

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Planning, Evaluation, and Fabrication Activities Leading to the Construction and Operation of the USNC MMR Demonstration

SECTION B. Project Description and Purpose:

INL and USNC share missions in finding resolutions to the barriers that prevent deployment of small advanced nuclear energy systems. These barriers include fuel production and qualification, seismic analysis and compliance with standards, licensing of multiple small geographically dispersed reactor units, and coordination of power from multiple zero emission electricity sources on an isolated grid. The scope of this collaboration includes planning activities toward:

- Deployment and long-term operation of a multi-unit USNC nuclear power plant based on MMR technology.
- Demonstrating the operation of an energy storage facility linked to an MMR. The energy storage will operate as a manifold capable of accepting multiple clean energy heat input sources such as nuclear, solar, and wind and production of electricity, hydrogen, and commodities using industrial processes and heat energy from the energy storage facility.
- Siting a commercial fuel fabrication facility.
- Joint work on nuclear fuel modeling, qualification, and production.

Project Task Statement 1 (PTS-1) : Scoping and Feasibility

PTS-1 will identify reactor siting activities that are feasible and of interest to INL and USNC. PTS-1 will define future activities based on a feasibility determination. USNC will provide the reactor test case. INL could potentially serve as a siting location for the proposed USNC reactor. Work products generated from PTS-1 will be used to clarify the steps required by the microreactor testing community to complete a future microreactor demonstration at INL.

Tasks and Division of Responsibilities

Task 1: USNC will provide information and support to INL for all following tasks regarding the MMR reactor design and deployment.

Task 2: INL will map the potential for USNC technology contribution to INL's Net Zero strategy.

Task 3: INL will determine the deployment feasibility of USNC reactors on the INL site to meet the needs of INL's Net Zero strategy. Specific subtasks include:

- a. Identify potential approaches for achieving authorization to operate small reactor facilities at INL for specific applications of USNC reactor technology.
- b. Determine if DOE is amenable to authorizing nuclear operations for specific applications of USNC reactor technology.
- c. Develop roles and responsibilities for INL and USNC for nuclear reactor facilities, fuel production facilities, and IES that may be authorized by DOE.
- d. Draft a preliminary Safety Design Strategy for reactors that may be authorized by DOE, if DOE authorization is feasible.
- e. Identify and collect applicable information about potential INL sites that could be used to support the proposed demonstration activities. Complete a preliminary siting alternative study, resulting in the selection of preferred sites.
- f. Develop the strategy for complying with the National Environmental Policy Act (NEPA) for proposed activities. The output of this task will be an assessment of the level of NEPA review required for proposed activities to be undertaken under this CRADA (e.g., development of an environmental impact statement or environmental assessment), if the nuclear facility is authorized by DOE.

Note: Activities completed in Task 3 may determine no feasibility and stop work.

Task 4: USNC will complete a scoping study regarding the use of power from USNC for DOE operations at INL, including discussions with local power providers.

Task 5: INL will develop the initial framework for the lease agreement between INL and USNC for process heat generated by MMR reactor(s).

Task 6: INL with support from USNC will prepare a final report documenting the outcomes of PTS-1.

Project Task Statement 2 (PTS-2): Thermal Hydrogen Generation

PTS-2 will identify the physical location of the molten salt loop (MSL) within the planned Energy Systems Laboratory (ESL) 2 facility. Work will investigate site selection and integration into the MSL module layout with option to provide thermal and/or electrical input from a future microreactor on/near site. Work will inform preliminary piping and instrumentation diagram (P&ID) drawings for the MSL to integrate planning MSL into existing facilities models.

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

Task 1: INL will model thermal and electrical profiles to run real time dynamic models of scenarios not suitable for emulation.

Task 2: INL will work with USNC to develop requirements for testing USNC technologies in INL's planned ESL 2 and evaluate the potential for USNC technologies to fill those requirements. Specific subtasks include:

- a. Develop a concept for a molten salt storage system that can be used to demonstrate collection of heat energy from multiple sources such as solar, wind, and MMR reactors to produce commercial commodities such as electricity, hydrogen, and feedstock chemicals such as ammonia.
- b. A Go/No Go decision will be made for further development of MSL.
- c. Define an emulation framework for the USNC reactor, including USNC and INL joint studies and preparation of USNC reactor profiles. The emulator will be used to generate electrical and thermal outputs with the goal of producing hydrogen from electrolyzer skids at INL.
- d. A Go/No Go decision will be made for further development of emulation work.
- e. Complete steady-state emulations.

Task 3: INL will work with USNC to complete USNC reactor emulation, including USNC and INL joint studies and preparation of USNC reactor profiles. The emulator will be used to generate electrical and thermal outputs with the goal of producing hydrogen from electrolyzer skids at INL. Steady-state emulations will be performed.

Task 4: INL will work with USNC to prepare a final report documenting the outcomes of PTS-2.

Note that initial funding for the listed activities will be paper studies, supporting calculations, and planning for additional tasks. This environmental compliance permit has been prepared that supports the scope listed here. (i.e., only paper studies, supporting calculations, and planning). As the project progresses and additional work is planned, the environmental compliance permit will be updated. It is anticipated that the project will eventually require an environmental assessment or environmental impact statement.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

N/A

Discharging to Surface-, Storm-, or Ground Water

N/A

Disturbing Cultural or Biological Resources

N/A

Generating and Managing Waste

Small amounts of common office trash are expected and would be disposed of appropriately. All work is considered office work and routine administrative activities in nature.

Releasing Contaminants

N/A

Using, Reusing, and Conserving Natural Resources

Project personnel will use every opportunity to recycle, reuse, and recover materials and divert waste from the landfill when possible.

DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

For Categorical Exclusions (CXs), the proposed action must not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: 10 CFR 1021, Appendix A to Subpart D, A9 "Information gathering/data analysis/document preparation/dissemination" and Appendix B, B3.6, "Small-scale research and development, laboratory operations, and pilot projects".

Justification: Project activities described in this EC are consistent with 10 CFR 1021, Appendix A to Subpart D, item A9 "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.)"

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason L. Anderson, DOE-ID NEPA Compliance Officer on: 03/07/2022