

**GENERIC CATEGORICAL EXCLUSION FOR SMALL-SCALE RESEARCH AND  
DEVELOPMENT PROJECTS USING NANOSCALE MATERIALS,  
PACIFIC NORTHWEST NATIONAL LABORATORY,  
RICHLAND, WASHINGTON**

**Proposed Action:**

The U.S. Department of Energy (DOE) Pacific Northwest Site Office (PNSO) proposes to conduct indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials. Nanoscale materials are engineered materials consisting of, or containing, structures of between 1 and 100 nanometers (nm) that make use of properties unique to nanoscale forms of materials.

**Location of Action:**

The proposed activities would occur on the Pacific Northwest National Laboratory (PNNL) campuses in Richland and Sequim, Washington.

**Description of the Proposed Action:**

The proposed action is to (1) conduct indoor small-scale research and development projects using nanoscale materials; (2) carry out pilot-scale projects using nanoscale materials; (3) complete minor modifications of existing laboratory rooms to support projects using nanoscale materials. Activities include research involving bound nanoparticles as well as unbound engineered nanoparticles. Bound nanoparticles are engineered nanoparticles inhibited from becoming airborne, or unlikely to generate or release unbound-engineered nanoparticles in occupational settings under the particular circumstances of use. Unbound engineered nanoparticles are intentionally-created (in contrast with natural or incidentally-formed) particles with one or more dimensions greater than 1 nanometer and less than 100 nanometers. Nanoparticles which are suspended in an aerosol or in a liquid are "unbound". Examples of activities involving nanoscale materials include, but are not limited to:

- nanoscale capabilities to design surfaces, interfaces, and thin films for selective chemical and physical properties
- nanoscience and nanotechnology, including condensed phase and interfacial chemical physics, oxide surface science, catalysis and chemical transformation, mass spectrometry and ionic processes, photonic and molecularly organized nanostructural materials and low-temperature geochemical processes
- minor modifications to rooms, equipment, and instrumentation in direct support of laboratory operations associated with the use of nanoscale materials.

Proposed activities must meet the DOE categorical exclusion (CX) eligibility criteria (10 Code of Federal Regulations [CFR] 1021.410) and all of the following criteria:

1. Each activity would be conducted in compliance with DOE Policy 456.1 and DOE Order 456.1A.

2. Each activity would be conducted within structures that provide appropriate wastewater storage/handling and additional confinement or controls appropriate to the nature of the materials and equipment used in the project.
3. Each activity would comply with applicable facility safety and environmental administrative controls and permit requirements.
4. Each activity could use hazardous and/or radioactive materials, should the use be necessary. Inventories 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.
5. Releases of airborne substances to the environment would be minimized and remain compliant with applicable facility, local, state and federal regulations, and DOE Orders and guidelines.
6. Wastes generated by proposed actions would be limited to wastes with an available onsite or offsite treatment, storage, or disposal pathway. 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.

The proposed laboratory activities would 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 detectors; consulting and planning with sponsors and collaborators; maintenance, calibration, transport and use of analytical and research equipment; and award of grants and contracts.

These routine activities would be managed in accordance to, and in compliance with, DOE orders, as well as federal and state regulations and guidelines.

### **Biological and Cultural Resources:**

Biological and cultural resources reviews will be conducted prior to such activities to assure that impacts to sensitive resources are avoided or minimized.

The biological resources review will identify the occurrence of federally and state-protected species and habitats in the project area such as avian species protected under the Migratory Bird Treaty Act (MBTA); species protected by the Marine Mammal Protection Act (MMPA); essential fish habitat as defined by the Magnuson-Stevens Fisheries Conservation and Management Act (MSA); plant and animal species and critical habitat protected under

the Endangered Species Act (ESA), including candidates for such protection; and state species listed as threatened or endangered. Resource review recommendations will be followed during small-scale research and development projects and small-scale pilot projects using nanoscale materials to assure there are no adverse impacts to sensitive species and resources.

DOE will conduct a cultural resources review as part of the Section 106 process of the National Historic Preservation Act (NHPA). The Section 106 process assesses undertakings to determine if the undertaking will have an adverse effect/impact to historic properties.

If the biological and/or the cultural resources review determines that resources may be adversely affected/impacted, the use of this CX would be reevaluated. Potential options could be, but are not limited to, changing the proposed activity location, the development of mitigation measures to render the impacts not significant, or the performance of additional National Environmental Policy Act (NEPA) analysis and review.

**Categorical Exclusion to Be Applied:**

As the proposed action is to conduct indoor small-scale research and pilot projects using nanomaterials, the following CX, as listed in the DOE NEPA implementing procedures, 10 CFR 1021, would apply:

*B3.15* Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Generic CXs are authorized by 10 CFR 1021.410(f) for recurring activities to be undertaken during a specified period of time, after considering potential aggregated impacts.

**Eligibility Criteria:**

The proposed activity meets the eligibility criteria of 10 CFR 1021.410(b) because the proposed action does not have any extraordinary circumstances that might affect the significance of the environmental effects, 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 environmental impact statement preparation.

