PROJECT-SPECIFIC CATEGORICAL EXCLUSION FOR THE FISSION GAS CONSTRAINTS ON IRRADIATION HISTORIES PROJECT, PACIFIC NORTHWEST NATIONAL LABORATORY, RICHLAND, WASHINGTON

Proposed Action:

The U.S. Department of Energy (DOE) proposes to analyze fission gas from samples of high burnup boiling water reactor spent fuel rods (BWR rods), at the Pacific Northwest National Laboratory (PNNL) Richland Campus, and send samples to collaborators.

Location of Action:

BWR rods were shipped to PNNL in 2025 and are located at PNNL's Radiochemical Processing Laboratory (RPL, 325 Building), located in the Hanford 300 Area in eastern Washington. Activities associated with taking samples from the BWR rods will occur in the RPL, and the resulting samples may be analyzed within RPL and the 3420 and 3430 buildings of the PNNL-Richland Campus (Figure 1). All research performed on the PNNL Richland campus would be appropriate for the potential impact category of the buildings and within established building controls and limits. Radioactive waste will be shipped following established procedures to the Hanford Site for storage or disposal. Samples derived from BWR rod research activities may be shipped to Lawrence Livermore National Laboratory (LLNL).

Figure 1. Buildings Where Work Will Occur within the 300 Area and PNNL-Richland Campus.

Description of the Proposed Action:

The Fission Gas Constraints on Irradiation Histories Project (fission gas project) is an ongoing project at the PNNL Richland Campus. Analysis of fission gas isotopic compositions supports DOE National Nuclear Security Administration (NNSA) missions related to nuclear detection. The project is a collaborative project with LLNL and Oak Ridge National Laboratory (ORNL). The project overall proposes to analyze fission gas samples in order to generate data that would be utilized for advanced modeling activities. Previous work associated with the fission gas project has been appropriate for coverage under generic DOE categorical exclusions (CXs).

The proposed project activity would utilize swipe samples and Focused Ion Beam (FIB) samples taken from the BWR rods. Swipe samples are swipes of cut surfaces of the BWR rods that collect particulates which are then subsampled (made into smaller samples) and analyzed. FIB samples are 1 to 30-micron diameter cubes that are cut from a thin section of the BWR rods. Swipe and FIB cube samples will be analyzed at both PNNL and LLNL to compare methods and measurements. During sample shipment to LLNL, samples are treated as radiological material though they are below detection levels. The samples analyzed at PNNL may be removed from RPL and analyzed in buildings 3430 and 3420 on the PNNL Richland Campus, as appropriate and within building controls (see Criteria 1 below). Instrumentation, including but not limited to Thermal Ionization Mass Spectrometer and Scanning Electron Microscope, will be used at PNNL to analyze the samples and collect data. Data from these analyses are used in modeling and comparison studies that support DOE missions.

The activities evaluated in this CX would meet all the following criteria:

1. Each activity would be conducted within existing structures that provide appropriate wastewater storage/handling, exhaust ventilation, air filtration, and additional confinement or controls appropriate to the nature of the materials and equipment used in the activity. Activities would follow PNNL processes (i.e., Electronic Prep and Risk, Lab Assist and Radioactive Material Tracking) that ensure the materials being used are appropriate for the lab space and buildings where work would occur. Controls associated with the potential impact category for radiological facilities would be maintained for the respective buildings. The proposed action would not increase the quantities of materials in a manner that would necessitate a modification to the accident analyses for the RPL.

2. Each activity would comply with applicable facility safety and environmental administrative controls and permit requirements.

3. Inventories of hazardous and radioactive materials would be maintained at the lowest practicable levels while remaining consistent with continuing operations and research goals, pollution prevention measures, applicable permits and licenses, and waste minimization practices.

4. Releases of liquid and/or airborne substances to the environment would be minimized and remain compliant with applicable facility, local, state, and federal regulations and DOE Orders and PNNL guidelines. The 3420, 3430, and RPL facilities continuously sample (RPL also continuously monitors with an in-line detector) air effluents exiting the permitted stacks, downstream of the pollution prevention devices (e.g., high efficiency particulate air filters).

5. Wastes generated by proposed activities would be limited to wastes with an available treatment, storage, and/or disposal pathway(s). Volumes of waste generated by each activity would be reduced as much as possible by pollution prevention measures and waste minimization practices. Wastes would be dispositioned in accordance with applicable local, state, and federal regulations and DOE Orders and guidelines.

6. Materials and waste would be packaged and transported in accordance with local, state, federal, Department of Transportation (DOT) and other applicable regulations.

The proposed action also includes reasonably foreseeable actions necessary for implementation such as radiological control and safety support; material storage, packaging, and transport; equipment and material staging; equipment/instrument installation, modification, calibration, and maintenance; award of grants and contracts; waste management, transport, treatment, storage, and disposal; and obtaining associated regulatory permissions. These activities would be managed in accordance to, and in compliance with, DOE orders, as well as federal, state, and local regulations and guidelines.

Biological and Cultural Resources:

Biological and cultural resource reviews are conducted for proposed actions with the potential to impact environmental resources. Work associated with the proposed action includes research occurring within the RPL, 3430, and 3420, and sample shipments to LLNL. Cultural resources will not be affected by research occurring within facilities. The RPL has been determined eligible for listing on the National Register of Historic Places as a contributing component of the Hanford Site Manhattan Project and Cold War Era Historic District. The proposed action will not alter the property or any character defining features. Sensitive biological resources would not be affected by research occurring within facilities. The proposed action has no potential to impact biological or cultural resources. Activities that could cause impacts to biological or cultural resources are not included in the scope of this CX.

