DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

CX Posting No.: DOE-ID-INL-22-071

SECTION A. Project Title: FY-23 Annual Laboratory Directed Research and Development

SECTION B. Project Description and Purpose:

Idaho National Laboratory's (INL's) core mission is to discover, demonstrate, and secure innovative nuclear energy solutions, clean energy options, and critical infrastructure. The INL Laboratory Directed Research and Development (LDRD) program engages researchers, leadership, and infrastructure to convert scientific and engineering ideas into scientific discoveries, research capabilities, research and development (R&D) programs, and deployed technology solutions. INL uses the LDRD program to develop core capabilities and achieve strategic initiatives in science and technology (S&T).

For the Fiscal Year (FY)-23, INL's LDRD program focuses on the laboratory's five strategic initiatives and two emerging core capabilities as described below. In addition, INL encouraged the formation and submission of proposals that specifically address and establish INL's leadership position in creating a carbon-free energy future. Appendix A lists and describes individual FY-23 LDRD proposals for these initiatives.

Nuclear Reactor Sustainment and Expanded Deployment: INL focuses on technology options ranging from small modular light-water reactors to a suite of non-light-water technologies to sustain the existing light-water fleet and expand the deployment of nuclear power. Near-term microreactor demonstrations and the fast-spectrum capability of the Versatile Test Reactor accentuate strategies for this mixed-technology nuclear future. Significant scientific advancements in materials and fuels are imperative to achieve reactor sustainment and deployment, as is the development of techniques, technologies, and capabilities that enable substantially lower operational costs and integration of advanced nuclear systems into non-baseload applications.

Integrated Fuel Cycle Solutions: Research at INL uses science, technology, and infrastructure to find solutions for the availability of special nuclear materials for fuel fabrication needs to support the demonstration of new advanced reactors, and the management and disposition of existing and future radiological waste materials. Developing a fuel cycle with inherent process transparency will reduce the risk of nuclear proliferation, so INL is focused on developing fuel cycle technologies that incorporate safeguards by design for the effective and efficient monitoring and verification of nuclear materials throughout the fuel cycle. INL supports proliferation risk reduction in the integrated fuel cycle through research that demonstrates simplified used nuclear fuel (UNF) recycling processes, develops and demonstrates real-time interrogation of UNF treatment processes, and demonstrates the direct chemical and physical immobilization options for UNF.

Advanced Materials and Manufacturing for Extreme Environments: Innovative materials and manufacturing techniques must be created to realize a nuclear future that is economically sustainable. INL develops materials that can sustain environments with high radiation, temperature, and pressure, and that may be highly corrosive. It forges new methods to efficiently manufacture components capable of withstanding extreme conditions. INL is growing new national capabilities, including additive manufacturing, to design, characterize, develop, and manufacture the needed materials.

Integrated Energy Systems: This initiative fosters sustained and expanded nuclear energy deployment and advances the integration of variable renewable energy sources onto the electric grid. The current nuclear fleet and next-generation nuclear plants can be increasingly sustained by optimizing the use of the high-quality heat generated by nuclear fission to support electricity production and industrial processes, such as hydrogen generation, production of potable water, and chemical manufacturing. INL conducts extensive simulation, optimization, and real-time experimental demonstration to support the deployment of efficient, reliable, and resilient integrated energy systems for all energy use sectors.

Secure and Resilient Cyber-Physical Systems: INL seeks to transform the cyber-informed science and engineering of control systems in critical infrastructure and vital national security systems to advance their security and resiliency. Civilian and defense energy systems and critical infrastructure rely on the availability, security, and resiliency of digital command, control, computing, and communication systems. To assure the nation's security and prosperity, INL provides world-leading research, development, and deployment (RD&D) capabilities and delivers innovative solutions that enhance these critical systems' capabilities to protect, detect, respond, and recover from significant cyber and physical events.

Chemical and Molecular Science (emerging core capability): One of 25 DOE-recognized core capabilities, this capability represents the ability to conduct experimental, theoretical, and computational research to fundamentally understand chemical change and energy flow in molecular systems that provide a basis for the development of new processes for the generation, storage, and use of energy and for mitigation of the environmental impacts of energy use. Areas of research include atomic, molecular and optical sciences; gas-phase chemical physics; condensed phase and interfacial molecular science; catalysis science; separations and analytical science; actinide chemistry; and geosciences.

Condensed Matter Physics and Materials Science (emerging core capability): One of 25 DOE recognized core capabilities, this capability represents the ability to conduct experimental, theoretical, and computational research to fundamentally understand condensed matter physics and materials sciences that provide a basis for the development of materials that improve the efficiency, economy, environmental acceptability, and safety in energy generation, conversion, transmission, and utilization. Areas of research include experimental and theoretical condensed matter physics, x-ray and neutron scattering, electron and scanning probe microscopies, ultrafast materials science, physical and mechanical behavior of materials, radiation effects in materials, materials chemistry, and bimolecular materials.

Net-Zero Carbon Emissions: The driving force behind INL's nuclear and other clean energy research and development is creating clean, scalable, and sustainable energy solutions to address national and global needs while reducing environmental impacts. INL will lead by example, committing to becoming a national carbon-neutral prototype and achieving net-zero emissions in INL operations within the next 10 years. Achieving net-zero means drastically reducing onsite emissions and offsetting the limited residual emissions from activities that are impossible to decarbonize. This is a substantial and long-term commitment. INL will use technology innovations and partnerships, increased efficiencies, and novel approaches to demonstrate the path forward for establishing a clean energy economy.

GENERAL

The proposed laboratory activities include reasonably foreseeable actions necessary to implement the proposed action, such as radiological control and safety support; sample, chemical, and material transport; project closeout; waste management, transport, treatment, storage and disposal; maintenance, development, and demonstration of processes, instruments and detection; maintenance, calibration, transport, and use of analytical and research equipment; consulting and planning with sponsors and collaborators; and award of grants and contracts.

FACILITIES

The proposed LDRD projects leverage facilities across INL – the Advanced Test Reactor (ATR) Complex, Central Facilities Area (CFA), Critical Infrastructure Test Range Complex (CITRC), Materials and Fuels Complex (MFC), and the Research and Education Campus (REC). These facilities each host complementary resources and infrastructure to support research.

The primary focus of the ATR Complex is continued fuels and materials irradiation testing, nuclear safety research and nuclear isotope production. The ATR subjects experiments to a wide range of temperatures, pressures and exposure to high levels of neutrons and gamma rays to determine how the materials will react in high-radiation environments. The ATR-Critical Facility (ATR-C) is a full-size, low-power, pool-type nuclear replica of the ATR, designed to evaluate prototypical experiments before the actual experiments are irradiated in the ATR.

CFA supports the Wireless Test Bed network, operations center, and the site-wide protection, emergency response, network and communications, transportation, and warehousing services for the Site campuses.

CITRC supports INL National & Homeland Security (N&HS) missions in developing solutions for security and resilience of critical infrastructure and advancing security solutions that prevent, detect and counter nuclear and radiological threats. This mission engages strategic partnership projects that include other federal agencies, national and international programs and the energy industry.

MFC has facilities for fabricating, examining, and characterizing nuclear fuel and materials, as well as remotely handling and processing spent fuel and radioactive wastes. Projects at MFC primarily focus on developing innovative solutions for nuclear power technology, including nuclear fuel development, separations development, post-irradiation examination (PIE), and fast reactor development. The Analytical Laboratory (AL) houses shielded hot cells, air and inert atmosphere glove boxes, casting laboratories and related assets used for nuclear fuels and materials characterization, environmental sampling and analysis and other examination tasks. The Fuel Conditioning Facility (FCF) contains two adjacent hot cells, a mock-up area and shielded decontamination and repair area that support legacy spent fuel treatment, remote equipment development, cask receipt and related activities. The Fuel Manufacturing Facility (FMF) features a highly secure vault and two work rooms with glove boxes that allow for the receipt, storage, handling and inspection of fissionable material and the development of advanced nuclear fuels. The Transient Reactor Test Facility (TREAT) is an air-cooled, thermal test reactor maintained in standby status to support radioisotope dispersal device exercises, recovered spent fuel storage and potential future transient testing needs.

The Research and Education Campus is located in Idaho Falls and includes laboratories where researchers work on a wide variety of R&D projects. The campus includes numerous office, lab and support facilities, including the N&HS Laboratory & Training Facility, the Center for Advanced Energy Studies (CAES), the Information Operations and Research Center (IORC), the INL Research Center (IRC), the Energy Systems Laboratory (ESL), Energy Innovation Laboratory (EIL), the Collaborative Computing Center (C3), Cybercore Integration Center (CIC), and National and Homeland Security's University Boulevard (UB) 2 and 3. Activities in these facilities are highlighted below:

- The N&HS Laboratory & Training Facility offers a blend of low- and high-bay work areas and wet and dry lab space for technologies close to commercial deployment.

- CAES is a research and education consortium between INL, Boise State University, Idaho State University, University of Idaho and University of Wyoming and provides a collaborative, multi-mission environment focusing on research including nuclear and materials science, geothermal energy systems, advanced manufacturing, and energy policy.

- The IORC is a secure building that serves as a centralized location for industry, vendors, and government agencies to work together to reduce cyber vulnerabilities in control systems.

- The IRC houses more than 60 laboratories and was designed to allow easy lab space modification as research needs change over time. Scientists and engineers at the IRC conduct research in several different fields including materials science, biology, analytical chemistry, nondestructive battery evaluation, autonomous systems and geochemistry.

- The ESL supports R&D to reduce technical and economic risks associated with the deployment of new energy technologies in the areas of bioenergy research, energy storage and advanced vehicles, and energy systems integration.

- EIL houses INL researchers affiliated with Energy & Environment Science & Technology, Nuclear Science & Technology, and the Nuclear Science User Facilities. Laboratories at EIL support chemical sciences, nanotechnology, water chemistry, advanced microscopy, control systems, high-temperature testing, thermal hydraulics, materials testing and characterization, separations technology and advanced instrument training.

- The C3 is a facility where INL researchers, Idaho universities and industry can explore computer modeling and simulation to develop new nuclear materials, advance nuclear energy concepts and conduct a broad span of scientific research.

- The CIC supports research on security and resilience of the nation's critical infrastructure, including the power grid. The research focuses on developing the partnerships, people and innovations required to meet emerging threats from persistent, capable, well-resourced and highly motived cyber adversaries.

- University Boulevard 2 and 3 (UB2/3) contain engineering space that supports a wide range of work-for-others customers including programs for the departments of Defense and Homeland Security.

The proposals listed below involve work locations outside of the INL:

- 23A1070-086FP, Evidence-Based Zero-Trust Data Analytics Toolkit for Industrial Internet of Things Systems to Fuel Cyber Strategies for Security and Reliability, involves research with University of Wyoming(UW) and Boise State University(BSU) in accordance with UW and BSU Standard Operating Procedures (SOP) found at http://www.uwyo.edu/safety/procedures/standard-operating-procedures.html and https://www.boisestate.edu/policy/facilities-planning-campus-safety/policy-title-environmental-health-and-safety/ respectively.

- 23A1070-134FP, Reinforcement Learning Based Approach to Optimizing Quality of Service and Security on 5G Networks, involves collaboration with Idaho State University (ISU) in accordance with Idaho State University SOP found at https://www.isu.edu/ehs/environmental/.

- 23A1070-127FP, Artificial Intelligence based Confidentiality, Integrity, and Availability of Wirelessly Transmitted Data in Nuclear Industry, involves research with University of Utah (UofU) in accordance with UofU Standard Operating Procedures found at https://oehs.utah.edu/.

- 23A1070-034FP, Online Process Monitoring and Uncertainty Quantification of Nuclear Material in Molten Salt Reactor Fuel Salt using Spectroscopy Techniques, will involve laser induced fluorescence (LIF) at University of Michigan (UM) in accordance with University of Michigan's SOP found at https://ehs.umich.edu/.

- 23A1070-050FP, High-burnup structure formation and associated fission product diffusion, will involve Argonne National Laboratory through Nuclear Science User Facilities (NSUF) in accordance with Argonne National Laboratory SOP found at https://www.anl.gov/environmental-protection.

- 23A1070-069FP, Accelerated Experiments and Modeling for High Temperature Helium Embrittlement in Ni-bearing Structural Materials, will involve research from University of California, Berkeley (UC Berkeley) in accordance with UC Berkeley's SOP found at https://ehs.berkeley.edu/home.

