



# U.S. Department of Energy

## Categorical Exclusion Determination Form

**Program or Field Office:** Advanced Research Projects Agency - Energy (ARPA-E)

**Project Title:** 25A2876 - Upgrading Refinery Off-gas to High-Octane Alkylate

**Location:** \*- Multiple States - New Jersey, Pennsylvania, Oklahoma

**Proposed Action or Project Description:**

American Recovery and Reinvestment Act:

Oil refining is the most efficient industry at converting a chemical feedstock, oil, into finished products. Less waste is produced per ton of product in refining than in petrochemicals, fine chemicals, or pharmaceuticals. This high level of efficiency is absolutely necessary given the enormous volumes of material processed. Because of the scale of refining in the US, small percentage inefficiencies equate to massive real losses of potential fuel and unnecessarily emitted greenhouse gases. In the US, one such source of loss is the olefin content of refinery off-gas, or ROG. ROG is the waste generated from fluid catalytic cracking and other similar operations. It consists of light paraffins and olefins, particularly ethane and ethylene. For refineries outside the petrochemical hub along the US Gulf Coast, few markets for light olefins like ethylene and propylene are accessible, and separating the olefin is difficult and expensive, so this valuable material must be burned in the refinery. This ARPA-E project seeks to develop a step-out technology to increase refinery efficiency, reduce CO2 emissions, and produce more gasoline from each barrel of oil by converting the olefinic portion of ROG into alkylate, a clean-burning, high-octane component of gasoline. The technology will develop a novel solid catalyst capable of promoting isoparaffin alkylation using dilute ethylene, the primary olefin contained in ROG. ~~The process will be designed to use ROG directly, without the need to conduct energy intensive operations of the olefin first.~~

**Categorical Exclusion(s) Applied:**

X - B3.6 Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects

\*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR10 21 [Click Here](#)

This action would not: threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive Orders; require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities, but may include such categorically excluded facilities; disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; or adversely affect environmentally sensitive resources (including but not limited to those listed in paragraph B.(4)) of Appendix B to Subpart D of 10 CFR 1021). Furthermore, there are no extraordinary circumstances related to this action that may affect the significance of the environmental effects of the action; this action is not "connected" to other actions with potentially significant impacts, is not related to other proposed actions with cumulatively significant impacts, and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

Based on my review of information conveyed to me and in my possession (or attached) concerning the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: /s/ William J. Bierbower Digitally signed by William J. Bierbower  
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email=william.bierbower@hq.doe.gov, c=US  
Date: 2009.11.20 11:30:01 -05'00' Date Determined: 11/20/2009

Comments:

Webmaster: