DOE/EA-1670

ENVIRONMENTAL ASSESSMENT

for the

PROPOSED DECONTAMINATION AND DEMOLITION OF BUILDING 310
AT ARGONNE NATIONAL LABORATORY

U.S. Department of Energy
Argonne Site Office
Argonne, Illinois

April 2010

Page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
AEC	U.S. Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
APS	Advanced Photon Source
Argonne	Argonne National Laboratory
ASA	Auditable Safety Analysis
BLS	Bureau of Labor Statistics
BMP	best management practice
CFR	Code of Federal Regulations
dBA	A-weighted decibel(s)
DOE	U.S. Department of Energy
DPM	diesel particulate matter
EA	environmental assessment
EBR	Experimental Breeder Reactor
EBWR	Experimental Boiling Water Reactor
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
FTE	full-time equivalent
FY	fiscal year
FWS	U.S. Fish and Wildlife Service
g	gram(s)
gal	gallon(s)
HEPA	high efficiency particulate air (filter)
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IHPA	Illinois Historic Preservation Agency
km	kilometer(s)
L	liter(s)
LLW	low-level radioactive waste
LWTP	Laboratory Wastewater Treatment Plant
m	meter(s)
mi	mile(s)
mCi	millicurie(s)
MLLW	mixed low-level radioactive waste
mrem	millirem(s)
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	*National Register of Historic Places*
NTS	Nevada Test Site
PCB	polychlorinated biphenyl
PM	particle pollution in the air that includes a mixture of solids and liquid droplets
$PM_{2.5}$	particulate matter less than 2.5 μm in diameter

LIST OF ACRONYMS AND ABBREVIATIONS, cont.

PM_{10}	particulate matter less than or equal to 10 μm in diameter
RCRA	Resource Conservation and Recovery Act
SWTP	Sanitary Wastewater Treatment Plant
TSCA	Toxic Substances and Control Act
TSD	treatment, storage, and disposal
VdB	vibration decibel(s)
U.S.C.	United States Code
yd	yard(s)

Chemical Elements

Am	americium
Cs	cesium
Co	cobalt
H	hydrogen
Pu	plutonium
Sr	strontium
U	uranium

1.0 BACKGROUND

The U.S. Department of Energy (DOE) is proposing to demolish Building 310 at Argonne National Laboratory (Argonne) in Argonne, Illinois. Under this proposed action, DOE would decontaminate and demolish the building and repave or re-vegetate the project site. This work would begin in fiscal year 2010 (FY10), with expected completion by August 2011 (FY11). DOE has prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) §§ 4321 *et seq*., and applicable regulations (Title 40, Code of Federal Regulations [CFR] Parts 1500–1508 and 10 CFR Part 1021).

1.1 Facility Description and History

Building 310, formerly known as the Experimental Waste Processing, Storage, and Shipping Building, is a support facility that was constructed in 1950 in the south–central area of the Argonne site (see Figures 1 and 2). The brick-faced building is constructed of concrete and structural steel, with a two-story lab/office addition extending south from the southwest corner. Dimensions of the rectangular main building are 90 ft × 225 ft (27 m × 69 m), with the southwest wing measuring 24 ft × 62 ft (7 m × 19 m).

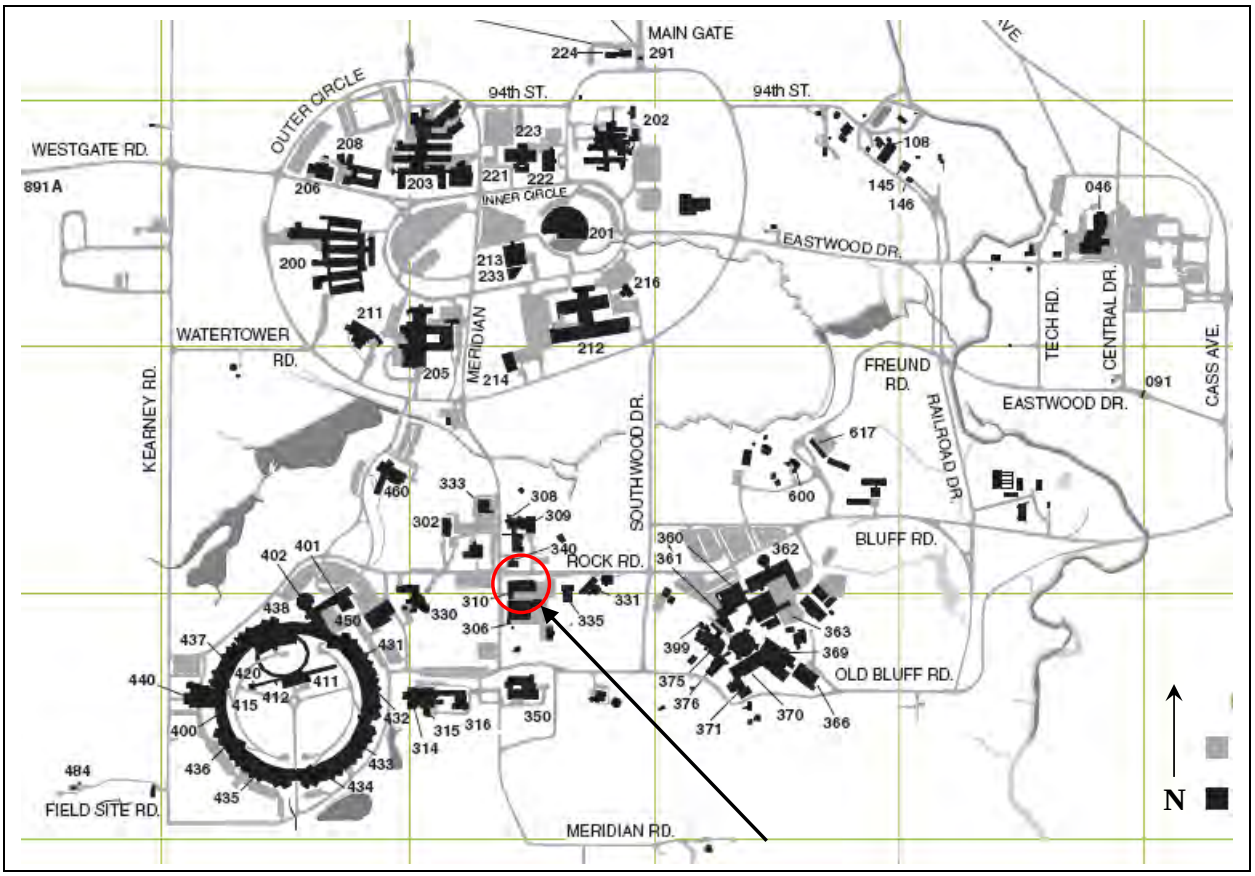


Figure 1. Location of Building 310 at the Argonne Site (2010)

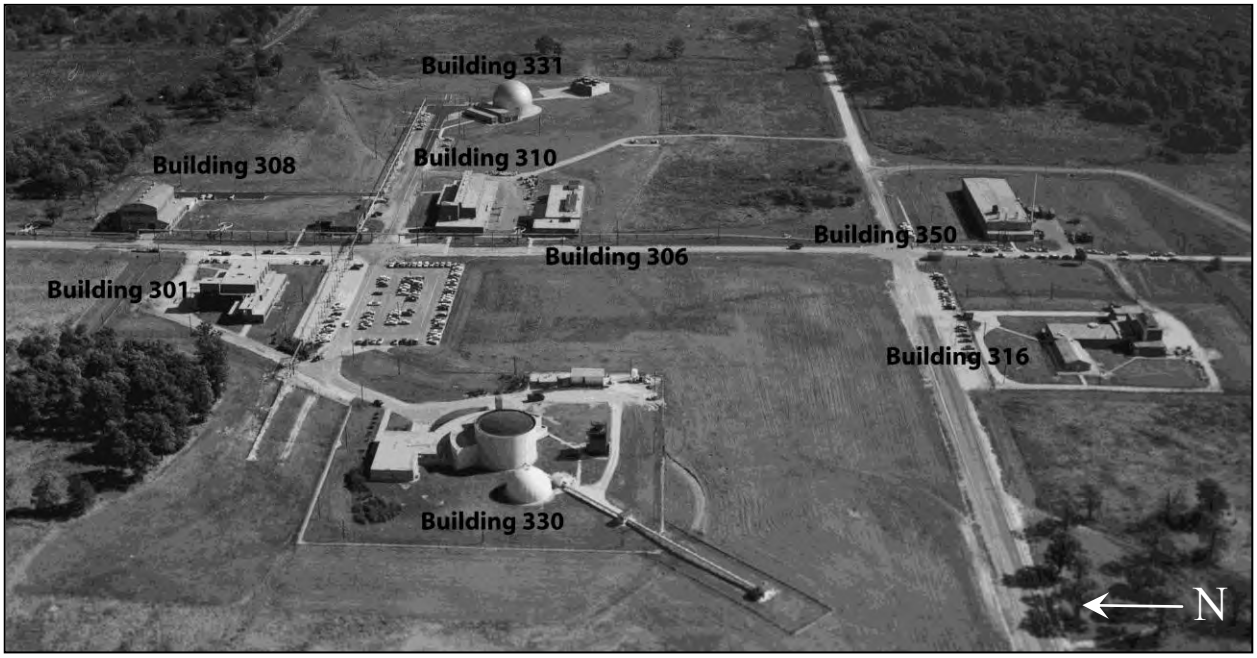


Figure 2. Argonne Site 300 Area (1957)

The building contains two main floors, a partial basement service floor, and a fan loft on the third floor, encompassing a total of 42,546 ft^2 (see Figures 3 through 7). There are two tunnels extending south from the service floor to the adjacent Building 306; one for personnel and the other housing a system of liquid waste transfer pipes.

As a specialty building, Building 310 formerly supported a number of functions, including experimental work (i.e., design, development, and testing) and waste processing. 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 with 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 (O'Rourke and Wescott 1999). The tanks also provided overflow capacity for contaminated liquid wastes that were initially received by Building 306 for processing. A piping system/tunnel continues to connect the two buildings. 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 facility consisting of a pool measuring 28 ft × 17 ft (9 m × 5 m) was added for conducting high-level gamma radiation experiments. Spent fuel rods were used to irradiate food samples for studying the effects of radiation on bacteria.

Building 310 underwent several additions in the 1970s to support Idaho National Laboratory's Experimental Breeder Reactor II (EBR-II) project. Specifically, the facility supported development and testing activities related to the development and construction of prototypes supporting the EBR-II Fuel Cycle Facility.

