

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** University of Alabama**STATE:** AL

PROJECT TITLE: Tailoring Carbide Dispersed Steels: A Path to Increased Strength and Hydrogen Tolerance

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002022	DE-EE0008831	GFO-0008831-001	GO8831

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 University of Alabama (UA) to develop a novel type of steel that can retain high strength, moderate ductility, and fatigue strength when exposed to hydrogen. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities would include computational design/analysis, synthesis of carbide dispersed steel (CDS) powders, sintering and hot isostatic pressing (HIP) of powders to form CDS alloy samples/bars, characterization of CDS alloys, charging of CDS alloys with hydrogen, and mechanical testing of hydrogen charged samples. During BP1, the focus of research would be on identifying suitable carbide particles for hydrogen trapping and developing a process for the manufactured of CDS alloys. Small-scale tokens (approx. 1cm x 1cm x 1cm) would be synthesized for characterization. During BP2, larger scale billets would be synthesized from CDS alloys selected during the previous BP. These billets would be charged with hydrogen and subjected to mechanical testing. Finally, BP3 would focus on optimizing the CDS alloys from the previous BP and testing the final versions of the materials. This period would also include the development of a CDS design guide and dissemination of research (e.g. workshops, technical conferences, etc.).

All project activities would be overseen by UA and performed at existing, purpose-built laboratory/manufacturing facilities that regularly perform work activities similar to that included in the scope of this project. Ferrochrome powders would be provided by Ames National Laboratory (ANL). These powders would be processed via ball milling at UA's campus in Tuscaloosa, AL and at the Army Research Laboratory in Adelphi, MD. Preliminary hydrogen charging, material characterization, HIP, and mechanical testing would also be performed at UA's campus. Prototype powders would be consolidated into CDS alloy samples/bars by Exothermics at its processing facility in Amherst, NH. Hydrogen charging of the steel would be performed by Sandia National Laboratories (SNL) at its facilities in Albuquerque, NM. No physical modifications to existing facilities, construction of new facilities, ground disturbing activities, or changes to the use, mission, or operation of existing facilities would be required. Likewise, no

additional permits or authorizations would be required to perform project activities.

Project activities would include the use and handling of hazardous materials and heavy machinery. Potential hazards that can result from misuse of equipment and materials include inhalation risks associated with metallic dust formation, bodily injury associated with the use of heavy machinery with moving parts, combustion hazards associated with the handling of gases for laboratory-based experiments (e.g. hydrogen), and bright light exposure associated with welding. UA and its project partners all have established health and safety protocols in place which would be adhered to throughout the project. Hazards would be mitigated through adherence to these protocols, which would include training of personnel, the use of personal protective equipment, engineering controls (e.g. safety checks on equipment), and monitoring. UA 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:

Fuel Cell Technologies Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Jonathan Hartman, 11/14/2019

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:



Casey Strickland

NEPA Compliance Officer

Date: 11/14/2019

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: _____