

**U.S. Department of Energy
Finding of No Significant Impact
Proposed Decontamination and Demolition of Building 310
at Argonne National Laboratory,
Argonne, Illinois**

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: DOE has prepared an Environmental Assessment (EA), DOE/EA-1670, to evaluate impacts from the decontamination and demolition of Building 310 at Argonne National Laboratory (Argonne) in Argonne, Illinois. Under this proposed action, DOE would decontaminate and demolish the building, remove contaminated soil in the immediate vicinity of the building, and repave or re-vegetate the project site. DOE intends to demolish this building as part of its mission to protect human health and the environment from risks associated with unneeded and deteriorating structures that contain radioactively contaminated areas and material.

Based on the analysis in the EA, DOE has determined that the proposed action would not significantly affect the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an environmental impact statement is not required.

DESCRIPTION OF THE PROPOSED ACTION: The proposed action is the decontamination and demolition of Building 310, formerly known as the Experimental Waste Processing, Storage, and Shipping Building. The scope of the proposed action involves the decontamination or removal of fixed radiological contamination within the building prior to demolition; the demolition of all interior mechanical, electrical, and architectural systems and components; the open-air demolition and removal of the physical structure, including the concrete foundations, sidewalk and asphalt surfaces adjacent to the facility; removal of contaminated soil in the vicinity of the building; and transportation of waste to approved disposal facilities. All activities would be performed in accordance with relevant environmental permits and an approved work plan that meets the requirements of 10 CFR Part 835, Occupational Radiation Protection.

The areas of elevated contamination that would be encountered during demolition include fixed contamination under paint and floor tile, and systems embedded in structural components, such as ductwork and piping. Predominant radionuclides inside the building include uranium-238, americium-241, cobalt-60, and cesium-137. Predominant radionuclides in soils in the vicinity of the building include uranium-238, americium-241, strontium-90 and cesium-137. Previous sampling (2002) of the asphalt lot and subsurface soil between Building 310 and 306 also indicated the presence of plutonium-238, plutonium-239 and hydrogen-3 (tritium).

Background

Building 310 was constructed in 1950 and is located in the south-central area of the Argonne site. In its early years, the building functioned as the experimental waste processing, storage, and shipping facility, with the general purpose of reducing waste volumes for shipment to an off-site disposal facility. In this capacity, the building supported experimentation of various waste processing techniques for liquid and solid radioactive waste treatment, storage, and packaging. The service floor retention tank facility provided for the storage of liquid radioactive waste prior to processing in Building 306. The tanks also provided overflow capacity for contaminated liquid wastes that were initially received by Building 306 for processing. In addition, dry active waste was brought to the facility for incineration prior to removal of the incinerator in the late 1950s.

In 1954, an irradiation source (spent fuel pool) facility was added for conducting high-level gamma radiation experiments. Building 310 underwent several additions in the 1970s to support Idaho National Laboratory's Experimental Breeder Reactor II project.

Decontamination and decommissioning of the retention tank facility was completed in 2002. In recent years, the building housed office space, a machine shop, a staging area, and storage for maintenance spare parts.

Decontamination and Demolition

Interior decontamination and demolition tasks would include activities such as equipment and systems disassembly (including removal of building components, tanks, piping, ventilation, fixtures, equipment, and debris), size reduction by mechanical means, decontamination of building surfaces, and packaging and disposal of resultant waste. This work would be performed indoors in Building 310.

Polychlorinated biphenyl (PCB)-containing light fixtures would be removed and disposed of by trained workers. Asbestos-containing material (ACM), present primarily as fire-retardant insulation and floor tile, would be removed and disposed of by certified asbestos abatement workers using personal protective equipment and proper methods to prevent release to the outside atmosphere.

Any water encountered during demolition activities would be collected and tested for contamination. In addition, water would be misted over all surfaces to control dust emissions during demolition of the exterior structure and subsequent rubble reduction, generating a secondary waste stream of potentially contaminated water. Up to an estimated 13,600 liters (3,600 gallons) of water per day would be used to suppress dust, requiring collection and pumping to the Laboratory Wastewater Treatment Plant (LWTP). Standard industry practices would be used to minimize the potential for generating waste and spreading contamination, and the wastewater would be tested and disposed of in accordance with the demolition contractor's approved waste management

plan. If the wastewater requires treatment, Argonne would use a commercial waste disposal contractor to store, treat, and transport the contaminated water for disposal.

Soil in the vicinity of Building 310 and beneath the asphalt lot between Buildings 310 and 306 is expected to be contaminated with uranium-238, americium-241, strontium-90, and cesium-137 (as well as a number of hazardous chemical compounds), based on soil and groundwater sampling performed during building characterization. Sampling performed in 2002 also indicated the presence of hydrogen-3 (tritium), plutonium-238, and plutonium-239. Contamination in the sampled area exceeds Argonne cleanup criteria, necessitating the removal of approximately 5,909 cubic meters (208,800 cubic feet) of soil during the proposed action.

Waste generated by the proposed action would be transported by truck for off-site disposition. There are no plans to recycle any waste from Building 310. To conservatively bound transportation impacts, DOE increased the anticipated number of waste shipments by 50 percent and assumed the most distant disposal facility option for all waste streams.

DOE estimated that the proposed action would generate approximately 6,986 cubic meters (246,840 cubic feet) of clean, solid debris waste, consisting mainly of concrete, metal, wood, plastic, soils, paper, and cloth; approximately 6,053 cubic meters (213,875 cubic feet) of low-level radioactive waste (LLW), consisting mainly of contaminated demolition debris (e.g., drain piping and scabbled concrete), paper, and cloth; and approximately 5,909 cubic meters (208,800 cubic feet) of contaminated soil. LLW and contaminated soil would likely be shipped by the demolition and waste management contractor to the Nevada Test Site (NTS) in Mercury, Nevada, or *EnergySolutions* in Clive, Utah, for disposal.

DOE also estimated that the proposed action would generate approximately 30 cubic meters (1,060 cubic feet) of mixed LLW, 151 cubic meters (5,321 cubic feet) of ACM, approximately 4 cubic meters (141 cubic feet) of hazardous, chemical, or Toxic Substances Control Act (TSCA) waste (in forms such as lead-based paint or PCBs), and approximately 4 cubic meters (142 cubic feet) of universal waste (including mercury switches, fluorescent light bulbs, PCB light ballasts, and batteries). Hazardous, chemical, TSCA, and universal wastes would be disposed of at a licensed facility.

After demolition, a survey would be performed in accordance with DOE Order 5400.5 to identify any contamination exceeding Argonne release criteria and to determine if additional actions or remediation are necessary. In the absence of such contamination, the site would be backfilled and finish grading. Native plantings of grasses will be used to finish the area.

The proposed action is expected to take 11.5 months to complete and require a workforce of approximately 33 employees or contractors.

ALTERNATIVES: Under the no action alternative, Building 310 would not be decontaminated or demolished. Surveillance and monitoring activities would continue to (1) ensure adequate containment of radioactive contamination, (2) provide physical safety and security controls, and (3) preserve the facilities to allow for personnel access. Continued maintenance, surveillance, and monitoring would cost approximately \$467,800 annually (\$5.5 million over the next 10 years).

DOE considered alternatives to the decontamination and demolition of Building 310. Demolition without decontamination was considered feasible (i.e., it would meet DOE's need for agency action) but was not selected as DOE's preferred alternative. Building contamination is expected to be limited, and extensive decontamination is not anticipated. The proposed action is likely to present fewer environmental impacts due to the lower volume of LLW generated.

DOE also considered decontaminating and releasing Building 310 for reuse in another capacity. However, the cost of maintenance would increase over time and the building would ultimately need to be demolished. Since no future use has been identified for the building, this alternative does not meet DOE's purpose and need for agency action and was not analyzed in the EA.

ENVIRONMENTAL IMPACTS: Impacts of activities associated with the proposed demolition of Building 310 were analyzed in the EA. This FONSI for the proposed action is based on the following factors, which are supported by information and analysis in the EA.

Cultural Resource Impacts: Building 310 was evaluated in 1999 to determine its historical significance. At that time, it was not deemed eligible for listing on the National Registry of Historic Places. In anticipation of demolition, an additional historical review was performed in 2009, focusing on activities that occurred in the building after 1989. No activities occurred in the building between 1989 and 2009 that were of historical significance. In April 2009, the Illinois Historic Preservation Agency concurred with DOE's finding of no adverse effect.

Sensitive Resource Impacts: Structural demolition activities would be conducted outdoors, and all of the nearby wildlife habitats are potentially susceptible to air (dust and radiological), noise, and human disturbance. However, no federal- or state-listed threatened or endangered species are known to reside in these habitats. All proposed demolition activities would be conducted using standard construction best management practices (BMPs) that control the airborne spread of dust and residual radioactive contamination. Implementation of BMPs would also minimize runoff from the project site and wetland sedimentation. Environmental impact on woods, wetlands, and floodplain would be minimal.

Solid Waste Impacts: Radiological waste generated as a result of the proposed action would be transported off-site by the demolition and waste management contractor for disposal at the DOE disposal facility at NTS, the EnergySolutions commercial facility in

Utah, or other commercial disposal sites in accordance with their waste acceptance criteria. Neither NTS nor EnergySolutions are nearing their capacities for LLW disposal.

Wastewater Impacts: Approximately 33 current Argonne personnel and/or outside contractors would conduct and oversee the proposed decontamination and demolition activities for a period of about 11.5 months. The increase in sanitary wastewater handling requirements would be negligible and within the handling capacity of Argonne's existing sanitary wastewater treatment system.

The LWTP is expected to have adequate wastewater treatment capacity to accommodate liquid wastes generated as a result of the proposed action. All wastewater would be collected within the project site and be sampled to determine if it meets LWTP release requirements. If radiologically contaminated wastewater meets Argonne release criteria, it could be released to the LWTP in accordance with Argonne Waste Management Procedures. If the wastewater requires additional treatment beyond LWTP capability, a commercial waste treatment contractor would be used to store, treat, and transport the contaminated wastewater for disposal.

A stormwater pollution prevention plan would be developed to contain runoff from the project site, as required by Argonne's National Pollutant Discharge Elimination System (NPDES) Permit. Implementation of this plan would prevent runoff from leaving the project site, thereby mitigating any potential impacts.

Air Quality Impacts: Fugitive dust particulate emissions from the proposed action (which could include lead and small amounts of radioactive material) would be subject to the terms of the Argonne Title V air permit. However, by employing dust suppression techniques, dust emissions from the proposed action are unlikely to violate permit conditions. Work areas would be monitored for airborne dust, and respiratory protection may be used, if necessary. Protective clothing and personnel monitoring devices may also be used. Portable high efficiency particulate air (HEPA) filters would be used during internal demolition activities. If necessary, a small, temporary shelter or tent with portable HEPA filtration could be used to contain potential emissions from size reduction of certain materials.

A construction permit would be required under the terms of the Argonne Title V air permit due to the potential release of radionuclides. Air modeling was used to estimate human health impacts and would be used to prepare the permit application for open-air demolition (see **Human Health Impacts** below for air modeling results). Air monitoring may be performed during the project to verify emissions levels and demonstrate compliance with permitted limits (10 millirems per year to any member of the public).

Demolition activities would also generate criteria and toxic air pollutants from heavy equipment engine exhaust, soil disturbances, and unpaved road traffic. Considering the small numbers of heavy equipment and crew, and the fact that emissions would take place over an 11.5-month period, the potential impacts of engine exhaust emissions from heavy equipment on ambient air quality are anticipated to be minimal. Preliminary

screening calculations indicate that, even under the most unfavorable meteorological conditions, the particulate matter concentration at the nearest site boundaries would be low. Currently, the highest background particulate concentrations observed at nearby monitoring stations are well below the ambient air quality standard. Accordingly, fugitive dust emissions from the proposed action would not likely result in exceedance of the ambient air quality standard at site boundaries.

Levels of diesel particulate matter (DPM) from engine exhaust, which is toxic and accounts for most of the inhalation risk in urban air, are expected to be low at site boundaries. DPM is a known occupational hazard, but its effects would generally be limited to heavy equipment operators and nearby workers.

Regulators generally rely on work practice standards rather than emission standards to control emissions. Dust suppression techniques, which reflect the current state of knowledge and may be specified by permit, would be employed during demolition. In addition, most emissions from demolition activities would be temporary and intermittent in nature, and unlikely to result in the exceedance of the ambient air quality standard at site boundaries.

Noise Impacts: Noise receptors are limited to persons who work in or near Building 310, and noise levels would be monitored weekly. Workers in areas where noise levels exceed permissible noise exposures would be required to wear hearing protection. Persons beyond the Argonne site boundary and buffer zone (Waterfall Glen Forest Preserve) would not notice noise impacts due to distance from the source.

The heavy equipment used during demolition activities (e.g., jackhammers and bulldozers) could generate maximum combined noise level of around 95 dBA at a distance of 15 m (50 ft) from noise sources. The noise levels at 1,770 meters (1.1 mile) west-southwest of Building 310 (the approximate distance to the nearest residence) would be less than 50 dBA. In addition, the Advance Photon Source (APS) structures and densely wooded forest in the direction of the nearest residence would significantly attenuate noise levels. Due to the proximity to Lemont Road and Interstates 55 and 355, the background noise level at the nearest residence is relatively high and noise levels from the proposed activity would be barely discernable or completely inaudible.

Demolition activities result in various degrees of ground vibration, depending on the equipment, methods employed, and soil compactness. However, vibrations diminish in strength with distance. Major demolition equipment could cause vibrations that are capable of affecting ongoing experimental activities at nearby facilities, requiring that activities be coordinated or that vibrations be dampened to acceptable levels. The vibration velocity level at a receptor beyond 70 meters (230 feet) from any demolition activities (except high-explosive detonation or impact pile-driving) would diminish below the 65-velocity decibel threshold of human perception and interference with vibration-sensitive activities. No high-explosive detonation or major heavy equipment capable of causing great ground vibration would be used for the proposed action and APS structures are located beyond about 300 meters (984 feet) from Building 310. Therefore,

there would be no adverse vibration impacts from the proposed activity on the main APS structure. Vibration monitoring performed during the Building 301 demolition project confirmed no effects on the APS, the APS utility building, or other nearby buildings.

Socioeconomic and Environmental Justice Impacts: The total cost of the proposed action would be approximately \$11.6 million (and does not include the removal of all known contaminated soil in the vicinity of Building 310). The expenditure would take place over approximately 28 months (including project planning, characterization, decontamination and demolition, backfill and grading, site restoration, and final project reporting) and represents a small fraction of Argonne's annual operational budget. Thus, the economic impact of the proposed action would be minor in the context of Argonne and extremely small in the context of the regional economy. There would be no socioeconomic impacts such as those related to relocation of residents or impacts on lifestyle and living conditions.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, requires federal agencies to analyze disproportionately high and adverse environmental effects of proposed actions on minority and low-income populations. Off-site impacts of the proposed action would be minimal, so impacts to minority and low-income populations would also be minimal.

Human Health Impacts: The proposed action would result in the exposure of workers to ionizing radiation and exposure of noninvolved workers and the public to very small quantities of radioactive materials, which could result in an increased risk of a latent cancer fatality. The discussion below describes the potential for these human health impacts.

Radiological Impacts to Project Workers. Workers decontaminating and demolishing Building 310 would be exposed to low-level, residual radioactive contamination. Occupational exposures from direct radiation for most project personnel are not expected to exceed 25 millirems for the entire project. Doses to demolition/excavation/restoration personnel would have the potential to exceed the public dose limit of 100 millirems per year. The upper bound collective dose for all project personnel would be approximately 1.57 person-rem. Based on an occupational risk factor of 6.0×10^{-4} fatal cancers per person-rem, workers engaged in the proposed action would incur a 9.4×10^{-4} collective risk for a fatal cancer, or about 1 chance in 1,062. Occupational exposure to radiation would be controlled under established Argonne procedures that require doses to be kept As Low As Reasonably Achievable (ALARA) and administratively limit any individual's dose to less than 1 rem per year.