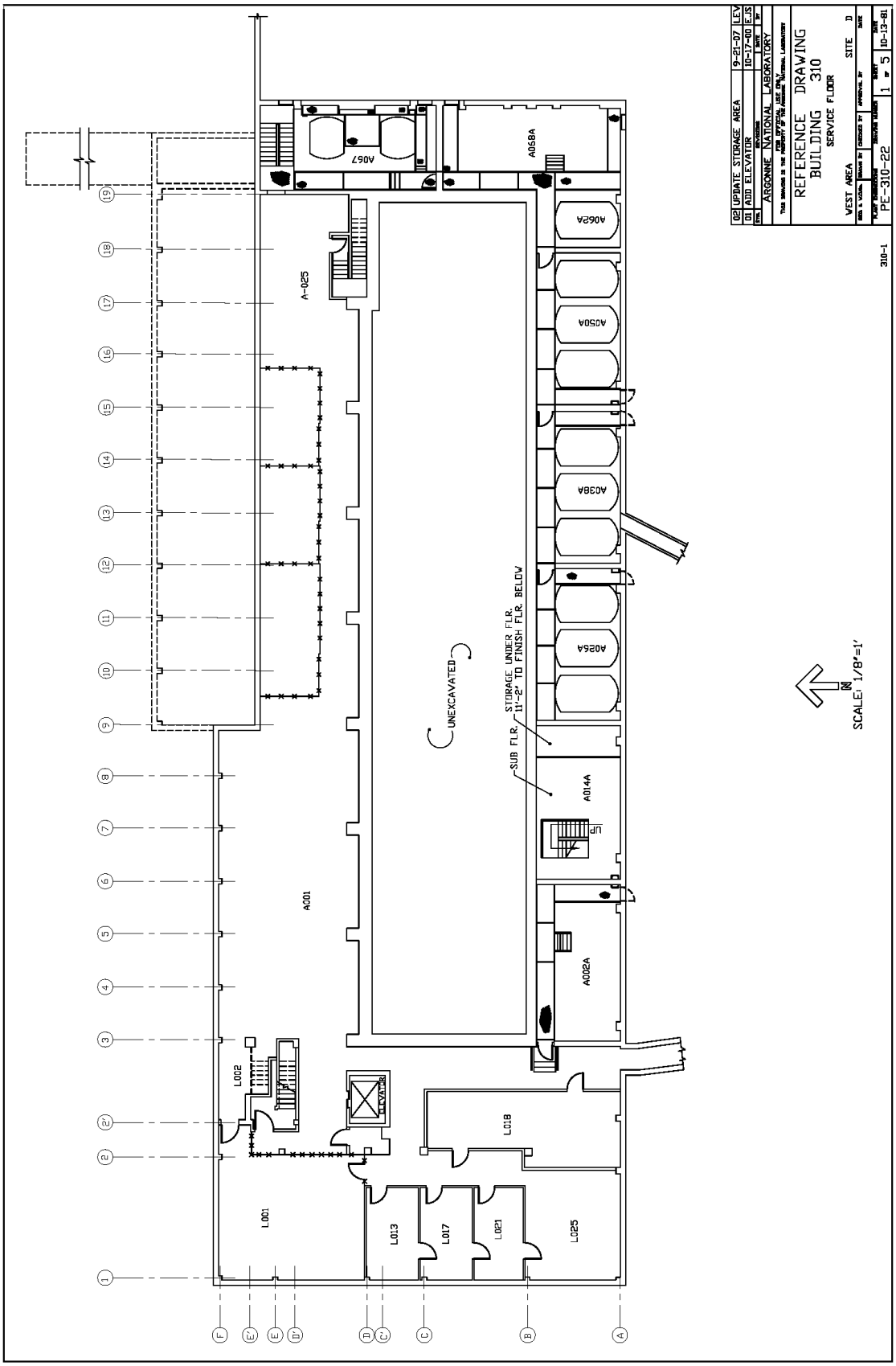


Figure 3. Building 310 Service Floor Plan

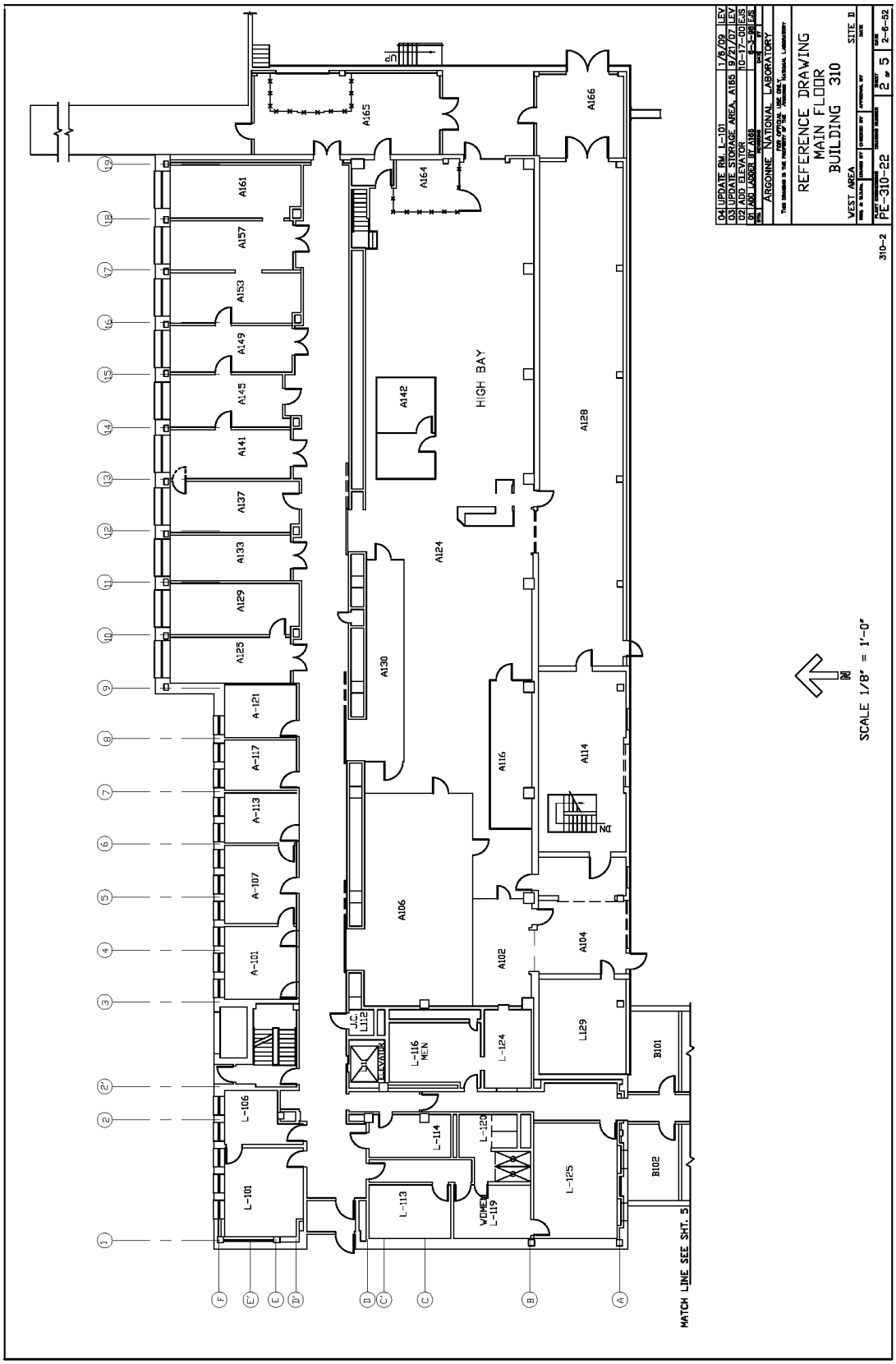


Figure 4. Building 310 Main Floor Plan

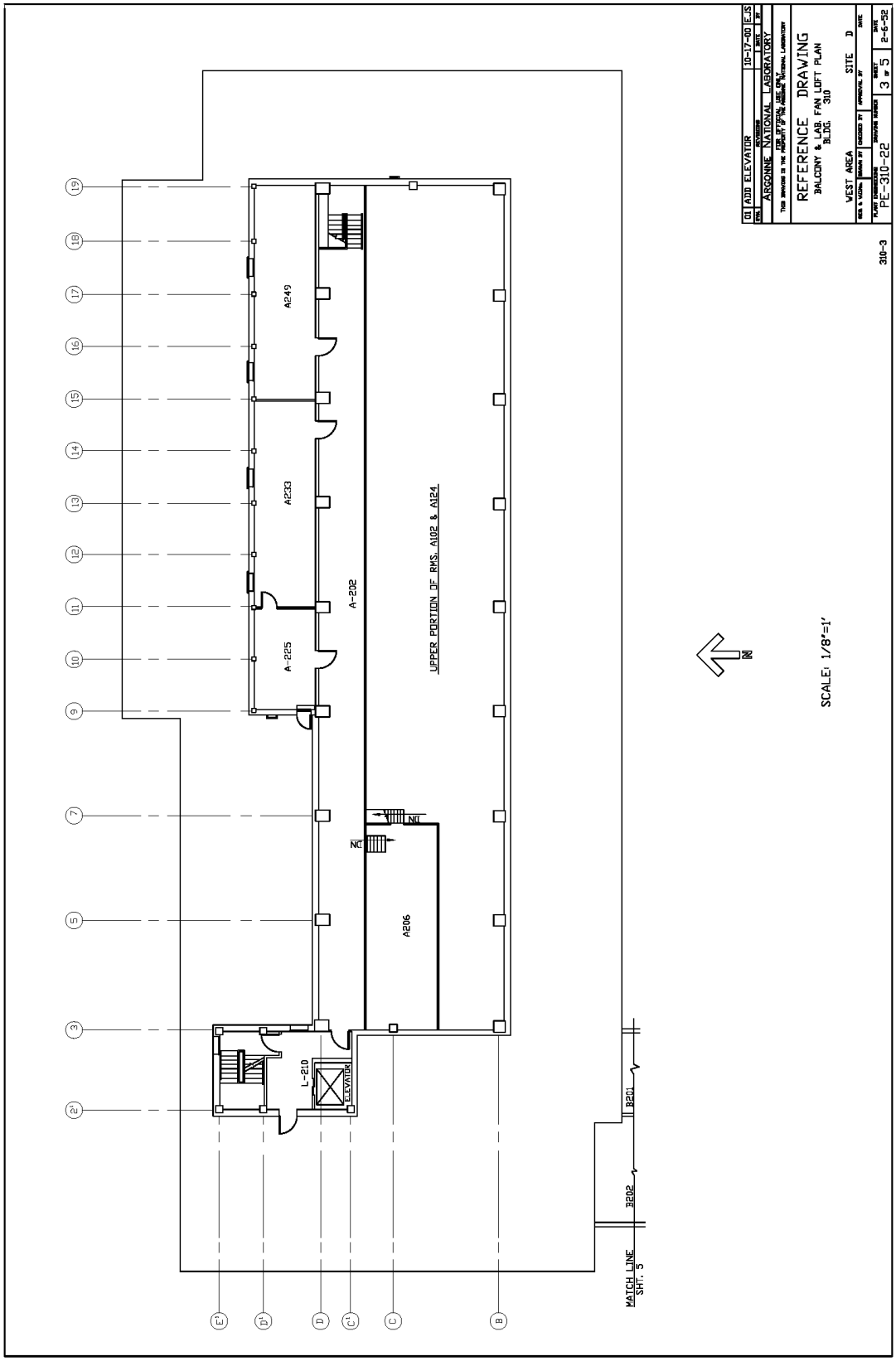


Figure 5. Building 310 Balcony/Lab Plan

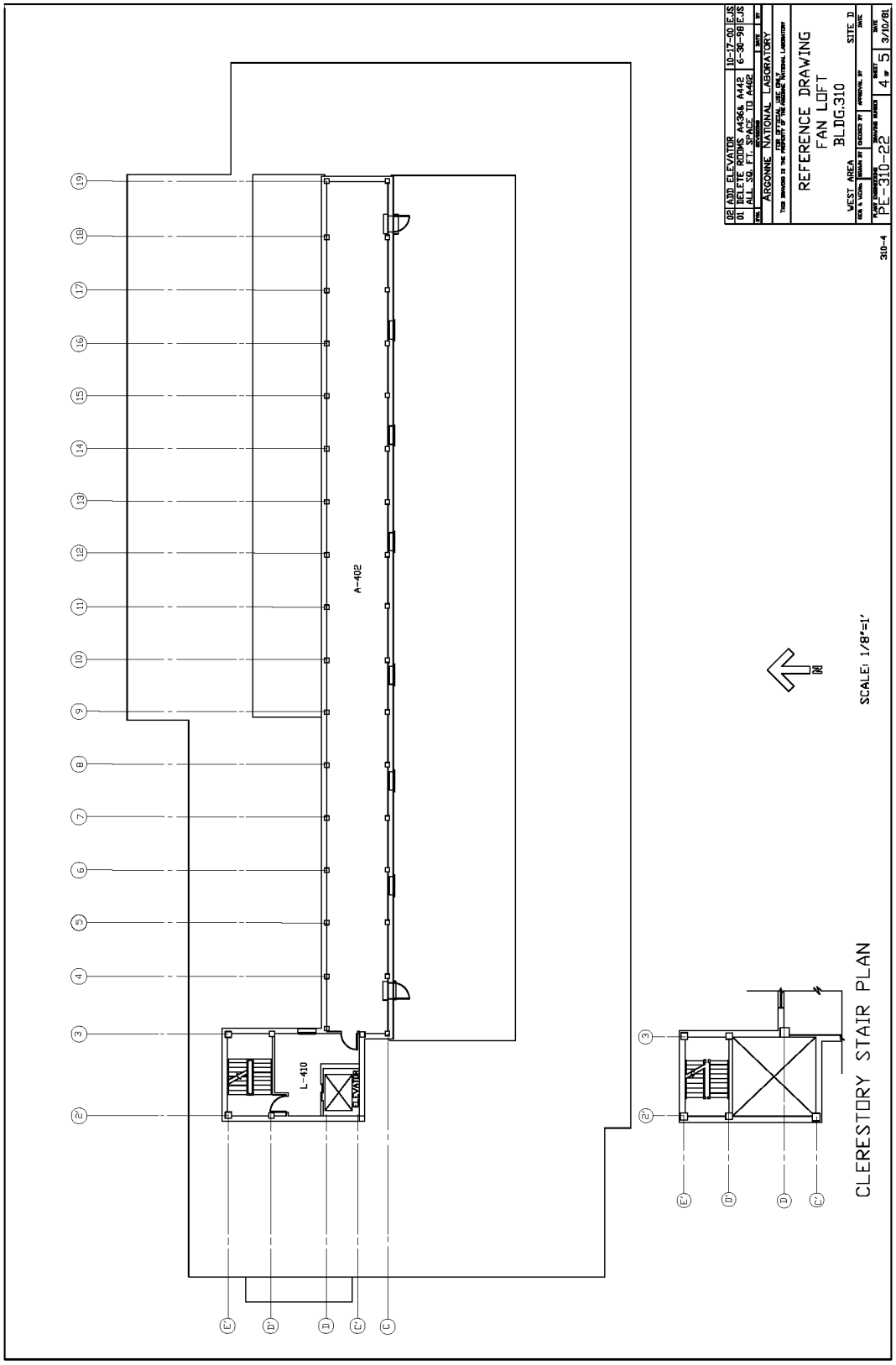


Figure 6. Building 310 Fan Loft Plan

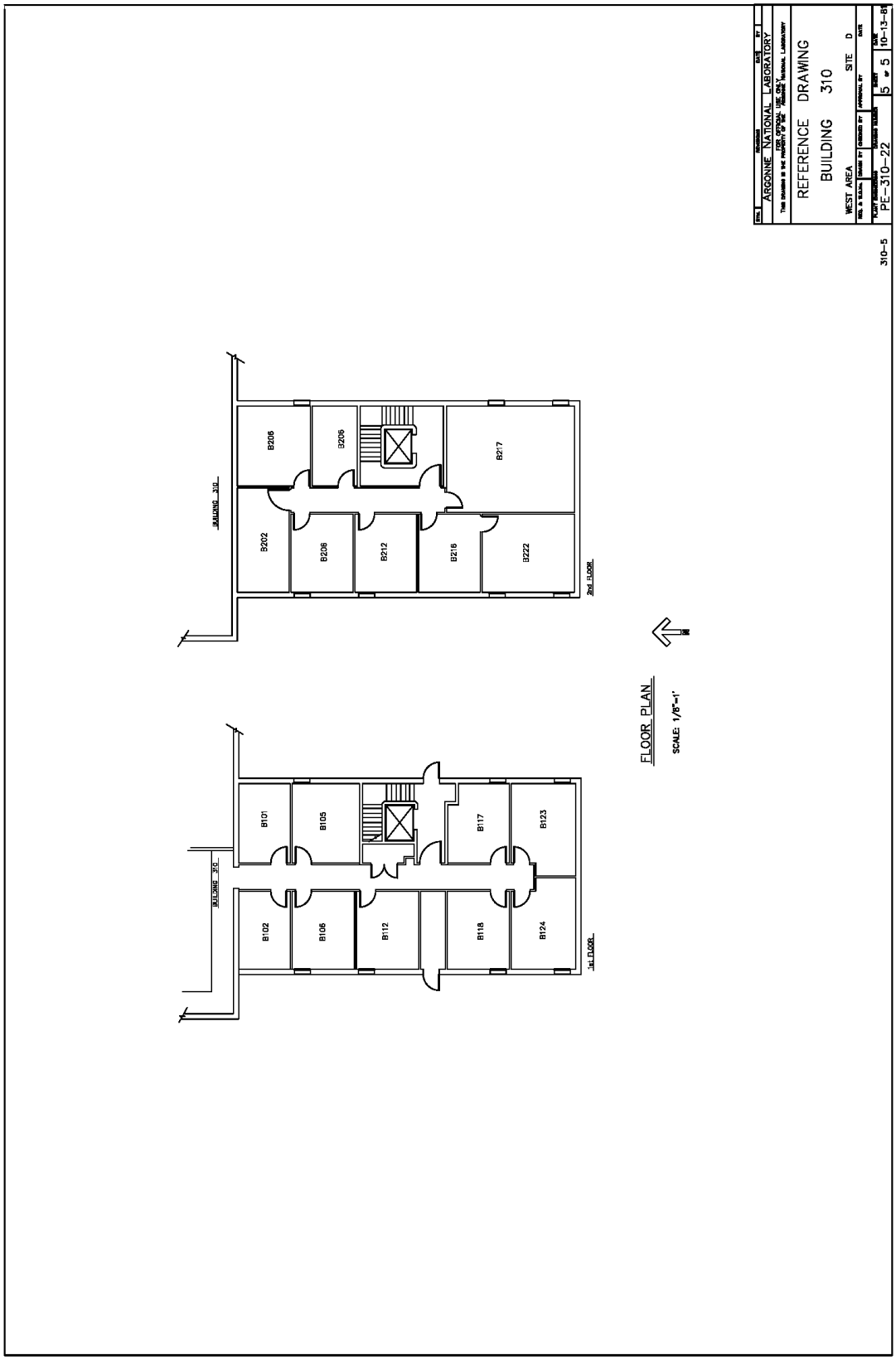


Figure 7. Building 310 Office Wing Plan

Characterization of and closure planning for the long-dormant tank facility was initiated in 1996; the major isotopes of concern were identified as Cesium-137 (Cs-137), Strontium-90 (Sr-90), Americium-241 (Am-241), and Plutonium-239 (Pu-239), with notable quantities of Uranium-238 (U-238), Uranium-234 (U-234), and Uranium-235 (U-235) (Vik 2002). Decontamination and decommissioning activities began in 2000; that project concluded in 2002 with release of the tank facility spaces for unrestricted use (with elevated levels of residual activity in inaccessible areas).

