PMC-ND
(1.08.09.13)

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

RECIPIENT: Jeff Mays/Gas Technology Institute **STATE:** IL

PROJECT TITLE: Compact Hydrogen Generator

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DNFA	DE-EE0008637	GFO-0008637-001	

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.)
B1.31 Installation or relocation of machinery and equipment	Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
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 Gas Technology Institute (GTI) to design, develop, fabricate, and test a novel hydrogen generation system. The system would utilize a sorbent-enhanced reforming process for the generation of hydrogen from natural gas and steam. Project work would build on previous GTI efforts and would utilize equipment and components from previous projects. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Four testing series would be performed throughout the project: atmospheric calcination, solids handling, materials characterization, and pilot testing. Atmospheric calcination testing would utilize two types of calciners and would calcine a powdered limestone ($CaCO_3$) into lime (CaO). Solids handling testing would consist of the design and testing of equipment to transport powdered sorbent between process loops, as well as testing of powdered limestone at ambient conditions. Materials characterization testing would analyze physical properties of a sorbent in carbonated and oxide states. Pilot testing would use steam, natural gas, and a sorbent to produce hydrogen and carbon dioxide over a catalyst.

BP1 would focus on component development and economic analysis. Proposed project activities would include process simulation modeling, component design, development and fabrication, calciner testing, cold flow testing of solids handling equipment, and economic analysis. BP2 would consist of feasibility demonstration unit (FDU)

upgrading and testing. Project activities would include fabrication and testing of new equipment, component installation and auxiliary upgrades, system commissioning, and pilot testing. Pilot testing would be performed to demonstrate FDU operations totaling 200 hours and analyze system performance during this operational period.

Atmospheric calcination, solids handling, and materials characterization tests would be performed at the facilities of sub-recipient Heyl Patterson Thermal Processing, in Pittsburgh, PA and sub-recipient Jenike & Johanson, in San Luis Obispo, CA, and Tyngsboro, MA. No modifications to these facilities would be required for completion of the project. FDU pilot testing would be performed at the Advanced Gasification Test Facility (AGTF) at GTI's research campus in Des Plaines, IL. Various modifications would be made to this facility. These are discussed further below. All sites at which project work would be performed are existing, purpose built facilities that regularly perform work similar in nature to that proposed as part of this project. No new permits or authorizations would be required for completion of project work.

For the final, pilot testing phase, GTI would relocate its existing FDU from its current location at the Energy & Environmental Research Center (EERC) in Grand Forks, ND to the AGTF. Currently, the FDU consists of three skids; a test article (8'x8'x32'), a facility skid (8'x8'x7'), and a water treatment skid (6'x3'x5'). This FDU would be upgraded with a number of new components, including a depressurizing lock hopper, a receiver hopper, a calciner, a CO2 solids filter, a pressurizing lock hopper, and a screw-feeder hopper. To accommodate the FDU and upgrades, the plant layout at GTI's AGTF would be modified. The modification would require additional wiring for the components and instrumentation, new insulation for additional process lines and equipment, and new walkways to access the process equipment. All upgrades would be performed indoors. No modifications to the exterior of GTI's facilities would be required.

Fabrication of new components would be performed by qualified third-party vendors. This would include the fabrication of an atmospheric calciner unit, as well as solids handling equipment. Components and support structures would be assembled at the GTI facility by qualified individuals under GTI's supervision. All existing equipment would be transferred to the AGTF by qualified third party transporters.

Risks associated with the use of test materials, including lime (e.g. calcined state of limestone) and a nickel catalyst, would be mitigated through proper storage and handling of these materials by trained personnel. All hazardous materials would be disposed of by a qualified hazardous waste disposal company. Any discharge of wastewater would also be sampled prior to disposal to verify that it is within municipal wastewater disposal limits. All personnel performing project activities would be properly trained and use proper personal protective equipment. All work activities performed by GTI, its sub-recipients, or vendors would comply with relevant Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 06/13/2019

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: Electronically Signed By: Casey Strickland Date: 6/14/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- [x] 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