Radiological Impacts to Noninvolved Workers and the Public. The only potential radiological impact on noninvolved workers at the Argonne site or to members of the public would be from radiological air emissions. Assuming no dust suppression and complete airborne suspension of all soil contamination (for bounding purposes), the estimated radiation dose from the proposed action for a nearby, maximally exposed resident is 7.13×10^{-2} millirem per year, which is much less than the 10 millirem/year

regulatory limit specified in the National Emission Standard for Hazardous Air Pollutants (Subpart H to 40 CFR 61). This estimated radiation dose is equivalent to a latent cancer fatality risk of less than 4.3×10^{-8} , or about 1 chance in 23 million. Although doses to nearby noninvolved workers would likely be higher due to their closer proximity to the project site, the anticipated doses are significantly less than 1 millirem. As with worker exposures, public and noninvolved worker exposures to radiation would be controlled under established Argonne procedures that require doses to be kept ALARA.

Nonradiological Impacts to Project Workers. Removal of ACM would be performed by certified asbestos abatement workers wearing full personal protective equipment. Potential emissions would be appropriately contained. No health effects on project workers, non-involved Argonne employees, or the general public would be anticipated.

Transportation Impacts: All waste transportation for the proposed action would be conducted by truck, at random intervals over the duration of the project. Estimates for all waste streams include a 50-percent increase in the number of required shipments, to conservatively bound the anticipated volume of waste and associated transportation impacts.

Approximately 1,760 truckloads of LLW and contaminated soil would leave Argonne for transport to NTS or EnergySolutions. In addition, five shipments of MLLW, 11 shipments of ACM, one shipment of hazardous/chemical/TSCA waste, and one shipment of universal waste could be required. Because preferred disposal locations for these shipments are subject to change, NTS was assumed to bound the transportation impacts for LLW, contaminated soil, and MLLW. Finally, approximately 1,017 shipments of clean (unregulated) debris could be required.

The 1,765 projected radiological shipments for the proposed action would represent a 1,700-percent increase in radiological shipments from Argonne over the span of one year. The total of 1,778 regulated waste shipments for the proposed action compares to the FY2009 total of approximately 163 shipments of similar waste from Argonne, representing a 990-percent increase in the number of annual shipments. On-site roads and gates would be adequate to accommodate this volume (as well as clean debris shipments), as would the nearby interstate highways. The additional truck traffic associated with the off-site transportation of waste for disposal would be temporary and would contribute to a very small increase in the volume of truck traffic on the interstate highways in the vicinity of the site and nationwide.

An upper bound total of 10,154,978 truck-kilometers (6,311,360 truck-miles) would be traveled by all projected waste shipments, including the 1,765 round-trip shipments to NTS in Nevada (the most distant of the anticipated disposal site options for LLW, contaminated soil, and MLLW). Actual distance traveled is expected to be less. The upper bound truck mileage for the proposed action would represent 0.004 percent of the mileage traveled annually by similar trucks in the United States. Based on state-specific accident and fatality rates, the upper bound number of traffic accidents for all projected waste shipments is estimated to be 3.07 (approximately three occurrences) and no traffic-

related fatalities are expected (upper bound probability less than 0.115, or 1 chance in 8). No pollution-related latent fatalities to the surrounding population from truck emissions are expected (estimated probability of 0.008, or about 1 chance in 117).

Using conservative assumptions (including the 50-percent increase in the number of anticipated waste shipments), the collective population risk of latent cancer fatality for the general public from incident-free radiological exposure during transit is estimated to be 0.013 (21.4 person-rem), or about 1 chance in 78. The estimated collective latent cancer risk to occupational workers (truck drivers only) is 0.02 (33.6 person-rem), or about 1 chance in 50. The collective population risk of latent cancer fatality from the accidental release of radioactive materials following accidents severe enough to damage a shipping container is estimated to be 1.2×10^{-4} (0.197 person-rem), or about 1 chance in 8,460.