During preparations for the final status survey of the retention tank removal project in 2002, efforts to mitigate rainwater infiltration into the former tank facility led to the identification of several areas of elevated radioactivity in the asphalt lot that separates Buildings 310 and 306. Radiological sampling was performed to support the installation of a sump (and associated excavation), indicating elevated levels of Hydrogen-3 (H-3), Pu-238, Pu-239, Am-241, and Cs-137 in the asphalt, gravel, and underlying soil. However, these sampling activities were not sufficient to fully characterize the nature and extent of the contaminated area (Moos 2002). The extent and severity of groundwater contamination were also not assessed.

Over the building's lifetime, several methods have been used to fix contamination on floors and walls, including painting and the installation of new floor tile. These areas are typically labeled with appropriate language to signify the existence of subsurface fixed contamination. Characterization in 2009 confirmed elevated levels of U-238, Am-241, Cobalt-60 (Co-60), and Cs-137 inside the building (Navarro 2010).

Prior to being vacated, Building 310 housed office space, a machine shop, a staging area, and storage for maintenance spare parts.

1.2 Current Status

Building 310 is currently unoccupied, unused, and awaiting demolition. Most freestanding equipment has been removed; any remaining equipment will be removed prior to the start of building decontamination. Because many laboratory rooms contained contaminated equipment and materials at various times, there are multiple areas inside and outside the facility where postings and marking indicate fixed contamination:

- Metal plates and floor tiles cover fixed floor contamination in the old machine shop.
- Concrete walls of the spent fuel pool are painted to fix contamination and contain markings to this effect.
- Floor tiles and painted walls are marked as covering fixed contamination.
- Contamination is fixed onto the south outer face of the building structure (below grade), in the asphalt lot, and in the subsoil beneath the lot.

1.3 State Notification

Per DOE regulation (10 CFR 1021.301(d)), the preapproval draft EA was provided to the Illinois Environmental Protection Agency (IEPA) for review on March 18, 2010. The IEPA responded on March 25, 2010, with no objection to the proposed action and no comments that affect the EA (see Appendix A).

2.0 PURPOSE AND NEED

The purpose and need for agency action is to protect human health and the environment from risks associated with an unneeded and deteriorating structure that contains radioactively contaminated areas and material. DOE's Office of Environmental Management needs to demolish Building 310 as part of its mission to dispose of unneeded and radioactively contaminated buildings.

3.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVE

3.1 The Proposed Action

The proposed action is the decontamination and demolition of Building 310. The scope of the proposed action would involve 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; and transportation of waste materials to approved disposal facilities. Argonne intends to award all demolition and waste management functions to a single ~~"t~~urnkey" contractor, which will impact the modes and locations of waste disposal.

All demolition activities would be performed in accordance with an approved work plan, permits, and program that meet the requirements of 10 CFR Part 835, Occupational Radiation Protection, including requirements to implement measures to keep radiological exposure As Low As Reasonably Achievable (ALARA). The 10 CFR 835 dose limit for radiation workers is 5 rem per year, although Argonne imposes an administrative limit of 1 rem per year.

Applicable federal limits for public exposure are set at 10 mrem per year by the U.S. Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants regulations (NESHAPs, 40 CFR Part 61) for the airborne pathway and 100 mrem per year by DOE Order 5400.5 (DOE 1993) for the sum of all exposure pathways. The following steps would be taken to ensure compliance with the limits and ALARA principles in the implementation of the proposed action:

- Air monitoring would be performed at the building location and site boundaries as appropriate to verify that no threat to the public was present and that cumulative emissions of radionuclides during the proposed demolition activities would not result in members of the public receiving more than the applicable regulatory limits.

- Airborne contamination controls would be provided to ensure that no worker would receive a radiation dose in excess of the federally allowable limit. These controls may include, but would not be limited to, barriers, filters, containment structures, dust suppression techniques, and differential pressures between adjacent areas/rooms, as appropriate.

- If necessary, personal protective equipment such as respirators and anti-contamination clothing would be worn by workers in contaminated areas to minimize contamination and radiation exposures.

- Area radiation monitors, personal contamination monitors, friskers, and other radiation detection equipment would be used as appropriate to ensure that workers are alerted to any abnormal radiological conditions in a timely manner.

- ALARA reviews and other activities would be performed as appropriate during work planning and implementation.

- A post-decontamination, free-release survey and a post-demolition Final Status Survey would be conducted, along with the collection of confirmation samples for radiological and hazardous waste characterization and other analyses (as required).

Interior Demolition

Interior demolition tasks would include activities such as equipment and systems disassembly, size reduction by mechanical means, and all packaging and disposal of resultant waste. Depending on the amount, type, and level of non-radiological contamination, interior demolition could also include removing building components, tanks, piping, ventilation, fixtures, equipment, and debris to reduce hazards and simplify disposal. This work would be performed indoors in Building 310.

Polychlorinated biphenyls (PCBs) are present in Building 310, primarily in the ballasts of aging fluorescent light fixtures. PCB-containing light fixtures would be removed and disposed of by trained workers using personal protection equipment and proper methods to prevent release to the outside atmosphere.

Asbestos-containing material (ACM) is also present in Building 310, primarily as fire-retardant insulation and floor tile. ACM would be removed and disposed of by certified asbestos abatement workers in accordance with 40 CFR 763 (Subpart G) and 40 CFR 61 (Subpart M).

Special chemicals may be used to remove hazardous materials such as ACM. Adhesives may be used to fix radionuclides or hazardous materials. However, no additional hazardous materials would be introduced into the project area. Cleaning supplies and other non-hazardous materials would be stored in cabinets designed for that purpose. Inventories would be kept to the minimum expected to be used and would be inventoried periodically. Disposal of any hazardous or mixed wastes generated by these activities would be the responsibility of the removal contractor. Disposal would be conducted in accordance with 40 CFR 261-264 for hazardous waste and DOE Order 435.1 for radioactive mixed waste.

Structural Demolition and Soil Removal

Demolition of the building structure would include disconnecting all building utilities, removal and disposal of equipment and materials, demolishing the building and foundations, removing and disposing of resultant waste, and restoring the area. During demolition, dust dispersion would be controlled to reduce releases into the atmosphere and exposure to both involved and non-involved workers at and around the work site.

Small amounts of liquid waste may result from the demolition, as supply and discharge water systems may contain residual volumes of liquid. After testing for contamination, wastewater that meets Argonne release criteria would be treated in the Laboratory Wastewater Treatment Plant (LWTP) and compliantly discharged or, if levels of allowable contamination are exceeded, it would be collected, treated, and properly disposed of in accordance with the contractor's approved waste management plan. Any contaminated liquids encountered while draining pipes or tanks would be processed in accordance with the contractor's approved waste management plan.

Demolition would be conducted in open air. During rubble reduction, water would be misted over all surfaces for dust control, generating a secondary waste stream of potentially contaminated water. Up to an estimated 13,600 L (3,600 gal) of water per day would be used to suppress dust, requiring collection and pumping to the LWTP after filtering for debris, sand, etc. Standard industry practices such as diversion, retention, and testing would be used to minimize the potential for generating waste and spreading contamination, and the water would be tested and disposed of in accordance with the contractor's approved waste management plan. If the wastewater met the Argonne release criteria, it could be released to the LWTP for treatment and disposal. If the wastewater required 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 U-238, Am-241, Sr-90, and Cs-137 (as well as a number of hazardous chemicals), based on soil and groundwater sampling performed during building characterization (Navarro 2010). Radiological soil contamination is likely attributable to leakage from portable tanks that were delivered to the building for processing and stored in this area during the building's role as an experimental waste processing facility (see Figure 8). Soil contamination in the sampled area exceeds Argonne cleanup criteria (Argonne 2008), necessitating the removal of approximately 5,909 m^3 (208,800 ft^3) of soil during the project (see Figure 9). Additional contamination may exist outside of the project boundary, which may require additional environmental evaluation.

A survey would be performed in accordance with DOE Order 5400.5 prior to demolition, and a post-demolition Final Status Survey would be performed to identify any contamination exceeding release criteria and determine if additional actions or remediation are necessary. In the absence of such contamination, the site would be backfilled and graded.

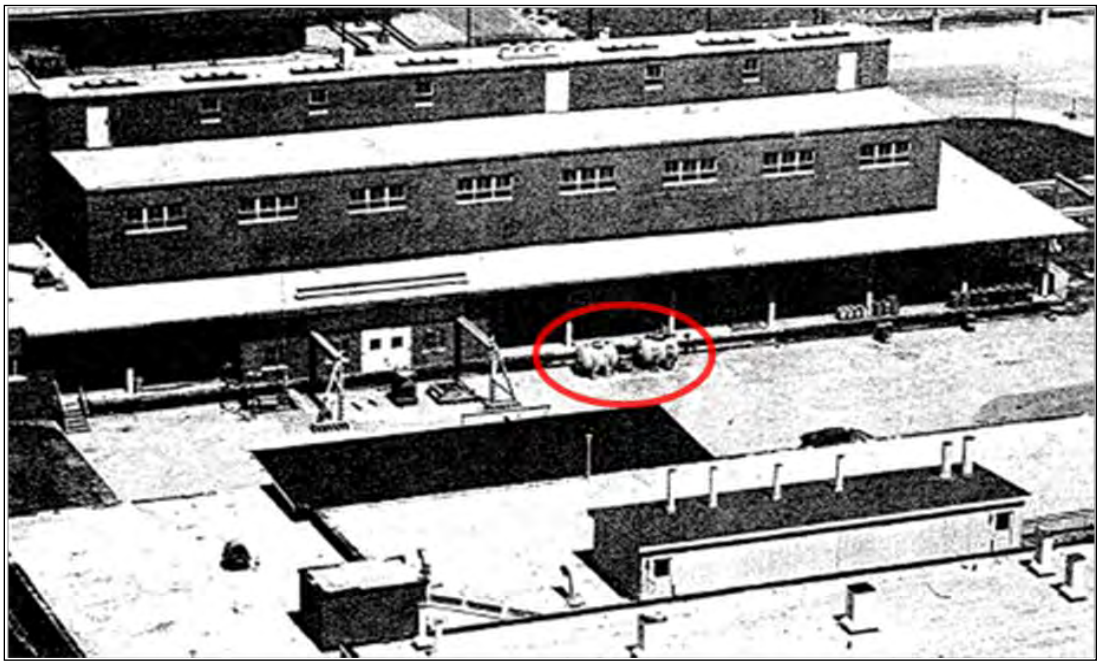


Figure 8. Outdoor Storage of Portable Liquid Waste Tanks at Building 310 (1962)

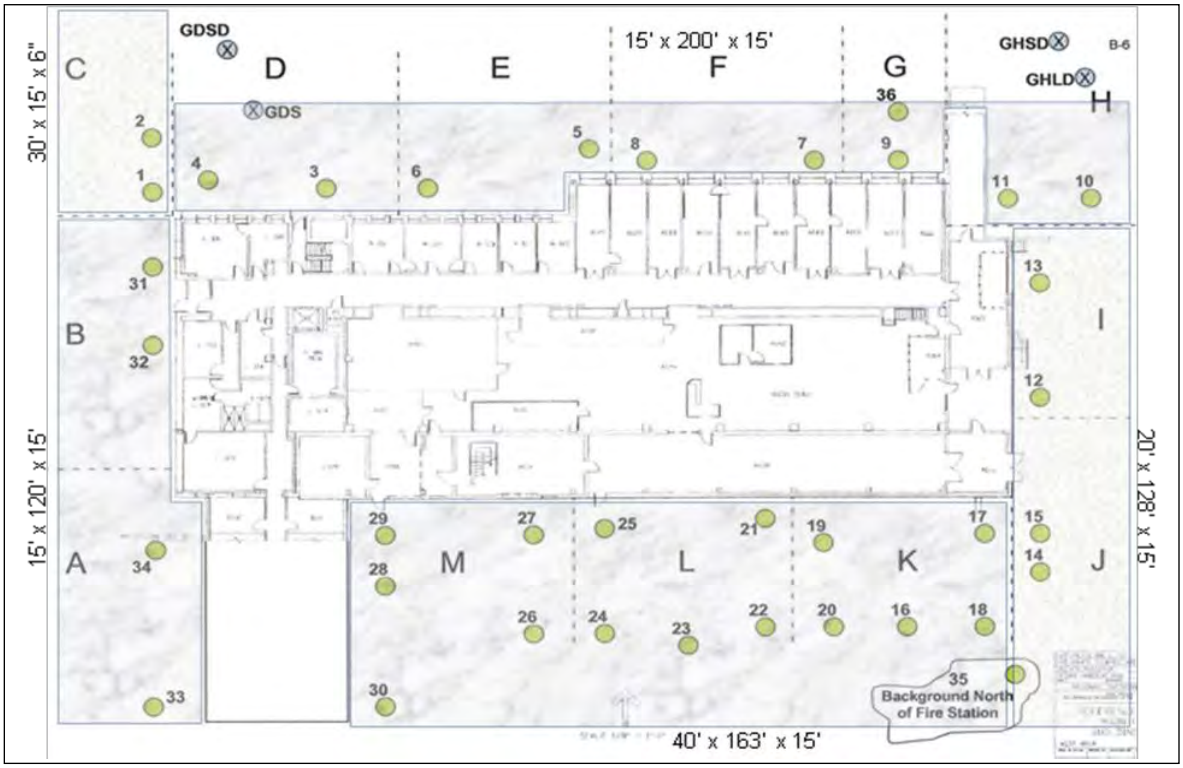


Figure 9. Approximate Boundaries of Soil Excavation (not to scale)

Transportation and Waste Disposal

The waste generated by demolition activities would be transported by truck for off-site disposition.[1] Table 1 lists the types and estimated volumes of waste that would be generated as a result of the proposed demolition activities (Argonne 2009, 2010), as well as the locations where the wastes would likely be shipped for disposal. Although some wastes may be radioactively contaminated, DOE assumed for the purposes of this analysis that the majority of the waste would not be radioactively contaminated and would be disposed accordingly. The number of anticipated shipments for each type of waste has been increased by 50 percent for conservative bounding of waste transportation impacts.

