

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Pow Genetic Solutions**STATE:** CA

PROJECT TITLE: A Two-Chamber Growth and Production System for Robust Continuous Bioprocessing

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002029	DE-EE0008924	GFO-0008924-001	GO8924

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 funding to Pow Genetic Solutions (PGS) to develop and demonstrate a fermentation process to produce mevalonolactone (MVL) from glucose and cellulosic hydrolysate.

Proposed project activities would include the following:

Task 1 would consist of a demonstration of baseline metrics to DOE. Laboratory-scale fermentation (<1L scale) experiments would be performed to validate earlier efforts.

Tasks 2 – 7 would focus on the development of a bacterial strain that is resistant to an economical biocide and capable of producing MVL at specified levels. Gene editing tools would be applied to strains to synthesize strains with the desired traits. Gene expression tools that enable efficient decoupling of growth from production and an inducible genetic switch would also be developed in order to enhance the MVL production capabilities of the strain. Fermentation processes would be developed and tested in both a two-stage (i.e. cell propagation and MVL production) continuous bioreactor and a fed-batch bioreactor.

Task 8 would consist of a mid-project demonstration of MVL production.

Tasks 9 – 12 would focus on optimization of the two-stage continuous bioreactor process developed as part of Tasks 2 – 7. Baseline MVL production would be established at laboratory scale. The bioprocesses for MVL production would then be optimized and tested for robustness via deliberate contamination (e.g. adding wastewater samples to the fermentation). The fermentation process, once optimized would then be operated for up to 1000 hours.

Task 13 would consist of scaling up the fermentation process to pilot scale (approximately 10L) and demonstrating MVL production as a continuous bioprocess for more than 72 hours. The scaled-up pilot demonstration would be

performed at the Lawrence Berkeley National Laboratory (LBNL).

Task 14 would consist of the preparation of a techno-economic analysis and final report to be issued to DOE.

All project activities would be overseen by PGS and performed at existing laboratory facilities. Strain engineering, analysis activities, and laboratory scale fermentations would be undertaken at PGS' incubator space within the University of California Berkeley (UC Berkeley) campus in Berkeley, CA and at sub-recipient Visolis' laboratory facility in Hayward, CA. The scaled-up fermentation process would be demonstrated at LBNL. No physical modifications to existing facilities, construction of new facilities, ground disturbing activities, or changes to the use, mission, or operation of existing facilities would be required. Likewise, no additional permits or authorizations would be required for completion of project activities.

The project involves the use and handling of materials including Biosafety Level 1 (BSL-1) microbes, acids, bases, organic solvents, and metals. All project activities would be undertaken in controlled, laboratory environments. All facilities in which work would be performed have established health and safety policies and procedures in place. Protocols would include adherence to established chemical safety guidelines, employee training, the use of personal protective equipment, engineering controls, monitoring, and internal/external assessments. Prior to disposal, biological wastes produced during fermentation would be bleached and/or autoclaved, wastewater would be treated, and acids/bases would be neutralized. Waste materials would all be disposed of by a qualified waste management service provider. PGS and its project partners would adhere to applicable Federal, state, and local health, safety, and environmental regulations.

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.

Notes:

Bioenergy Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 11/12/2019

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:  _____
NEPA Compliance Officer

Date: 11/13/2019

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: _____