

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



**RECIPIENT:** North Carolina Agricultural & Technical State University

**STATE:** NC

**PROJECT TITLE :** Catalytic Deconstruction of Plasma treated Single-Use Plastics to Value-added Chemicals and Novel Materials

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002473	DE-EE0009945	GFO-0009945-001	

**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 the North Carolina Agricultural and Technical State University (NCAT) to analyze, test, and demonstrate non-thermal plasma (NTP) treatment of waste plastics and development of subsequent destructive catalysts to create C2-C4 olefins (raw materials typically used in the manufacturing of plastics), BTX (Benzene, Toluene, Xylene) (components used in the production of petrochemicals), and oxygenated intermediates (target products) at lower energy consumption than manufacturing virgin plastics.

DOE has not previously completed any NEPA Determinations (NDs) for this specific award, however DOE previously completed an ND (GFO-Single-Use-Plastic-FOA-Verification-001; A9, B3.6; 5/17/2021) for Funding Opportunity Announcement (FOA) DE-FOA-0002473. The ND for the FOA applies to initial verification activities for awards issued under the FOA, including this award (DE-EE0009945, Task 1). Such activities would involve initial verification of baseline data, data collection, analysis, and preliminary laboratory demonstrations (such as bench-scale laboratory work intended to demonstrate viability of later project activities).

This award would be executed over two budget periods. Award activities include assessment of NTP treatment of plastic wastes, development of mechanisms for depolymerization and oxidation, development of catalyst compositions for destruction of treated plastics, testing activities, and demonstration. Small amounts (gram-quantities) of waste plastics would be treated and measured at the 4-STAR Laboratory (Raleigh, NC) and NCAT Laboratory (Greensboro, NC). Plasma research, chemistry and analysis would occur at the Plasma Science and Technology Laboratory (PSTL) (Ann Arbor, MI). Administrative, techno economic analysis (TEA), life cycle assessment (LCA), and computational tasks would occur at the California Institute of Technology (Pasadena, CA) and/or Dow Chemical Company (Lake Jackson, TX; Midland, MI; Freeport, TX). All locations are purpose built and would not require physical modifications, ground disturbing activities, change in use, mission, or operation, or require installation of equipment outdoors.

Award activities would produce vapors containing monomers and radicals. All vapor-producing activities would be conducted within laboratory fume hoods to prevent emissions. Other hazards would include the handling and use of nanoscale catalyst materials and use of high voltage electricity. All nanoscale materials would be handled using proper engineering controls until adhered to surface materials or dissolved in solvents. Approximately 40 liters of processed wastewater would be generated during analysis activities. Wastewater would be collected and disposed of in accordance with University, state, and federal requirements. Existing university and corporate health, safety, and environmental policies and procedures would be followed at all facilities including personnel training, proper personal

protective equipment (PPE), engineering controls, monitoring, and internal assessments. North Carolina Agricultural and Technical State University would adhere to all applicable federal, state, and local health, safety, and environmental regulations. DOE does not anticipate any impacts to resources of concern due to the proposed activities of the project.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office (AMO)  
NEPA review completed by Amy Lukens, 7/1/2022

## 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:

  
NEPA Compliance Officer

Date: 7/1/2022

## 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: