



Department of Energy

Office of Science

ORNL Site Office

P.O. Box 2008

Oak Ridge, Tennessee 37831-6269

Proposed Action Title: Generic Categorical Exclusion (CX) Determination for Nuclear Material and Radiochemical Processing Research and Development at Oak Ridge National Laboratory (ORNL)

Program or Field Office: Office of Science (SC) - ORNL

Location(s) (City/County/State): Oak Ridge, Anderson, Tennessee

Proposed Action Description:

The Department of Energy (DOE) SC conducts research and development activities at nuclear and radiological facilities located at the ORNL on an ongoing and routine basis. The research and development activities involve the study of nuclear materials and radiochemical processing. The work includes both experimental and theoretical research for a broad range of interdisciplinary applications with emphasis on the characterizing, testing, developing, and analyzing various radioisotope materials, and developing and testing equipment and components for the generation of advanced nuclear material systems, and radiochemical processes. These ongoing research and development activities take place at existing facilities at ORNL.

Research and development activities include, but are not limited to:

- (1) Advancing techniques and methodology involved in separation, production, and distribution of radioactive isotopes. These activities include development of novel chemical separation processes to improve performance and efficiency for radioisotope processing, and purification. It also includes activities related to converting radioisotopes to specific forms (chemical and physical) to meet isotope user needs for research and development activities.
- (2) Developing technology in waste minimization and utilization. This work includes research and development activities related to new waste forms for applications to spent nuclear fuel and radioactive waste from isotope production activities. Waste forms are synthesized, and tested for performance with simulants, and the relevant radioisotopes.
- (3) Developing instrumentation and methodology for detection of nuclear materials associated with nonproliferation, threat reduction, and arms controls assessment. These activities focus on development and testing of new gamma, alpha, beta and neutron radiation measurement equipment, and methods for specified missions. This scope includes measurement of radioactive material to test performance of developed radiation measurement, and imaging technologies.

- (4) Recovered nuclear material conversion and configuration to suitable end-use material systems and engineered solutions. These activities include chemical processing of nuclear material to remove impurities, and conversion to stable forms for use. Efforts include dispensing of isotopes and development of sealed sources of nuclear material for measurement, and calibration.
- (5) Inspection and determining the integrity of storage containers containing fissile materials. These activities include the engineering design, development, assessment testing, evaluation, and qualification of new DOE/ National Nuclear Security Administration, and Nuclear Regulatory Commission (NRC) Certificate of Compliance Type AF, Type B, and Type B Fissile transportation package/shipping containers. These activities also include the Department of Transportation International Atomic Energy Agency/NRC Special Form Radioactive Material capsules development, assessment testing, evaluation, and qualification.
- (6) Designing, developing, and testing processes and equipment for the separation, handling, and/or stabilization of nuclear wastes. To support existing radiochemical processing activities, new processing equipment is tested and qualified for use. Equipment is in support of dissolution, chemical separation, abatement, and waste solidification unit operations.
- (7) Designing, developing, and testing processes and equipment for the preparation and/or recycle of nuclear fuels and other nuclear materials. These activities focus on development and testing of advanced chemical processes for the recycle of used nuclear fuel and the equipment required to perform the processes. The processing and equipment include mechanical handling and chemical processing. All activities are for research purposes only.
- (8) Post-irradiation examination and processing of special nuclear and/or isotopic materials. The activities involve mechanical, materials, and radiation characterization of irradiated targets and fuel to evaluate performance for the purpose of improving safety and understanding irradiation behavior of materials. All characterization activities of irradiated material are performed in shielded hot cells. These activities support isotope production activities, accident event analysis, and existing and new nuclear fuel performance evaluations.

These activities are conducted in support of many and diverse programmatic missions within the DOE complex, sister, and international agencies, and involve materials originating from multiple sources, including facilities located outside the United States.

The activities take place within existing facilities at ORNL and have been reviewed in accordance with the Cultural Resource Management Plan or applicable sections in a ratified Programmatic Agreement document and would not result in an adverse effect to historic properties included or eligible for inclusion in the National Register of Historic Places (National Register). If the ORNL actions would have an adverse effect on properties included or eligible for inclusion in the National Register, DOE would consult with the State Historic Preservation Officer and initiate actions specified in procedures set forth in the Advisory Council's regulations in 36 Code of Federal Regulations (CFR) Part 800.

A separate National Environmental Policy Act (NEPA) screening will be performed, documented, and maintained by ORNL each time this generic CX is applied. Should the action or related/cumulative effect of the action have the potential to result in an unusual or significant impact to the environment (see 10 CFR 1021 Appendix B to Subpart D, Conditions that are Integral Elements of the Classes of Action in Appendix B), a separate NEPA review would be performed. Should the action not meet the conditions for CX consideration, a separate NEPA document would be prepared and submitted to DOE-SC for review and approval.

ORNL facilities in which activities described in this document will continue to occur are: 1509, 2360HVC, 3025E, 3047, 3500, 3525, 4500N, 4500S, 4501, 4505, 4508, 4515, 5800, 7603, 7605, 7606A, 7735, 7920, and 7930. Any activities which have the potential for routine radiation exposure to workers or the public that are above regulatory, DOE Order, or local administrative limits are not covered by this CX. These actions will not require new construction or major upgrades to existing facilities and would not result in substantive changes in ongoing operations at ORNL. The study of nuclear materials and radiochemical processing have been longstanding activities at ORNL that have required the development of robust environmental monitoring programs, public and worker safety programs, and waste management programs that routinely ensure these efforts are undertaken in a responsible manner that adhere to their respective requirements and do not cause significant impacts to the environmental impacts. Any new activity which will cite this categorical exclusion will be performed as so these programs are not required to create new processes to support the work or require a new or modifications to existing environmental permit. Any wastes generated during research and development activities would be appropriately characterized and disposed of at existing permitted/approved waste storage, treatment, or disposal facilities.

No known extraordinary circumstances would be associated with these actions that might affect the significance of the environmental effects of the proposed action based on past similar actions. These actions would not be connected to other actions with potentially significant impacts or related to other proposed actions with cumulatively significant impacts; they would meet the conditions that are integral elements of the classes of actions which may be categorically excluded from further NEPA documentation. Should the action not meet the conditions for CX consideration, a separate NEPA document would be prepared.

¹*National Historic Preservation Act Historic Preservation Plan, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL/TM-2004/62, April 2004.*

Categorical Exclusion(s) Applied:

B1.10 - Onsite storage of activated material

B2.6 - Recovery of radioactive sealed sources

B3.4 - Transport packaging tests for radioactive or hazardous material

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

B3.11 - Outdoor tests and experiments on materials and equipment components

B7.2 - Import and export of special nuclear or isotopic materials

For the complete DOE NEPA regulations regarding CX, including the full text of each CX, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 Comprehensive Environmental Response, Compensation, and Liability Act-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, 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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 above description accurately describes the proposed action, which reflects the requirements of the CX cited above. Therefore, I recommend that the proposed action be categorically excluded from further NEPA review and documentation.

Program Point of Contact: Martha Kass January 12, 2021
Martha J. Kass, DOE-OSO Date Determined
Director, Operations and Oversight Division

Based on my review of the proposed action, as NEPA Compliance Officer, I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: _____
Peter Siebach, DOE-SC-CSC Date Determined
NEPA Compliance Officer