Clean, Solid Debris Waste. The proposed action would generate an estimated 6,986 m^3 (246,840 ft^3) of clean, solid debris waste, consisting mainly of concrete, metal, wood, plastic, soils, paper, and cloth. Debris waste would be loaded into 30-yd roll-off containers and shipped to a local approved landfill within 160 km (100 mi) of the Argonne site.

Low-Level Radioactive Waste (LLW) and Contaminated Soil. The proposed action would generate an estimated 6,053 m^3 (213,875 ft^3) of LLW, consisting mainly of contaminated demolition debris (e.g., drain piping and scabbled concrete), paper, and cloth. The major radionuclides anticipated to be present in Building 310 LLW are Am-241, Cs-137, Co-60, Sr-90, U-235, and U-238. The proposed action would also generate an estimated 5,909 m^3 (208,800 ft^3) of contaminated soil. As noted above, contaminated soil is expected to contain U-238, Am-241, Sr-90, and Cs-137.

LLW and contaminated soil would be loaded into B-25 boxes having a capacity of 2.5 m^3 (90 ft^3). Alternatively, 55-gallon drums could be used. Although disposal sites are subject to change, this waste would likely be shipped to the LLW disposal site at the Nevada Test Site (NTS) near Mercury, Nevada, or to Energy*Solutions* (a commercial disposal facility formerly known as Envirocare) near Clive, Utah, in accordance with DOE policies and procedures (or comparable waste disposal contractor document). Contaminated soil would be used as "filler" in LLW shipping containers to reduce void space. Due to weight restrictions, four B-25 containers would likely constitute a single truck shipment. A total of approximately 1,173 round-trip truck shipments would be required to transport this volume of LLW and contaminated soil to the selected disposal location.

Mixed Low-Level Radioactive Waste (MLLW). MLLW is defined by the EPA as containing both LLW and Resource Conservation and Recovery Act (RCRA)-defined hazardous waste. The proposed action is not expected to generate MLLW, but contaminated lead bricks and other mixed waste constituents may be encountered during the project. Therefore, a volume of 30 m^3 (1,060 ft^3) of MLLW is included in this analysis for bounding purposes. MLLW materials would be surveyed and handled in accordance with the contractor's approved waste management plan

[1] Argonne has no on-site rail access. It is possible that waste could be loaded into containers and transported by truck to a local railway node and transported by rail to appropriate disposal sites. For the purposes of this analysis, however, DOE assumed that all waste would be transported by truck to its final destination. Potential impacts are generally greater for transportation by truck than by rail because more trips are required for truck transportation and impacts are primarily a factor of the number of trips. For this reason, DOE believes that the truck transportation analysis bounds the potential impacts of transporting waste by rail.

Table 1. Waste Types, Estimated Volumes, Shipments, and Disposal Options

Type	Volume (ft^3)	Container	Shipments[a]	Disposal[b]	Distance (mi)[c]
Clean debris	246,840	30-yd^3 roll-offs	1,017[d]	Local licensed landfill	100
LLW	213,875	B-25 boxes	893	Nevada Test Site Energy*Solutions*	1,793
Contaminated soil	208,800	B-25 boxes	867	Nevada Test Site Energy*Solutions*	1,793
MLLW[e]	1,060	B-25 boxes	5	Energy*Solutions* Perma-Fix	1,453[f]
ACM[g]	5,321	30-yd^3 roll-offs	11	Environtech or other licensed facility	100
Hazardous, chemical, TSCA[h]	141	55-gal drums	1	Licensed TSD[i] facility	300
Universal waste	142	55-gal drums	1	Licensed TSD[i] facility	300

[a] Because anticipated waste volumes are estimates of actual volume, the number of anticipated number of shipments for each type of waste (except hazardous, chemical, TSCA, and universal) has been increased by 50% to ensure conservative bounding of transportation impacts.
[b] Disposal options are subject to change, based on the procurement of a demolition and waste disposal contractor. To conservatively bound transportation impacts, the most distant disposal option is generally assumed.
[c] One-way.
[d] Container estimate for clean debris is based on waste density and shipping weight restrictions instead of container volume.
[e] One MLLW (or standard LLW) shipment is weight-limited to four B-25 boxes; this MLLW shipment would contain a partial load of one B-25 box and was conservatively rounded to one shipment.
[f] The mileage to NTS conservatively bounds the mileage to Energy*Solutions* or Perma-Fix (which operates disposal facilities at several U.S. locations) and has been assumed to simplify the transportation analysis.
[g] For purposes of this analysis, DOE assumed that all ACM would be contaminated and disposed of at NTS. If ACM is confirmed to be uncontaminated, it could be disposed of at a licensed commercial disposal site within 160 km (100 mi) of Argonne, reducing transportation impacts.
[h] The projected waste shipment would contain a partial load of 13 drums. This was conservatively rounded to one shipment, although the drums could be transported together with the partial load of MLLW.
[i] TSD = treatment, storage, and disposal.

and disposed of at a licensed facility. MLLW destined for off-site disposal would be loaded into 90-ft^3 B-25 boxes and likely shipped along with LLW/contaminated soil or hazardous/chemical waste. The likely off-site disposal locations for MLLW are Energy*Solutions* or Perma-Fix (which operates disposal facilities at several U.S. locations). To conservatively bound the potential transportation impacts of disposal at any of these sites, the distance to NTS has been assumed in this analysis.

Asbestos-Containing Material (ACM). The proposed action would generate approximately 151 m^3 (5,321 ft^3) of ACM. The ACM would be removed prior to the start of general demolition activities by an Illinois-licensed contractor and disposed of in accordance with DOE policies and procedures (or comparable waste disposal contractor document). ACM sampling in the building has suggested that ACM is not radiologically contaminated, so it could be disposed of at a licensed commercial landfill within 160 km (100 mi) of Argonne using intermodal containers with a capacity of 28 m^3 (37 yd^3). However, some ACM could be radiologically contaminated and would be disposed of in the same manner as LLW.

Hazardous, Chemical, Toxic Substances Control Act (TSCA), and Universal Waste. The proposed action would generate approximately 4 m^3 (141 ft^3) of hazardous, chemical, or TSCA waste in forms such as lead-based paint, lead anchors, and residual chemicals in lab drains. Approximately 4 m^3 (142 ft^3) of universal wastes will also be generated, including mercury switches, fluorescent light bulbs, PCB light ballasts, and batteries. Such wastes would be disposed of at a licensed commercial waste management facility in accordance with the contractor's approved waste management plan, as well as State of Illinois and RCRA disposal requirements. This waste would be loaded into approximately forty-one 55-gallon drums. Although the waste drums could be shipped with MLLW (depending on the choice of disposal facility), it was conservatively assumed that this waste stream would be shipped separately.

3.2 No Action Alternative

Under the no action alternative, Building 310 would not be decontaminated or demolished and would be maintained as at present. 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 to maintain the building in its present state (DOE 2008). At an escalation of 3 percent per year, these recurring maintenance and surveillance costs would total $5.5 million over the next 10 years.

3.3 Other Alternatives Considered

DOE considered an alternative to the proposed action for the decontamination and demolition of Building 310, namely demolition without decontamination. This process would involve fixing loose contamination and then demolishing the entire building using large equipment and a fogger (or comparable dust suppression techniques). Following the demolition, clean and contaminated wastes would be segregated to the extent possible, and a concrete crusher would be used to rubblize concrete and brick. LLW would be shipped to a licensed disposal facility, and the remaining wastes would be shipped to facilities that accept non-radioactive wastes.

Although this alternative was considered to be feasible (i.e., it would meet DOE's purpose and need for agency action), it was not selected as DOE's preferred alternative. The proposed action is preferred, as building contamination is expected to be limited and the need for extensive decontamination is not anticipated. The proposed action is also likely to present fewer environmental impacts because it would result in the generation of a lower volume of LLW. Conservative assumptions have been made concerning anticipated waste volumes (e.g., 50 percent increases in the volumes of LLW, ACM, and hazardous wastes) compared to current planning assumptions to bound the impacts of the proposed action.

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

4.0 AFFECTED ENVIRONMENT

4.1 Project Site Description

Argonne occupies 600 hectares (1,500 acres) in southern DuPage County, Illinois. The Argonne site is completely surrounded by the 830-hectare (2,040-acre) DuPage County Waterfall Glen Forest Preserve, which is used as a public recreational area, nature preserve, and demonstration forest. The Argonne site is approximately 43 km (27 mi) southwest of downtown Chicago and 39 km (24 mi) west of Lake Michigan.

Building 310 is located in the south–central area of the Argonne site (see Figures 1 and 2), near the intersection of Meridian and Rock Roads. The building is located close to the center of the site and over 400 m (1,320 ft) from the closest site boundary. The areas surrounding and near the building are developed, and there are several other buildings located in close proximity.

Land use in the area surrounding Argonne is varied, including residential, commercial, and industrial properties. No residential populations live within 1.6 km (1 mi) of the center of the project site.

4.2 Cultural Resources

Cultural resources include archaeological sites and historic structures and features that are protected under the National Historic Preservation Act (NHPA) of 1966, as amended. Cultural resources also include traditional cultural properties that are important to a community's practices and beliefs and are necessary to maintain the community's cultural identity. Cultural resources that meet the eligibility criteria for listing on the *National Register of Historic Places* (NRHP) are considered –significant" resources and must be taken into consideration during the planning of federal projects. Federal agencies are also required to consider the effects of their actions on sites, areas, and other resources (e.g., plants) that are of religious significance to Native Americans as established under the American Indian Religious Freedom Act. Native American graves and burial grounds are protected by the Native American Graves Protection and Repatriation Act.

Extensive research on cultural resources has been undertaken at Argonne. Research has focused on both archaeological sites and historic buildings. Numerous archaeological and historic building surveys have been performed at Argonne, and a Cultural Resource Management Plan (Argonne 2007) was developed to aid in the management of these resources. The following sections provide an overview of the types of cultural resources found at Argonne.

4.2.1 Archaeological Sites

Argonne is located in DuPage County on bluffs overlooking the Des Plaines River. Prehistoric occupation of DuPage County covers every known archaeological phase for eastern North America (Curtis and Berlin 1980). Evidence from the Paleoindian Period (10,000 to 8000 B.C.) is minimal in the vicinity of Argonne and widely scattered. Sites with Paleoindian components are found primarily in upland areas or on the edges of large river valleys. The Archaic Period (8000 to 1500 B.C.) is noted for an increase in technology and adaptation to a new environment

as the last of the glaciers from the Wisconsin glaciation retreated. The Woodland Period (1000 B.C. to A.D. 1000) is generally marked by the discovery of ceramic technologies, and habitation during the Middle Woodland Period focused on broad river valleys and burial mounds. The Mississippian Period (A.D. 1000 to A.D. 1600) marks the highest level of social complexity in prehistoric America. These highly complex settlements appear along rivers with wide fertile floodplains and show a heavy reliance on agriculture.

As described in the 2008 Argonne *Site Environmental Report* (Golchert et al. 2009), 46 archaeological sites have been recorded at Argonne. These include prehistoric chertscatters, special-purpose camps, base camps, and historical farmsteads. Of the 46 recorded sites, three sites have been determined to be eligible for the *National Register of Historic Places*, 22 have been determined to be ineligible, and 21 have not been evaluated for eligibility. None of the archaeological sites are in or near the area that would be disturbed or otherwise affected by the demolition of Building 310.

4.2.2 Historic Structures

The first recorded Europeans in the region traveled down the Des Plaines River in 1673 (Blanchard 1882). However, significant settlement of the area did not begin until after 1822, when the U.S. Government approved the construction of the nearby Illinois and Michigan Canal (located just south of the Des Plaines River). Settlers in the Argonne area included many Irish who had previously worked on the canal, as well as farmers from New England, New York, Pennsylvania, and Ohio (Pease 1919). In 1834, the community of Cass (consisting of Upper and Lower areas) was founded as a stage coach stop along the Chicago-Joliet Road, on what would become the Argonne site. The area surrounding Cass was quickly subsumed by farms. The canal, and later the railroads, provided the farmers access to markets. This situation persisted into the 1940s.

4.2.2.1 Argonne National Laboratory

Argonne is located southwest of Chicago. The first permanent buildings constructed at Argonne housed the key divisions responsible for conducting nuclear research. The layout simulated a university setting, with a central green space surrounded by the Applied Chemistry, Cyclotron, Chemistry, Reactor Engineering, and Physics Buildings; the Biology Building was somewhat removed from the main core of the campus. Parts of the main campus have been deemed eligible for listing on the *National Register of Historic Places* (Wunderlich 2002). Specialized facilities including test reactors and waste processing facilities (including Building 310) were located south of the main campus in what is known as the 300 Area.

In 1947, Argonne was selected as the primary nuclear reactor center for the U.S. Atomic Energy Commission (AEC), and activities within the main campus focused on reactor development. During the 1950s and 1960s, Argonne developed numerous reactor designs, such as the Experimental Breeder Reactor-I (EBR-I) and the Experimental Boiling Water Reactor (EBWR). EBR-I was the first reactor to generate electricity, and EBWR's design is the basis for many operating commercial power reactors. Argonne was also involved in development of the pressurized water reactor design for the *U.S.S. Nautilus*, the world's first nuclear submarine.

4.2.2.2 Building 310

A historical review of pre-1989 activities in Building 310 concluded that no historically significant events or persons are associated with the building and that no significant developments originated in the building (Wescott and O'Rourke 2001a,b). Additionally, the building was determined to not be a significant property and retained little integrity from its original construction. Therefore, DOE deemed the building not eligible for listing on the NRHP in 2001.

