PMC-ND
(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: Development of high value bioproducts and enhancement of direct-air capture efficiency with a marine algae biofuel production system

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002203	DE-EE0009278	GFO-0009278-001	GO9278

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), 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 Duke University (Duke) to grow and evaluate algae strains indoor in laboratory facilities and outdoors in race ponds, to design fabricate and test a direct air capture system for CO2 capture.

Duke would grow and evaluate candidate algae strains to identify a strain that co-produces collagen precursors or whey protein replacement. This work would be completed at an existing Duke University laboratory. Project partner University of California Santa Cruz would fabricate and test a prototype carbonate membrane system for capture of solid particulate. This work would be laboratory scale and would be completed at an existing University laboratory.

Project partner MoleculeWorks (Richland, Washington) would then develop and fabricate two direct air capture (DAC) systems. The DAC systems would include storage tanks, filters, pumps, and a membrane system. The two systems would both be laboratory scale. The first system would be less than 1 meter by 1 meter in size and have a capacity of 25 gallons a day of CO2 capacity. The second system would be larger, approximately 2 meters by 2 meters, but would still be a laboratory scale mobile system that would fit on a rolling cart, and would have a capacity of 500 gallons a day CO2 capacity. The two systems would be tested for operational capacity at MoleculeWorks before being shipped to Duke for use.

At Duke the smaller system would be utilized for experimentation with the laboratory. Once data is evaluated from indoor laboratory scale experiments Duke would continue experiments at existing outdoor algae raceway ponds. Ponds are within a developed experimental research area and are up to 5,000 liters in size. The larger system would be wheeled to the existing outdoor research area and utilized at the existing ponds. No modifications to any facilities, indoors or outdoors, would be required. The larger system would be plugged into existing 110V service and attached to the ponds with a ½ inch piece of tubing to deliver CO2.

The project would involve the use and handling of various hazardous materials including small quantities of chemicals and solvents used for growing and characterizing algae, respectively. All such handling would occur in the laboratory in a controlled environment and all of the proposed techniques are currently approved for use at all locations. Existing corporate health and safety policies and procedures would be followed at all locations, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Should any new health and

safety risks be identified, additional policies and procedures would be implemented as necessary. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technology Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Roak Parker, 12/16/2020

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Roak Parker Date: 12/16/2020

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ Field Office Manager review not required
☐ Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager