

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Phinix, LLC**STATE:** MO

PROJECT TITLE: Rare Earth Element Separation Using Gas-Assisted Micro-Flow Extraction with Task-Specific Ionic Liquids

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
FOA-0002322	DE-EE0009435	GFO-0009435-001	G09435

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:

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 funding to Phinix, LLC to design, assemble, and optimize a novel rare earth element (REE) separation system. A novel bench scale extractor based on gas-assisted microflow extraction (GAME) theory would be constructed, which would include dispersion modules. Various task-specific ionic liquids (TSILs) used for extraction of heavy metals from aqueous systems would be evaluated and compared. The most efficient and cost-effective liquid would be synthesized and used to generate rare earth solutions from bauxite residue. Contaminant metal ions in the solutions would be removed through conventional solvent extraction, producing the rare earth element, neodymium oxide. By the last budget period, REEs in real solutions would be separated using the novel extractor and the most promising TSIL. A process flowsheet would be created for guidance on producing high quality rare earth elements from bauxite residue. Techno-economic analysis and technology-to-market evaluations would be run. The project would be completed over three Budget Periods (BPs) with a Go/No-Go Decision Point between each BP. This NEPA review applies to all three BPs.

Proposed project activities by location are listed below:

Phinix, LLC – Clayton, MO

- Project Management, techno-economic analysis, technology to market evaluation, and design of processing flowsheet.

Mineral Processing Laboratory, Virginia Tech – Blacksburg, VA

- All lab experiments, including design of a novel extractor, synthesis of task-specific ionic liquids (TSILs), and production of neodymium oxides from bauxite residue using the extractor and TSILs.

NICHE Industrial Chemicals – Gramercy, LA

- Provide bauxite residue samples, design techno-economic analysis, and lead technology to market effort and finding markets for recovered neodymium.

Project activities would involve the use and handling of hazardous materials, including mineral acids, strong bases, and solvents used for metal extraction. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies and procedures. Protocols would include employee training, the use of fume hoods, the use of personal protective equipment, monitoring, engineering controls, and internal assessments. All waste products would be disposed of by licensed waste management service providers. Phinix, LLC and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations. No additional modifications, new permits, or changes in the use, mission, or operation of any facility would be required.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 4/2/21.

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:

 Electronically Signed By: Casey Strickland
NEPA Compliance Officer

Date: 4/5/2021

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:

Field Office Manager

Date: _____