PMC-ND
(1.08.09.13)

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

RECIPIENT: ZymoChem Inc **STATE:** CA

PROJECT TITLE: Development of Bacillus as an industrial host for the microbial production of biopolymers

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001916	DE-EE0008490	GFO-0008490-001	GO8490

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 ZymoChem, Inc. to develop tools and techniques for engineering Bacillus licheniformis bacteria strains to convert sugars derived from biomass into biopolymers. The project would also involve establishing a fermentation-based process for strain engineering in a controlled bioreactor followed by development of a process for recovering the biopolymer. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities for BP1 would center on validation of base-case B. licheniformis strain performance in 250 mL bioreactors. BP2 project activities would consist of metabolic pathway development, development of tools and methods for engineering B. licheniformis strains, strain engineering (e.g. RNA sequencing, metabolomics), and strain screening/selection of benchmark strains. BP3 activities would include metabolic pathway optimization and strain evaluation via fermentation cycles (2 L and 300 L scales).

ZymoChem would complete metabolic pathway development and analysis in its laboratory space at University of California Berkeley (Berkeley, CA). Advanced Biofuels and Bioproducts Process Development Unit (ABPDU) would complete 300 L fermentations at its laboratory facility within the Lawrence Berkeley National Laboratory (LBNL) in Emeryville, CA. LBNL would perform quantitative metabolomics measurements, strain characterization and evaluation, and metabolic pathway development. Oak Ridge National Laboratory (ORNL) would work on development of genetic tools and techniques in its facilities in Oak Ridge, TN.

All project activities would be completed by ZymoChem and its project partners in existing, purpose-built laboratory facilities that regularly complete work similar in nature to that included as part of this project's scope. No change in the use, mission or operation of existing facilities would be required.

The project would involve the use and handling of various acids, bases, and industrial solvents, in addition to B. licheniformis strains. B. licheniformis is a Biosafety Level-1 (BSL-1) organism. All media, plastic ware, and liquids

that contain B. licheniformis DNA would be decontaminated either via autoclaving or by bleaching using standard operating procedures established prior to disposal. Any risks associated with the handling of B. licheniformis or any of the other project materials would be mitigated through adherence to established health and safety policies and procedures, including training, monitoring and oversight, engineering controls, and the use of personal protective equipment. At all locations, all applicable Federal, State and local health, safety and environmental regulations would be observed.

Upon completion of the project all genetic material (i.e. DNA, strains) would be transferred to ZymoChem by sub-recipients of the project and would be stored appropriately (i.e. in -20 and -80C freezers) to enable continued use beyond the project. Non-proprietary genetic material would be stored for longer term at the discretion of each individual lab and used for future projects as deemed necessary. ZymoChem would obtain any permits or authorizations that may be required for the handling or transport of genetic material.

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.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance 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 Jonathan Hartman, 11/15/2018

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: Casey Strickland Date: 11/19/2018

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