

PMC-ND
(1.08.09.13)

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



RECIPIENT: North Carolina State University

STATE: NC

PROJECT TITLE: Catalytic Upgrading of Carbohydrates in Waste Streams to Hydrocarbons

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001916	DE-EE0008498	GFO-0008498-001	GO8498

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 federal funding to North Carolina State University (NCSU) to develop and validate an economical and sustainable process for converting the carbohydrates in paper sludge, a wet organic waste stream, into a hydrocarbon (HC) product that can be blended into jet or diesel fuel.

The proposed project is organized into three performance periods. In the first performance period, the Recipient would work with the National Renewable Energy Laboratory (NREL) to perform initial process validation (i.e. confirm benchmark data). Intermediate process validation would be performed during the second performance period, involving the production of at least 50 mL of HC for fuel property analyses. Research in the third performance period would focus on scaling up the process to produce at least 1 L of HC for additional fuel property testing to determine if a greater proportion of the product could be blended into jet or diesel fuel.

The types of activities associated with the proposed project would include office-based data analysis and computer modeling in addition to various laboratory-based research and development (R&D) tasks. Sugar production from paper sludge, chemical production from sugars, and process verification would occur at the Pulp and Paper Laboratory located in Biltmore Hall at NCSU (Raleigh, NC). Aldol condensation of furans, catalytic hydrodeoxygenation, process verification, and fuel property testing would occur at NREL (Golden, CO).

The quantities of materials used and produced by the proposed project would not exceed pilot-scale metrics. For intermediate process validation and scale-up work, respectively, approximately 30 kg and 50 kg sludge (dry basis) would be obtained from the waste streams of existing paper mills. Production of HC from the paper sludge would involve the use and handling of various hazardous materials, such as reaction solvents and solid catalysts potentially containing transition element metals. This process would generate relatively small amounts of potentially hazardous waste, including approximately 50 L dioxane, 5 L wastewater, and 10 kg solid residue after enzymatic hydrolysis.

The use, handling, and disposal of hazardous materials would be conducted in-lab by organizations dedicated to proper chemical management and disposal practices in compliance with applicable Federal, state, and local environmental regulations. Small amounts of non-hazardous waste generated after the ash removal process would be disposed of according to standard disposal practices and systems already in place at these facilities. Project participants would strictly follow established health and safety policies and procedures to include employee training and the use of personal protective equipment. All project work would be conducted indoors at R&D facilities that were purpose-built for the type of activities being proposed; therefore, no physical modifications or new permits would be required. No change in the use, mission or operation of existing facilities would arise out of project-related efforts.

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.

Include the following condition in the financial assistance agreement:

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.

Notes:

Bioenergy Technologies Office

This NEPA determination requires a tailored NEPA Provision.

NEPA review completed by Whitney Doss, 2/19/2019

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:

2/20/2019

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: _____