DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

CX Posting No.: DOE-ID-INL-16-095 R1

SECTION A. Project Title: Materials and Fuels Complex (MFC) Research Collaboration Building (RCB) R1

SECTION B. Project Description and Purpose:

Revision 1:

The Research Collaboration Building (RCB) and dry lab is built and occupied. The RCB building or support systems to the laboratory may be modified to support on-going needs of staff or research projects. It provides space for the Nuclear Science User Facilities (NSUF) User Community to collaborate with INL research scientists on the development and evaluation of new research instruments or new detection and testing capability prior to deployment of this capability in a nuclear or radiological facility. The type and resolution of characterization requested by the nuclear fuels and materials research community is continually increasing, driving the development of new characterization instruments and detectors, and the combination of detectors and integration with instruments to increase the amount of information available from a single specimen or a single grain. Development and testing of this new instrumentation in a dedicated instrument development laboratory provides a great deal more flexibility in access for researchers an instrument vendor, freedom from radiological controls, and the proper supporting equipment. The laboratory is utilized for:

- Initial set up and testing of new characterization systems, such as new electron beam microscopes or x-ray diffraction systems prior to delivery to IMCL, HFEF, SPL, EML, or other INL facilities. These instruments require utilities such as electrical service, compressed air, compressed gas (argon, nitrogen, helium), and cooling water for a recirculating chiller. Instruments may also require small quantities (<10 liters per week) of liquid nitrogen, liquid argon, or dry ice (solid carbon dioxide) to cool detectors. Some instruments may use oil filled vacuum pumps that may discharge a small amount of oil mist (milliliters per week) to the laboratory ventilation system. Laboratory quantities of chemicals will be used in support of various activities.

- Development and bench top of new detector, measurement, mechanical testing frames or techniques, robotics, or testing system prototypes designed for use with electron microscopes, thermal property measurement systems, mechanical testing systems, x-ray diffraction, neutron diffraction, neutron imaging, etc. Alcohol and acetone may be used in small quantities (<100 ml per day) to clean components. This activity may require soldering of components or heating of components or systems in ovens to remove moisture or test performance at elevated temperatures. 3-D printing will be required to prototype or mockup research support systems or components.

- Coupling of new sensors with microscopes and other systems and testing of the performance of the integrated system. The laboratory will also be used for prototyping and benchtop fabrication such as setup and testing of tooling for radiation experiment disassembly in preparation for deployment in radiological hot cells or other hostile environments. These activities may require small quantities of oil or silicone-based lubricants (milliliters per day).

- Development of metallographic sample preparation techniques or other sample preparation activities. This activity typically uses suspensions of diamond, silicon carbide, silicon oxide, aluminum oxide, garnet, or other abrasives in oil or water. Solutions may be mildly acidic or basic (pH range typically 2 - 11). The quantity of this material is approximately one liter per month. Other activities may include the use of small quantities (~100 ml per month) of strong acids or bases (HNO3, H2SO4, NaOH) in water or alcohol to etch the surface of ceramic or metallic materials to prepare them for microscopy after polishing.

- The RCB Project will equip the lab with miscellaneous equipment, utilities, and furniture:

- 48" standing laboratory fume hood with an airflow monitor reading face velocity and low flow alarm.
- Instrument quality compressed air service and piping distributed throughout the laboratory.
- Special gases will be provided from gas cylinders stored in the mechanical room.
- The system will use three separate manifolds for typical laboratory gas distribution (e.g., argon, nitrogen, helium, research project dependent).

- Ventilation exhaust system will service specialty point exhausts including fume hood exhaust.

- Research programmatic work may occur in the lab varying from sample preparation, microscopy, surface science (XPS), mechanical testing (e.g., Instron, creep frames, etc.), or other similar activities. Laboratory quantities of chemicals will be used in support of various research activities.
- Small scale demonstration, mockup, or testing supporting advanced reactor demonstration platforms may utilize the RCB lab. An example is the Sterling generator used to support safety basis and engineering analysis for the MARVEL project. The generator is started/stopped locally and remotely to gain specific data on controls.