Categorical Exclusion to be Applied:

As the proposed action is to perform research and development activities, the following CX, as listed in 10 CFR 1021, would apply:

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.

Eligibility Criteria:

The proposed action meets the eligibility criteria of the DOE NEPA Implementing Procedures. To find a proposal is categorically excluded when applying a categorical exclusion to a proposal, DOE considers the following factors for the full scope of the proposal:

1. The proposal fits within one or more classes of actions listed in appendices B-C of the DOE NEPA Implementing Procedures;
2. The proposal has not been segmented to meet the definition of a categorical exclusion;
3. There are no extraordinary circumstances related to the proposal that indicate a normally excluded agency action is likely to have a reasonably foreseeable significant adverse effect.

To fit within the categories of actions listed in 10 CFR 1021, the proposal must include the following "Integral Elements", which are satisfied as discussed below:

INTEGRAL ELEMENTS, 10 CFR 1021, SUBPART B	
Would the Proposed Action	Evaluation
Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health?	The proposed action would not threaten a violation of regulations, DOE orders, or Executive Orders.
Require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities?	No waste facilities would be constructed under this CX. Any generated waste would be managed in accordance with applicable regulations in existing facilities. Waste disposal pathways would be identified prior to generating waste and waste generation would be minimized.
Disturb hazardous substances, pollutants, or contaminants that preexist in the environment such that there would be uncontrolled or unpermitted releases?	No preexisting hazardous substances, pollutants, or contaminants would be disturbed in a manner that results in uncontrolled or unpermitted releases.

Have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited, to: • protected historic/archaeological resources, • protected biological resources and habitat, • jurisdictional wetlands, 100-year floodplains, • Federal- or state-designated parks and wildlife refuges, wilderness areas, wild and scenic rivers, national monuments, marine sanctuaries, national natural landmarks, and scenic areas.	No environmentally sensitive resources would be adversely affected by the proposed action. Refer to the Biological and Cultural Resources section for details regarding the project potential to impact environmental resources.
Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species?	The proposed action does not involve the use of genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species.

Summary of Environmental Impacts:

The following table summarizes environmental impacts considered when preparing this CX determination.

Environmental Impacts Considered when Preparing this CX Determination	
Would the Proposed Action	Evaluation
Result in more than minimal air impacts?	Air impacts would be minimized as necessary and would be compliant with applicable permits, local, state, and federal regulations, DOE orders, and PNNL guidelines.
Increase offsite radiation dose measurably?	The proposed action would be performed within applicable environmental permits and would not increase the offsite radiation dose measurably.
Require a radiological work permit?	The proposed action will be conducted in accordance with applicable radiological work permits. The activities will be performed in compliance with as low as reasonably achievable (ALARA) principles, applicable local, state, and federal regulations, DOE orders, and PNNL guidelines. Radiation received by workers during the performance of research activities would be administratively controlled below DOE limits as defined in 10 CFR 835.202(a). Under normal circumstances, those limits control individual radiation exposure to below an annual effective dose equivalent of 5 rem.

Discharge any liquids to the environment?	Liquid wastes can be generated during research activities. Liquid wastes generated by research activities would be discharged into existing treatment systems and/or disposed of in accordance with applicable regulations and best management practices.
Require a Spill Prevention, Control, and Countermeasures plan?	The proposed action is not expected to require a formal Spill Prevention, Control, and Countermeasures plan.
Involve hazardous, radioactive, polychlorinated biphenyl, or asbestos waste?	The proposed action will involve hazardous and radioactive waste streams. Wastes generated by proposed activities would be limited to wastes with an available onsite or off-site treatment, storage, and/or disposal pathway(s). Volumes of waste generated by this activity would be reduced as much as possible by pollution prevention measures and waste minimization practices. Waste will be characterized, handled, packaged, transported, treated, stored, and/or disposed of in treatment, storage, and disposal facilities as appropriate in accordance with applicable regulations.
Use carcinogens, hazardous, or toxic chemicals/materials?	The proposed action may involve the use of carcinogens, hazardous and/or toxic chemicals and materials. Project inventories would be maintained at the lowest practicable levels, and chemical wastes would be recycled, neutralized, or regenerated if possible. Product substitution (use of less toxic chemicals in place of more toxic chemicals) would be considered when reasonable.
Cause more than a minor or temporary increase in noise level?	The proposed action is not expected to cause an increase in ambient noise levels.
Create light/glare, or other aesthetic impacts?	The proposed action is not expected to create light, glare, or other aesthetic impacts.
Require an excavation permit (e.g., for test pits, wells, utility installation)?	The proposed action is not expected to require an excavation permit.
Disturb an undeveloped area?	The proposed action is not expected to disturb an undeveloped area.
Result in more than minimal impacts on transportation and public services?	The proposed action will not have more than minimal impacts on transportation and public services.
Disproportionately impact low-income or minority populations?	The proposed action will not disproportionately impact low income or minority populations.

Require environmental or other permits from federal, state, or local agencies?	Federal, state, and/or local environmental permits may be required for the proposed action. All permits will be acquired or updated prior to project activities, as required, and activities will abide by all applicable permit requirements.

Compliance Action:

I have determined that the proposed action satisfies the DOE NEPA eligibility criteria and integral elements, does not pose extraordinary circumstances, and meets the requirements for the CX referenced above. Therefore, using the authority delegated to me, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature:  Digitally signed by THOMAS MCDERMOTT
Date: 2025.09.11 07:47:05 -07'00'

Tom McDermott

PNSO NEPA Compliance Officer

cc: ES Norris, PNNL