

**SUPPLEMENT ANALYSIS
FOR
EARLY-LEAD MINI FISHER-TROPSCH REFINERY PROJECT
UNIVERSITY OF KENTUCKY
CENTER FOR APPLIED ENERGY RESEARCH
FAYETTE COUNTY, LEXINGTON, KY
(DOE/EA-1642)**

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

ACTION: Supplement Analysis (SA)

SUMMARY: On August 12, 2009, DOE issued an Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) on a project proposed by the University of Kentucky's Center for Applied Energy Research (CAER), on behalf of the Coal Fuel Alliance, for funding as a Congressionally-directed project managed under DOE's Fuels Program. The EA was titled: *Design and Construction of an Early Lead Mini Fischer-Tropsch Refinery at the University of Kentucky Center for Applied Energy Research, near Lexington, Kentucky (DOE/EA-1642)*. Subsequent to DOE approval, the Recipient revised the design of the project facilities to now occupy a larger footprint and to shift the location of the facilities slightly within the originally proposed project site. The plant's production levels, materials usage and storage, and emissions would remain unchanged. Based on the analyses in this Supplement Analysis (SA), DOE has determined that there would be no substantial changes to the proposal or significant new information relevant to environmental concerns that would require a Supplemental EA.

BACKGROUND: DOE's original proposed action was to provide a grant to partially fund the University of Kentucky's proposed project, an *Early-Lead Mini Fischer-Tropsch Refinery* to be housed in a dedicated new facility that would be constructed at the University of Kentucky's CAER research park, located north of Lexington in Fayette County, KY.

The pilot-scale facility would test recent improvements in process and plant element designs and would produce research quantities of Fischer-Tropsch liquids and finished fuels. These fuels would then be further tested at three university entities that constitute the Coal Fuel Alliance (CFA): Southern Illinois University at Carbondale, the Energy Center at Purdue University, and University of Kentucky's CAER. These three university entities entered into a Memorandum of Understanding to form the CFA.

This project would support anticipated growth in the coal to liquid fuels industry, and more specifically, the stability of the Nation's liquid fuel supply. While DOE initially provided \$1,370,065 in Phase I financial assistance in a cost-sharing arrangement with the Recipient DOE now proposes to provide a total of \$4,568,940 over the first three phases of the project. The total cost of the project through the first three phases is now estimated at about \$5.7 million. Over the expected life of the project spanning 8 phases, the total costs are estimated roughly at \$15 million; and DOE may share in the costs of subsequent phases.

The federal action of providing funding for this project requires compliance with the *National Environmental Policy Act of 1969* (NEPA; 42 U.S.C. 4321 et seq.), the Council on Environmental Quality regulations (40 CFR Parts 1500 to 1508) and DOE's NEPA implementing procedures (10 CFR Part 1021). Accordingly, DOE initially prepared an EA that led the Department to issue a FONSI. Upon receipt of notice of the proposed changes in the project, DOE has now prepared this SA to evaluate the need for a Supplemental EA.

PURPOSE AND NEED: The overall purpose and need for DOE action pursuant to the Fuels Program and the Congressional direction are to accelerate the availability of coal-to-liquid (CTL) fuels for transportation. Through funding of selected projects, DOE aims to foster research, development and demonstration of CTL fuels with the goal of reducing costs and improving the performance of these fuels. This would lessen the United States' dependence on imported oil.

NEPA ANALYSIS TO DATE: The National Energy Technology Laboratory (NETL) completed its environmental review for Recipient's project, as originally planned at the University of Kentucky's research park, with the issuance of a Final EA (DOE/EA-1642) in July of 2009, followed by the issuance of a FONSI on August 12, 2009. The main issues examined in the EA were related to the potential impacts to groundwater resources, cultural resources, and air quality as a result of the construction and subsequent operation of the Mini Fisher-Tropsch Refinery. It was found that while the project would be located in a delineated wellhead protection area, prior to the start of operations the Recipient would prepare a Groundwater Protection Plan to document practices intended to minimize the potential for release of fuel during storage and transport. This plan would be implemented during design, construction, and operations. Based on the analysis in the EA, DOE determined that providing funding to the Recipient for the proposed project would result in no significant adverse impacts to the human environment.

The Kentucky State Historic Preservation Office (SHPO) participated in consultations with DOE during the original assessment. DOE contacted the SHPO again when the plans changed for the building's size and the exact location of the plant. In both cases, the SHPO determined that the project would not affect sites eligible for listing on the National Register of Historic Places. The SHPO further determined that the project is planned in an area that likely suffered substantial disturbance during the original construction of the adjacent structures and parking lot, and as such, an archaeological survey is not required.

Operation of the Mini Fisher-Tropsch Refinery is expected to emit approximately 1,500 pounds of carbon monoxide annually, in addition to some light hydrocarbons. Both the carbon monoxide and the hydrocarbons would be incinerated in a flare; therefore, potential emissions from the operation of the Mini Fisher-Tropsch Refinery are expected to be below the Kentucky Division for Air Quality thresholds requiring a permit or registration. The proposed modification would not increase emissions.