4.3 Biological/Ecological Resources

The areas immediately surrounding Building 310 consist of maintained and predominantly non-native vegetation (see Figure 10). Three viable wildlife habitats exist near the project area, including two woodlands (400 ft NE, 500 ft W–NW) and a floodplain (800 ft N). These habitats are characterized predominantly by native species. The adjacent field to the W and SW is old-field and characterized by non-native grasses. A small wetland exists approximately 300 ft SE of the project area.

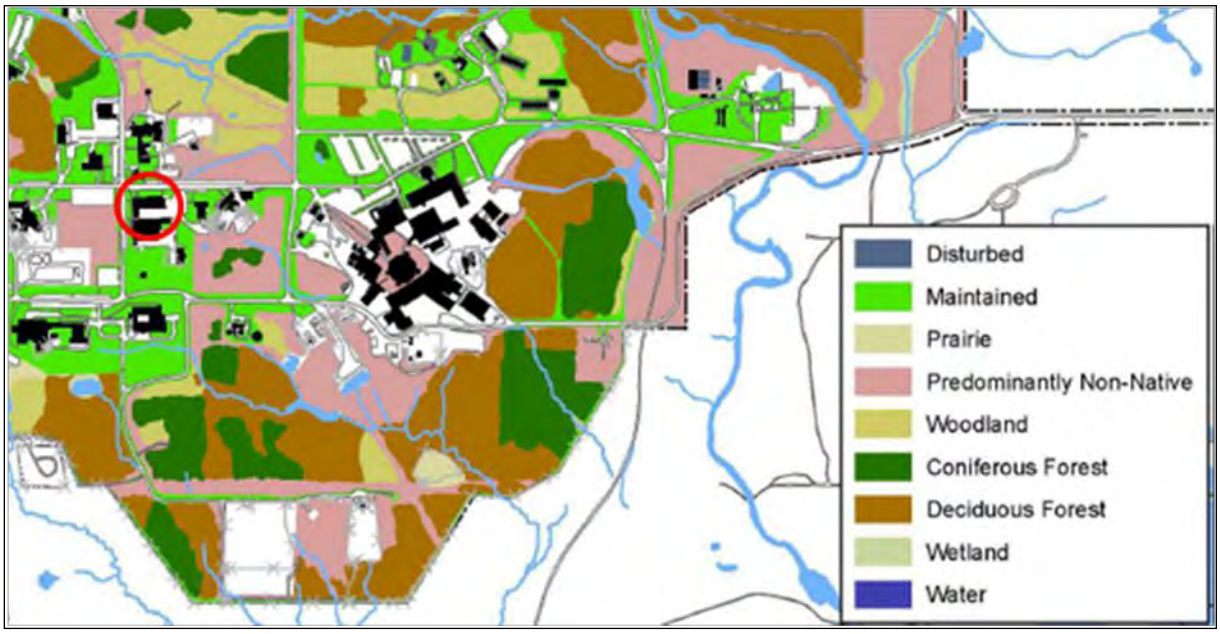


Figure 10. Argonne Vegetation Communities near Building 310 (Golchert et al. 2009)

The U.S. Fish and Wildlife Service (FWS) and the Illinois Department of Natural Resources (IDNR) have recently developed online review process tools to ensure that federal actions do not jeopardize federal- and state-listed threatened or endangered species, in accordance with the Endangered Species Act (see Appendix A). Application of the FWS online consultation process (FWS 2010) indicates that seven species (three endangered, three threatened, and one candidate) may be present in Du Page County, Illinois. One of these species (Hine's Emerald Dragonfly) has been observed in the nearby Waterfall Glen Forest Preserve. Additionally, application of the IDNR Ecological Compliance Assessment Tool (IDNR 2010) indicates that four additional state-protected species may occur in the vicinity of the Argonne site. However, no federally listed threatened or endangered species are known to occur on the Argonne site, and no suitable

habitat for federally listed species occurs at the site or in the area that will be affected by the proposed action (Golchert et al. 2009; Appendix A). A state-listed Kirtland's Snake was observed in the SW corner of the Argonne site circa 1990, but there is no suitable habitat in the area that would be affected by the proposed action.

4.4 Air Quality

Routine continuous monitoring has demonstrated that the amount of radioactive material released to the atmosphere by emissions sources at Argonne is extremely small, resulting in a very small incremental radiation dosage to the neighboring population. The calculated maximum perimeter dose from radionuclide air emissions in 2008 was 0.03 mrem. The largest estimated individual dose from all radionuclide air emissions to an off-site member of the public in 2008 was 0.0034 mrem, which is 0.03 percent of the 10-mrem-per-year limit for radionuclide emissions established by the NESHAPs (40 CFR 61 Subpart H) (Golchert et al. 2009).

Air monitoring was also conducted at Argonne perimeter and off-site sampling stations for total alpha and beta activities. No statistically significant difference was identified between samples collected at the Argonne site perimeter and samples collected off-site in surrounding communities (Golchert et al. 2009). Air monitoring has also been performed during recent open-air building demolition projects to verify the absence of air impacts. Monitoring by the demolition contractor during the demolition of Building 301 (2009) showed no positive results for airborne radioactivity or silica.

National Ambient Air Quality Standards (NAAQS) are set by EPA, and the IEPA is responsible for ensuring compliance through its state implementation plan. Argonne is in a moderate non-attainment area for ozone and fine particulate matter (2.5 microns or less). The NAAQS substance of concern for the proposed demolition of Building 310 is fugitive particulate matter (dust), as the Argonne Title V air permit (condition 5.3.2) requires that dust not be visible by an observer looking generally overhead at the Argonne site boundary (IEPA 2006).

4.5 Waste Disposal, Water Usage, and Wastewater Discharge

Table 2 shows the types and approximate number of waste shipments leaving Argonne in FY09. Disposal of LLW and contaminated soil at NTS or Energy*Solutions* would be conducted in accordance with facility waste acceptance criteria and subject to available disposal capacities. Neither NTS nor Energy*Solutions* are nearing their capacities for LLW disposal.

Table 3 shows water consumption and discharge at the Argonne site from 2007 through 2009. Potable water for use in the Laboratory distribution system is obtained from Lake Michigan; water for industrial uses (including cooling tower makeup water) is obtained from the Chicago Sanitary and Ship Canal. Treated wastewaters are discharged via the LWTP and Sanitary Wastewater Treatment Plant (SWTP).

Table 2. Argonne FY09 Waste Shipments

Type	Shipments[a,b]
Clean trash	287
Unneeded Materials and Chemicals (UMC) clean sweep debris	92
Clean debris – Building 301 demolition	575[a]
LLW	43
LLW – Building 301 demolition	29[b]
Transuranic	20
MLLW	6
Non-radioactive (including hazardous, chemical, ACM, and universal)	48
TSCA materials	1

[a] Although shipments of clean debris from the Building 301 demolition are complete, shipments from the Building 330 demolition will commence in FY10. However, all Building 330 demolition waste is assumed to be LLW (see note b).
[b] Fifteen additional LLW shipments from the Building 301 demolition have occurred in FY10, and approximately 470 LLW shipments from the Building 330 demolition are anticipated in FY10.

Table 3. Water Use and Discharge at the Argonne Site[a,b]

Year	Potable	Industrial	LWTP	SWTP
2009	140.1 (0.38)	171.4 (0.47)	175.9 (0.48, N/A)	99.3 (0.27, N/A)
2008	142.8 (0.39)	167.4 (0.46)	169.5 (0.46, 1.47)	107.3 (0.29, 2.50)
2007	172.8 (0.47)	174.1 (0.48)	182.0 (0.50, 1.03)	109.5 (0.30, 1.41)

[a] Total (million gallons per year), average (million gallons per day), and maximum (million gallons per day).
[b] Maximum flows for effluent discharge (where provided) from Golchert et al. 2008, 2009.

4.6 Transportation Infrastructure and Capacity

Road infrastructure and traffic volume capacity within Argonne are sufficient to accommodate the additional truck traffic required to transport the waste generated from the Building 310 site through Argonne (DOE 2007). No road upgrades, new roads, or new access gates are anticipated. Off-site, trucks would use interstate highways that are immediately adjacent to the site. These interstate highways are currently major truck routes.

4.7 Environmental Justice

Executive Order No. 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, directs federal agencies to identify any disproportionately high and adverse human health or environmental effects of their actions on minority or low-income populations. To identify such impacts, it is first necessary to identify the minority or low-income populations that could be affected by the proposed action or no action alternative. Approximately 8.9 million people live within an 80-km (50-mi) radius of Argonne, and approximately 145,000 people live within 8 km (5 mi) of Argonne (Golchert et al. 2008, 2009). On the basis of 2000 census data, 51 percent of the population within 80 km (50 mi) and 24.5 percent of the population within 8 km (5 mi) of the site consists of minorities, as compared to the state averages

of 32.2 percent for Illinois, 14.2 percent for Indiana, and a national average of 30.9 percent (U.S. Census Bureau 2004a; DOE 2007).

With respect to low-income populations, based on 2000 census tract data, 10.6 percent of the population within 80 km (50 mi) and 3.4 percent of the population within 8 km (5 mi) of the site are comprised of low-income populations, as compared with the state averages of 12.7 percent for Illinois, 9.5 percent for Indiana, and a national average of 12.3 percent (U.S. Census Bureau 2004b; DOE 2007).

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 Environmental Impacts of the Proposed Action

The following sections describe the potential environmental impacts of the proposed action.

5.1.1 Impacts on Cultural Resources

Impacts on cultural resources occur when a historically significant structure or archaeological site is altered in a way that changes its historic character. Significance is based on four criteria (36 CFR 60.4) and the resource's potential to provide information on its period of historical use. Significant resources are eligible for listing on the NRHP.

In anticipation of the demolition of Building 310, a historical review was conducted in 2009 (O'Rourke 2009), focusing on the activities that occurred in the building after 1989 (the 2001 review focused on the Cold War period of 1946 to 1989). Based on this review, no activities occurred in the building between 1989 and 2009 that were of historical significance. A report was sent to the Illinois Historic Preservation Agency (IHPA) in April 2009; IHPA concurrence with DOE's finding of no adverse effect for the project was received on April 22, 2009 (Appendix A).

5.1.2 Impacts on Biological/Ecological Resources

Demolition activities would be conducted outdoors, and all of the nearby wildlife habitats (described in Section 4.3) are potentially susceptible to air (dust and radiological), noise, and human disturbance from the proposed action. However, no state-listed or federally listed threatened or endangered species are known to reside in these habitats (Golchert et al. 2009). 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. No adverse environmental impacts on woods, wetlands, or floodplains are expected as a result of the proposed action.

5.1.3 Impacts on Waste Disposal Capacity

Table 1 contains the types and estimated volumes of waste that would be generated as a result of the proposed demolition activities and the number of shipments required to transport the waste off-site for disposal. These wastes would be shipped off-site by the demolition and waste

management contractor for disposal at the DOE disposal facility at NTS, the Energy*Solutions* commercial facility in Utah, or other commercial disposal sites in accordance with their waste acceptance criteria. Neither NTS nor Energy*Solutions* are nearing their capacities for LLW disposal.

5.1.4 Wastewater Disposal and Stormwater Impacts

Under the proposed action, approximately 33 personnel (including the Argonne Project Management Team and the demolition contractor) would conduct the proposed decontamination, demolition, and waste management activities for a period of about 11.5 months. The resulting increase in sanitary water handling requirements would be negligible and within the excess handling capacity of the existing Argonne 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 (Table 3). All wastewater would be collected within the project site and sampled to determine if it meets LWTP release requirements. If radiologically contaminated wastewater met Argonne release criteria, it could be released into the LWTP in accordance with Argonne Waste Management Procedures. If the wastewater required additional treatment beyond LWTP capability, a commercial waste treatment contractor would be used to store, treat, and transport the contaminated wastewater for disposal. In either case, Argonne has adequate waste handling capacity to manage the wastewater. The 13,600 L (3,600 gal) per day of wastewater from dust control would be a very small fraction of the 0.48-million-gallon-per-day average volume processed by the LWTP in 2009. In practice, less than 5 percent of the water volume used for dust control is collectible after infiltration into the ground.

A stormwater pollution prevention plan would be developed to contain runoff from the demolition site, as required by the National Pollutant Discharge Elimination System (NPDES) Permit. This plan would include the identification of stormwater discharge points, nearby permit outfalls that receive stormwater from the project site, conveyances that serve these outfalls, and specific measures to mitigate stormwater contamination and runoff (including standard construction best management practices). Approval by the State of Illinois and implementation of this plan would prevent runoff from the leaving the site, thereby mitigating any potential impacts on nearby surface water resources and NPDES Permit outfall(s).

5.1.5 Air Quality Impacts

Demolition activities are essentially the reverse of construction activities, but typically on a more limited scale and duration. Operations typically involved in demolishing and removing structures include mechanical or explosive dismemberment (wrecking ball or blasting operations), drilling and breakup of foundations, debris loading, pushing (bulldozing) operations, and truck traffic. Explosives would not be used for the proposed action. For the above activities, fugitive dust particulate emissions are a primary concern and minor emissions of criteria pollutants and hazardous air pollutants from engine exhaust would be generated. Control of particulate air emissions (dust) from demolition activities would involve standard construction practices for demolition, including dust suppression. Dust could include lead and small amounts of radioactive material (see Table 4). Dust emissions from the proposed action would be subject to the terms of

Table 4. Estimated Building 310 Radiological Source Term

Radionuclide	Estimated Inventory (mCi)[a,b]
Am-241	1.7
Cs-137	19.0
Sr-90	13.8
U-238	23.4

[a] Estimated soil volume multiplied by average radionuclide concentrations in exterior soil boring samples.

[b] For Argonne demolition projects, the fractions of contaminated soil particulates that become airborne with and without the use of planned dust control methods are typically assumed to be 0.001 percent and 0.1 percent, respectively. However, the entire estimate of soil activity was assumed in this analysis to be airborne to ensure conservative bounding of potential air impacts.

the Argonne Title V air permit (condition 5.3.2). However, by employing dust suppression techniques, the demolition activities would be unlikely to violate these 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 HEPA filtration would be used to contain potential emissions from size reduction of certain materials, such as structural steel.

