

**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 action would occur on the Pacific Northwest National Laboratory (PNNL) Site and in the vicinity of PNNL facilities in the State of 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 456.1.
2. Each activity would be conducted within existing 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.

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

It is not likely that small-scale indoor projects using nanoscale material would result in adverse impacts to sensitive biological or cultural resources. However, minor modifications to facilities to support laboratory operations may warrant biological and cultural resource reviews. Reviews would be conducted to assure that impacts to sensitive resources are avoided and minimized.

Biological resource reviews would assure that impacts to sensitive biological resources are avoided. These reviews would identify the occurrence of federal and state protected species in the project area such as avian species protected under the Migratory Bird Treaty Act (MBTA); plant and animal species protected under the Endangered Species Act (ESA), including candidates for such protection; and species listed as threatened or endangered by the state of Washington. Resource review recommendations would be followed to assure there are no adverse impacts to sensitive species and resources.

Cultural resource reviews would assure that impacts to sensitive cultural resources are avoided. Impact avoidance and mitigative measures would be implemented as stipulated by the resource review. Tagged historical artifacts would not be damaged. If consultation with the State Historic Preservation Office and/or affected tribes is deemed necessary, it would be initiated before project implementation.

**Categorical Exclusion to Be Applied:**

The proposed action is to conduct indoor small-scale research and development, and pilot-scale projects using nanoscale materials, as well as perform minor modifications to facilities for indoor nanoscale research. Therefore, the following CX, as listed in the DOE National Environmental Policy Act (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, 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).

**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 EIS 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>	
<b>WOULD THE PROPOSED ACTION:</b>	<b>EVALUATION:</b>
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 are identified prior to generating waste and waste generation is 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.
<p>Have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited, to:</p> <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. Resource reviews would be conducted for special circumstances. Refer to the Biological and Cultural Resources section for details regarding the application of cultural and biological resource reviews.</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>
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?	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

**Checklist Summarizing Environmental Impacts:** The following checklist summarizes environmental impacts that were considered when preparing this CX determination. Answers to relevant questions are explained in detail in the text following the checklist.

<b>Would the proposed action:</b>		<b>YES</b>	<b>NO</b>
1	Result in more than minimal air impacts?	X	
2	Increase offsite radiation dose measurably?		X
3	Require a radiological work permit?	X	
4	Cause more than a minor or temporary increase in noise level?		X
5	Discharge any liquids to the environment?	X	
6	Require a Spill Prevention Control and Countermeasures plan?		X
7	Require an excavation permit (e.g., for test pits, wells, utility installation)?	X	
8	Disturb an undeveloped area?		X
9	Use carcinogens, hazardous, or toxic chemicals/materials?	X	
10	Involve hazardous, radioactive, polychlorinated biphenyl, or asbestos waste?	X	
11	Require environmental permits?	X	

**Explanations:**

1. 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.
3. Although not expected, research operations and minor laboratory modification activities might require a radiological work permit. Activities would be performed in compliance with as low as reasonably achievable 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.
5. Liquid wastes would be generated during nanoscale research activities and possibly during facility modification activities. Liquid wastes generated by research operations would be handled in accordance with applicable local, state, and federal regulations and permit requirements, DOE Orders, and PNNL guidelines. Any liquid biological wastes containing nanoscale materials would be autoclaved or chemically disinfected prior to collection. 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 PNNL requirements and best management practices.
7. Though expected to be a rare occurrence, it is possible that modifications to laboratories might result in exterior changes that require an excavation permit.

Stipulations in the excavation permit to minimize potential impacts to safety and the environment would be followed.

9. Proposed research projects and conventional laboratory operations could use small quantities of pesticides, carcinogens, and/or toxic chemicals. 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.
10. Proposed activities can be expected to result in hazardous, radioactive, PCB, 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 Hanford Site or offsite treatment, storage, and disposal facilities in accordance with applicable local, state, and federal regulations, DOE Orders and guidelines.
11. Although not expected under this CX, it is possible that small-scale research and development might require submittal of a Notice of Construction to the State Department of Health, for example, when a modification results in a change to an existing radiological control system. Notifications and approvals might be required from the Benton County Clean Air Authority, for example, to use temporary air pollution sources such as portable generators. Any necessary applications would be coordinated with PNSO staff.

**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 by DOE Order 451.1B, Change 2, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature:  Date: 12/12/11  
Theresa Aldridge  
PNSO NEPA Compliance Officer

cc: JA Stegen, PNNL