PMC-ND
(1.08.09.13)

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

RECIPIENT: Mosaic Materials **STATE:** CA

PROJECT TITLE: High-efficiency Process for RNG Production from Biogas using MOF-based Solid Adsorbents

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001926	DE-EE0008511	GFO-0008511-001	GO8511

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 Mosaic Materials (“Mosaic”) to develop a lower cost process for the critical carbon dioxide (CO2) removal step in biogas upgrading using a novel class of solid adsorbents composed of diamine-appended metal-organic frameworks (MOFs). A pilot-scale system utilizing the developed MOF-based adsorbents would be designed and engineered by an accredited global engineering, procurement, and construction (EPC) firm contracted by Mosaic, then installed and tested over the course of one year at a Wastewater Treatment Plant (WWTP) host facility.

The types of activities associated with the proposed project include data analysis, design, preliminary engineering, and laboratory research and development (R&D) culminating in a short-term pilot-scale demonstration. Design, development, and production of the MOF-based adsorbent would occur at Mosaic’s R&D facility in Berkeley CA. Desktop-based system development and design activities would be conducted at subrecipient AECOM’s offices in Oakland, CA. Activities at Mosaic and AECOM would be limited to indoor office and laboratory settings where activities would be conducted in accordance with existing business licenses and applicable research permits. No change in the use, mission, or operation of these facilities would arise out of project efforts.

Pilot equipment testing would be hosted at the Napa Sanitation District WWTP, an existing water treatment plant serving Napa, CA. All project work would occur entirely on previously developed areas of this facility. Activities here would include the installation of a pilot skid (not to exceed an approximately 12 ft. x 12 ft. area) on a pre-existing concrete pad adjacent to the WWTP cogeneration unit. Minor modifications would be required to accommodate the skid, including the connection of auxiliary power, water, and biogas supply lines to similar infrastructure already in place at this purpose-built facility. During the demonstration period, additional process configurations may be evaluated by specialized engineers/technicians from Mosaic/EPC partner, who would be on site to monitor, adjust, and sample as needed.

The only new material introduced to the WWTP site would be the solid MOF adsorbent within the pilot skid. This

material is stable under normal conditions and would be stored and transported appropriately in closed, dry containers. Up to approximately 60 kg of this material would be produced and used within the pilot system to separate up to approximately 14 standard cubic ft. per minute (14 SCFM) of biogas slipstream from the current anaerobic digesters. All gaseous streams generated by the unit would be recombined and returned to the main facility system after demonstrating the separation, where it would be processed the same as it would in the absence of the pilot. Hence no change to facility operations would arise out of the provisional project-related test configuration. A small increase in power consumption (4-8 kW) would be needed to operate the skid and provide compression; however, based on this estimate the proposed activities are not expected to meaningfully impact emissions at this site. All pilot testing activities would be performed entirely within the limits of the facility's existing National Pollutant Discharge Elimination System and Air Emissions Permit to Operate.

The proposed project would involve the use and handling of various hazardous chemicals and materials, including the diamine-containing MOF adsorbent, precursor materials, and flammable gases. Such work would occur in-lab or at the properly equipped WWTP, and all project participants are dedicated to proper hazardous material management. Existing health and safety policies and procedures would be followed, including risk assessment, job hazard analyses, employee training, PPE, and engineering controls as appropriate to each task. Standard industry best practices and equipment for processing flammable gases would be used during project activities. As the pilot skid testing would represent the first use of larger than bench-scale quantities of the MOF adsorbent material (>100 g) outside of a controlled laboratory environment, a thorough hazard assessment and mitigation Process Safety Plan would be prepared and implemented by experienced project personnel to ensure that any applicable fire, safety, and permitting requirements are met at all times.

At the conclusion of the proposed project, the pilot skid would be safely isolated and purged of flammable gases, then disassembled and moved to an offsite storage facility. Aliquots of the MOF adsorbent would be transported back to the laboratory and fully characterized. Any remaining spent adsorbent would properly disposed of as hazardous solid waste via established methods, and equipment contacting this material would be cleaned according to Mosaic's standard handling and manufacturing protocols.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Whitney Doss, 11/16/2018

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

- [x] 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