15 Small-scale renewable energy research and development and pilot projects	Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Lumen Bioscience, Inc. to design, develop, and evaluate lipid-producing and stress resistant strains of genetically engineered Arthrospira (cyanobacteria species) for algal biofuel production.

The proposed project would involve: data collection and analysis; software development; laboratory-based research and development including metabolic design, engineering and profiling; and both indoor and outdoor performance testing of genetically modified Arthrospira strains. Initial design, bench- and small-scale strain engineering and testing will occur at the dedicated Lumen research laboratory in Seattle, WA. Combinatorial libraries of stress tolerance genes would be comprised of 100-1000 unique sequences. Algae growth would be approximately 1-50 L in indoor photobioreactors and raceways. Samples would be shipped to the National Renewable Energy Laboratory (NREL) in Golden, CO for bench-scale indoor strain cultivation (up to 5 L) and metabolic phenotyping of the strains utilizing mass spectrometry and infrared spectroscopy. Both of these facilities are designed for this type of research; no modifications or new permits, additional licenses and/or authorizations would be necessary. No change in the use, mission or operation of existing facilities would arise out of these efforts.

Larger-scale outdoor cultivation experiments (up to 1000 L) aimed at testing strain productivity and establishing a raceway optimization protocol would occur at Arizona State University's Arizona Center for Algae Technology and Innovation (AzCATI) located in Mesa, AZ. This work would make use of the existing ATP3 testbed production platform to cultivate select engineered strains in photobioreactors and 4 m2 minipond raceways. The project would culminate with participation in the PEAK outdoor demonstration challenge at AzCATI, with a short-term and temporary production goal of 19 grams per square meter per day for the purpose of strain validation. AzCATI is purpose-built for the types of activities being proposed; therefore, no adverse impacts to sensitive resources are expected as a result of the proposed activities at this location.

The proposed project would involve the use and development of genetically engineered organisms. All such work at Lumen is classified as Biosaftey Level (BSL-1) – the lowest biosafety lab level posing minimal potential threat to workers and the environment. Laboratory activities would be conducted in accordance with federal, state and local regulations on the use of biohazards, as well as the Institutional Biosafety panel's recommendation on handling, maintenance, and disposal of modified strains. This would include clear sample tracking and destructive discarding of materials. For activities involving outdoor testbeds under contract with AzCATI, an Environmental Protection Agency (EPA) approval would be obtained to conduct open pond studies with Arthrospira. Specifically, a dedicated Toxic Substances Control Act (TSCA) Environmental Release Application (TERA) for the outdoor cultivation of engineered organisms would be filed early in the proposed project to position this work for appropriate oversight. The project team would work closely with EPA representatives and ASU's Department of Environmental Health and Safety to develop proper protocols for outdoor cultivation trials following the TERA process.

The proposed project would involve the use and handling of various hazardous chemicals involved in molecular biology techniques during strain construction. All such handling would occur in-lab following existing health and safety policies including employee training, proper protective equipment, monitoring, and internal assessments. Proposed laboratory activities and analytical-scale experiments would generate approximately 15 L of chemical waste. Appropriate and established waste management procedures would be followed. It is anticipated that AzCATI would produce an estimated 30,000 L of non-hazardous wastewater during the course of outdoor demonstration runs, which would be properly treated before being disposed via the local water treatment system under procedures already in place for this facility. No atypical handling of materials or waste is expected as a result of the proposed activities at any project location. No siting, construction or major expansion of waste storage, disposal, recovery or treatment actions/facilities would be required.

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 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:

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.

A Toxic Substances Control Act (TSCA) Environmental Release Application (TERA) approval must be received from the EPA prior to conducting outdoor testbed activities with Arthrospira at AzCATI.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Whitney Doss, 08/09/2017

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By Casey Strickland Date: 8/10/2017

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