

ENVIRONMENTAL ASSESSMENT

PROPOSED DECONTAMINATION AND DISASSEMBLY OF THE
ARGONNE THERMAL SOURCE REACTOR (ATSR)
AT ARGONNE NATIONAL LABORATORY



U. S. Department Of Energy
Chicago Operations Office

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ACRONYMS

ANL-E	Argonne National Laboratory-East
ASA	Auditable Safety Analysis
ATSR	Argonne Thermal Source Reactor
CFR	Code of Federal Regulations
Ci	Curie
CP-1	Chicago Pile-1
D&D	Decontamination and Disassembly
DOE	U.S. Department of Energy
EBWR	Experimental Boiling Water Reactor
FFCA	Federal Facilities Compliance Act

HEPA	High Efficiency Particulate Air (filter)
ICRP	International Commission on Radiological Protection
IEPA	Illinois Environmental Protection Agency
NEPA	National Environmental Policy Act
mrem	millirem
RCRA	Resource Conservation and Recovery Act
yr	Year
ZPR	Zero Power Reactor

1.0 BACKGROUND

1.1 Facility Description and History

The Argonne Thermal Source Reactor (ATSR) was one of several early “zero power” reactors (ZPRs) developed and operated from 1950 to 1989 within the Building 314, 315, 316 complex at Argonne National Laboratory-East (ANL-E). The reactor was in use from 1953 until the late 1980's when it was shut down and defueled. The ATSR facility is located in rooms E-101, E-102 and E-111 in Building 316 (see Figures 1, 2 and 3).

The reactor assembly, located in room E-111 is contained inside a 6' x 5' x 8' tall shield tank. The shield tank contains the core tank, dump line, start-up source drive and the primary shielding which consists of a shield tank, an inner water shield, a lead shield, and an outer water shield (see Figure 4). Neutrons escaped the core from the unshielded east face of the shield tank and were directed to experiments in either a graphite pile or a depleted uranium “Snell” block. Support systems for ATSR included the shield water system, core water system including the dump tank, reactor air system and reactor control systems. The reactor was operated from the control panel which was located in room E-101. The Snell block and the control panel have been removed, however, the table that held the Snell block remains. Room E-102 contains piles of graphite from the ATSR and the Chicago Pile-1 (CP-1), which was the world’s first nuclear reactor.

The U.S. Department of Energy (DOE) has determined that the Building 314, 315, 316 complex is eligible for listing on the National Register for Historic Places and that the ATSR may be a contributing component of that complex. The ZPRs were operated at zero power so that engineers could assess the performance of various reactor core configurations. ZPR-I provided basic physics studies for naval reactors. The ZPR-I core and vessel were modified in 1953 and renamed ZPR-IV. In 1960, the reactor was moved to its present location in Building 316 and several modifications were made including replacement of the core tank and modifications to the control rod and safety rod systems. At this time the reactor was renamed the ATSR and was used as a source of a broad range of neutron intensities for irradiating materials and testing neutron detector performance.

1.2 Current Status

The ATSR has been characterized and the key findings are (NES Inc. 1998):

-  The total radioactive material inventory is approximately 64.84 mCi.
-  The majority of the activity is in the reactor lead, graphite piles, reactor aluminum, and the contaminated concrete in room E-102.
-  Fixed and loose surface contamination were only found in the fume hood ducting, a hot spot in E-102, and inside the reactor.
-  Predominant nuclides detected were U-238, Cs-137, Co-60 and Eu-152.

- ☞ Activation (i.e., atoms that were made radioactive by absorbing neutrons from the reactor) is limited to the concrete shield blocks, graphite, steel rails and reactor metals.
- ☞ General area dose rates are below 1 mrem/hr throughout the facility.