A construction permit would be required under the terms of the Argonne Title V air permit (condition 7.1.11), due to the potential release of radionuclides in resuspended soil as a result of demolition and soil removal (see Table 4). CAP88-PC air modeling data would be used to prepare the permit application for open-air demolition; radiological air modeling results are addressed in Section 5.1.8. Air monitoring may be performed during the project to verify that emissions levels do not exceed the permit limits in condition 7.1.3 (i.e., emissions that would cause any member of the public to receive an effective dose equivalent of 10 mrem in any year).

Demolition activities would 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 required for the proposed action, and the fact that low emissions would be spread over a 11.5-month project period, the potential impacts of engine exhaust emissions from heavy equipment on ambient air quality are anticipated to be minimal. However, fugitive dust emissions are a concern for most construction activities, because they are released near the ground without any plume rise induced by buoyancy and/or vertical momentum. Preliminary screening calculations indicate that, even under the worst meteorological conditions, the PM_{10} concentration[2] at the nearest site boundaries (about 560 m [0.35 mi] from the demolition site and not in the direction of prevailing wind) would be low. Currently, the highest background PM_{10} levels observed at nearby monitoring stations are well below the ambient air quality standard (less than 60 percent). Accordingly, the contribution of fugitive dust emissions from demolition activities would not likely result in exceedance of the ambient air quality standard at Argonne site boundaries.

[2] Particulate matter with an aerodynamic diameter of less than or equal to 10 μm.

Diesel particulate matter (DPM) from engine exhaust, which is toxic and accounts for most of the inhalation risk in urban air, is also considered. As explained above, levels at Argonne site boundaries would likely be very low. DPM is a known occupational hazard, but its effects would generally be limited to heavy equipment operators and other nearby workers.

Regulators generally rely on work practice standards rather than emission standards to control emissions such as those described above. Dust suppression by misting and erecting enclosures may be specified as conditions in permits that are required for demolition or construction. 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. Dust suppression techniques, which reflect the current state of knowledge and may be specified by permit, would be employed during demolition (see Section 3.1).

5.1.6 Noise Impacts

Noise would be associated with the operation of machinery and equipment such as coring machines, scabblers, jackhammers, saws, forklifts, and portable HEPA filter units. Receptors of such noise would be limited to persons who work in or near Building 310. Workers in areas where noise levels would exceed permissible noise exposures defined in 29 CFR 1910.95 would be required to wear hearing protection. Noise levels would be monitored weekly. Persons beyond the Argonne site boundary and its buffer zone (Waterfall Glen Forest Preserve) would not notice noise impacts due to the distances from the source.

Unless high-explosive detonation, impact pile driving, or a rock drill is used, heavy equipment used during demolition activities (e.g., jackhammers and bulldozers) could generate a maximum combined noise level of around 95 A-weighted decibels (dBA) at a distance of 15 m (50 ft) from noise sources. The noise levels at 1,770 m (1.1 mi) west–southwest of Building 310 (the approximate distance to the nearest residence) would be less than 50 dBA, considering geometric spreading and ground effects only. In addition, the Advanced Photon Source (APS) structures and densely wooded forest in the direction of the nearest residence could significantly attenuate the noise levels. Due to the proximity to the major arterial Lemont Road and Interstates 55 and 355, the background noise level at the nearest residence is relatively high and could mask noise from the proposed activity. Considering these factors, the noise levels from the proposed activity would be barely discernable or completely inaudible at the nearest residence.

Demolition activities can result in various degrees of ground vibration, depending on the equipment and methods employed, and soil compactness. Major demolition equipment such as bulldozers, graders, compactors, and wrecking balls has the potential to cause vibrations that could affect ongoing experimental activities at nearby facilities such as the APS. Activities that typically generate the most severe vibrations are high-explosive detonation and impact pile-driving. All demolition equipment causes ground vibration to some degree, but the vibrations diminish in strength with distance. The vibration velocity level at a receptor beyond 70 m (230 ft) from any demolition activities (except high-explosive detonation or impact pile-driving) would diminish below the 65-velocity decibel (VdB) threshold of perception by humans and interference with vibration-sensitive activities (Hanson et al. 2006). No major heavy equipment capable of causing great ground vibration would be used during this project and APS structures are located beyond about 300 m (984 ft) from Building 310. Therefore, no adverse vibration

impacts from the proposed activity are expected on the main APS structure. Vibration monitoring performed by Argonne during the Building 301 demolition project confirmed no effects on the APS, the APS utility building, or other nearby buildings.

5.1.7 Socioeconomic Impacts/Environmental Justice

The total estimated cost of the proposed action would be approximately $11.6 million (DOE 2008). This cost estimate does not include the removal of all known contaminated soil. 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 social 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. As indicated in prior sections, off-site impacts of the proposed action would be minimal. Therefore, there would not be any environmental justice concerns associated with the proposed action.

5.1.8 Impacts on Workers and the Public from Radiation and Hazardous Materials

Workers demolishing Building 310 would be exposed to low-level beta/gamma radiation from residual fixed contamination and residuals in piping/drain systems. Individual occupational exposures from direct radiation for project management, decontamination, and ACM removal would not be expected to exceed 25 mrem, based on current radiological conditions in and around the building. Doses to the demolition/excavation/restoration crew would have the potential to exceed the public dose limit of 100 mrem per year, primarily due to higher residence time in areas with elevated exposure rates. The upper bound collective dose for the 33 project-related personnel (see Table 5) is estimated to be 1.57 person-rem. Based on an occupational risk factor of 6.0×10^{-4} fatal cancers per person-rem (DOE 2002a), 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 radiation exposure would be controlled under established Argonne procedures that require doses to be kept ALARA and administratively limit any individual's dose to less than 1 rem per year.

The only potential radiological impact on non-project-related workers at the Argonne site or members of the public would be from radiological air emissions (see Section 5.1.5). Assuming no dust suppression and complete suspension of soil contamination (for bounding purposes), the estimated radiation dose from the proposed action (calculated using CAP88-PC) for a nearby, maximally exposed resident would be 7.13×10^{-2} mrem per year, which is much less than the 10 mrem per year NESHAP contained in 40 CFR 61, Subpart H. This 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 non-project-related workers could be higher due to their closer proximity to Building 310 (and the uncertainties involved in calculating doses at short

Table 5. Anticipated Demolition Workforce and Exposure Rates

Type	Number	Residence (%)	Total Time (person-hour)	Estimated Exposure Rate (mrem/hour)[a]
Contract Project Management	8	25[b]	6,107	0.014
Contract Decontamination Crew	5	100	1,689	0.034
Contract ACM Removal Crew	10	100	2,399	0.034
Contract Demolition Crew	5	100	6,285[c]	0.034
Contract Excavation Crew			3,142.5[c]	0.2
Contract Restoration Crew			3,142.5[c]	0.1
Argonne Project Specialist	2	100	3,696	0.034
Argonne Project Manager	1	50	924	0.034
Argonne Safety Manager	1	50	924	0.034
Argonne Program Manager	1	5	93	0.034
Total	**33**	-	**28,402**	

[a] Typical area exposure rates include rounded average inside building, rounded average of all surveyed areas (interior and exterior), and minimum.
[b] Project management hours are typically off-site and do not involve radiation exposure, but a residence of 25 percent is assumed for bounding purposes.
[c] One crew will likely perform all three functions, so the total time of 16,658 person-hours was partitioned 50 percent–25 percent–25 percent to more accurately estimate collective exposures in the varying radiological environments.

distances),[3] the expected doses would still be significantly less than 1 mrem. As with worker exposures, public and non-project-related worker exposure to radiation would be controlled under established Argonne procedures that require doses to be kept ALARA.

Removal of ACM would be performed by certified asbestos abatement workers wearing respirators and full personal protective equipment. The work area would be enclosed and maintained under negative pressure, and HEPA filtration would be used to contain potential ACM emissions. No health effects on ACM abatement workers, non-involved Argonne employees, or the general public would be anticipated.

5.1.9 Impacts Resulting from Transportation

As indicated in Table 1, 1,760 shipments of LLW and contaminated soil would leave Argonne for transport to either NTS or Energy*Solutions*. This estimate includes a 50-percent increase in the number of shipments to conservatively bound the anticipated volume of waste. In addition, 5 shipments of MLLW, 11 shipments of ACM, 1 shipment of hazardous/chemical/TSCA waste, and 1 shipment of universal waste could be required.

The transport of wastes would occur at random intervals over the 11.5-month duration of the project; ACM abatement and the resulting waste shipments would occur prior to the start of radiological decontamination and building demolition. As noted in Table 2, the number of LLW-type (radiological) shipments from Argonne in FY09 was 98. Therefore, the 1,765 shipments of LLW and contaminated soil for the proposed action would represent a

[3] While CAP88-PC is reliable for calculating radiation doses to off-site residents, the calculated radiation dose to nearby non-involved workers is less reliable due to the limitations of the model (DOE 2007). Uncertainties of 20 percent and 35 percent have been estimated at short distances (< 10 km) for ground-level and elevated releases, respectively. However, the projected doses from demolition-related air emissions (see Section 5.1.8) are low enough that these uncertainties are insignificant.

1,700-percent increase in LLW-type shipments over the span of one year. The total of 1,778 shipments of LLW, contaminated soil, MLLW, ACM, hazardous/chemical/universal, and TSCA waste for the proposed action compares to the total of 163 shipments of similar waste from Argonne in FY09, representing a 990-percent increase in the number of annual shipments. On-site roads and gates would be adequate to accommodate this volume, 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.

Because preferred disposal locations for most project waste streams are subject to change (and dependent on the contractor), the most distant disposal site was assumed for each waste in order to conservatively bound the potential transportation impacts. An upper bound of approximately 10,154,978 vehicle-km (6,311,360 vehicle-mi) would be traveled by all projected waste shipments, including 1,765 round-trip shipments to NTS in Nevada (the most distant of the anticipated LLW/soil disposal site options, including MLLW for bounding purposes).[4] Actual distance traveled is expected to be less. The upper bound truck mileage for the proposed action would be 0.004 percent of the 2.33×10^{11} vehicle-km (1.45×10^{11} vehicle-mi) traveled annually by similar trucks in the United States (BTS 2009).

Vehicle-related risks (such as physical trauma from accidents or latent health effects from vehicle emissions) result simply from transporting any material from one location to another, independent of the characteristics of the cargo. The presence or absence of cargo is not a factor in the assessment of these risks. Based on state-specific accident and fatality rates (Saricks and Tompkins 1999), 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 < 0.115, or 1 chance in 8).[5] The collective risk of pollution health effects to the surrounding population from truck emissions (Biwer and Butler 1999) is estimated to be 0.008, or about 1 chance in 117.

Cargo-related risk is dependent on the characteristics of the cargo being transported. The radiological cargo-related risks from the transportation of radiological wastes would be attributable to ionizing radiation exposure. Using the RADTRAN code[6,7] and conservative assumptions to evaluate transportation risk, the collective population risk of latent cancer fatality for the general public from incident-free radiological exposure during transport is estimated to be 0.013 (21.4 person-rem), or about 1 chance in 77. The collective risk of latent cancer fatality for occupational workers (truck drivers only) is estimated to be 0.02 (33.6 person-rem), or about 1 chance in 50. The collective population risk of latent cancer fatality from the accidental release

[4] Calculated using the DOE Transportation Routing Analysis Geographic Information System (WebTRAGIS), version 4.6.2.
[5] Product of total distance traveled by state-specific rates.
[6] Version 5.6 (Weiner et al. 2008).
[7] Specific measurements of dose rates for the anticipated shipping containers are not available. In lieu of detailed shielding analyses for specific containers, DOE assumed that the dose rate for the containers would be 1 mrem per hour at 1 m from the containers/truck, which is typical for LLW/MLLW shipping analyses (DOE 2002c). This is an overestimate and conservatively bounds the collective dose estimate for transportation crews.

of radioactive materials following accidents severe enough to damage a shipping container is estimated to be 1.2×10^{-4} (0.197 person-rem),[8,9] or about 1 chance in 8,460.

5.1.10 Physical Hazards and Accidents

Auditable Safety Analyses (ASAs) were prepared for the decontamination and decommissioning of the CP-5 reactor (Argonne 1998) and the decontamination and demolition of Building 301 (DOE 2007). Both projects were similar in scope to the proposed action, and both ASAs indicated the potential for only localized consequences.

Occupational accidents could occur in all proposed action operations, including demolition, maintenance, on-site transportation, characterization, disassembly, and packaging for off-site disposal. Potential causes of accidents could include vehicular crashes, forceful contact with objects and equipment, and falls. Based on a projected 28,402 person-hours of effort required to implement the proposed action (see Table 5) and an occurrence rate of 1.04×10^{-7} fatalities per hour (BLS 2007),[10] no fatal accidents would be expected to occur during the proposed action (risk of 0.003, or about 1 chance in 338). Based on a non-fatal occupational injury and illness incidence rate of 2.6×10^{-5} cases per hour for the construction industry (BLS 2008),[11] less than one non-fatal occupational injury/illness is anticipated (risk of 0.74).

The estimated incidences of fatalities and injuries for the proposed action are based on national average construction industry rates. Accident rates for the proposed action would be expected to be lower because of the safety programs that would be implemented for decommissioning workers at Argonne. Three large decontamination and demolition projects — the EBWR, the Janus Reactor, and the CP-5 Reactor — involved 325,000 person-hours of work with no lost-time accidents, and only minor injuries occurred during the performance of these projects. Lessons learned from these projects would be incorporated into the plans and procedures for the demolition of Building 310 to further reduce the probability of an injury.

5.1.10.1 Accident Analysis

In addition to the industrial types of accidents discussed above, 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 their expected frequency of occurrence and the severity (i.e., the level of consequence). The types of accidents analyzed range from those that are high probability/low consequence to those that are low probability/high

[8] Because the specific activity of LLW from building decontamination is highly uncertain, the specific activity of contaminated soil (Table 3) has been assumed for the transportation accident analysis.
[9] This is an extreme bounding estimate, which assumes the entire source term (Table 3) is available in each waste shipment. Given the distribution of contaminants in soil and throughout the building, it is highly unlikely that any single shipment will contain this level of activity and impossible that every shipment would.
[10] Hourly risk estimate was derived from Bureau of Labor Statistics (BLS) hours-based estimates of fatal occupational injuries per 100,000 full-time equivalent workers. Although a general rate of 12.6 is reported for construction and extraction occupations (5.4 for construction managers), the more conservative rate of 20.8 for construction laborers was used for this analysis. Derivation assumes 2,000 hours worked per year, which is consistent with BLS calculations.
[11] Derived from BLS-reported incidence rate of 5.2 non-fatal injuries/illnesses per 100 full-time equivalent workers.

consequence. A sliding scale approach is generally employed with greater depth in analysis provided for higher-consequence accidents (DOE 2002b).

