

PMC-ND  
(1.08.09.13)

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

**RECIPIENT:** Colorado School of Mines**STATE:** CO

**PROJECT TITLE:** Microstructural Engineering and Accelerated Test Method Development to Achieve Low Cost, High Performance Solutions for Hydrogen Storage and Delivery

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002022	DE-EE0008828	GFO-0008828-001	

**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 Colorado School of Mines (CSM) to develop steel alloys with novel microstructural designs for use in hydrogen refueling infrastructure (e.g. pressure vessels, compressors, and fuel dispensing applications). Materials would then be subjected to accelerated life testing to analyze their resistance to hydrogen embrittlement. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

BP1 activities would be focused on designing the initial alloying and processing strategies, including the development of a test bed methodology for material testing. Alloys would be produced for analysis by POSCO in this period. Characterization experiments would then be performed. BP2 activities would consist of follow-up characterization/screening of alloys and mechanical testing; this time using final product form alloys manufactured by U.S. Steel Research and Technology Center (U.S. Steel). BP3 activities would conclude material screening activities. Optimal alloy conditions would be identified through down-select processes and mechanical testing would be performed. An economic assessment/market transformation plan would also be developed during this period.

Manufacturing of steel alloy materials (e.g. steel ingots, plates, and sheets) would be performed by POSCO in Pohang, South Korea and U.S. Steel in Munhall, PA. Production of steel alloy materials would be performed at dedicated manufacturing facilities designed for these operations.

Laboratory testing and experimentation would be performed at existing, purpose-built laboratory facilities. Material characterization, testing and data analysis would be performed by CSM at its campus in Golden, CO. Additional material characterization would be performed at Sandia National Laboratory (Livermore, CA) and Los Alamos National Laboratory (Los Alamos, 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. No additional permits or authorizations would be required.

The project would involve the use and handling of various hazardous materials, including industrial chemical, solvents, and metal alloys. Mechanical testing would involve high load capacities. All handling of project materials and operation of equipment/machinery would be performed in controlled, laboratory and/or manufacturing environments. Fume hoods would be used when handling chemicals and solvents in order to ensure appropriate ventilation. All laboratory and manufacturing facilities have established health and safety procedures and policies which would be adhered to, including staff training and active monitoring of machines and associated equipment. Any hazardous waste produced as part of project activities would be disposed of properly, with oversight by each entity's respective Environmental Health and Safety Office. CSM 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, 11/08/2019

## 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.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

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: 11/12/2019

## 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: \_\_\_\_\_