- 23A1070-132FP, Development of Light-weight Structural Materials with Improved Mechanical Properties for Fission Batteries Application, involves research with University of Michigan (UM) in accordance with UM Standard Operating Procedures https://ehs.umich.edu/

- 23A1070-147FP, Assessment of Long-Range Ordering on the corrosion performance Ni-based Commercial Alloys in Molten Salts, involves research with University of Houston (UH) and Oregon State University (OSU) in accordance with SOP found at https://uh.edu/ehs/environmental/, and https://ehs.oregonstate.edu/ respectively.

- 23A1070-030FP, Lattice structure design of low-density resilient materials for advanced reactors, will involve collaboration at University of Texas (UT) in accordance with UT SOP found at https://policies.utexas.edu/policies/environmental-health-and-safety-policy.

- 23A1070-096FP, A hybrid physics-informed reduced order model embedded with process-informed fluctuations for quality control in directed energy deposition, involves modeling work from Purdue University in accordance with Purdue University SOP found at https://www.purdue.edu/ehps/index.php.

- 23A1070-062FP, Enhancement of Gamma-Ray Emission Modeling through Advanced Analysis of Random and True Coincidence Summing Effects, involves work at the Idaho Accelerator Center (ISU) if the 3rd year objectives of the project does not utilize the TREAT facility to produce isotopes.

- 23A1070-064FP, PhoNon transport in superior heat conductors under irradiation, involves research with University of Utah performing first-principle simulations to model the defects and thermal transport and Texas A&M University will conduct proton radiation tests at their Accelerator Laboratory, in accordance with University of Utah's SOP found at https://oehs.utah.edu/ and https://ehs.tamu.edu/ respectively.

- 23A1070-120FP, Proteomic insights to interaction between fermenters and rare earth elements, involves research with Michigan State University for proteomic runs of samples in accordance with Michigan's State University SOP found at https://ehs.msu.edu/enviro/index.html.

- 23A1070-027FP, Metaheuristic Machine Learning Accelerated Quantum Chemistry for Investigating Multiphase Interactions in Electrochemical Systems, involves research with Idaho State University in accordance with ISU Standard Operating Procedures found at https://www.isu.edu/ehs/environmental/.

- 23A1070-112FP, Transient Species Reaction Fundamentals, involves collaboration with Purdue University for ion-ion reactions in a mass spectrometer and Colorado School of Mines for computational calculations in accordance with Purdue University SOP found at https://www.purdue.edu/ehps/index.php.

- 23A1070-091FP, Transient Electro-Kinetic Reactor to Accelerate Development of Advanced Catalysts for Electrocatalytic Carbon Dioxide Reduction to Ethylene, involves research with Massachusetts Institute of Technology (MIT) in accordance with MIT Standard Operating Procedures found at https://ehs.mit.edu/.

- 23A1070-166FP, Rational Design of 3D Porous Carbon Architecture for Efficient Carbon Dioxides Capture with High Capture Capacity and Low Energy Input for Regeneration, involves research with University of Maine https://www.maine.edu/board-of-trustees/policy-manual/section-1002/.

- 23A1070-057FP, Computationally-informed design and manufacturing of damage tolerant materials, possibly involves computational modeling with Boise State University.

- 23A1070-037FP, Unlocking the Power of Microreactors with Biomimicry and Additively Manufactured Nuclear Fuel, involves research with non-nuclear test articles characterized for fluidic behavior by collaborators at Oregon State University (OSU) in accordance with OSU Standard Operating Procedures found at https://ehs.oregonstate.edu/.

- 23A1070-092FP, Unraveling Fundamental Mechanisms of Elemental Segregation using Integrated Experimental and Multiscale Modeling Approach, involves research with University of Michigan (UM), AMES Laboratory, and U.S. Department of Energy National Laboratory in accordance with UM Standard Operating Procedures found at https://ehs.umich.edu/, AMES Laboratory (SOP) found at https://www.ameslab.gov/about-ames-laboratory/environment-safety-and-health, and U.S. Department of Energy National Laboratory SOP found at https://www.energy.gov/lpo/environmental-compliance.

