

PMC-EF2a

**U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION**



(2.04.02)

RECIPIENT: University of Oklahoma

STATE: OK

PROJECT TITLE : OU Center for Biomass Refining

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|--|--------------------------------------|----------------------------|-------------------|
| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
| CDP | DE-FG36-08GO88064 | GFO-08-096-002 | GO88064 |

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

- B3.6** Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).
- B3.11** Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components), under controlled conditions that would not involve source, special nuclear, or byproduct materials. Covered activities may include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests

Rational for determination:

This project is a renewal of an existing project which received a CX 3.6 and 3.11 in 2008 and 2009. The actual tasks are logical next steps in their overall evaluation of pyrolysis oils to fungible fuels. As is expected, the tasks for this effort are different than the tasks from the original determination. Similar to the previous work, all work for this project is being conducted in existing facilities and labs on the University of Oklahoma campus at the lab, bench and pilot scales.

The proposed effort is a two-year effort and the DOE funds will be used to support the entire effort. DOE funds will be utilized to provide the necessary materials and supplies (gases, chemicals, fittings, tubing, and standards) for both tasks. DOE funds will also be used to support project personnel, travel, and project management activities.

The tasks to be performed include the following: Task 1 - Production and characterization of stabilized pyrolysis oil and pyrolysis oil fractions. In Task 1, the Recipient will examine catalytic reactions for 'stabilizing' the pyrolysis oil. The catalytic reactions may involve rapid quenching of the pyrolysis vapors with hydrogen transfer compounds as well as use of molecular hydrogen. The pilot scale system at U. of Oklahoma has the capability of multiple quenches and/or catalytic treatments. Different catalytic reactor configurations will also be researched. The micropyrolysis reactor is set up for single quench, but its scale facilitates studies of the effect of changing reaction conditions and feedstock composition as well as the use of either fixed bed or monolith catalytic reactors for the upgrading/stabilization described above. Switchgrass will be the feedstock used in this Task. Task 1 is split into two subtasks to accommodate the research noted above.

Task 2 consists of combustion studies. A furnace facility with radiant feedback to the flames, simulating utility boiler furnaces is currently under construction on the U. of Oklahoma campus. This task will include instrumenting and testing this facility first with conventional fuels and second with pyrolysis oil produced from switchgrass. The two subtasks include Subtask 2.1 controlled combustion of atomized liquid sprays of pyrolysis oils and Subtask 2.2 effects of bio-additives on the combustion of pyrolysis oils. Spray flames will be studied under different flow conditions. The flame temperatures, radiation emission, global emissions (CO, CO₂, and NO), and soot-volume fractions are measured to understand the overall combustion behavior. For Subtask 2.2, the measurements stated in Subtask 2.1 will be conducted while varying water and alcohol content in the pyrolysis oils.

The project work will take place in two buildings on the University of Oklahoma Norman campus: the Sarkey's Energy Center (SEC) and Bldg 210, North Campus (NC). The mailing addresses are for SEC: 100 E. Boyd St, Norman, OK 73019 and for Bldg 210: 1928 Goddard Ave, Norman, OK 73019. In SEC the laboratory room numbers are C110, C116, C118, and E105; work in these laboratories relates primarily to Task 1. In NC the room number is Test Cell 2. Work in this laboratory relates primarily to Task 2.

The university requires that all personnel read and be familiar with the university Laboratory Safety Manual prior to entering any lab space. All laboratory personnel also participate in a lab safety training session or complete online laboratory safety training. Laboratory safety is monitored by the laboratory research supervisors (faculty) and by the University of Oklahoma Environmental Health & Safety Office (EHSO) (Mr. Trent Brown) with the cooperation of departmental staff. All chemicals and gasses will be handled according to institutional safety guidelines. No additional permits will be required for this project, additionally; no GMOs are used in this work.

Based on the information above, this project is comprised of bench-scale research projects and conventional laboratory operations to conserve energy, therefore the DOE has categorized this into Categorical Exclusions B3.6 and B3.11.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

None Given.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: *Electronically* Date: *8/24*
NEPA Compliance Officer *STG Hall*

FIELD OFFICE MANAGER DETERMINATION

Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____
Field Office Manager