

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



RECIPIENT: Carollo Engineers, Inc.

STATE: CO

PROJECT TITLE : Mainstream Aerobic Wastewater Treatment Using Process-Produced Hydrogen Peroxide

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002855	DE-EE0010992	GFO-0010992-001	

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.)

B3.6 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 Carollo Engineers, Inc. (Carollo) to research advancements in mainstream aerobic wastewater treatment using process-produced hydrogen peroxide.

Life cycle assessment and techno-economic analysis of the proposed technology would occur at the Carollo site in Walnut Creek, California. Design and development of laboratory and bench scale operations of microbial electrochemical cells and continuously stirred tank reactors for wastewater treatment would occur Arizona State University (ASU), in Tempe, Arizona. Operations of reactors would also at the City of Mesa, Northwest Water Reclamation Facility in Mesa, Arizona. Testing of greenhouse gas emissions from operating reactors would occur at ASU and University of California-Irvine.

The project would involve the use and handling of various hazardous chemicals for assessment of water quality, including chemical oxygen demand kits, hydrogen peroxide measurements, micronutrients for culture health, acid-based eluents for chromatography, and DNA extraction kits. All such handling would occur in existing laboratory spaces. Wastewater and wastewater sludge would be used as part of this project, which is considered Bio-Safety Level 2 and would be performed in BSL2 labs only. Personnel that would contribute to award work are properly trained in the handling and disposal of these chemicals and wastewater. The project would also use bioelectrochemical equipment with low voltages applied to electrochemical reactors, leading to possible electrical hazards. Also, the project would involve the pumping and management of pressurized gases (air and nitrogen gas) for experiments. Award personnel are also trained through the universities in compressed gas operation. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations.

Efforts associated with this award would include creating artificial wastewater media that would contain low concentrations of sodium acetate, ammonium chloride, potassium phosphate, and trace minerals as well as handling/working with diluted sulfuric acid. Existing corporate health and safety policies and procedures would be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Personnel that would transport the wastewater are trained on proper transport procedures. Addendums to existing protocols within the Institutional Biosafety Committee would be undertaken to help identify possible biosafety hazards and propose approaches to mitigate potential safety concerns. Bioreactors that involve air flow would be placed in chemical hoods to avoid aerosols from wastewater reaching the laboratory. Additional policies and procedures would be implemented as necessary as new health and safety risks are identified. Vaccinations against

infection, including Hepatitis A and B, would be offered free of charge to pertinent personnel handling wastewater.

Sludge and wastewater from Mesa Northwest Reclamation Plant would be disposed of by the Environmental Health and Safety team at ASU. General lab waste including pipette tips, gloves, disposable tubes, etc. would be considered biohazardous and disposed of after use.

Emissions would occur as part of project award from the reactor work that would occur at ASU. These efforts would include generating trace amounts of N₂O and CO₂ from microbial respiration. All emissions would be controlled by operating inside a chemical fume hood and/or and or releasing gases inside a biosafety cabinet. While this location is within a USEPA Nonattainment Area, the extent and nature of emissions associated with this project would be negligible.

No modification is required to existing facilities. No ground disturbing activities would occur as part of this award and equipment would not be deployed outdoors. No new permits, licenses, or authorizations would be required. Based on the nature of the modifications associated with the award, the DOE does not anticipate any impacts to resources of concern due to the proposed award activities under this conditional NEPA determination.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Industrial Efficiency & Decarbonization Office
NEPA review completed by Chris Akios, 05/30/2024

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: **Matthew Blevins**
NEPA Compliance Officer

Date: 5/30/2024

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: _____