IMPACTS and ASPECTS

The proposed projects could result in emissions to the atmosphere of both chemicals and radionuclides; generating hazardous, mixed, radioactive low-level, transuranic (TRU), and industrial wastes. The total estimated sum of the generated TRU waste is less than 2E-05 m3 per year. The total estimated sum of low-level waste is to be <5 m3. The total estimated sum of nanoparticle waste is estimated to be less than 1 m3. Samples for analysis or R&D work may be received from outside the INL or originate within the INL. Laboratory activities may result in excess samples or sample residues that project personnel must return to the generator or to INL personnel to manage and dispose. Project activities may retain wastewater from laboratory operations for characterization and management by Waste Generator Services (WGS) or may be disposed to laboratory drain systems in accordance with the appropriate sewage disposal regulations.

To complete some of the proposed work activities, it is necessary for projects to use the HFEF hot cell which contains both defense and nondefense related materials and contamination. Project materials will come into contact with defense related materials. It is impractical to clean out defense related contamination, and therefore, waste associated with project activities is eligible for disposal at the Waste Isolation Pilot Plant (WIPP). National Environmental Policy Act (NEPA) coverage for the transportation and disposal of waste to WIPP are found in Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling transuranic (TRU) waste at the generator-storage facilities would be conducted. The Department has analyzed transuranic (TRU) waste management activities in the Final Waste Management Programmatic Environmental Impact Statement (WM PEIS) (DOE/EIS-200-F, May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP.

After PIE, irradiated test pin segments and PIE remnants will be stored with other similar DOE-owned irradiated materials and experiments at MFC, most likely in the HFEF or the Radioactive Scrap and Waste Facility (RSWF) in accordance with DOE's Programmatic SNF Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (FEIS) and ROD (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). Ultimate disposal of the irradiated test pin segments and PIE remnants will be along with similar DOE-owned irradiated materials and experiments currently at MFC. Categorizing this material as waste is supported under Department of Energy Manual (DOE M) 435.1-1, Att 2, Item 45, which states "...Test specimens of fissionable material irradiated for research and development...may be classified as waste and managed in accordance with this Order [DOE O 435.1]."

Packaging, repackaging, transportation, receiving, and storing used nuclear fuel and R&D for used nuclear fuel management is covered by DOE's Programmatic Spent Nuclear Fuel (SNF) Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (EIS) and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). The analyses include those impacts related to transportation to, storage of, and research and development related to used nuclear fuel at the INL (see Tables 3.1 of the SNF Record of Decision (May 30, 1995) and Table 1.1 of the Amended Record of Decision [February 1996].

The environmental impacts of transferring LLW from the INL Site to the Nevada National Security Site were analyzed in the 2014 Final Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security

Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (DOE/EIS-0426) and DOE's Waste Management Programmatic EIS (DOE/EIS-200). The fourth Record of Decision (ROD) (65 FR 10061, February 25, 2000) for DOE's Waste Management Programmatic EIS established the Nevada National Security Site as one of two regional LLW and MLLW disposal sites.

The potential for transportation accidents was analyzed in the SNF EIS (Section 5.1.5 and Appendix I-5 through I-10).

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Note: If this project or activity produces or causes air emissions, and it is not stated in this ECP how those emissions caused by this project or activity are exempt, then an APAD is required for documentation.

INL LDRD projects have the potential to generate small amounts of air emissions containing a variety of constituents. Each activity must meet state and Federal air emission regulations. Due to the nature of these LDRD projects, INL anticipates emissions will be minor and covered by existing APAD's for the individual facilities. The APAD establishes the appropriate maximum 24-hour and maximum annual emission limits for toxic pollutants used at the laboratory. Administrative controls based on inventory limits and independent Hazard Reviews for new programs would then be implemented to assure that these limits would not be exceeded.

Discharging to Surface-, Storm-, or Ground Water

This ECP does not authorize direct discharge to ground water, surface water, or the ground surface. Storm water runoff may occur from parking lots.

Proposed activities have the potential to discharge chemicals to the Idaho Falls Sewer System. No discharges are planned to occur out at the INL Site.

No discharges are planned for off-site locations.

Disturbing Cultural or Biological Resources

It is not likely that LDRD projects would result in adverse impacts to sensitive biological or cultural resources. However, when project circumstances warrant it, biological and cultural resource reviews would be conducted to assure that impacts to sensitive resources are avoided and minimized. Resource review recommendations would be followed to assure there are no adverse impacts to sensitive species and resources.

