PMC-ND
(1.08.09.13)

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

RECIPIENT: NREL **STATE:** CO

PROJECT TITLE: NREL-19-012 Advanced Cellobiohydrolases

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	DE-AC36-08GO28308	NREL-19-012	GO28308

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:

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's (DOE) National Renewable Energy Laboratory (NREL), located in Golden, Colorado, proposes to enter into a Cooperative Research and Development Agreement (CRADA) with Novozymes, located in Davis, CA, to explore cellulose degrading enzymes that enable conversion of biomass-to-sugars in a cost-effective manner for use in advanced biorefineries.

Activities that would occur at NREL would involve producing and screening Glycoside hydrolase (GH) 6 and GH7 cellobiohydrolase enzymes to develop a library of enzymes that would be tested in biomass conversion applications. An active, limitedly genetically modified fungus, T. reesei, would be used to produce enzymes via cloning. T. reesei is currently used at NREL for lab scale enzyme production and is classified as a biosafety level 1 microorganism. Small-scale performance testing of the enzymes would occur to identify candidate enzymes for further analysis, and candidate enzyme structures would be solved using X-ray crystallography. Approximately 20 L of fermentation broth would be developed to produce the required enzymes. The broth would then be concentrated to a final volume of approximately 100 mL, at which time it would be delivered to Novozymes for further testing; the broths would be filtered and free of organism. NREL would also deliver deacetylated mechanically refined (DMR) corn stover (CS) to Novozymes, a nonhazardous biomass material that would be used to test the performance of the enzymes.

Activities that would occur at Novozymes would involve a protein engineering campaign on GH6 and GH7 enzymes, and digestion experiments. Protein engineering work would involve high-throughput (HTP) screening and crystal structure work to quickly evaluate potential subsites of interest. Novozymes would prepare ground DMR CS substrate for use in small scale experiments, ranging from 1-100 mL, to assess the ability of the candidate enzymes to convert DMR CS to fermentable sugars. The result of this work would be a "cocktail" of high-performing enzymes that convert biomass to fermentable sugars that could then be used in advanced biorefineries.

Laboratory tasks associated with the project would involve chemicals and materials typically used in biological work. At the conclusion of the experiments, the biologically active samples would be sterilized, and the resulting non-hazardous material would be disposed of in accordance with NREL and Novozymes policies and procedures. All chemical waste would be managed as appropriate.

All research activities would occur in existing laboratories that perform such work, and no new equipment or infrastructure would be needed to support the experiments. No change in the use, mission, or operation of existing facilities would result from the proposed project. If required, the responsible researchers at NREL and Novozymes will obtain any United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) permits

needed for the work. Any work associated with this proposed project shall not proceed until all required permits have been received.

There would be no anticipated direct or indirect environmental or health and safety impacts due to the work. Existing NREL and Novozymes health and safety policies and procedures would be followed, including safe handling of organisms, proper waste disposal, and the use of employee personal protective equipment.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance agreement:

If required, the responsible researchers at NREL and Novozymes will obtain any United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) permits needed for the work. Any work associated with this proposed project shall not proceed until all required permits have been received.

Notes:

NREL
Nicole Serio 1/22/2019

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: Electronically Signed By: Kristin Kerwin Date: 1/24/2019

NEPA Compliance Officer

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: _____ Date: _____

Field Office Manager