

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



**RECIPIENT:** University of Kansas Center for Research, Inc

**STATE:** KS

**PROJECT TITLE :** Recycling of End-of-Life Solar Panels using Near-critical Fluids and Ozone

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002582	DE-EE0010496	GFO-0010496-001	

**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 federal funding to the University of Kansas Center for Research, Inc. (KU) to establish the science, technology, and partnerships needed to develop a novel, resource-efficient, intensified, cost-effective and environmentally benign recycling technology for end-of-life solar photovoltaic (PV) cells.

The types of activities associated with the proposed project would be limited to outreach, data analysis, computer modeling, and laboratory research. The proposed project would involve processing swarfs of PV cells in bench-scale vessels to delaminate cell components for recycling the constituent elements (e.g., cadmium and telluride) via ozonation and acid leaching. The project's principal investigator at KU (Lawrence, KS) would perform research on near-critical media for the delamination of PV cells. The Idaho National Laboratory (INL; Idaho Falls, ID) would conduct laboratory experiments on PV cell swarfs ranging from approximately 1 square centimeter (cm<sup>2</sup>) to 1,000 cm<sup>2</sup> to delaminate cell layers. First Solar, Inc. (Tempe, AZ) would assist the project with techno-economic and life cycle assessment for the proposed technologies.

Project activities undertaken at KU and INL would involve the use and handling of organic solvents, compressed gases, and ozone, as well as the production of acidic aqueous wastes containing the elements from the PV swarfs. All such handling would occur in-lab following standard laboratory practices to mitigate environmental, health and safety (EH&S) hazards. The minor quantities of hazardous materials used and produced during the course of the proposed project would be managed in accordance with established EH&S procedures at each facility.

All work would occur entirely within existing offices and chemical research laboratories that were purpose-built for the type of small-scale research and development being proposed. Physical modifications or additional permits would not be necessary. No change in the use, mission, or operation of existing facilities would arise out of this effort. DOE does not anticipate any impacts to resources of concern due to the proposed activities of the project.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

**NEPA PROVISION**

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office (SETO)  
Review completed by Whitney Donoghue on 05/23/2023.

**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:  Date: 5/23/2023  
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