

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



**RECIPIENT:** Purdue University Northwest

**STATE:** IN

**PROJECT TITLE:** Development and Demonstration of an Industrial Hydrogen-Fired Steel Reheating Furnace

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002804	DE-EE0010843	GFO-0010843-001	GO10843

**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:

<b>A9 Information gathering, analysis, and dissemination</b>	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.)
<b>B3.6 Small-scale research and development, laboratory operations, and pilot projects</b>	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 Purdue University Northwest to analyze, design, fabricate, and conduct operational trials of a retrofitted hydrogen(H<sub>2</sub>)-fired reheating furnace (RF). The proposed award activities would investigate the feasibility of using H<sub>2</sub> combustion to reduce RF carbon dioxide (CO<sub>2</sub>) emissions while maintaining existing quality standards and enhancing energy efficiency.

Award activities would be completed over two Budget Periods (BPs,) with a Go/No Go Decision Point between the BPs. This NEPA determination applies to both BPs.

Proposed project activities by location are:

Purdue University Northwest, Hammond, IN

- Development of simulation models and analysis of simulation results from reheating furnace modeling; development of visualization tools; project management.

Gerdau Special Steel North America, Monroe, MI

- Design and installation of gas supply; retrofitting burners; conducting H<sub>2</sub>-fired RF operation trials.

Linde Technology Center, Tonawanda, NY

- Design of fuel flow skids and burner modifications; fabrication of oxygen (O<sub>2</sub>) and fuel lances; laboratory testing of a retrofitted burner.

Cleveland-Cliffs Indiana Harbor, East Chicago, IN

- Providing technical expertise on reheating furnace operation and other related support.

ArcelorMittal North America, East Chicago, IN

- Chemical analysis of scale and refractory samples; providing technical expertise on reheating furnace operation and other related support.

Argonne National Laboratory, Lemont, IL

- Conducting life cycle analysis (LCA) and techno-economic analysis (TEA) of the hydrogen application.

Oak Ridge National Laboratory, Oak Ridge, TN

- Development of reduced order model and assisting with the control module.

The proposed design, fabrication, laboratory testing, and operational trial activities would be performed at existing, purpose-built facilities. Project activities would involve the use and handling of potentially hazardous materials,

including natural gas, H2, and O2. The facilities listed above have well established methods and procedures for hazardous material handling and disposal practices. All facilities would follow established corporate health and safety policies and procedures. Liquid H2 would be transported per existing U.S. Department of Transportation regulations by Linde, Inc.

The retrofit of the traditional steel making RF and subsequent operational trials would take place at the Gerdau Monroe Plant. The retrofit would be temporary, and would include installation of piping, utilities, and updated control systems. Ancillary equipment to temporarily store, pressurize, and convey H2 fuel would also be installed.

No modifications to existing facilities, ground disturbing activities, or changes to the use, mission, or operation of existing facilities would be required. No additional permits, licenses, or authorizations would be required. The current emissions permit issued by the Michigan Department of Environment, Great Lakes, and Energy for the Gerdau Monroe Plant would be modified prior to commencement of project work to include the use of H2. DOE does not anticipate any impacts to resources of concern due to the proposed award activities.

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:

Industrial Efficiency & Decarbonization Office (IEDO)  
NEPA review completed by Melissa Parker, 03/13/24

## 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: 3/14/2024  
NEPA Compliance Officer

## FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required
- Field Office Manager review required