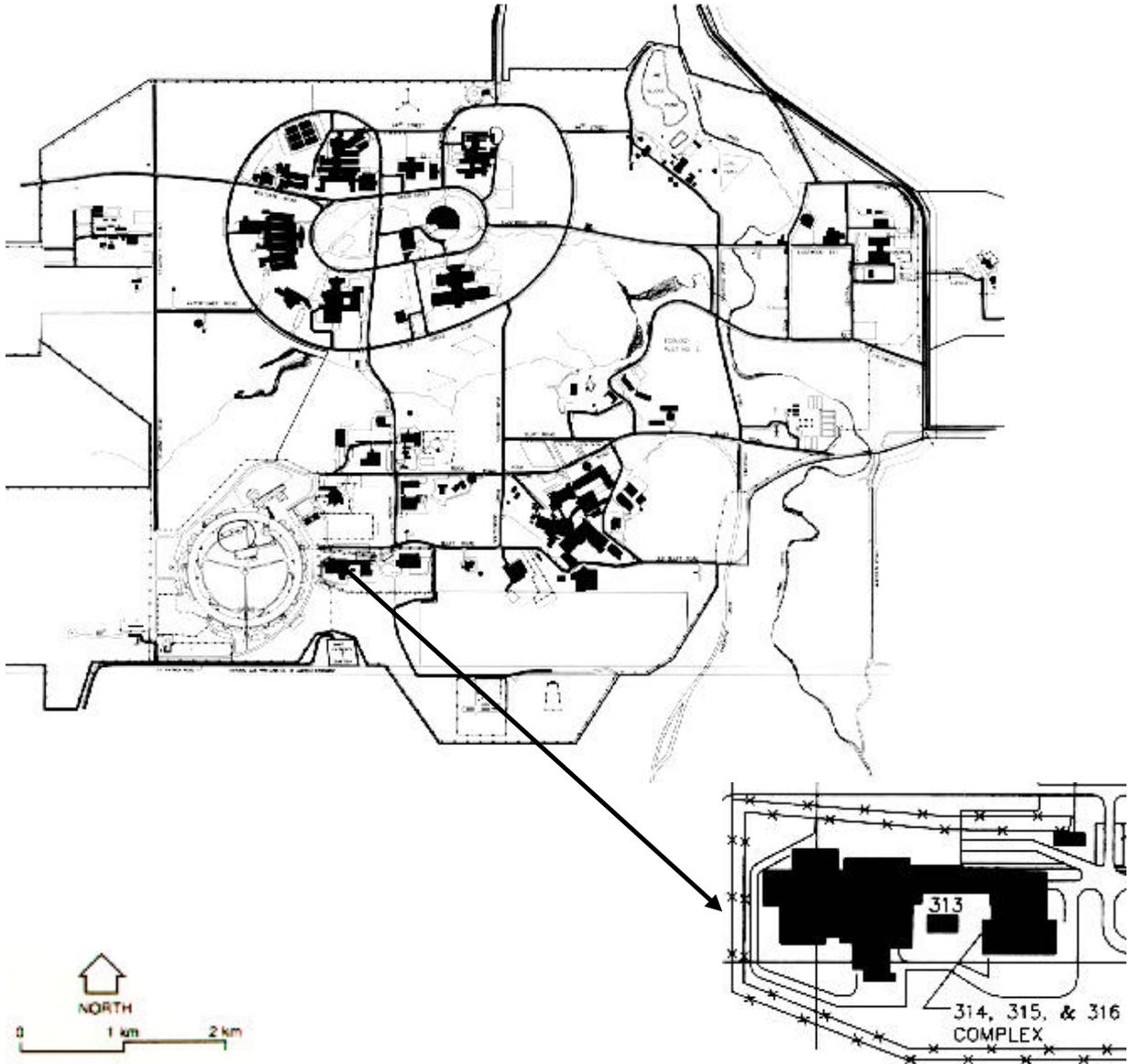
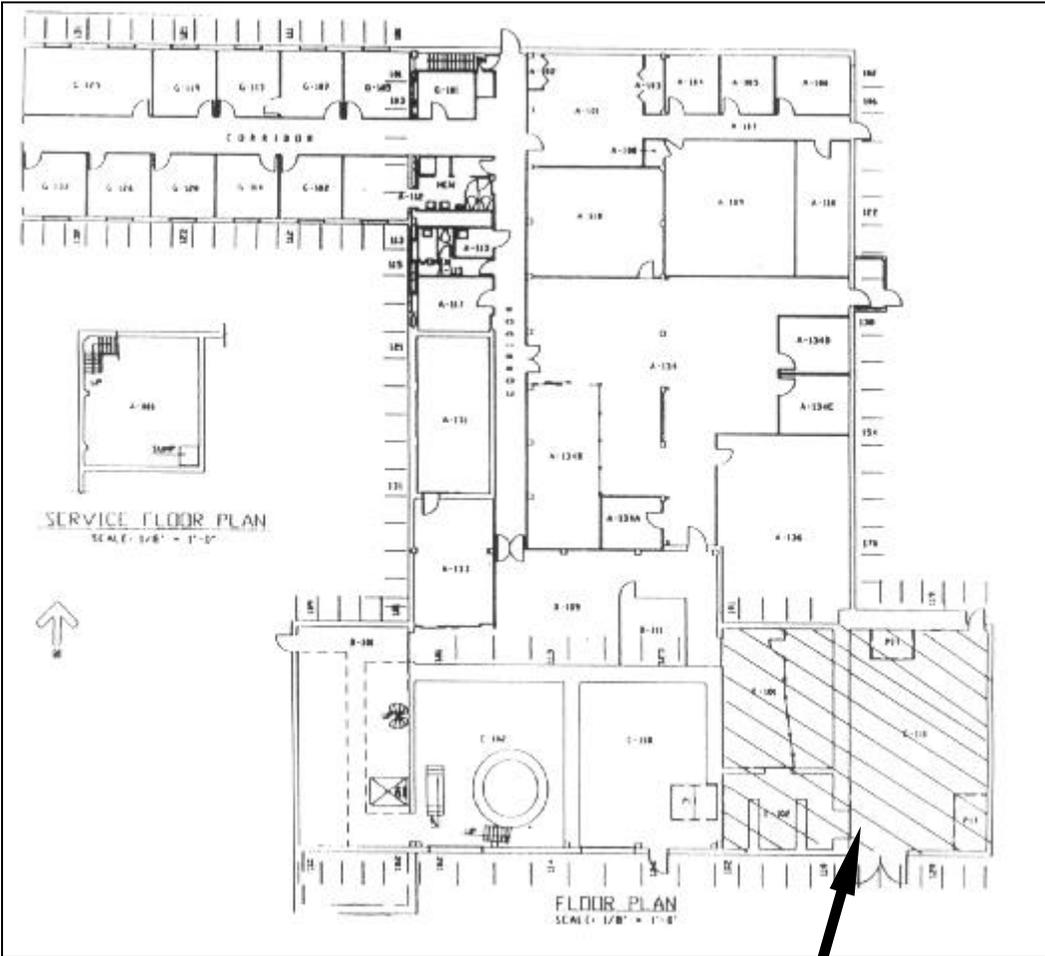