DESCRIPTION OF THE PROPOSED CHANGES OR NEW INFORMATION: The proposed modification involves an increase in the footprint from 2,700 square feet to 5,680 square feet (110 percent increase) and changes in building height from 40 ft for the entire building to a stair-step profile of approximately 20 ft for part of the building, 40 feet for the remainder of the building, and 60 ft in a small reactor tower attached to the side of the building.

The changes in plans also involve shifting the position of the building 20 to 30 yards to the west of the originally proposed location. These modifications are necessary to better accommodate larger than expected skid sizes and vessel sizes of the individual refinery process units and to provide more operational space.

ALTERNATIVES CONSIDERED: No alternatives were identified for proposed changes in dimensions of the building or in the exact location of the building footprint; although, the building foot print and location within the selected parcel of land probably could be changed if a need was identified.

ANALYSIS AND ENVIRONMENTAL CONSEQUENCES: DOE reconsidered the potential environmental consequences of the proposed project in light of the proposed changes in plans. DOE reconsidered the 14 environmental resource areas that were originally considered during the preparation of the EA. However, not all areas were reconsidered at the same level of detail. DOE focused more detailed review on areas that would relate most directly to the proposed changes in plans. The areas DOE reconsidered in more detail are cultural resources, water resources, and air quality. For these areas, DOE determined there would be negligible environmental impacts associated with the proposed project when accounting for the changes in project plans.

Findings

- Changes are proposed in the size and location of the Mini Fisher-Tropsch Refinery building; however, rates and capacities proposed for the individual process units to be housed in the building remain unchanged. Therefore, there would be no changes or increases in air emissions, solid and hazardous wastes, or inventories of bulk materials.
- There are two known archaeological sites in proximity to the existing University of Kentucky CAER facilities. An e-mail received from the SHPO stated “that the new stand-alone building is to be constructed in an area that has likely suffered substantial disturbance during construction of the adjacent structures and parking lot. As such, an archaeological survey should not be required.” (Attachment A)
- The proposed expansion and minor relocation of the Mini Fisher-Tropsch Refinery building would result in no change in impacts to the area’s water or biological resources. The wellhead protection area would not be further at risk because the quantities of hazardous materials used and produced would not increase as a result of the proposed changes in plans for the project, and ground water recharge would not be appreciably reduced by the increase in impervious surface area.
- The proposed increase in the building’s size would result in a negligible change in the socioeconomic impacts.
- No additional impacts to neighboring parcels, buildings, or sensitive receptors have been identified.
- In summary, changes to the project, as identified to DOE by the Recipient, would not appreciably alter the impacts for any of the resource areas as evaluated and expressed in the EA. The potential environmental impacts that may be associated with the proposed project, including the proposed changes to the project, have been

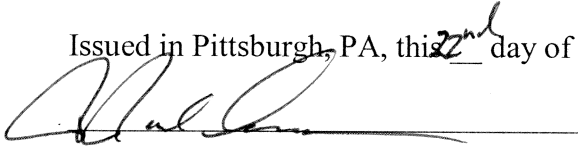
adequately evaluated in the EA and were considered in the Finding of No Significant Impact issued on August 12, 2009.

PUBLIC AVAILABILITY: Copies of this SA will be sent to stakeholders that submit requests to DOE's National Energy Technology Laboratory. A copy will be posted on the NETL web site at <http://www.netl.doe.gov/publications/others/nepa/ea.html>.

MITIGATION REQUIREMENTS: No mitigation requirements have been identified for the proposed changes in project plans.

DETERMINATION: On the basis of the evaluations in this SA, DOE has determined that there would be no substantial changes to the proposal or significant new information relevant to environmental concerns that would require a Supplemental EA. No significant impact on the human environment would occur as a result of DOE's proposed action, to provide the remainder of a \$4,568,940 federal grant, and the Recipient's proposed project, to construct and operate an Early Lead Mini Fischer-Tropsch Refinery at the University of Kentucky's Center for Applied Energy Research, near Lexington, Kentucky. Although the proposed changes in project plans would increase the refinery building's footprint by 110 percent, increase the building's height by adding a reactor tower that reaches an additional 20 ft upwards, and shift the building's location by 20 to 30 yards, the related impacts would be negligible. The plant's production levels, materials usage and storage, and emissions would remain unchanged. Changes to the project, as identified to DOE by the Recipient, would not appreciably alter the impacts for any of the resource areas evaluated in the EA. DOE has, therefore, determined that the proposed changes to the project fall within the scope of analyses documented in the EA that was issued in July 2009. For the reasons listed above, DOE determines that no further NEPA documentation is required as a result of the proposed changes in project plans that have been disclosed to DOE.

Issued in Pittsburgh, PA, this 22nd day of September 2010.



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