PMC-ND
(1.08.09.13)

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

RECIPIENT: The University of Toledo **STATE:** OH

PROJECT TITLE : A comprehensive strategy for stable, high productivity cultivation of microalgae with controllable biomass composition

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001628	DE-EE0008247	GFO-0008247-001	GO8247

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 funding to the University of Toledo (UT) to design and develop a series of complementary approaches to optimize algae productivity for improved biofuel production. Strategies would focus on increasing the scale and productivity of algal cultures, improving biomass composition, and further developing existing methods for biomass productivity optimization (e.g. enhancement of genome editing approaches).

The proposed project would seek to improve algal productivity and biomass composition through media optimization (e.g. modifications to pH, alkaline and saline levels) and genetic engineering to improve cellular carbon flow. Targeted analyses would be conducted on a microalgae isolate, Chlorella Sorokiniana strain SLA-04, in indoor enclosures and outdoor ponds, and across multiple seasons. Proposed project activities would include strain analysis and characterization, productivity assessments, computer modelling of biological processes (e.g. CO2 transport and metabolic networks), cultivation testing, gene sequencing, assembly and annotation, and genome editing based on CRISPR-Cas9 technology. All project work would be limited to bench and pilot-scale testing and analysis.

All experimental work would take place at dedicated, purpose-built laboratories and test facilities operated by UT or its partners, including Montana State University ('MSU' – Bozeman, MT) and Arizona State University ('ASU' – Mesa, AZ). University of North Carolina ('UNC' – Chapel Hill, NC) would participate as a sub-recipient on this award, but its work activities would be limited to economic modeling and life cycle assessments. UNC would not perform any experimental work. Laboratory work at UT, MSU and ASU would involve the use of solvents, compressed gases, and hazardous chemicals. All facilities in which laboratory work would be conducted have health and safety protocols and procedures in place that would be adhered to. All institutions would also adhere to applicable local, State and Federal waste management and environmental regulations. No change in the use, mission, or operation of existing facilities would arise out of these efforts.

Cultivation of SLA-04 would be carried out at the indoor laboratories of UT, MSU and ASU; at previously developed mini-ponds housed in the greenhouse facility at the Scott Park Campus of University of Toledo (Toledo, OH); and at previously developed outdoor mini-ponds at the Arizona Center for Algae Technology and Innovation ('AzCATI' – Mesa, AZ) test field site. Laboratory scale cultivation would be conducted in enclosures of up to 3L. Outdoor testing would be conducted in mini-ponds of up to 1000L. AzCATI and UT's facilities regularly conduct experimental work that

is similar in nature to the activities proposed as part of this project. Both institutions have operated their field sites and laboratories for over 8 years without incident.

Proposed project activities at MSU would include CRISPR/Cas9-based genome editing of strain SLA-04. MSU has biosafety protocols in place that would be adhered to. Its Institutional Biosafety Committee (IBC) would assess compliance with these protocols and provide guidance. MSU Project Investigators have already received IBC approval for recombinant DNA work and to use Cas9 technologies to make mutations in human cells. A similar protocol would be issued prior to working with algae. All applicable local, State and Federal health, safety and environmental requirements would be adhered to.

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.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 6/27/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 6/27/2018

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