Figure 1 Location of the ATSR on the ANL-E Site in Building 316



Argonne Thermal Source Reactor
Decontamination and Disassembly Area

Figure 2 Location of Argonne Thermal Source Reactor in Building 316 (Shaded Area)

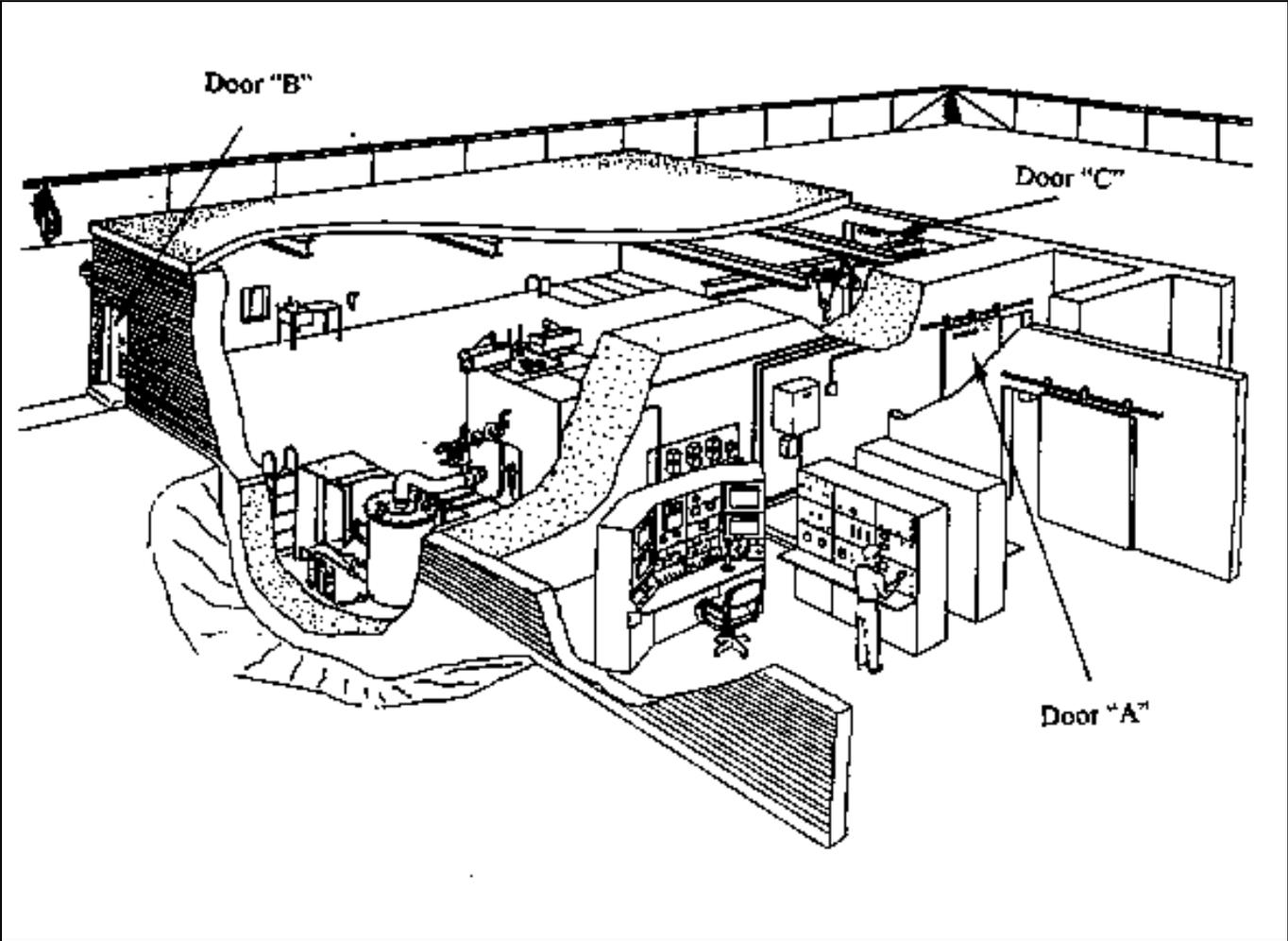


Figure 3 Argonne Thermal Source Reactor Facility Layout (Approximate Scale: 1" = 12')

