PMC-ND
(1.08.09.13)

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

RECIPIENT: Amyris, Inc. **STATE:** CA

PROJECT TITLE: Integrated process for commercial production of farnesene, a versatile platform chemical, from domestic lignocellulosic feedstock

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001433	DE-EE0007729	GFO-0007729-001	GO7729

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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Amyris, Inc. to develop a manufacturing-ready, farnesene-fermentation process using cellulosic sugars that achieve cost parity with Amyris' 1st generation sugar- manufacturing process using cane syrup.

Activities associated with the proposed project would include preliminary validation of current capabilities (Task A); cellulosic sugar production, concentration, and purification (Tasks B, J, K, Q, R); strain engineering (Tasks C, D, L, M, S) ; analysis of engineering products (Tasks E, F, N, U, V); selection and assessment of potential feedstock sites (Tasks G and H); integration optimization (Task I); design and installation of a simulated moving bed chromatography (SMB) unit (Task O); validation of project progress (Task P); and process development (Task T). These activities would take place at pre-existing, purpose-built facilities as follows:

• Amyris, Inc.—Research & Development (R&D) Lab in Emeryville, CA
Enzyme identification, Strain engineering, Analytical method development, Fermentation at up to 2 L scale, and Product analysis.
• Renmatix—R&D Lab, Headquarters, Pilot Plant in King of Prussia, PA
Bench-scale R&D, Analytical work, Pilot plant runs, Accounting, Legal, Administrative work, and Project management
• Renmatix—Feedstock Processing Facility in Rome, NY
Pretreatment and hemicellulose hydrolysis of pine wood chips
• Renmatix—Demonstration-scale plant in Kennesaw, GA
Supercritical water hydrolysis of biomass solids obtained from the Rome facility, refining of cellulosic sugars
• Total Marketing Services—Business Offices in Paris, France
Engineering studies, Techno-economic analysis, and Life-cycle analysis

Design for the configuration of the SMB Unit would be completed in-house; however the installation would be outsourced to a fully licensed, third-party contractor. This installation would take place at Renmatix's Kennesaw facility and would result in no change in the use, mission or operation of the existing facility. The lab where purification of cellulosic sugars using ion exchange would be completed has not yet been identified. However, this is standard lab work that would be completed at a fully licensed, purpose built lab similar to those listed above. The

facilities utilized for all lab work under this award have obtained all applicable permits, and would not need additional permits for the proposed activities.

The proposed project would necessitate the use and handling of non-pathogenic, genetically modified, micro-organisms (Saccharomyces cerevisiae, or common baker's yeast) and standard molecular biological reagents, some of which may contain hazardous materials. For analytical method development, there would also be some handling of solvents. Genetic modifications would be made to yeast strains in a targeted fashion to express enzymes to degrade cellulosic sugars. Amyris is a Biosafety Level (BSL) 1 laboratory, but has a safety review process to evaluate risk and mitigation needed for the introduction of BSL2 strains if needed for strain engineering purposes. Proposals to use BSL2 organisms would be reviewed by the Amyris Biosafety Committee. New genetically modified production strains would likewise be evaluated and classified for risk group according the World Health Organization/Center for Disease Control guidelines by the Amyris Biosafety Committee. Biological waste containing genetically modified strains would be collected by a licensed medical waste hauler inactivated by heat (autoclave) and disposed of in a licensed land disposal site.

Wastes associated with the proposed project would include solvents, sharps (glass, syringes, razors), used paper and plastic consumables, and regular trash. Biological waste and hazardous chemicals would be transported using permitted and licensed waste haulers and would be managed in accordance with federal, state and local environmental regulations. Other wastes would be recycled when possible and would otherwise be disposed of through normal municipal waste streams. Amyris has existing corporate policies in Illness Injury Prevention, Biosafety (including biological waste), Chemical Hygiene, Personal Protective Equipment, Hazardous waste and Emergency Response. These policies include formal project risk assessment plans and provide for training for new hires and refresher training for existing employees.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of 10 CFR 1021 subpart B 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. Furthermore, the proposed activities at Total Marketing Services located in Paris, France are exempt from further review under EO 12114 per Section 5.1.1 (Actions not having a significant effect on the environment outside the US) of the DOE EO 12114 Implementing Guidelines. 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.

Note to Specialist :

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord, 09/02/2016.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: _____

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