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 (e.g., fires) are also 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 (DuPage County 2007).

As indicated above, the ASAs prepared for decommissioning of CP-5 and the demolition of Building 301 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 associated with such accidents were determined to be negligible. These conclusions would continue to hold for the proposed action because of the limited amount of residual radioactive material in Building 310 (which is less than was estimated for Building 301) and the fact that the radioactivity is fixed. After potentially contaminated building materials are removed during decontamination (scabbled concrete, floor tiles, etc.), some of these materials could be rubblized and rendered more dispersible in air. Therefore, if an accident occurred 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 such an accident scenario would be comparable to the impacts from a transportation accident involving the breach of a waste container. Exposure could potentially increase due to a time-intensive cleanup effort. However, the potential impacts from a hypothetical ten-fold increase in exposure would still be very low, with the collective risk of latent cancer fatality increasing from 1.2×10^{-4} (see Section 5.1.9) to 1.2×10^{-3}. The most significant potential impacts would be largely physical, such as the risk of injury from wind-blown debris (large and small).

The potential for accidental dispersal of contaminated waste and dust would be mitigated by minimizing the duration that demolition waste is present at the project site.

5.1.10.2 Terrorism or Sabotage

Accident analysis is also required to address the results of an intentional destructive or terrorist act (DOE 2006). Because of their nature, a probability of occurrence for intentional 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 (DOE 2007). 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. These impacts for the proposed action are addressed in Sections 5.1.10.1 and 5.1.9, respectively. The Building 310 project would be conducted in such a manner that it would not create a ―highly visible" target for malicious acts or acts of terrorism.

5.1.11 Other Potential Direct, Indirect, Cumulative, or Long-Term Impacts

Cumulative impacts are defined as ~~"~~the impact which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions" (40 CFR 1508.7). Based on the impact analysis of past decontamination, decommissioning, and demolition projects, such as those conducted for Building 330 (the CP-5 Reactor), EBWR, and Building 301, 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). The demolition of Building 310 will likely overlap with ongoing Building 330 demolition activities.

5.1.12 Compliance with Environmental Laws, Regulations, Permits, and Orders

The proposed action would comply with applicable federal, state, and local laws and regulations as well as current permits. The applicable and potentially applicable environmental laws, regulations, DOE Orders, and relevant permits are summarized below:

- IEPA Title V air permit for Argonne and construction permit for radionuclide emissions to the environment
- IEPA regulations for air pollution control
- IEPA NPDES permit for Argonne
- IEPA regulations for water pollution control
- IEPA RCRA Part B permit for the treatment and storage of hazardous and mixed waste
- DOE Order 435.1 governing radioactive waste management and DOE Order 5400.5 governing decontamination/decommissioning of certain structures
- DOE Order 450.1A, ~~"~~Environmental Protection Program"
- DOE regulations governing occupational radiation protection (10 CFR 835)
- Environmental Protection Agency regulations governing protection of the environment (40 CFR 61 [Subpart M], 261–264, 761, and 763 [Subpart G])
- Occupational Safety and Health Administration standards (29 CFR 1910) and/or DOE regulations governing worker safety and health (10 CFR Part 851)
- Department of Transportation regulations governing shipment of hazardous and radioactive materials

5.1.13 Pollution Prevention

The proposed action would be performed in accordance with the Pollution Prevention Act of 1990 (42 U.S.C. 133), Executive Orders 12856 (*Federal Compliance With Right-To-Know Laws and Pollution Prevention Requirements*), 12873 (*Federal Acquisition, Recycling, and Waste Prevention*), and 12902 (*Energy Efficiency and Water Conservation at Federal Facilities*), and Argonne's waste minimization and pollution prevention (P2) practices.

5.2 Environmental Impacts of the No Action Alternative

Under the no action alternative, Building 310 would not be decontaminated or demolished on the proposed schedule. Surveillance and maintenance activities would continue to ensure adequate containment of fixed radioactive contamination and would provide physical safety and security controls to allow for personnel access. This alternative could result in low-level radiation exposure to surveillance and maintenance personnel and the continued risk of radioactive/hazardous material release due to accidents, natural hazards, or terrorism. Releases to the air would not likely increase, but resource requirements could escalate over time in order to maintain the integrity of the building and contain the residual fixed contamination. Transportation risks would be avoided, and cultural resources would not be affected. The excess facility would eventually be demolished, as no future use has been identified. Therefore, some of the impacts quantified in this environmental assessment would simply occur at a later time.

6.0 INDIVIDUALS AND AGENCIES CONSULTED

Illinois Department of Natural Resources (online consultation), March 7, 2010

Illinois Environmental Protection Agency, Lisa Bonnett, March 25, 2010

Illinois Historic Preservation Agency, Anne E. Haaker, April 22, 2009

U.S. Fish and Wildlife Service (online consultation), March 7, 2010

U.S. Fish and Wildlife Service, Janice C. Engle, February 26, 2010

U.S. Fish and Wildlife Service, John D. Rogner, March 18, 2005

7.0 REFERENCES

Argonne, 2010. Argonne National Laboratory. *Energy Report FY 2009*. Energy Programs Office, Facilities Management and Services, Argonne National Laboratory. Argonne, Illinois.

Argonne, 2009. Argonne National Laboratory. *NEPA Determination for the FMS Project "Building 310 Demolition Project."* Memo from P. Rash to M. Kamiya. Argonne National Laboratory, Argonne, Illinois. February 26.

Argonne, 2008. Argonne National Laboratory. *Environment, Safety and Health Manual, Section 10.17: Environmental Radiological Cleanup Criteria*. Argonne National Laboratory. Argonne, Illinois. March.

Argonne, 2007. Argonne National Laboratory. *Cultural Resource Management Plan for Argonne National Laboratory*, Environmental Science Division, Argonne National Laboratory, Argonne, Illinois. April.

Argonne, 1998. Argonne National Laboratory. *Auditable Safety Analysis for the Decontamination & Decommissioning of the CP-5 Research Reactor*, PP-1.1-19. Technology Development Division, Argonne National Laboratory, Argonne, Illinois, July.

Biwer and Butler, 1999. Biwer, B.M. and J.P. Butler. Vehicle Emission Unit Risk Factors for Transportation Risk Assessments. *Risk Analysis* **19**(6):1157–1171. Available at *http://www.springerlink.com/content/x6213845k5042310/fulltext.pdf* (accessed March 2010).

Blanchard, 1882. Blanchard, R. *History of DuPage County, Illinois*. O.L. Baskin and Co., Chicago, Illinois.

BLS, 2008. Bureau of Labor Statistics. *Workplace Injury and Illness Summary.* U.S. Department of Labor, Washington, D.C. October. Available at *http://www.bls.gov/news.release/osh.toc.htm* (accessed June 2009).

BLS, 2007. Bureau of Labor Statistics. *Census of Fatal Occupational Injuries, 2007*. U.S. Department of Labor, Washington, D.C. Available at *http://www.bls.gov/iif/oshcfoi1.htm* (accessed June 2009).

(BTS, 2009) Bureau of Transportation Statistics. *National Transportation Statistics 2009*. U.S. Department of Transportation, Research and Innovative Technology Administration. Available at *http://www.bts.gov/publications/national_transportation_statistics* (accessed March 2010).

Curtis and Berlin, 1980. Curtis, S.A. and A. Berlin. *A Study of the Cultural Resources at the Argonne National Laboratory*. Argonne National Laboratory, Cultural Resource Management, Argonne, Illinois.

DOE, 2008. U.S. Department of Energy. *Statement of Mission Need/CD-0 for Building 310 Demolition*. R.J. Lutha, Argonne Site Office, Argonne National Laboratory, Argonne, Illinois. January.

DOE, 2007. U.S. Department of Energy. *Environmental Assessment, Proposed Decontamination and Demolition of Building 301 at Argonne National Laboratory,* DOE/EA-1585. U.S. Department of Energy, Argonne, Illinois. March. Available at *http://gc.energy.gov/NEPA/nepa_documents/ea/ea1585/EA1585.pdf* (accessed March 2010).

DOE, 2006. U.S. Department of Energy. Memorandum from the Office of NEPA Policy and Compliance, U.S. Department of Energy, Subject: *Need to Consider Intentional Destructive Acts in NEPA Documents*. December 1. Available at *http://www.gc.energy.gov/NEPA/documents/terrorism--interim_nepa_guidance.pdf* (accessed March 2010).

DOE, 2002a. U.S. Department of Energy. Memorandum from A. Lawrence, Office of Environmental Policy and Guidance, Subject: *Radiation Risk Estimation from Total Effective Dose Equivalents*. U.S. Department of Energy, Washington, D.C. August 9. Available at *http://www.doeal.gov/SWEIS/DOEDocuments/055%20iscors.pdf* (accessed March 2010).

DOE, 2002b. U.S. Department of Energy. *Recommendations for Analyzing Accidents Under the National Environmental Policy Act*. Office of NEPA Policy and Compliance, U.S. Department of Energy, Washington, D.C. July. Available at *http://gc.energy.gov/NEPA/nepa_documents/TOOLS/GUIDANCE/Volume2/2-8-accidents.pdf* (accessed March 2010).

DOE, 2002c. U.S. Department of Energy. *A Resource Handbook on DOE Transportation Risk Assessment*, DOE/EM/NTP/HB-01. National Transportation Program, U.S. Department of Energy, Albuquerque, New Mexico. July. Available at *http://www.doeal.gov/SWEIS/DOEDocuments/089%20transrisk_handbook.pdf* (accessed March 2010).

DOE, 1993. U.S. Department of Energy. *Radiation Protection of the Public and the Environment*, DOE Order 5400.5 Change 2. Office of Environment, Safety, and Health, U.S. Department of Energy, Washington, D.C. January 7. Available at *https://www.directives.doe.gov/directives/current-directives/5400.5-BOrder-c2/at_download/file* (accessed March 2010).

DuPage County, 2007. DuPage County, Illinois. DuPage County Natural Hazards Mitigation Plan. DuPage County Hazard Mitigation Workgroup, DuPage County, Illinois. October. Available at *http://www.co.dupage.il.us/emplibrary/DuPageMitigationPlanOct2007.pdf* (accessed March 2010).

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, February 11, 1994. Available at *http://www.epa.gov/compliance/resources/policies/ej/exec_order_12898.pdf* (accessed March 2010).

FWS, 2010. U.S. Fish and Wildlife Service, Midwest Region. Section 7(a)(2) Technical Assistance Website. Fort Snelling, Minnesota. Available at *http://www.fws.gov/midwest/endangered/section7/s7process/index.html* (accessed March 2010).

Golchert et al., 2009. Golchert, N.W., T.M. Davis, and L.P. Moos. *Argonne National Laboratory Site Environmental Report for Calendar Year 2008*, ANL-09/02. Argonne National Laboratory, Environment Safety and Health/Quality Assurance Division. September. Available at *http://www.anl.gov/Community_and_Environment/Environmental_Reports/ser2008.pdf* (accessed March 2010).

Golchert et al., 2008. Golchert, N.W., T.M. Davis, and L.P. Moos. *Argonne National Laboratory Site Environmental Report for Calendar Year 2007*, ANL-08/05. Argonne National Laboratory, Environment Safety and Health/Quality Assurance Division. September. Available at *http://www.anl.gov/Community_and_Environment/Environmental_Reports/ser2007.pdf* (accessed March 2010).

Hanson et al., 2006. Hanson, C.E., D.A. Towers, and L.D. Meister. *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06. Prepared by Harris Miller Miller & Hanson Inc. for U.S. Department of Transportation, Washington, D.C., May. Available at *http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf* (accessed March 2010).

IDNR, 2010. Illinois Department of Natural Resources. Ecological Compliance Assessment Tool (EcoCAT). Springfield, Illinois. Available at *http://www.dnrecocat.state.il.us/ecopublic/* (accessed March 2010).

IEPA, 2006. Illinois Environmental Protection Agency. *Clean Air Act Permit Program (CAAPP) Permit* (issued to Argonne National Laboratory). Permit Section, Division of Air Pollution Control, Illinois Environmental Protection Agency, Springfield, Illinois. October.

Moos, 2002. Moos, L.P. Building 310 South Parking Lot Preliminary Characterization Report. Argonne National Laboratory, Argonne, Illinois. December.

Navarro, 2010. Navarro Research and Engineering, Inc. *Final Characterization Report for Building 310 D&D Project*. Prepared for Argonne National Laboratory, Facilities Management and Services, Office of Project Management. January.

O'Rourke, 2009. O'Rourke, D.J. *National Historic Preservation Act Review for the Demolition of Building 330, Chicago Pile-5 and Building 310*. Environmental Science Division, Argonne National Laboratory, Argonne, Illinois. April.

O'Rourke and Wescott, 1999. O'Rourke, D.J., and K.L. Wescott. *National Register Eligibility Evaluation of the Retention Tanks in Building 310, Argonne National Laboratory-East, DuPage County, Illinois.* Argonne National Laboratory. Environmental Assessment Division, Argonne, Illinois. September.

Pease, 1919. Pease, T.C. *The Frontier State 1818–1848*, A.C. Clurg & Co., Chicago, Ill.

Saricks and Tompkins, 1999. Saricks, C.L., and M.M. Tompkins. *State-Level Accident Rates of Surface Freight Transportation: A Reexamination,* Argonne/ESD/TM-150. Argonne National Laboratory, Argonne, Illinois. April.

U.S. Census Bureau, 2004a. *State and County Quick Facts,* data derived from population estimates, 2000 Census of Population and Housing. Available at *http://quickfacts.census.gov/qfd/states/00000.html* (accessed March 2010).

U.S. Census Bureau, 2004b. *Percentage of People in Poverty by State Using 2- and 3-Year Averages: 2001–2003*.

Vik, 2002. Vik, A.R. *Project Final Report for the Decontamination and Decommissioning of the Building 310 Retention Tank Facility*. Argonne National Laboratory, Technology Development Division, Argonne, Illinois. October.

Weiner et al., 2008. Weiner, R.F., D.M. Osborn, D. Hinojosa, T.J. Heames, J. Penisten, and D. Orcutt. *RADCAT 2.3 User Guide*, SAND2006-6315. Sandia National Laboratories, Albuquerque, New Mexico. April. Available at *https://radtran.sandia.gov/docs/RadCat2_3UserGuide_Rev1.pdf* (accessed March 2010).