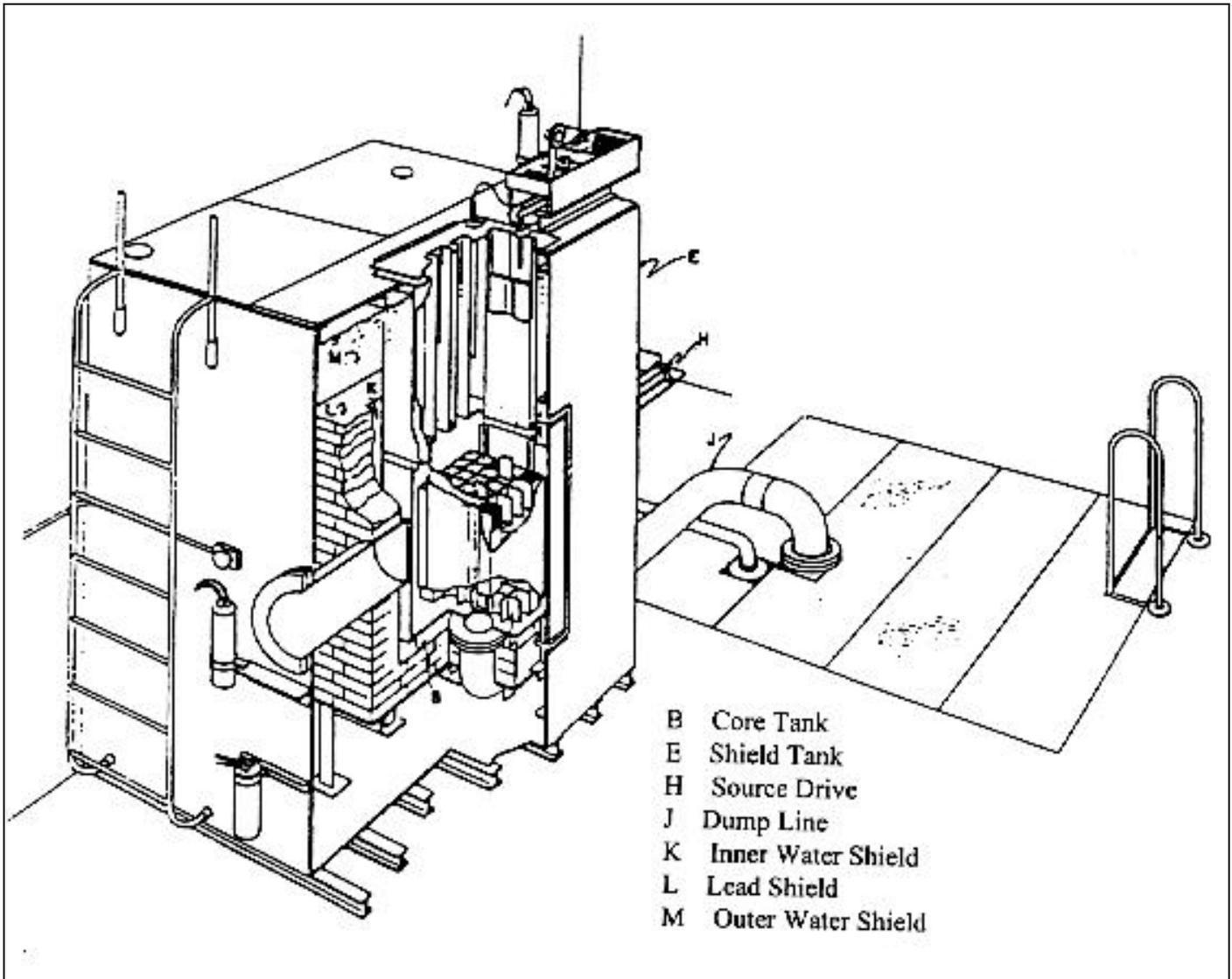


Figure 4 Isometric Cutaway of Argonne Thermal Source Reactor (Approximate Scale: 1" = 2.4')

2.0 PURPOSE AND NEED

The purpose of this project is to protect human health and the environment from risks associated with the contaminated surplus ATSR. The proposed action is needed because the ATSR, a former experimental reactor, contains residual radioactivity and hazardous materials.

3.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVE

3.1 The Proposed Action

The proposed action is the decontamination and disassembly (D&D) of ATSR, which includes activities such as equipment and systems disassembly; size reduction by cutting with saws or cut-off wheels; and all packaging and disposal of resultant waste. Some lead-based paint would be removed by grit blasting using a High Efficiency Particulate Air (HEPA)-filtered recovery system. The work would be performed indoors in Building 316.

The proposed activities are broken down into phases of work, as listed in Table 1. These phases are organized around major components of the facility and may not necessarily be performed in the sequence presented. Figures 2 and 3 denote the location where the following activities would take place.

TABLE 1 PROPOSED ACTIVITIES

PHASE OF WORK	TYPES OF ACTIVITIES DURING WORK
Lead Removal	Disassemble, survey and package lead bricks and items as either mixed waste or recoverable material.
Graphite Removal	Package for disposal the CP-1 and ATSR activated graphite piles.
Electrical Equipment	Electrically isolate and remove all electrical components and associated wiring.
Miscellaneous Equipment	Survey for “free release” all miscellaneous materials (i.e., furniture, tools, and equipment). Package activated/contaminated items as low level radioactive waste and “clean” material as surplus or recycle.
Reactor Systems	Disassemble, size reduce and package the reactor water systems and reactor air system as low level radioactive waste.
Activated Materials	Disassemble, size reduce and package for disposal the reactor shield tank, ATSR reactor tank, concrete shield blocks, safety and control rod drives, Snell block table, ATSR graphite table, and steel floor tracks.
Contaminated Materials	Disassemble, size reduce and package for disposal the fume hood and associated duct work, the dump tank and the equipment and material from the fuel storage pit.
Area Decontamination	Decontaminate with a jack hammer or decontamination solution the hot spot in E-102 and any additional contamination discovered during the D&D.
Final Survey	Perform a final radiological survey to confirm cleanup levels.

No hazardous materials would be introduced into the project area. Cleaning supplies, decontamination solutions 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.

Table 2 shows the types and amounts of waste generated. Approximately five truckloads of wastes would be shipped from ANL-E to off-site disposal facilities. These round-trip shipments would represent at most an additional 25,600 vehicle-kilometers.

