

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



RECIPIENT: NREL

STATE: CO

PROJECT TITLE : Sustainable Aviation Fuel (SAF) from Pyrolysis Oil and Fatty Acids; NEPA Tracking No. 22-010

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	DE-AC36-08GO28308	NREL-22-010	GO28308

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:

DOE/EA-1968 (NREL STM)	SITEWIDE ENVIRONMENTAL ASSESSMENT, U.S. DOE NATIONAL RENEWABLE ENERGY LABORATORY, SOUTH TABLE MOUNTAIN CAMPUS, GOLDEN, COLORADO
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Rationale for determination:

The U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (FTLB) proposes to renovate a laboratory in the Field Test Laboratory Building (FTLB) to support pilot scale research in sustainable aviation fuel (SAF). The FTLB is located on NREL's South Table Mountain campus in Golden, Colorado.

The proposed project would consist of two research tasks: (1) the pretreatment of pyrolysis oil to prepare it for hydrotreating; and (2) hydrotreating the pretreated oil and other feedstocks such as volatile fatty acids, fats, oils, and greases. This NEPA review is specific to Task 1 activities as they are fully known at this time; Task 2 activities will be reviewed in a separate NEPA review once complete details are available.

Task 1 involves the installation of equipment and associated infrastructure in the FTLB-131 high bay to support the operation of an industry partner facility to fractionate and distill biocrude and SAF intermediates. A fractionation-distillation system would be installed and operated, titled the advanced pyrolysis oil liquid-liquid extraction system (APO LLE). Operation of this equipment would result in two carts: the first cart would produce raw advance pyrolysis oil (APO) and residual pyrolysis oil (RPO), and the second cart would distill the raw APO and RPO into true APO and RPO. NREL would develop intermediate steps in the distillation of SAF and would not conduct the final processing at pilot scale.

Construction

FTLB-131 would be retrofitted and equipment would be installed in FTLB-104B. In FTLB-131, a HAL Class I Division 1/Class 1 Division 2 Extraction Booth would be installed to provide a controlled environment and safety. The APO LLE would be designed, built, and operated within the HAL enclosure.

Existing laboratory systems would be replaced or upgraded as needed to support the new system, which would include electrical, fire, pressure, gas service, chilled water or glycol, and automation systems.

Construction would occur over an approximately 2-month period during summer 2022.

The renovation of FTLB-104B would be conducted to support Task 2 work; as such, construction activities for this task would be reviewed under a separate NEPA review. At this time, it is known that a SAF-hydrotreater and an air compressor would be installed in FTLB-104B. Once FTLB-104B is remodeled, APO produced in FTLB-131 may be hydrotreated using the system to be design, built, and operated in FTLB-104B.

Commissioning

The APO LLE system would operate within the HAL enclosure to fractionate and distill pyrolysis oil into APO and RPO. The bio-derived components that would be used would be provided by Alder Fuels, the current industry partner. Small quantities of APO and RPO would be generated to validate the process and ensure all production steps are in place.

To start, approximately 1 to 10 gallons a day of APO and RPO would be generated. These products would then be shipped back to the industry partner for further testing and use. Gas byproducts would be routed through the FTLB

ventilation system.

Pilot Scale Advanced Pyrolysis Production

Once the NREL process is validated and the production steps are in place, use of the APO LLE system would increase to produce up to 84 gallons a day of pyrolysis oil and up to 42 gallons a day of both APO and RPO. This would involve operating the system continuously, 24 hours a day, for up to 2 years. The purpose of this scale-up in operation is to produce enough APO that can be further hydrotreated offsite into ASTM-certified SAF to be used in a flight demonstration of a commercial jet airliner.

Shipment and Storage

During the pilot scale work, Alder Fuels would provide 14 to 15 barrels of pyrolysis oil per week to the FTLB. NREL would process the material and ship the APO and RPO products and byproducts to Alder Fuels weekly. The barrels would be stored outside the FTLB in a structure with appropriate secondary containment; the setup would meet applicable fire codes and be refrigerated. The barrels would vary from 42 gallons to 55 gallons in size; no storage container used would exceed 55 gallons in size. The storage building would be a commercially available prefabricated structure that can be used for flammable barrel storage and can accommodate sixty 55-gallon barrels. The building would be installed in the west parking lot of the FTLB and would not require ground disturbance.

The APO and RPO produced would be shipped back to the industry partner for further testing and use.

Project Conclusion

At the conclusion of the project, the equipment and special systems would be dismantled and either reused, recycled, or disposed of in accordance with requirements.

Impacts Analysis

Project activities would not affect cultural resources, threatened or endangered species, wetlands, floodplains, or prime farmlands and would not involve ground disturbance. The project would not alter the use, operation, or mission of the FTLB.

Non-hazardous waste generated would be reused, recycled, or disposed of in accordance with applicable regulations and NREL policy and procedures. While research is being conducted, industrial solvent-contaminated water at pilot scales would be produced. This waste stream would be disposed of in accordance with NREL programs and procedures and regulatory requirements. APO and RPO produced would be shipped back to the industry partner for future use. Renovation-related noise would consist of a short-term, intermittent increase in ambient noise levels and would follow applicable noise ordinances.

The project would result in volatile organic compound (VOC) emissions. Initial stages of research would not require an Air Permit Emission Notice (APEN) as the quantities emitted would be low. During this time, data would be collected to determine if the VOC emissions that may be produced at pilot scale would require an APEN. If the data shows that at pilot scale an APEN would be required, an APEN shall be obtained prior to commencing research at pilot scale.

Individuals working on this project could be exposed to physical, chemical, and electrical hazards. Existing corporate health and safety policies and procedures would be followed including employee training, work/worker authorization, proper protective equipment, engineering controls, and monitoring, as well as obtaining a Safe Work Permit. Additional policies and procedures would be implemented as necessary if new health and safety risks are identified.

Based on the review of the project, DOE has determined that the proposed project fits within the scope of activities that were analyzed in Section 3.2.1, "Research Activities, Laboratory Activities, and Site Operations Enhancements", of the 2014 Final Site-Wide Environmental Assessment of the NREL STM (DOE/EA-1968). DOE has determined that the proposed project is bound by the environmental impact analysis contained in this EA and its respective FONSI, and no further NEPA review is required.

NEPA PROVISION

DOE has made a conditional NEPA determination.

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

Task 1

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

Task 2

Include the following condition in the financial assistance agreement:

All required permits, notifications, and permissions shall be obtained prior to commencing permit-required activities.

Notes:

NREL
Nicole Serio, 5/11/2022

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Electronically Signed By: Lisa Jorgensen Date: 5/12/2022
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