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Work at Idaho National Laboratory's (INL's) Materials and Fuels Complex (MFC) involves research and technology development, with results disseminated openly and shared with the scientific community or made available to private industry. The quality of such work depends on open dialogue and exchange of information. In this capacity, MFC hosts many foreign visitors and assignees with whom active information exchange is encouraged. Other work includes training programs as well as Department of Homeland Security research and development (R&D). Other research involves commercial interests.

Facilities housing major capabilities at MFC have been maintained and renovated over the years to enable R&D for various initiatives, but MFC faces significant challenges from normal aging of buildings and infrastructure. There is a substantial need for upgraded facilities.

To address the need for accessible space at MFC for nuclear energy research and support personnel, critical small-scale mock-up equipment, instrumentation development work, data visualization and analysis, and computer workstations for analysis of post irradiation examination work, the proposed action would design and construct a Research Collaboration Building (RCB) at MFC.

The proposed RCB would be designed and space allocated for external nuclear energy researchers to train, work and collaborate with MFC researchers. The facility would be two stories and approximately 15,000 to 20,000 sq. ft. located outside of the MFC perimeter west of building MFC-701 and would be used for office, collaboration, and non-radiological laboratory space. MFC research and support personnel would be relocated to the facility. A dry laboratory area would be designed and constructed for small-scale mock-up experiments and processes and instrumentation development.

Building construction would require relocation of part of the perimeter fence west of MFC-701 and the vehicle entry. A utility corridor would be installed to provide electrical power, sewer, potable water, fire water, and telephone and data communications from inside the MFC perimeter. The building would have standard utilities including heating, ventilation, and air conditioning (HVAC), electrical lighting and power, compressed air, telephone and data communications, potable water, sewer, voice paging, evacuation, fire alarm and wet fire sprinkler systems. Storm drainage would be installed to convey rainwater from the building to the MFC storm water drainage system. Excavation would be needed for the building foundation, utility corridor, and potential removal or relocation of existing underground utilities.

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

When wastes are generated, how they are disposed can adversely affect the environment. Managing wastes appropriately and responsibly and implementing recycling or reuse practices,
where feasible, during project activities can reduce the potential impact on the environment.

- Industrial (non-hazardous, non-radioactive) waste includes typical maintenance wastes such as boxes, wood, wiring, paper, insulation, and some metals.
- Hazardous wastes have the potential to be generated during maintenance operations on systems or equipment containing hazardous chemicals, or by using hazardous chemicals to clean or decontaminate equipment and systems. Hazardous metal waste (e.g., lead, electronics, brass, metal containing paints, etc.) may also be generated.

Releasing Contaminants

When chemicals are used during the project there is the potential for spills that could impact the environment (air, water, soil).

Using, Reusing, and Conserving Natural Resources

N/A

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:

B1.15 "Support buildings",

B3.6 "Small-scale research and development, laboratory operations, and pilot projects"

Justification:

B1.15 Support buildings. Siting, construction or modification, and operation of support buildings and support structures (including, but not limited to, trailers and prefabricated and modular buildings) within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Covered support buildings and structures include, but are not limited to, those for office purposes; parking; cafeteria services; education and training; visitor reception; computer and data processing services; health services or recreation activities; routine maintenance activities; storage of supplies and equipment for administrative services and routine maintenance activities; security (such as security posts); fire protection; small-scale fabrication (such as machine shop activities), assembly, and testing of non-nuclear equipment or components; and similar support purposes, but exclude facilities for nuclear weapons activities and waste storage activities, such as activities covered in B1.10, B1.29, B1.35, B2.6, B6.2, B6.4, B6.5, B6.6, and B6.10 of this appendix.

B3.6 Small-scale research and development, laboratory operations, and pilot projects. Siting, construction, modification, operation, and decommissioning of facilities for small-scale 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.

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: 04/20/2023.