PMC-ND

(1.08.09.13)

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

**RECIPIENT:** West Virginia University Research Corporation **STATE:** WV

**PROJECT TITLE :** Enabling Low-Heat Industrial Decarbonization through Optimizing Electromagnetic Material-Wave Interactions.

| Notice of Funding Opportunity Number | Procurement Instrument Number | NEPA Control Number | CID Number |
|---|---|---|---|
| DE-FOA-0002997 | DE-EE0011198 | GFO-0011198-002 | GO11198 |

**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. |
| **B3.15 Small-scale indoor research and development projects using nanoscale materials** | Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). |

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to West Virginia University (WVU) for the optimization of electromagnetic material-wave interactions for enabling low-heat industrial decarbonization.

Microwave-enhanced catalytic experiments, converting plastics to olefins, catalyst synthesis, testing and data analysis, and microwave reaction process simulation would occur at West Virginia University (WVU) in Morgantown, West Virginia. Research and development for electromagnetic (EM) catalysis, EM reactor design and optimization, demonstration of continuous flow process chemistry and analytical characterization would be carried out at ThermalWave Solutions, LLC (TWS) in Aiken, SC. Catalysts synthesis and characterization as well as traditional heating, microwave, and radio-frequency induction chemical conversions of waste plastic to light olefins would occur at Horizon I Engineering Center and the Swearing Engineering Center at the University of South Carolina (USC). Literature searches, information gathering, data analysis, computer modeling, training, report preparation and project meetings would occur at Benedict College in Columbia South Carolina and AIChE – RAPID Manufacturing Institute in New York, NY. General office work, including consulting and marketing associated with the award would occur at Shell Technology Center in Houston, Texas.

Nanosized metal particles would be created as part of the project at WVU, TWS and USC sites and may introduce respiratory and skin exposure risks. West Virginia University would develop microwave catalysts made from inorganic materials, which would be used in converting ethanol into ethylene in microwave reactors. University of South Carolina (USC) would synthesize monolithic structured catalysts. Thermal Wave Solutions would scale up microwave and radio frequency reactors. All project-related activities involving hazardous materials would occur in a laboratory setting. Existing health and safety protocols would be followed, including employee training, the use of proper protective equipment, monitoring, control and internal assessments. Award efforts involving hazardous materials would not occur at the RAPID Institute, Shell or Benedict College.

No permits would be needed in association with the proposed project and no physical modification of existing facilities or ground disturbing activities would occur as a result of award activities.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant.

EERE is aware of the November 12, 2024, decision of Marin Audubon Society v. FAA, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the Council on Environmental Quality (CEQ) regulations implementing NEPA are not judicially enforceable or binding on this agency action, EERE has nonetheless elected to follow those regulations at 40 C.F.R. Parts 1500-1508, in addition to DOE's procedures/regulations implementing NEPA at 10 C.F.R. Part 1021, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

**NEPA PROVISION**

DOE has made a final NEPA determination.

Notes:

Industrial Efficiency and Decarbonization Office
NEPA review completed by Chris Akios, 01/22/2024

**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: Andrew Montano Date: 2/25/2025

NEPA Compliance Officer

**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: _____ Date: _____

Field Office Manager