PMC-ND U.S. DEPARTMENT OF ENERGY
(1.08.09.13) OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY NEPA DETERMINATION

RECIPIENT: Colorado State University

STATE: CO

PROJECTPoly(oxymethylene) Ethers as a High Cetane, Low Sooting Biofuel Blendstock for Use in Medium to**TITLE:**Heavy Duty Mixing Controlled Compression Ignition Engines

Funding Opportunity Announcement NumberProcurement Instrument NumberNEPA Control NumberCID NumberDE-FOA-0001919DE-EE0008726GFO-0008726-001

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 (including, but not limited to, literature surveys, inventories, site visits, and audits), data
Information	analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to,
gathering,	conceptual design, feasibility studies, and analytical energy supply and demand studies), and information
analysis, and	dissemination (including, but not limited to, document publication and distribution, and classroom training and
dissemination	informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and
scale	development projects; conventional laboratory operations (such as preparation of chemical standards and
research and	sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a
development,	concept before demonstration actions, provided that construction or modification would be within or
laboratory	contiguous to a previously disturbed or developed area (where active utilities and currently used roads are
operations,	readily accessible). Not included in this category are demonstration actions, meaning actions that are
and pilot	undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for
projects	commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Colorado State University (CSU) to design, synthesize and test biofeedstock blends comprised of poly(oxymethylene) ethers (POM-E) which are viable for production, for use in Mixing Controlled Compression Ignition (MCCI) engines, and for reduction of soot and particulate matter (PM) emissions.

The proposed project would be divided into four tasks. In task 1 CSU would identify and design potential POM-E fuels for analysis, as well as conduct a techno-economic analysis and life cycle analysis of the fuels. CSU would then synthesize the identified POM-E fuels. CSU would synthesize approximately 6 liters of POM-E fuels. POM-E fuels would be synthesized from up to 50 gallons of chemicals including methanol, ethanol, propanol, polyoxymethelyne dimethyl ethers, and water combined with up to 25 kg of resin catalyst. All materials would be purchased off the shelf materials commonly used in this type of research.

In task 2 CSU would conduct physico-chemical analysis of the POM-E fuels. This would include chemical analysis of the fuels, predictive modeling, ignition analysis, and sooting analysis.

In task 3 CSU would blend the POM-E fuels with diesel fuel at a minimum blend ratio of 5% POM-E and up to 30% POM-E, and conduct the analyses described in task 2 for the blended fuel.

In task 4 CSU would select one POM-E diesel blend and conduct MCCI engine testing on the fuel blend. This would include testing of the blend on an MCCI engine.

Synthesis of POM-E fuels (task 1) would occur at the CSU Powerhouse Research Campus, in Fort Collins, Colorado. Analysis of the POM-E fuels (tasks 2 and 3) would be conducted at both University of Colorado, Boulder Campus Mechanical Engineering Laboratory and Yale University Mason Laboratory located in New Haven, Connecticut. Engine testing of the POM-E diesel blend (task 4) would occur at CSU at the Engine and Energy Conversion Laboratory in Fort Collins, Colorado.

Proposed work would involve work with hazardous chemicals, solvents, flammable gases, and fuels. This would include production of approximately 6 liters of synthesized POM-E and up to 50 gallons of diesel blend stock. Work would include the use of high speed machinery, micro reactors, reactors, and lasers. All work will be conducted on pre-existing machinery in indoor university laboratories purpose designed and built for the type of work being conducted. All staff involved in the work would be trained in chemical safety and laser safety. All materials would be handled and disposed of in accordance with laboratory safety practices and existing federal, state and local regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

This NEPA determination does NOT require a tailored NEPA provision Water Power Program NEPA review completed by Roak Parker 7.29.2019

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:

Rectronically Signed By: Casey Strickland

Date: 7/29/2019

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:

Field Office Manager

Date: