

PMC-ND

(1.08.09.13)

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



RECIPIENT: Global Algae Innovations

STATE: CA

PROJECT TITLE: Innovations in Algae Cultivation

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002029	DE-EE0008903	GFO-0008903-001	GO8903

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.
- 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 funding to Global Algae Innovations (GAI) to research and develop algae cultivation methods and monitoring tools in order to increase productivity and improve targeted characteristics (e.g. robustness, biomass quality). In terms of cultivation research, GAI would study the effects of alterations to the abiotic conditions of cultivation systems. Laboratory research would focus on developing new analytical testing techniques to improve strain monitoring capabilities and pond management practices.

Research activities would be performed concurrently in both laboratory settings and at the outdoor cultivation ponds. Much of the work would focus on translating results between laboratory cultures, grown in photo-bioreactors, and mass cultures, grown in outdoor algae raceway ponds. Specific project activities are as follows:

Tasks 1 – 3 would consist of initial data collection/verification, ongoing project management and reporting activities, and the development of techno-economic and life-cycle assessment models.

Task 4: This task would consist of preparatory activities for cultivation and research. This would include the modification of the outdoor algae raceway ponds that would be used throughout the project, as well as the installation of additional photo-bioreactors at the laboratory space used (discussed further below). Additional activities would include updates to the database that would be used and the development of the experimental design for cultivation sampling and testing.

Tasks 5 – 7: These tasks would consist of algae cultivation and testing. Cultivation conditions, such as nutrient media/timing, areal density variation, mixing/O₂ removal, temperature, and light levels would be varied during testing. Productivity data would be collected and analyzed.

Task 8: This task would focus on the isolation and collection of new algae strains determined to be suitable for biofuel production. These strains would be co-cultured and analyzed.

Task 9: This task would assess the impacts and effectiveness of various bacterial control options (e.g. varying concentrations of bleach, alternating nitrogen sources).

Tasks 10 – 14: These tasks would focus on combining approaches for increasing productivity and improving the quality of the strains, as well as optimizing the most effective approaches.

All project activities would be coordinated by GAI and performed at existing, purpose-built facilities that regularly perform work similar to that included in the scope of this project. Analytical testing and laboratory-based experiments would be performed at GAI's Kauai Algae Laboratory (KAL) in Lihue, HI. Other laboratory-based work (e.g. spectroscopy and computer modeling) would be performed at the National Renewable Energy Laboratory (NREL) in Golden, CO. Algae cultivation and processing would be performed at GAI's Kauai Algae Facility (KAF) in Lihue, HI.

Cultivation experiments would require the modification of existing algae raceways at KAF. Both mini-raceways and intermediate-scale raceways would be modified so as to enable operations with a novel mixing technology that would be developed as part of the project. Modifications would be made to five (5) mini-raceways, which would consist of the incorporation of sloped shells, automated media addition, improved instrumentation, and controller automation into the existing raceways. Modifications would also be made to three (3) intermediate-scale raceways. The updates made to the intermediate-scale raceways would be similar to those of the mini-raceways, and would result in three intermediate-scale sloped, wave mixed raceways. Modifications for both the mini and intermediate-scale raceways would require the installation of new steel enclosures and connecting new components to the existing power supply.

Additionally, laboratory-based research at KAL would require the installation of six (6) photo-bioreactors (PBRs) for use in cultivation experiments. These installations would supplement the existing PBRs. Additional power would be routed to the room in which the PBRs would be installed.

Neither the modifications to the outdoor raceways at KAF, nor the installations at KAL's research space would include any ground disturbing activities or changes to the use, mission, or operation of existing facilities.

Project work at GAI's KAF would involve cultivation operations which include the use and handling of hand tools and machinery (e.g. fork lifts, rotating equipment). All such handling would occur in a controlled setting with restricted access. Risks associated with work performed at this location would be mitigated through adherence to established health and safety policies and procedures. Protocols would include personnel training, the performance of regular safety checks, and the use of personal protective equipment. Laboratory work to be performed at KAL and NREL would include the use of industrial chemicals and laboratory equipment. Both facilities are controlled, laboratory environments with protective equipment and procedures in place, including fume hoods, biological safety cabinets, and emergency showers/eyewash stations. Laboratory personnel would be trained in relevant health and safety protocols. Autoclaves and/or chemical disinfectants would be used for the treatment of biological waste prior to disposal. GAI and NREL would observe all applicable Federal, state, and local health, safety, and environmental regulations.

It is not anticipated that algal strains would be imported into Kauai for this project. However, if the need should arise, U.S. Department of Agriculture Animal and Plant Health Inspection Service permits would be obtained prior to importation. GAI would ensure that any other applicable permits are obtained prior to performing associated work activities.

Water from the Lihue ditch system (run-off water from Mt. Waialeale) would be used for outdoor cultivation experiments. No more than 10,000 gallons per day would be used. Commercial agricultural fertilizers would be used for algal production. All fertilizers would be consumed during production and the remaining, non-hazardous water would be evaporated in a secondary pond.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 01/22/2020

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: _____



Casey Strickland

NEPA Compliance Officer

Date: 1/23/2020

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: _____

Field Office Manager

Date: _____