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(1.08.09.13)

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



RECIPIENT: Duke University

STATE: NC

PROJECT TITLE Marine AlGae Industrialization Consortium (MAGIC): Combining biofuel and high-value bioproducts to meet the RFS

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001162	DE-EE0007091	GFO-0007091-002	GO7091

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 Duke University to use the Marine Algae Industrialization Consortium's (MAGIC) fully integrated platform technology for the production of biofuels and high-value nutritional bioproducts to demonstrate a combined co-product value >\$1,000/metric ton while yielding a biofuel intermediate that demonstrably meets or exceeds the renewable fuel standards for advanced biofuels, has an energy return on investments >3, and would sell for <\$5/gallon of gas equivalent. Phase 1 was completed to validate existing data and to develop technical metrics for project progress. A NEPA review was completed (GFO-0007091-001; CX A9 on 9/8/2015) for Phase 1. Phase 2 would use the platform technology to produce, process, and validate algae-based products by direct comparison to the performance of established products at industry-standard demonstration scale. In addition to the biofuel product, three specified bioproducts would be targeted for the nutrition of fish, poultry, pigs, and humans. All of these activities would be performed by a team of partners, across multiple locations in the US and one site in Norway. This NEPA review is for Phase 2.

The proposed project would grow microalgae at various scales (approximately 1 mL – 1000 L), harvest these algae to create a concentrated paste, extract and separate components of algae cells and evaluate these components using various biochemical and animal model methods. This would require the installation of eight mini-ponds (approximately 3.5 m x 1.7 m) outdoors for the growth of algae at Duke University. The ponds would be located between two buildings, elevated and would not disturb the ground surface.

Feeding trials would be conducted at Cornell University. Mice, broiler chicks, and pigs and would be fed different

types and levels of defatted microalgal biomass. Animal protocols are approved and animal care would follow standard procedures. Prior to animal testing, Cornell would provide the DOE Contracting Officer a copy of the Institutional Animal Care and Use Committee approval for this project and their Animal Welfare Assurance Number. Also, prior to the testing of iron supplement capsules, iron fortificants of cereal, and novel ingredients for milk products and other foods on human subjects, Cornell would provide the DOE Contracting Officer with their Office for Human Research Protections Federal Wide Assurance number and a copy of the approval of this project by their Institutional Review Board. Feeding trials with fish would also occur at Nord University in Norway. The Contracting Officer will restrict those activities (Subtasks 4.2, 4.3, and 4.4) until the required documents are received.

Additional activities including computer modeling, analysis, planning, fuel testing, culturing and growth of algae, and the manufacturing of experimental diets, and would be completed in dedicated laboratories and manufacturing sites. This would involve the use and handling of various hazardous materials including small quantities of chemicals and solvents used for growing and characterizing algae. All such handling would occur in the laboratory in a controlled environment and all of the proposed techniques are currently approved for use at those locations. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations.

Based on a review of the project information, DOE has determined that the proposed project activities would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that these activities are consistent with actions contained in DOE categorical exclusions A9 "Information gathering, analysis, and dissemination," B3.6 "Small-scale research and development, laboratory operations, and pilot projects," and B5.15 "Small-scale renewable energy research and development and pilot projects" and are categorically excluded from further NEPA review. Additionally, the proposed activities at Nord University located in Norway are exempt from further review under Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions", per Section 5.1.1 (Actions not having a significant effect on the environment outside the US) of the DOE EO 12114 Implementing Guidelines.

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.

Review completed by Diana Heyder on 3/17/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



Kristin Kerwin
NEPA Compliance Officer

Date: 3/18/2016

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: _____