Physical Hazards and Accidents: Auditable Safety Analyses (ASAs) were prepared for previous Argonne decontamination and demolition projects that were similar in size and scope to the proposed action, and both ASAs indicated the potential for only localized consequences.

Occupational accidents could occur during all operations of the proposed action, including demolition, maintenance, characterization, disassembly, and packaging, and transportation. Potential causes of accidents could include vehicular crashes, forceful contact with objects and equipment, and falls. Based on a projected total of 28,402 person-hours of effort and a national average occurrence rate of 1.04×10^{-7} fatalities per hour for construction laborers, no fatal accidents are expected to occur during the proposed action (risk of 0.003, or about 1 chance in 338). Based on a national average nonfatal occupational injury and illness incidence rate of 2.6×10^{-5} cases per hour for the construction industry, less than one nonfatal occupational injury/illness is anticipated (risk of 0.74). Accident rates for the proposed action would be expected to be lower because of the safety programs that would be implemented for decontamination and decommissioning workers at Argonne.

Accidents could also occur due to natural phenomena (e.g., earthquakes, tornadoes, floods, etc.), equipment failure, or human error. These types of accidents are generally categorized according to expected frequency of occurrence and severity, from high probability/low consequence to low probability/high consequence. The maximum, reasonably foreseeable accident is the dispersal of contaminated dust and debris initiated by a tornado, although other events capable of causing similar dispersion are possible. The likelihood of a tornado hitting anywhere in DuPage County is 35 percent in a given year, and the odds of a tornado hitting any particular square mile in the County in a given year are 1 in 960.

Analyses performed for previous Argonne decontamination and decommissioning projects of similar size and scope have indicated that the consequences of accidents would be localized and within the limits established by DOE for emergency actions, regardless of the frequency. Consequently, the risks were determined to be negligible.

These conclusions continue to hold for the proposed action because the amount of residual radioactive material in the building is limited and fixed. If an accident occurs involving a container of LLW or contaminated soil, some of the material could be suspended or aerosolized and dispersed into the environment. However, the impacts from exposure to dispersed radioactive or hazardous material in an accident scenario would be comparable to the impacts from a transportation accident involving the breach of a waste container. The potential impacts from a hypothetical ten-fold increase in exposure from a time-intensive cleanup effort would still be very low, with the collective risk of latent cancer fatality increasing from 1.2×10^{-4} to 1.2×10^{-3} (about 1 chance in 833). The more significant potential impacts would be largely physical, such as the risk of injury from wind-blown debris. The potential for dispersal of contaminated dust would be mitigated by minimizing the duration that demolition rubble and waste containers are present at the project site.

Because of their nature, a probability of occurrence for intentional destructive or terrorist acts cannot be estimated. Although Argonne is a secure, access-controlled site with security gates and 24-hour security, DOE considered the potential for a terrorist attack or sabotage during the decontamination and demolition of Building 301 and the subsequent transportation of waste. The impacts of such an unlikely event would be similar to those associated with natural hazards such as tornadoes or the impacts of an accident involving a truck carrying waste from the site. The Building 310 project would also be conducted in such a manner that would not create a “highly visible” target for malicious acts or acts of terrorism.

Other Potential Direct, Indirect, Cumulative, or Long-Term Impacts: Based on the impact analysis of past decontamination, decommissioning, and demolition projects conducted at Argonne, the incremental impact of the proposed action would be minimal and not significant when added to the impacts from other projects at Argonne (including ongoing operations and other demolition projects).

Compliance with Regulations: The proposed action would comply with applicable federal, state, and local laws and regulations, as well as current permits.

Pollution Prevention: The proposed action would be performed in accordance with Argonne’s waste minimization and pollution prevention (P2) practices.

DETERMINATION: Based on the analysis in the EA, DOE has determined that the proposed decontamination and demolition of Building 310 at Argonne does not constitute a major federal action that would significantly affect the quality of the human environment within the meaning of NEPA, and DOE will not prepare an environmental impact statement. The proposed action alternative would result in only minor environmental, health, and safety impacts and is the most efficient and cost-effective alternative.


PUBLIC AVAILABILITY: Copies of the EA (DOE/EA-1670) are available from:

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