If a project has the potential to disturb soil, vegetation, or wildlife contact the Natural Resources Group (208-526-9085) to arrange the appropriate reviews.

Generating and Managing Waste

LDRD projects will generate waste, including office waste, industrial waste (e.g., gloves, non-hazardous hardware, ceramic-type pellets, machining scrap, lab pipettes, wipes, etc.), low-level waste (LLW), mixed LLW (e.g., from irradiated fuel salt and salt-facing components), hazardous waste from chemical solutions and solvents, and transuranic (TRU) waste from certain activities at the INL Site. The total estimated sum of the generated TRU waste is less than 2E-05 m3 per year. The total estimated sum of low-level waste is to be <5 m3. The total estimated sum of nanoparticle waste is estimated to be less than 1 m3.

Off-Site Locations: Locations off-site will have the potential to generate industrial waste, office waste, hazardous waste, and LLW. No TRU waste will be generated at off-site locations. From LWP-20000, research performed by INL personnel at offsite (non INL) locations must be performed with the same rigor as on-site work. To ensure such rigor is applied, an analysis must occur between the work performer and research line management using Form 420.15, "Off-Site Work Request." If it is determined that the work controls are consistent with INL standards, research by the INL performer at the offsite location may be allowed. In the absence of a defined and structured work-control process, INL work-control processes should be applied.

Physical modeling of geotechnical centrifuge tests at the UCSD will be performed in compliance with UCSD research safety policies, procedures, and services for research and teaching laboratories available at https://blink.ucsd.edu/safety/research-lab/index.html.

Research in collaboration with NCSU will be performed in accordance with NCSU Standard Operating Procedures found at https://ehs.ncsu.edu/home-page-info/environmental-affairs/.

Research activities at DOE laboratories outside of INL comply with the environmental and other requirements applicable to the laboratory where work is being performed.

Releasing Contaminants

When chemicals are used, there is the potential the chemicals could be spilled to air, water, or soil.

Using, Reusing, and Conserving Natural Resources

All materials will be reused and recycled where economically practicable. All applicable waste will be diverted from disposal in the landfill where conditions allow. Project description indicates materials will need to be purchased or used that require sourcing materials from the environment. Being conscientious about the types of materials used could reduce the impact to our natural resources Project activities may release known greenhouse gases (GHGs) to the atmosphere and increase INL's energy use.

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 B to subpart D, Item B3.6, "Small-scale research and development, laboratory operations, and pilot projects", B1.24 "Property Transfers" and B1.31 "Installation and relocation of machinery and equipment".

Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS- 0203-SA-02) and the Amended Record of Decision (1996)

Final Environmental Impact Statement for the Waste Isolation Pilot Plant (DOE/EIS-0026, October 1980) and Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant (SEIS-I) (DOE/EIS-0026-FS, January 1990)

Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, September 1997)

Final Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (DOE/EIS-0426, December 2014).

Justification:

The proposed R&D activities are consistent with CX B3.6 "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); 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 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."

B1.31, "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." and,

B1.24, "Transfer, lease, disposition, or acquisition of interests in personal property (including, but not limited to, equipment and materials) or real property (including, but not limited to, permanent structures and land), provided that under reasonably foreseeable uses (1) there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment and (2) the covered actions would not have the potential to cause a significant change in impacts from before the transfer, lease, disposition, or acquisition of interests."

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After PIE, irradiated test specimens and PIE remnants will be stored with other similar DOE-owned irradiated materials and experiments at MFC, most likely in the HFEF or the Radioactive Scrap and Waste Facility (RSWF) in accordance with DOE's Programmatic SNF Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (FEIS) and ROD (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). Ultimate disposal of the irradiated test pin segments and PIE remnants will be along with similar DOE-owned irradiated materials and experiments currently at MFC. Categorizing this material as waste is supported under Department of Energy Order (DOE O) 435.1, Att. 1, Item 44, which states "…Test specimens of fissionable material irradiated for research and development purposes only…may be classified as waste and managed in accordance with this Order..."

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The potential for transportation accidents was analyzed in the SNF EIS (Section 5.1.5 and Appendix I-5 through I-10).

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: 09/28/2022