TABLE 2 WASTE GENERATED

TYPE OF WASTE	AMOUNT
Wastewater	< 55 gallons
Hazardous waste (e.g. oils and lead-based paint removed.	Approximately 0.06 m ³ (2 ft ³)
Contact-handled low-level radioactive waste	Approximately 25.2 m ³ (890 ft ³)
Hazardous and radioactive mixed waste (i.e., surface contaminated and/or activated lead)	Approximately 2.7 m ³ (96 ft ³)
Non-contaminated waste materials (e.g. concrete, metal, wood, and plastic	Approximately 11.3 m ³ (400 ft ³)

3.2 No Action Alternative

Under the no action alternative, the ATSR would not be decontaminated and the existing equipment would not be removed. The ATSR would be maintained as at present in a safe lay-up condition. Surveillance and monitoring activities would continue to ensure adequate containment of radioactive materials, provide physical safety and security controls and to allow for personnel access.

4.0 THE AFFECTED ENVIRONMENT

4.1 Site Description

ANL-E occupies 1,500 acres in southern DuPage County, Illinois and is shown in Figure 1. The ANL-E site is completely surrounded by the 2,040 acre Waterfall Glen Forest Preserve, which is used as a public recreational area, nature preserve, and demonstration forest. The ANL-E site is approximately 27 miles southwest of downtown Chicago and 24 miles west of Lake Michigan. The ATSR is located in the southeast corner of Building 316 (see Figure 2).

The surrounding area is varied in land use and includes residential, commercial and industrial properties. No residential population live within 1 mile of the center of the project site.

4.2 Cultural Resources

4.2.1 Archaeological Sites

The entire ANL-E facility has been surveyed for archaeological sites (Bird 1992; Bird and Johnson 1993; Demel 1993a-c). Forty-six sites have been recorded. Three of the sites are eligible for the National Register of Historic Places (Demel and Lurie 1994; Elias and Greby 1990), 21 sites have been determined ineligible, and 22 sites have yet to be formally evaluated. None of the archaeological sites would be affected by the D&D of ATSR.

4.2.2 Historic Structures

The ATSR is located in the southeast corner of Building 316, in the Building 314, 315, 316 complex. DOE has determined that this complex is eligible for listing on the National Register of Historic Places because of its importance in the development of ANL-E and nuclear reactor technology and that the ATSR may be a contributing component of the complex (Haaker 1998) (see Appendix).

4.3 Air Quality

Routine continuous monitoring of sources of radionuclide air emissions at ANL-E has indicated that the amount of radioactive material released to the atmosphere is extremely small, resulting in a very small incremental radiation dosage to the neighboring population. The calculated potential maximum individual off-site dose to a member of the general public for 1996, from radionuclide air emissions other than radon-220, was 0.021 mrem which is 0.21 % of the 10 mrem per year U.S. Environmental Protection Agency standard. The maximum individual dose to an off-site member of the public in 1996 from all radionuclide air emissions, including radon-220, was 0.053 mrem. (Golchert and Kolzow 1997)

Air monitoring was also conducted at ANL-E perimeter and off-site sampling stations for total alpha activity, total beta activity, strontium-90, isotopic thorium, isotopic uranium, and plutonium-239 (Golchert and Kolzow 1997). No statistically significant difference was identified between samples collected at the ANL-E perimeter and samples collected off-site.

The State of Illinois has adopted the National Ambient Air Quality Standards. The ambient air quality standard of concern for the proposed D&D of ATSR is for particulate matter (dust) with a mean diameter less than or equal to 10 μm (PM_{10}). Concentrations of PM_{10} in the vicinity of ANL-E are less than the Illinois Environmental Protection Agency (IEPA) ambient air quality standard.

5.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

5.1 Environmental Impacts Of Decontamination and Disassembly

5.1.1 Sensitive Resources

The proposed activity would be conducted indoors, except for the transportation of waste. Therefore, there would be no environmental impact on wetlands, flood plains, or endangered species.

5.1.1.1 Cultural Resources

DOE has determined that the Building 314, 315, 316 complex is eligible for listing on the National Register of Historic Places because of its importance in the development of ANL-E and nuclear reactor technology. The ATSR may be a contributing component of the Building 314, 315, 316 complex, and the D&D of ATSR may be an adverse effect (Haaker 1998). DOE will mitigate for this adverse effect by completing Illinois Historic American Engineering Record documentation for ATSR in accordance with a memorandum of agreement with the Illinois Historic Preservation Agency (Crawford 1998a and b) (see Appendix).

5.1.2 Waste Disposal Capacity

5.1.2.1 Sanitary and Laboratory Wastewater

The proposed action would involve either the use of current ANL-E personnel or the use of up to ten outside contractors for a period of about three months. In either case the increase in sanitary water handling requirements would be negligible and well within the excess handling capacity of the laboratory system.

It is anticipated that little if any wastewater will be generated during the project (< 55 gallons total for the project). All waste water will be collected within the project site and sampled to determine if it meets laboratory wastewater discharge requirements. If it does not, it will be collected and sent to the ANL-E waste management facility for processing. In either case, ANL-E has adequate waste handling capacity to manage the wastewater.

5.1.2.2 Conventional Waste

The proposed action would generate approximately 11.3 cubic meters (400 cubic feet) of non-contaminated waste materials such as concrete, metal, wood and plastic from structures and equipment. These materials would be collected and transferred to a recycle contractor for sorting and disposal. Metals and other recyclable materials would be salvaged as scrap while the remaining materials would be disposed of at a municipal or commercial landfill with adequate

capacity to accept the waste. No disposal impacts for non-contaminated debris would be anticipated.

5.1.2.3 Hazardous Waste

The proposed action would generate less than 0.06 cubic meters (<2 cubic feet) of hazardous waste in the form of lead based paint and oils. Hazardous waste would be transferred to the ANL-E waste management facility for disposition by a contract vendor in accordance with applicable ANL-E waste management procedures and state Resource Conservation and Recovery Act (RCRA) requirements. The contract vendor selected will have adequate capacity to treat or dispose of the applicable waste stream.