Wescott and O'Rourke, 2001a. Wescott, K.L. and D.J. O'Rourke. *Sitewide Historic Property Inventory, Argonne National Laboratory-East, DuPage County, Illinois, Phase I: The Early Programmatic Years (194–1959)*. Argonne National Laboratory, Environmental Science Division, Argonne, Illinois. September.

Wescott and O'Rourke, 2001b. Wescott, K.L. and D.J. O'Rourke. *Sitewide Historic Property Inventory, Argonne National Laboratory-East, DuPage County, Illinois, Phase II: 1960–1989*. Argonne National Laboratory, Environmental Science Division, Argonne, Illinois. September.

Wunderlich, 2002. Letter from R.C. Wunderlich, Area Manager, U.S. Department of Energy, Argonne Area Office, to A.E. Haaker, Illinois Historic Preservation Agency. January 3.

Page intentionally left blank.

APPENDIX A: INTERAGENCY CORRESPONDENCE

Page intentionally left blank.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
James R. Thompson Center, 100 West Randolph, Suite 11-300, Chicago, IL 60601 • (312) 814-6026

PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

217-782-0547

March 25, 2010

Mr. Peter R. Siebach
NEPA Compliance Officer
Department of Energy
Argonne Site Office
9800 South Cass Avenue
Argonne, Illinois 60439

Dear Mr. Siebach:

Thank you for the opportunity to review the environmental assessment for the proposed demolition project for the Building 310 at Argonne National Laboratory.

The Agency has no objections to the projects; however, asbestos notification will be required to the Bureau of Air, Division of Air Pollution Control at least ten (10) working days prior to each demolition project initiation. Please contact Alan Grimmett, 217-782-2113, if you have questions concerning notification requirements.

Solid and hazardous waste must be properly disposed of or recycled.

Sincerely,

Lisa Bonnett

Lisa Bonnett
Acting Deputy Director

Rockford • 4302 N. Main St., Rockford, IL 61103 • (815) 987-7760
Elgin • 595 S. State, Elgin, IL 60123 • (847) 608-3131
Bureau of Land – Peoria • 7620 N. University St., Peoria, IL 61614 • (309) 693-5462
Collinsville • 2009 Mall Street, Collinsville, IL 62234 • (618) 346-5120
Des Plaines • 9511 W. Harrison St., Des Plaines, IL 60016 • (847) 294-4000
Peoria • 5415 N. University St., Peoria, IL 61614 • (309) 693-5463
Champaign • 2125 S. First St., Champaign, IL 61820 • (217) 278-5800
Marion • 2309 W. Main St., Suite 116, Marion, IL 62959 • (618) 993-7200

Department of Energy
Argonne Site Office
9800 South Cass Avenue
Argonne, Illinois 60439

01 APR 2009

Ms. Anne E. Haaker
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
1 Old State Capitol
Springfield, Illinois 62701

Ms. Haaker:

SUBJECT: REQUEST FOR CONCURRENCE FOR DEMOLITION OF BUILDINGS 330 AND 310 LOCATED AT ARGONNE NATIONAL LABORATORY (ARGONNE)

The U.S. Department of Energy, Argonne Site Office (DOE-ASO) intends to demolish Buildings 330 and 310 located at Argonne National Laboratory (Argonne), DuPage County, Illinois. Building 330 once housed the Chicago Pile-5 Reactor, which operated between 1954 and 1979. The Chicago Pile-5 Reactor was one of Argonne's premier facilities, and was determined eligible for the National Register of Historic Places (NRHP) in 1998. The reactor was documented in 1998 to the Illinois Historic American Engineering Record standards. The completed documentation is currently on file with the Illinois State Archive (IL HAER No. DU-1998-2). The portion of Building 330 that was not directly associated with the reactor was used as office space between 1980 and 2009.

Building 310 was built in 1950 as the Waste Processing, Storage, and Shipping Building. Many early strategies for processing radioactive waste were developed in Building 310 during the 1950s. The building was later used to support the Experimental Breeder Reactor-II project between 1964 and 1994. The building also served as experiment space for numerous other projects as well. Building 310 was evaluated during a Site-wide Building Inventory conducted in 2001. Building 310 was determined to lack sufficient integrity to be eligible for the NRHP.

Attached is a brief historical review of the activities that occurred in Building 330 and Building 310. The review focuses on activities that took place within the buildings during the last 20 years. Earlier reviews were focused on the Cold War era (1946-1989). Based on the information contained in the attached report, it appears that no activities occurred during the last 20 years in either building that would require additional documentation under Section 106 of the NHPA before the buildings are demolished.

If you have any questions, please contact Kate Panek of my staff at (630) 252-2736 to discuss the proposed demolition projects.

Sincerely,

Angela C. Harvey

Ronald J. Lutha
Site Manager

Enclosure:
As Stated

cc: D. O'Rourke, ANL/EVS, 900, w/o encl.
M. Kamiya, ANL/ESQ, 201, w/o encl.
R. Hrabak, ANL/FMS, 214, w/encl.

A component of the Office of Science

Illinois Historic Preservation Agency

FAX (217) 782-8161

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

DuPage County
Argonne
Demolition
Buildings 310, 330, Argonne National Lab.
IHPA Log #001040609

April 22, 2009

Ronald J. Lutha
Department of Energy
Argonne Site Office
9800 South Cass Avenue
Argonne, IL 60439

Dear Mr. Lutha:

We have reviewed the documentation submitted for the referenced project(s) in accordance with 36 CFR Part 800.4. Based upon the information provided, no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned.

Please retain this letter in your files as evidence of compliance with section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

If you have any further questions, please contact me at 217/785-5027.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

A teletypewriter for the speech/hearing impaired is available at 217-524-7128. It is not a voice or fax line.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chicago Ecological Services Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010
Phone: (847) 381-2253 Fax: (847) 381-2285

IN REPLY REFER TO:
FWS/AES-CIFO/

ARGONNE SITE OFFICE
MAR 02 2010
RECEIVED

February 26, 2010

Dr. Joanna M. Livengood
Department of Energy
Argonne Site Office
9800 South Cass Avenue
Argonne, Illinois 60439

Dear Dr. Livengood:

The U.S. Fish and Wildlife Service's Chicago Field Office (Service) received your request for a threatened and endangered species review dated February 23, 2010. We have developed a new on-line threatened and endangered species review process. You can access it at http://www.fws.gov/midwest/Endangered and click on the Section 7 Technical Assistance green shaded box in the lower right portion of the screen. There are three steps to this process; however, your project may or may not reach step 3. Additional details on completing this on-line process are enclosed.

In an effort to greatly reduce the timeframe in which you may receive a response from the Service we encourage you to use this new application; however, if you do not intend to use the on-line application, please contact Cathy Pollack at 847-381-2253, ex. 20 to complete the required review process.

Sincerely,

Janice C. Engle

Janice C. Engle
Field Supervisor

Enclosure

In **Step 1** you will determine which species (if any) may be present in the county of the proposed project. If none occur, you can end the consultation and document it for your own records. If species are present in the county, certain types of projects, if minor, may be eliminated right off the bat (conclude a "no-effect" determination). Examples of these types of projects include HUD projects, some pipeline or buried utility projects, some telecommunication projects, and some projects within developed areas.

If your proposed project did not get a "no effect" determination in the above review process, then an additional component of **Step 1** is to access the "Species Information Pages", define your action area, and cross reference the species information with knowledge of the project site.

- If suitable habitat is not present in the action area, conclude "species and critical habitat not present" and document your finding. No further consultation is required.
- If suitable habitat is present, but data (e.g., surveys) indicate species and critical habitat are absent from the action area, conclude "species and critical habitat not present" and document your finding. No further consultation required.
- If suitable habitat is present, and no other data indicate species or critical habitat are absent, conclude "species or critical habitat may be present" and proceed to **Step 2**.
- If suitable habitat is present, and no other data indicate species or critical habitat are absent, you may conduct a survey to determine whether listed species or critical habitat are present. Please contact this office for more information.

In **Step 2** you will determine whether the proposed action may affect listed or proposed species or designated or proposed critical habitat. In step 1, you defined your action area and concluded that a listed resource "may be present." In this step, you will determine whether your project "may affect" species or critical habitat. There are two possible determinations in this step: "no effect" or "may affect."

- If data indicate the species and habitat may respond upon exposure, or if data are equivocal or lacking to justify a determination of "no effect", conclude "may affect" and proceed to Step 3.

In **Step 3** you will determine whether listed or proposed species or designated or proposed critical habitat may be adversely affected. Specifically, you are assessing whether the species/critical habitat is "not likely to be adversely affected" or "likely to be adversely affected."

- If the listed resource is likely to respond in only a beneficial manner, conclude "not likely to adversely affect" and submit your finding and supporting rationale to this office and request concurrence.
- If the listed resource is likely to respond in a negative manner but such responses are expected to be insignificant, conclude "not likely to adversely

affect" and submit your finding and supporting rationale to this office and request concurrence.

- If the listed resource is likely to respond in a negative manner but the likelihood of either exposure or such a response is discountable, then conclude "not likely to adversely affect" and submit your finding and supporting rationale to this office and request concurrence.

If you cannot conclude that the response will be wholly beneficial, insignificant, or discountable, check the "Species-Specific Section 7 Guidance and Conservation Measures" to determine if there any measures that may be implemented to avoid or minimize the negative effects.

- If you modify your proposed action to include conservation measures to implement, assess how exposure and response are anticipated to change. Repeat Step 3 and document your conclusion, as appropriate. Be sure to identify the specific conservation measures you intend to incorporate and their associated biological consequences.

2

23 FEB 2010

CONCUR
ASO/dt
Turnquest
2/18/10
ASO
Houck
2/ /10
ASO
Roberts
2/ /10
ASO
Livengood
2/ /10

Ms. Janice Engle, Acting Field Supervisor
U.S. Fish and Wildlife Service
Chicago Illinois Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010

Dear Ms. Engle:

SUBJECT: PROPOSED DEMOLITION OF BUILDING 310 AT ARGONNE NATIONAL LABORATORY (ARGONNE)

U.S. Department of Energy (DOE) Argonne Site Office (ASO) is preparing an Environmental Assessment (EA) for the proposed demolition of Building 310 at Argonne. This activity is scheduled to commence later this year. In support of this EA effort, we request your concurrence that this project at Argonne will not adversely affect Federally-listed threatened or endangered species. The 22,526-square foot building is located on previously disturbed land at the Argonne site (see enclosed map showing the proposed project area). No new land disturbance is anticipated, except for the staging of excavated soil in an adjacent old field. No Federally-listed threatened or endangered species have been identified on the Argonne site.

If you or your staff would like more information about this project, please contact Eric Turnquest at (630) 252-9812.

Sincerely,

signed by

Dr. Joanna M. Livengood
Acting Manager

Enclosure:
As Stated

bc: K. Chiu, ASO, w/o encl.
P. Siebach, STS, w/o encl.

File: 5400.2 (2.6.2)

S:\ASO\Secretaries' Documents\Terry\MSOFFICE\WINWORD\ES&H Divisions\Turnquest\310 FWS consultation.doc

89

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chicago Ecological Services Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010
Phone: (847) 381-2253 Fax: (847) 381-2285

IN REPLY REFER TO:
FWS/AES-CIFO/(4-2026) / 5-1087

March 18, 2005

Mr. Robert C. Wunderlich
Department of Energy
Argonne Area Office
9800 South Cass Avenue
Argonne, Illinois 60439

Dear Mr. Wunderlich:

Thank you for your response dated February 28, 2005 in regards to a letter from us dated August 24, 2004 requesting searches for the habitat of the federally listed Hine's Emerald dragonfly *(Somatochlora hineana)* for the proposed construction of a regional biocontainment laboratory at Argonne National Laboratory-East. The proposed project site is located at T37N, R11E, Section 9 at Argonne National Laboratory, DuPage County, Illinois.

After reviewing additional detailed information submitted regarding the proposed project area, we concur with your conclusion for reasons given that suitable habitat does not exist at the site for the federally listed Hine's emerald dragonfly, and that the quantity and quality of groundwater responsible for the wetland seeps south of Argonne National Lab that support the Hine's emerald dragonfly would not be impacted by this project.

Based on the information provided in your submittal and a review of our records, we do not believe that any federally endangered or threatened species occur in the vicinity of the site. Based on the information provided, it does not appear that the project is likely to adversely affect any federally threatened or endangered species or adversely modify critical habitat of such species. This precludes the need for consultation on this project in accordance with section 7 of the Endangered Species Act of 1973, as amended. Should project modifications or new information indicate that endangered or threatened species may be affected, and the project is funded, authorized or carried out by a federal agency, then consultation with the Service should be initiated by the Army Corps of Engineers.

This letter only addresses federally listed species; the Illinois Department of Natural Resources should be contacted for information on State-listed species. Any impacts to wetlands or waters of the United States may require a permit from the U. S. Army Corps. of Engineers. This letter

90

Mr. Robert C. Wunderlich 2

does not preclude separate evaluation and comment by the U.S. Fish and Wildlife Service on wetland impacts proposed for section 404, Clean Water Act authorization.

If you have any questions, please contact Ms. Cathy Pollack at 847/381-2253, ext. 239 or Ms. Karla Kramer at 847/381-2253, ext. 230.

Sincerely,

John D. Rogner

John D. Rogner
Field Supervisor

cc: Valerie Nottingham, National Institutes of Health

Page intentionally left blank.

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 Energy*Solutions* 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 Energy*Solutions* commercial facility in

Utah, or other commercial disposal sites in accordance with their waste acceptance criteria. Neither NTS nor Energy*Solutions* 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 Energy*Solutions*. 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.

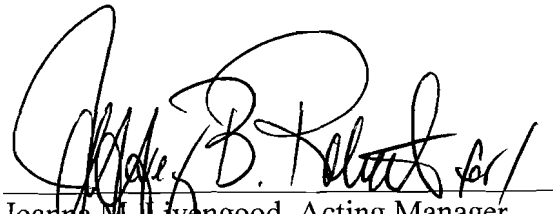
PUBLIC AVAILABILITY: Copies of the EA (DOE/EA-1670) are available from:

James Oprzedek
NEPA Document Manager
9800 South Cass Avenue
Argonne, Illinois 60439
(630) 252-2556

For further information regarding the DOE NEPA process, contact:

Peter R. Siebach
Acting NEPA Compliance Officer
Argonne Site Office
9800 South Cass Avenue
Argonne, Illinois, 60439
(630) 252-2007

Issued in Argonne, Illinois, this 9th day of April, 2010.



Joanna M. Livengood, Acting Manager
Argonne Site Office