

PMC-ND
(1.08.09.13)

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



RECIPIENT: Columbia University

STATE: NY

PROJECT TITLE: Harnessing Microbial Batteries for Efficient, Sustainable Water Treatment and Recycling in Rural Areas

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002336	DE-EE0009506	GFO-0009506-001	

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.)
- B3.1 Site characterization and environmental monitoring** Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to: (a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing; (b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools); (c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells; (d) Aquifer and underground reservoir response testing; (e) Installation and operation of ambient air monitoring equipment; (f) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes); (g) Sampling and characterization of water effluents, air emissions, or solid waste streams; (h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources); (i) Sampling of flora or fauna; and (j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.
- 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 is proposing to provide funding to Columbia University in support of a research and development project to develop, and demonstrate at pilot scale, improved and efficient water treatment technologies. The proposed project would be conducted over three Budget Periods (BP) with go/no-go decision points at the end

of BP1 and BP2.

This project would include both lab and field-based research and testing. Project activities would include laboratory testing, materials characterization, and analysis, data analysis and reporting, modeling and design, field-based water sampling and testing, design, construction and field demonstration of a pilot water treatment system.

Laboratory testing, materials characterization, and data analysis would be completed at the Comer Geochemistry Lab (Palisades, NY), University of Bristol - Biochemistry Labs (Bristol, UK), Stanford Synchrotron Radiation Lightsource (SSRL) (Menlo Park, CA), and Columbia University – Battery Lab (New York, NY). System modeling and design would occur at the University of Western Australia (Perth, Western Australia). Design testing and field-based water sampling and analysis, and construction of the pilot system would be completed by Missouri Breaks Industries (Eagle Butte, SD and Manderson, SD). Well water would be sampled at 200-300 sites across three study areas: Pine Ridge Reservation, SD, Cheyenne River Reservation, SD, and Spirit Lake, ND. Pilot demonstration of the water treatment system could potentially occur in Kyle, SD at an abandoned municipal water well maintained by the Oglala Sioux Tribe, Department of Water Maintenance and Conservation and an additional site in New Mexico.

All laboratory-based activities would take place in existing, purpose-built facilities. The project would involve the use and handling of various hazardous materials, including metals. These hazardous materials would only be handled in laboratory settings, following proper hazardous material handling and disposal practices. All hazardous materials would be managed in accordance with Federal, state, and local environmental regulations. All wastes (hazardous and non-hazardous) produced as a result of this project would be disposed of properly.

Field-sampling would occur at existing wells (no drilling would be required) that are not currently in use for drinking water. Sampling would occur at between 200 and 300 existing wells. Some (or all) of the sampled wells would be on Tribal land. All field activities would occur with prior approval and there would be a dedicated staff member (at Missouri Breaks Institute) to ensure that permit processes are followed and that local tribal authorities are aware of and have approved activities. Sampling water at existing wells (not currently in use for producing drinking water) is not anticipated to result in any adverse impacts.

The sites for the field-based pilot demonstration of the water treatment system have not been finalized at the time of this NEPA review. Additional NEPA review is required when field demonstration sites have been finalized, prior to initiating the pilot water treatment system construction and field demonstration activities.

DOE does not anticipate adverse impacts to any resources of concern as a result of the proposed activities in BP1, BP2 and Subtasks 3.1, 4.2 (system modeling activities only) and 5.3 in BP3. 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 conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

Budget Period 1 (All subtasks)

Budget Period 2 (All subtasks)

Budget Period 3 - Subtasks 3.1, 4.2 (system modeling activities only), and 5.3.

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

Budget Period 3 - Subtasks 4.2 (construction activities) and 4.3.

Include the following condition in the financial assistance agreement:

The recipient is required to provide their DOE Contracting Officer documentation of approval from the appropriate tribal authorities prior to conducting the field-based well water sampling.

The recipient is required to submit an additional Environmental Questionnaire (EQ-1) when the sites for the field-

based demonstration of the water treatment system have been identified. Construction, installation, and operation of the water treatment system is prohibited until DOE completes the NEPA review for those activities.

Notes:

Advanced Manufacturing Office
This NEPA determination requires a tailored NEPA provision.

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.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

A portion of the proposed action is categorically excluded from further NEPA review. The NEPA Provision identifies Topic Areas, Budget Periods, tasks, and/or subtasks that are subject to additional NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  _____ Date: 8/13/2021
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