5.1.2.4 Mixed Waste

The proposed action would generate approximately 2.7 cubic meters (96 cubic feet) of mixed waste predominantly in the form of activated lead bricks. This material would be surveyed. Lead with low dose rates and no loose contamination would be segregated for use at other projects as shielding. The remaining lead would be treated and disposed of in accordance with the Federal Facilities Compliance Act (FFCA) Site Treatment Plan for ANL-E. ANL-E may treat the lead by macro-encapsulation on-site and ship the treated lead to a commercial facility (i.e., Envirocare) for disposal. Alternatively, the activated lead would be shipped to Envirocare where it would be treated and disposed. In either case, the disposal facility has adequate capacity to handle this small volume of mixed waste. DOE would amend the FFCA Site Treatment Plan for ANL-E to provide for on-site macroencapsulation of lead prior to treating this waste stream on site.

5.1.2.5 Radioactive Waste

The proposed action would generate approximately 25.2 cubic meters (890 cubic feet) of low level radioactive waste in the form of activated concrete, graphite, and metal; and surface contaminated plastic, paper and cloth. The major radioactive isotopes are Cs-137, Co-60, U-238, and Eu-152. This material would be packaged and shipped to the low level radioactive waste disposal site in Hanford, WA in accordance with DOE policies and procedures. This disposal site has adequate capacity to receive this waste.

5.1.2.6 Asbestos

The project will not generate asbestos waste.

5.1.3 Air Quality Impacts

This project would generate very small amounts of particulate air emissions (dust) from size reduction of activated graphite, lead, metal and concrete. The dust would include lead and a small amount of the radionuclides Cs-137, Co-60, U-238, and Eu-152. Air emissions would be controlled by portable HEPA filters. IEPA has issued air operating permits for the portable HEPA filters. Impacts would be negligible

5.1.4 Noise Impacts

Noise would be associated with the operation of machinery and equipment such as coring machines, scabblers, jack hammers, fork lifts and portable HEPA filter units. Receptors of such noise would be limited to persons who work in or near Building 316. Noise impacts to persons beyond the site and its buffer zone (Waterfall Glen Nature Preserve) would not be noticed because of the distances from the source. The wearing of hearing protection would be required for workers in areas where noise levels would exceed permissible noise exposures defined at 29 CFR 1910.95. Impacts would be negligible.

5.1.5 Socioeconomic Impacts/Environmental Justice

Total proposed action cost would be less than \$650,000.00. These expenditures would take place over two years and represents a small fraction of ANL-E's annual operational expenditure. Thus the economic impact of the proposed action would be minor in the context of ANL-E 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. DOE has analyzed the effects of the proposed action and determined that implementing the action would not have adverse human health or environmental impacts in any area occupied by predominantly low-income or minority populations. Off-site impacts of the proposed action would be minimal and limited to the area immediately surrounding the ANL-E site. The area immediately surrounding ANL-E contains neither predominantly low-income nor minority populations.

5.1.6 Radiological Impacts

The only radiological effect on non-project workers in Building 316 or on the ANL-E site or members of the public would be from radiological air emissions (Section 5.1.3.). Worker personnel exposures from direct radiation are expected to average less than 100 mrem per worker and the estimated collective worker dose would be approximately 0.313 person-rem. (Garlock and Fellhauer 1998). Based on an occupational risk factor of 4×10^{-4} fatal cancers per person-

rem (ICRP 1991), workers engaged in this proposed project would incur a 1.24×10^{-4} collective risk for a fatal cancer.

Worker exposure to radiation would be controlled under established procedures that require doses be kept as low as reasonably achievable and that limit any individual's dose to less than 1 rem per year.

5.2 Environmental Impacts of Transportation

Approximately two truckloads of clean waste, three truckloads of low level radioactive waste, and one truckload of mixed waste would leave the site for shipment to disposal sites throughout the three month duration of the project. This compares to the annual average of about 45 shipments of low level waste from ANL-E and only represents a 7 % increase in low level waste shipments.

Based on a maximum of 25,600 vehicle-kilometers traveled, which represents four round-trip shipments to the DOE Hanford site in Washington state, and national average transportation accident rates of 0.25 accidents and 0.02 fatalities per million kilometers (Saricks and Kvittek 1994) the proposed mixed waste and low level radioactive waste shipments would result in an estimated 6.4×10^{-3} risk of an accident and a 5×10^{-4} risk of a fatality. Four round-trip shipments to the Hanford site were used to bound the transportation risk; actual vehicle-kilometers traveled would be less than four round-trip shipments to Hanford.

5.3 Natural Hazards and Accidents

An Auditable Safety Analysis (ASA) (Garlock and Fellhauer 1998) has been prepared for the proposed action. The major safety considerations are operational hazards and natural phenomena hazards. The ASA shows the potential for only localized consequences.

5.3.1 Natural Hazards

Risk associated with earthquake, lightning and floods are considered negligible (Garlock and Fellhauer 1998). All of the proposed disassembly work involving radioactive material would be done inside Building 316, a structure with 2 foot thick concrete walls and roof. In addition, the freight door is constructed with a 2 foot thick outside shield door which would also serve as a shield in the event of a direct tornado strike against the building. The impact of a tornado would be negligible because most of the limited amount of radioactive material at the ATSR is in the form of activation products in metals, graphite, and concrete; and would not be readily dispersed (Garlock and Fellhauer 1998).

