

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** University of Illinois at Urbana-Champaign**STATE:** IL

PROJECT TITLE: Improving the Productivity and Performance of Large-Scale Integrated Algal Systems for Wastewater Treatment and Biofuel Production

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002029	DE-EE0008905	GFO-0008905-001	GO8905

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 the University of Illinois at Urbana-Champaign (UI) to design and test an algal biofuel production system to improve biomass productivity using the Algaewheel wastewater treatment system.

The proposed project would be divided into thirteen tasks. Tasks 1 – 9 would consist of validation, project management, data gathering and analysis, laboratory work, and pilot testing. Tasks 11 – 13 would include field testing at sites which are not yet determined. As such, those tasks cannot be meaningfully evaluated at this time. This NEPA review is limited to Tasks 1 – 9.

UI would conduct an initial verification of the proposed project. Once completed UI would conduct bench scale and pilot scale experiments. Bench scale experiments would include assessing environmental stressors on at least three commonly used algal strains. UI would then augment selected algal strains in bench scale testing as well as optimize different absorbents, nutrients, and light exposure. Bench scale work would be completed by UI at the Illinois Sustainable Technology Center, a university laboratory in Champaign, IL.

Pilot scale experiments would be conducted by UI at the University greenhouses located at the Illinois Sustainable

Technology Center. These experiments would include the use of four pilot scale Algaewheel wastewater treatment systems. These systems would be located indoors, within the University greenhouse. Each system would be approximately 5'5" x 3'5" x 1'11" (LxWxH) with a working volume of 150 gallons. Each system would contain six chambers each of which would contain an algaewheel which would turn to mix the system. Each wheel would be an approximate 2' round cylinder, approximately 1'6" long. To deliver wastewater to the systems UI would install a buried pipeline from a sewer manhole near the greenhouse into the greenhouse. The total length of the pipeline would be approximately 150 – 200 feet. The pipeline would be installed in previously disturbed area (currently a mowed lawn) adjacent to a sidewalk and parking lot. The system would have a flow rate of approximately 2 gallons per minute. Wastewater would be filtered or screened prior to entering the algaewheel system. Discharge would be treated and then discharged into the sewer system on a daily basis. Pilot scale experiments would be similar in nature, but on a larger scale, to the bench scale experiments: assess stressors, as well as optimize different absorbents, nutrients, and light exposure.

In addition, UI would conduct a techno economic analysis and life cycle cost analysis.

The project would involve University based laboratory and pilot scale research that includes exposure to potentially hazardous chemicals, gases, pathogens, and hot surfaces. All hazardous materials would be managed in accordance with federal, state and local environmental regulations as well as University policies. Proper personal protective equipment, engineering controls, monitoring equipment, and internal audits would be utilized in accordance with University health and safety policies to facilitate compliance with applicable regulations and minimize risks to health and safety of employees and the general public.

NEPA PROVISION

DOE has made a conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

Task 1. Initial Validation

Task 2. Project Management

Task 3. Pilot-scale system setup and optimization of HRT, harvesting frequency and temperature

Task 4. Stress induced

Task 5. Bioaugmentation of growth promoting

Task 6. Integration of mixed adsorbents

Task 7. Optimizing nutrient supply and light-exposure frequency by dynamic control of influent flow and aeration rate in response to nutrient concentration and light intensity

Task 8. Separation and recycling of HTL-aq

Task 9. Interim TEA and LCA

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

Task 10. Field demonstration at a northern US site (Illinois)

Task 11. Field demonstration at a southern US site (Florida)

Task 12. TEA

Task 13. LCA

Notes:

Bioenergy Technologies Office

This NEPA determination does require a tailored NEPA provision.

Review completed by Roak Parker, 5/12/2020

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.

A portion of the proposed action is categorically excluded from further NEPA review. The NEPA Provision identifies Topic Areas, Budget Periods, tasks, and/or subtasks that are subject to additional NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



Casey Strickland

NEPA Compliance Officer

Date: 5/13/2020

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: _____