The "Integral Elements" of 10 CFR 1021 are satisfied as discussed below:

<b>INTEGRAL ELEMENTS, 10 CFR 1021, SUBPART D, Appendix B (1)-(5)</b>	
<i>Would the Proposed Action:</i>	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 or DOE or Executive Orders.
Require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities?	No waste management 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 or results in uncontrolled or unpermitted releases.
Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species?	The proposed action would not involve the use of 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).
Have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited, to: <ul style="list-style-type: none"> <li>• protected historic/archaeological resources</li> <li>• protected biological resources and habitat</li> <li>• jurisdictional wetlands, 100-year floodplains</li> <li>• Federal- or state-designated parks and wildlife refuges, wilderness areas, wild and scenic rivers, national monuments, marine sanctuaries, national natural landmarks, and scenic areas.</li> </ul>	<p>No environmentally sensitive resources would be adversely affected by the proposed small-scale research actions.</p> <p>The proposed action would not adversely affect floodplains, wetlands regulated under the Clean Water Act, national monuments, or other specially designated areas, prime agricultural lands, or special sources of water.</p> <p>Potential impacts to Biological or Cultural resources would be addressed as described above.</p>

**Summary of Environmental Impacts:**

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

<b>Environmental Impacts Considered when Preparing this CX Determination</b>	
<i>Would the Proposed Action:</i>	Evaluation

Result in more than minimal air impacts?	Air emissions during research operations would be compliant with applicable permits, local, state, and federal regulations, DOE orders, and PNNL guidelines. As necessary, Notice of Construction applications would be submitted for individual projects.
Increase offsite radiation dose measurably?	Research involving nanoscale materials and the use of radioactive isotopes might result in radioactive air emissions. In accordance with the National Emission Standards for Hazardous Air Pollutants (40 CFR 61), continuous air sampling is in place for those facilities whose cumulative emissions are likely to result in an annual dose to the public that is greater than 0.1 mrem. In addition, high-efficiency particulate air filters are in place to control emissions. After controls, abated emissions from research operations would not be expected to result in measurable offsite radiological dose.
Require a radiological work permit?	Although not expected, research operations utilizing nanoscale materials might require a radiological work permit. Activities would be performed in compliance with as low as reasonably achievable (ALARA) principles, applicable state and federal regulations, DOE Orders, and PNNL guidelines. The radiation received by workers during the performance of 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 would be generated during research activities and possibly during facility modification activities. Liquid wastes generated by research operations would be discharged into existing treatment systems and/or in accordance with regulations and best management practices. All liquid biological wastes would be autoclaved or chemically disinfected prior to discharge. During construction or modification activities, there might be minor quantities of liquid effluents, for example, fire or safety system-proofing wastewater, hydrotest water, and cleanup rinse water. Effluents would be managed in accordance with regulations and best management practices.
Require a Spill Prevention, Control, and Countermeasures plan?	Nanoscale materials research activities are not likely to require a Spill Prevention, Control, and Countermeasures plan. Laboratory operations will be conducted in accordance with PNNL safety procedures.

<p>Use carcinogens, hazardous, or toxic chemicals/materials?</p>	<p>Proposed research and minor modification activities would be expected to use small quantities 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 where reasonable. In addition, modifications of existing laboratory rooms could generate minor amounts of debris and excess equipment. These materials would be recycled, re-used, or excessed for other uses to the extent practical.</p>
<p>Involve hazardous, radioactive, polychlorinated biphenyl, or asbestos waste?</p>	<p>Proposed research and minor modification activities would be expected to result in small quantities of hazardous, radioactive, polychlorinated biphenyl, and/or asbestos wastes. If unrecyclable, such wastes would either be returned to the client or characterized, handled, packaged, transported, treated, stored, and/or disposed of in existing treatment, storage, and disposal facilities in accordance with applicable regulations.</p>
<p>Cause more than a minor or temporary increase in noise level?</p>	<p>Nanoscale materials research would not create significant noise impacts. Minor laboratory modifications may create noise impacts, but those impacts are expected to be minor and temporary in nature.</p>
<p>Create light / glare, or other aesthetic impacts?</p>	<p>Nanoscale materials research is not likely to create light, glare, or other aesthetic impacts.</p>
<p>Require an excavation permit (e.g., for test pits, wells, utility installation)?</p>	<p>Though expected to be a rare occurrence, it is possible that modifications to laboratories might result in exterior changes that require an excavation permit, such as a PNNL or Hanford Site excavation permit. Stipulations in the excavation permit to minimize potential impacts to safety and the environment would be followed.</p>
<p>Disturb an undeveloped area?</p>	<p>Nanoscale materials research would not disturb undeveloped areas, any new structures or building modifications to support the research would be within previously disturbed or developed areas with existing access to roads and utilities.</p>
<p>Result in more than minimal impacts on transportation or public services?</p>	<p>Nanoscale materials research would not result in more than minimal impacts to transportation or public services.</p>
<p>Disproportionately impact low-income or minority populations?</p>	<p>Nanoscale materials research would not disproportionately impact low-income or minority populations.</p>

Require environmental or other permits from federal, state, or local agencies?

Although not expected, modification activities might require submittal of a notice of construction to the State of Washington Department of Health, for example, when modifications result in changes to an existing radiological control system. Notifications and approvals might be required from air regulatory agencies to use temporary and portable air pollution sources, such as engines or generators, or modify or maintain permanent facilities and equipment subject to emission standards.

**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. This determination must be reviewed at least once every 5 years.

**Signature:** \_\_\_\_\_



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Tom McDermott  
PNSO NEPA Compliance Officer

cc: ES Norris, PNNL