5.3.2 Accidents

Accidents could occur in all proposed action operations including maintenance, on-site transportation, characterization, disassembly, and packaging for off-site disposal. Potential causes of accidents could include vehicles, contact with objects and equipment, and falls. Based on about 2,820 person hours of effort required to implement the proposed action and an occurrence rate for fatalities of about 7×10^{-8} fatalities per hour for construction-related activity (Bureau of Labor Statistics [BLS] 1996a), no fatal accidents would be expected to occur during the proposed action. Based on a rate of nonfatal occupational injuries and illnesses of about 5×10^{-5} cases per hour for heavy construction workers, except highway (BLS 1996b), no nonfatal occupational injuries and illnesses are anticipated.

The numbers of fatalities and injuries estimated for the proposed action (less than one) is based on average construction industry rates. Accident rates for the proposed action would be expected to be lower because of the safety programs that would be in place for D&D workers at ANL-E. The two most recently completed D&D projects, the Experimental Boiling Water Reactor (EBWR) and the Janus Reactor, involved 80,000 person hours of work. No loss time accidents and only three minor injuries occurred during the performance of these projects. Lessons learned from the D&D of EBWR and Janus would be incorporated into the plans and procedures for the D&D of ATSR to further reduce the probability of an injury.

5.4 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...”. Impact analyses have taken into consideration ongoing ANL-E actions. The incremental impact of the proposed action would be minimal and would not be significant when added to impacts from other projects at ANL-E, including ongoing operations. Future actions in the vicinity of ATSR include the D&D of reactors ZPR VI and ZPR IX (ANL-E 1993 and ANL-E 1994). These would not occur at the same time as the D&D of ATSR. The specific future use for the rooms that house the ATSR is not known. Additional National Environmental Protection Act (NEPA) review would be performed for any proposed re-use of this area.

5.5 Compliance With Regulations

The proposed action would comply with applicable federal, state and local laws. The applicable environmental laws and regulations are summarized below:

-  IEPA air permit for air discharges to the environment (Clean Air Act).
-  RCRA Part B permit for the treatment and storage of hazardous and mixed waste.

-  DOE Orders governing radioactive waste storage and decontamination/decommissioning of certain structures.
-  49 CFR Department of Transportation regulations governing shipment of hazardous and radioactive materials.

5.6 Pollution Prevention

The proposed action would be in accordance with ANL-E's waste minimization and pollution prevention practices. Efforts would be made during the disassembly process to recycle lead brick to the ANL-E lead bank for future use on-site. Efforts would also be made to recycle metal and concrete building materials, equipment and concrete shield blocks that are not activated or contaminated.

5.7 Environmental Impacts of the No Action Alternative

The no action alternative would preclude the use of the space for other activities and continue the Department's liability for the facility. The recovery of reusable lead shielding would also be precluded. This alternative would result in continued radiation exposure to surveillance and maintenance personnel and the continued risk of release of material due to accidents or natural hazards. Releases to the air and water would not increase, transportation risks would be avoided, and cultural resources would not be affected.

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO OTHER NEPA REVIEWS

Environmental Remediation at ANL-E (DOE/EA-1165) and Upgrade of Waste Storage Facilities at ANL-E (DOE/EA-1073) would be associated with the D&D of ATSR. DOE/EA-1073 analyzes ANL-E waste management operations which would be used in connection with waste generated from this proposed action. DOE/EA-1165 analyzes environmental remediation and D&D activities that are being conducted at other areas on the ANL-E site.

7.0 INDIVIDUALS AND AGENCIES CONSULTED

Illinois Historic Preservation Agency, A. E. Haaker, (May 21, 1998)

Advisory Council on Historic Preservation, T. M. McCulloch (June 15, 1998)

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APPENDIX

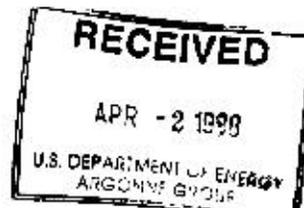


**Illinois Historic
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March 27, 1998

Timothy S. Crawford
Department of Energy
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Re: Eligibility of EBWR, CP-5 and ATSR, Section 106 process and
Programmatic Agreement

Dear Mr. Crawford:

We have reviewed the "Context for Evaluating Historical Significance of Structures at ANL-E" and the draft "Nuclear Weapons Production and Applied Atomic Research: A National Historic Context Document of Department of Energy Facilities Relating to the Manhattan Project (1942-1946) and Cold War Period (1947-1989)" provided by your office. This information provided us with a greater understanding of the Department of Energy's guidance for assessing historic properties and also gave us a better understanding of the general historic development of ANL-E. Based upon this framework and the previous report "National Register Eligibility Evaluation for Three Nuclear Reactors, Argonne National Laboratory-East, DuPage County, Illinois," our office believes that the Chicago Pile-5 (CP-5, 11-Du-339), the Experimental Boiling Water Reactor (EBWR, 11-Du-350) and the complex of Buildings 314, 315 and 316 which house the Argonne Thermal Source Reactor (ATSR, 11-Du-351) are eligible for listing on the National Register of Historic Places under criterion "A" because of their association with the development of ANL-E and the Cold War Period.

