

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



**RECIPIENT:** Diakont Advanced Technologies, Inc.

**STATE:** CA

**PROJECT TITLE :** Hydrogen-Resistant Multilayer Composite Coating for Hydrogen Blending in Gas Transmission/Distribution and Industrial End-Use Applications

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002553	DE-EE0010218	GFO-0010218-001	GO10218

**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 Diakont Advanced Technologies, Inc. to develop and test a hydrogen-resistant multilayer composite coating and the processes and tools capable of applying the developed coating in operational natural gas pipelines. Application of the developed coating to operational natural gas pipelines is not planned as part of this DOE project and any such future application would be beyond the scope of DOE funding. Deposition methods would be evaluated on coupon sections which would then be tested in hydrogen permeation facilities. The project would be completed over two Budget Periods (BPs) with a Go/No-Go decision point between each BP. This NEPA determination is applicable to both BPs.

Project participants would fabricate a multilayer, metal and metal oxide composite coating that repels hydrogen and protects pipes against hydrogen embrittlement. The selected coating would be applied on the inner surface of a sample pipe then the coated pipe sample would be subjected to gas permeation tests to measure its hydrogen permeability and to understand how well it can mitigate hydrogen-assisted fatigue. Concurrently, a conceptual tooling design and process for a suitable spray-based deposition coating application within existing piping and pipelines would be developed. Samples would be tested in 210 bar hydrogen gas in non-coated and coated conditions to quantify cycles to failure and assess whether coating improves fatigue life.

Based on characterization and mechanical testing results, the team would fabricate, test, and refine a prototype lab-scale robotic system for applying the coating. The system and process would be demonstrated on a short, approximately 24-inch diameter test pipe section on which continued fracture/fatigue tests would be conducted to validate performance. Techno-economic, market, and competitor analyses would be conducted to assist with scaling up and commercializing the technology.

Proposed project activities by location are listed below:

Diakont Advanced Technologies, Inc. – Carlsbad, CA

- Testing of robotic end-effector components for their performance in short, new, unused, pipe segments

Massachusetts Institute of Technology – Cambridge, MA

- Testing of cutting materials for hydrogen permeation and for crack resistance

Sandia National Laboratories – Livermore, CA

- Deposition methods would be evaluated on coupon sections, which would then be tested in hydrogen permeation facilities.

Exelon – Washington, DC

- Analytical activities

ADL Ventures – Cambridge, MA

- Analytical activities

No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities. Project activities would involve the use and handling of various hazardous materials, including metals and industrial solvents. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies and procedures which would include employee training, the use of personal protective equipment, engineering controls, monitoring, and internal assessments. All waste products would be disposed of by licensed waste management service providers. Diakont and its project partners would observe all applicable federal, state, and local health, safety, and environmental regulations.

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:

Advanced Manufacturing Office  
Review completed by Shaina Aguilar on 8/25/22.

## 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: 8/25/2022

**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: \_\_\_\_\_