PMC-ND

(1.08.09.13)

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

RECIPIENT: Purdue University **STATE:** IN

PROJECT TITLE : Analytical Modeling of Biomass Transport and Feeding Systems

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001689	DE-EE0008256	GFO-0008256-001	

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 Purdue University to develop and test fundamental models that describe phenomena associated with lignocellulosic biomass flow in order to better understand the feeding and handling behavior of feedstock materials within different equipment systems at biorefineries.

The proposed project would involve data analysis, computer modeling, and laboratory scale research and development (R&D). Associated activities would include the development of analytical models supported by in-lab characterization of chemical, structural and physical properties of lignocellulose materials to which these models would be applied (primarily corn stover, as well as grasses, bagasse, and/or poplar hardwood), followed by model verification at industrially relevant experimental conditions using the Idaho National Laboratory (INL) Process Development Unit (PDU).

Office-based tasks related to project management, paper studies, techno-economic and lifecycle analyses, computational modeling and various other mathematical techniques based on data gathered from laboratory measurements and PDU experiments would be conducted by Purdue University's Laboratory of Renewable Resources (LORRE) and School of Mechanical Engineering (both located on campus in West Lafayette, IN) together with subrecipients Argonne National Laboratory (Lemont, IL) and Forest Concepts (Auburn, WA). A 3rd party equipment supplier to INL, AdvanceBio, would conduct additional project-related desktop activities such as review, engineering, and process design services.

Laboratory-based tasks involving biomass characterization would be conducted by Purdue University at the following purpose-built campus facilities. Experimental activities related to the analysis of materials (including determination of biomass compositions, conditions for liquefaction, sugar analysis, and enzyme characterization) would be carried out in LORRE's dedicated laboratory for the processing and characterization of renewable resources. The Department of Agricultural and Biological Engineering in collaboration with the ADM Agricultural Innovation Center's operating experience and capabilities for the treatment of small quantities of biomass materials would measure physical properties of various forms of corn stover/residue. Rheological measurements of biomass slurries/shear-thinning fluids would be performed using existing tools at the School of Materials Engineering. Supplementary biomass characterization activities would be performed at INL (Idaho Falls, ID) as needed during the proposed project.

Pilot validation would be conducted at INL's PDU and Chemical Preconversion System within the Biomass Feedstock National User Facility (BFNUF). No equipment would need to be purchased, built, or installed to carry out the proposed project. Up to twenty tons (dry weight, approximately 46 bales) of multi-pass corn stover would be procured by INL through BFNUF. After a series of batch tests culminating in 24-hour verification runs in the continuous reactor at the 1 dry ton per day scale, the treated corn stover would be collected, stabilized, and shipped to Purdue for further analysis. Activities at both INL and Purdue would also employ feedstock provided by Forest Concepts. Corn stover bales, wood chips, and other biomass derived from pre-existing industrial sources would be processed in quantities ranging from 10 kg to 200 kg. All project designated materials would be received, stored, and prepared within Forest Concepts' established, R&D-focused manufacturing facility.

The types of natural, plant-based biomass to be used by this project are conventionally accepted as non-hazardous. Mechanical processing of raw materials into feedstocks involves steps that may liberate fugitive corn stover and dusts. The IDL and Forest Concepts facilities in which such work would occur already have appropriate collection and disposal methods in place for this solid waste. Forest Concepts is located within a non-attainment area, but airborne particulates are mostly captured by their proven point source and general dust control systems. And, since the proposed biomass processing activities are not expected to materially increase the total dust production of existing facilities, cumulative emissions resulting from project activities at Forest Concepts would not exceed regulatory thresholds for this site. Non-hazardous liquid waste generated by the proposed project would consist of wash and processing water. Depending upon its use in the process (e.g. water that has been in contact with biomass at high temperatures vs. noncontact cooling water) wastewater would either be kept separate from the municipal waste stream for disposal as an agricultural/construction waste, or filtered and neutralized in compliance with municipal requirements then discharged to the water treatment system. No siting, construction or major expansion of waste storage, disposal, recovery, or treatment actions/facilities would be required.

The proposed project would involve the use and handling of various hazardous chemicals, including maleic acid and dilute alkali for neutralization of chemically preprocessed corn stover. Such handling would occur in-lab following the existing health and safety policies and procedures of project participants, all of which incorporate employee training, proper protective equipment, engineering controls, monitoring, and internal assessments to minimize risk. Minor amounts of hazardous waste generated by project activities would be disposed of via standard practices adhered to by these organizations in accordance with applicable federal, state, and local environmental regulations.

All project-related work would occur in facilities that were previously developed for the types of activities being proposed; therefore, no adverse impacts to sensitive resources are expected as a result of the proposed activities at these locations. No change in the use, mission or operation of existing facilities would arise out of these efforts. Purdue University and subrecipients have all applicable permits in place, and would not need additional permits, licenses or authorizations for the proposed activities. At the conclusion of the proposed project, no decommissioning of equipment would be necessary.

Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410 (2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal 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 the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Insert the following language in the award:

You are required to:
Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Whitney Doss, 2/9/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 2/12/2018
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