PMC-ND
(1.08.09.13)

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

RECIPIENT: The Ohio State University **STATE:** OH

PROJECT TITLE: Engineering clostridia for n-butanol production from lignocellulosic biomass and CO2

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000974	DE-EE0007005	GFO-0007005-001	

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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Ohio State University to develop engineered Clostridia strains and fermentation processes that can directly utilize cellulose and fix Carbon Dioxide (CO2) for n-butanol production from lignocellulosic biomass.

The proposed project activities would include genetic engineering of Clostridia for n-butanol production from cellulose and CO2/H2; study of fermentation kinetics and optimization of processes; omic analysis of mutants in fermentation; and process design & cost analysis. Genetic engineering activities would take place at the dedicated biomolecular engineering labs at Ohio State University (OSU) in Columbus, Ohio. Fermentation kinetics studies and optimization of processes would be conducted at both the dedicated microbiology labs at OSU and Green Biologics (GB) research lab in Columbus, Ohio. Omic analysis would occur at the University of Alabama's (UA) dedicated lab in Tuscaloosa, AL. Process design and cost analysis would be completed by GB at their offices in Columbus, OH. The facilities where the proposed project would occur have been previously used for work that is similar to the activities included in the proposed project; therefore, no new or modified permits would be required, and no construction of new facilities or physical modifications to existing facilities would occur as a result of the proposed project.

Several Clostridium species and E. coli would be genetically engineered in the lab. Genetic material from other bacteria would be transferred and expressed in these bacteria. All lab procedures would follow the approved Institutional Biosafety Committee (IBC) Protocol and would be performed in the Biosafety level II facilities. The engineered bacteria would be contained in glass bottles or vials, and stored in the deep freezer (-80oC). These engineered bacteria are safe to use in the lab for research purposes, and generally do not pose any threat to public health and/or the environment. Unused or unneeded bacterial strains would be disposed of in biohazard bags after autoclaving to destroy any biological activity, and then collected by the University Environmental and Occupational Health Office (EOH) for final disposal.

The proposed project would involve the use and handling of various hazardous materials, including bacteria, solvents and chemicals. All such handling would occur in lab and would be managed in accordance with federal, state, and local environmental regulations. Existing university health and safety policies and procedures would be followed including

employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Solid wastes including broken glasses, used pipette tips, plastic tubes, syringes, etc. would be collected daily and disposed of by landfill and wastewater would be routed to city sewer treatment plants.

Based on review of the project information and the above analysis, DOE has determined the research, development and testing activities would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with actions contained in DOE categorical exclusions A9 "information gathering, analysis and dissemination," and B3.6 "small-scale research and development, laboratory operations and pilot projects and is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord, 07/15/2015.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 7/16/2015

NEPA Compliance Officer

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: _____

Field Office Manager