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(1.08.09.13)

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

RECIPIENT: Algenol Biotech LLC **STATE:** FL

PROJECT TITLE : Production of Bio-crude in an Advanced Photobioreactor-

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001471	DE-EE0007690	GFO-0007690-001	

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:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.
B5.15 Small-scale renewable energy research and development and pilot projects	Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Algenol Biotech LLC to carry out research and development to enhance cyanobacteria strains, cultivation methods, and dewatering procedures. Efforts focus on methods to convert algal biomass, via hydrothermal liquefaction (HTL), into a biocrude oil for refining to liquid transportation fuels. Additional research would be conducted to compare production and process economics of open pond production systems versus photobioreactor-based systems. Research activities would also include Techno-Economic Analyses and Life Cycle Analyses.

At Algenol in Fort Myers, FL, strain development, photobioreactor design, cultivation, dewatering optimization, and HTL conversion of algal biomass to biocrude would occur. At the National Renewable Energy Laboratory (NREL) in Golden CO, analysis of cyanobacterial biomass to identify approaches for strain improvement including bench scale experiments would occur. At the Arizona Center for Algae Technology and Innovation (AzCATI) field site in Mesa, AZ, cultivation and monitoring of cyanobacteria strains in outdoor mini-ponds would occur. Computer and paper studies to support development of Techno-Economic and Life Cycle Analyses would occur at Georgia Institute of Technology (GIT) in Atlanta, GA. Cultivation of cyanobacteria strains in outdoor ponds and HTL conversion and fractionation of cyanobacterial biomass would occur at the Reliance Industries Ltd (RIL) facilities in Gagva, India.

Recombinant DNA technologies would be applied by Algenol and by NREL. This work would involve plasmid-based gene introductions, incorporation of exogenous DNA into the cyanobacterial chromosome, insertional inactivation of native genes, and downregulation of native genes. All recombinant DNA work would be conducted in a manner consistent with the current National Institutes of Health Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules and in compliance with federal, state, and local regulations. All recombinant DNA organisms would exist in-lab and none would exist in the outdoor test facilities. After experiments are completed, recombinant organisms would be inactivated by contact with bleach, autoclaving, or incineration. Archival copies of organisms would be maintained by cryopreservation.

Algenol, NREL, and AzCATI scientists would carry out routine laboratory work involving standard laboratory equipment, solvents, compressed gases, and hazardous chemicals. All applicable state and federal regulations, established company/institution safety, and biosafety protocols would be followed at each site. In addition, AzCATI and Algenol would conduct outdoor cultivations of cyanobacteria and would work with compressed gas lines, control systems, motors, pumps, mechanical equipment, and chemicals for media formulation. Safety training, pre-operation hazard assessments, engineering controls, routine safety inspections, and proper use of personal protective equipment would be employed at each facility. RIL laboratory and pilot scale activities are conducted in full compliance with all Indian regulations.

The current ethanol/biomass production facility at the Algenol site would be modified slightly for this project to include biomass only production. The modification would involve continuous or semi-continuous harvest and would require changes in piping of existing outdoor facilities and potential changes in the photobioreactor design/deployment configuration. The downstream processing equipment would consist primarily of a HTL unit located outdoors in the Algenol Integrated Biorefinery pavilion. That HTL unit was constructed under a previous Department of Energy project (Algenol Integrated Biorefinery for Producing Ethanol from Hybrid Algae, Freeport, Texas, Fort Myers, Florida, DOE/EA-1786, December 2010). Algenol anticipates adding a safety enclosure to the unit. No significant ground disturbing activities would occur.

Activities carried out at the RIL facilities in Gagva, India are exempt from further review under Executive Order 12114 per Section 5.1.1 of the DOE Implementation of Executive Order 12114 Environmental Effects Abroad of Major Federal Actions Final Guideline.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410 (2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Insert the following language in the award:

You are required to:
Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination requires a tailored NEPA provision.
Review completed by Chris Rowe, 08/25/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Lori Gray Lori Gray Date: 8/26/2016
NEPA Compliance Officer

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