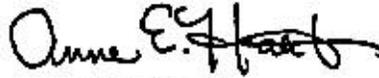
In our opinion, the decontamination and decommissioning of CP-5 and ATSR is an adverse effect, as defined under 36 CFR Part 800.9(b). We recommend that a Memorandum a Agreement (MOA) be developed to mitigate the adverse effect. This MOA should contain provisions for recordation of CP-5 and ATSR in accordance with the standards for the Illinois Historic American Buildings Survey/Historic American Engineering Record (IL HABS/HAER) program. I have enclosed information regarding the IL HABS/HAER program. Since EBWR has already been decontaminated and decommissioned and converted to storage, it will not be necessary to do any mitigation.

March 27, 1998
EBWR, CP-5, ATSR
Page 2

Your March 2, 1998 letter indicated that your staff is currently working on the development of a Programmatic Agreement which will provide for the National Register eligibility assessment of the remaining standing structures at ANL-E and also provide for the treatment of historic standing structures and archaeological sites. Based upon the context provided and the publication of J.M. Holl's book about Argonne, it appears that a basic framework for assessing the structures at ANL-E is available.

We look forward to continuing to work with you and your staff regarding the Department of Energy's section 106 responsibilities and the development of the Programmatic Agreement for ANL-E. If you have any questions, please contact Ms. Tracey A. Sculle, Cultural Resources Manager, at 217/785-3977.

Sincerely,



Anne E. Haaker
Deputy State Historic
Preservation Officer

enclosures

AEH:TAS

MAY 21 1998

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

Dear Ms. Haaker:

**SUBJECT: MEMORANDUM OF AGREEMENTS (MOA) FOR TWO REACTORS AT THE
DEPARTMENT OF ENERGY ARGONNE NATIONAL LABORATORY-EAST (DOE
ANL-E) SITE**

- References:**
1. Letter, A. E. Haaker to T. Crawford, dated 3/27/1998, Subject: Eligibility of EBWR, CP-5, and ATSR, Section 106 Process and Programmatic Agreement
 2. Letter, T. S. Crawford to J. Johnston, dated 4/14/1996, Subject: National Register Eligibility Evaluation for Three Nuclear Reactors
 3. Letter, T. S. Crawford to A. E. Haaker, dated 3/2/1998, Subject: Context for Evaluating Nuclear Reactors at ANL-E - IHPA Log #23081596

Reference 1 indicated that the decontamination and decommissioning (D&D) of Chicago Pile-5 (CP-5) and the Argonne Thermal Source Reactor (ATSR) is an adverse effect to the facilities as defined under 36 CFR Part 800.9(b). In addition, it recommended that a Memorandum of Agreement (MOA) be developed to mitigate the adverse effect.

As stated in reference 2, it remains the DOE's position that the CP-5 reactor is eligible for listing, while ATSR appears to be ineligible. However, DOE has decided to proceed as if both D&D projects would be adverse effects but is also in the process of hiring a certified historian to evaluate whether or not the ATSR is a contributing component of an eligible structure. Enclosure 1 is a signed MOA addressing the D&D of the CP-5 Reactor and enclosure 2 is a signed MOA addressing the D&D of the ATSR reactor. It is my understanding that my staff has prepared the MOAs in consultation with your Agency.

The ATSR D&D field work is scheduled to be completed by September, 30, 1998. In order to meet our project schedule we need the agreements to be signed and accepted by the Advisory Council on Historic Preservation no later than (NLT) June 15, 1998. Your expedited review and approval of the MOAs would be greatly appreciated.

Finally, as indicated by reference 3 we are still in the process of drafting a Programmatic Agreement that would establish a process for evaluating the remaining buildings on the ANL-E site. We expect to provide a draft agreement for your review in the near future.

MAY 21 1998

Ms. Anne E. Haaker

-2-

If you have any questions, please contact Donna Green at (630) 252-2264.

Sincerely,

ORIGINAL SIGNED BY
A. CREIG ZOOK

Timothy S. Crawford
Argonne Group Manager

Enclosures:
As stated

cc: T. McCulloch, Advisory Council on Historic Preservation, w/encs.



Department of Energy

Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

JUN 15 1998

Mr. Thomas M. McCulloch
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue, NW #809
Washington, D.C. 20004

Dear Mr. McCulloch:

Enclosed are proposed memoranda of agreement addressing (1) the decontamination and decommissioning of the Argonne Thermal Source Reactor at Argonne National Laboratory-East (ANL-E) and (2) the decontamination and decommissioning of the Chicago Pile-5 (CP-5) at ANL-E. The agreements have been signed by the Department of Energy and the Illinois Historic Preservation Agency. If possible, we would like to have the agreements accepted by the Advisory Council on Historic Preservation by June 19, 1998.

If you have any questions, please contact Donna Green at (630) 252-2264.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy S. Crawford".

Timothy S. Crawford
Argonne Group Manager

Enclosures:
As Stated

cc: A. Haaker, Illinois Historic Preservation Agency, w/o encls.
L. Thompson, EH-412/FORS, w/o encls.

MEMORANDUM OF AGREEMENT
BETWEEN THE U.S. DEPARTMENT OF ENERGY AND
THE ILLINOIS HISTORIC PRESERVATION OFFICER
SUBMITTED TO THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
PURSUANT TO 36 CFR 800.5(e)(4)
REGARDING THE DECONTAMINATION AND DECOMMISSIONING OF
THE ARGONNE THERMAL SOURCE REACTOR

WHEREAS the U.S. Department of Energy, Argonne Group (DOE-ARG) proposes to decontaminate and decommission (D&D) the Argonne Thermal Source Reactor (ATSR) for reasons of environmental concern, human health, and safety; and

WHEREAS the Department of Energy has established the D&D of ATSR's area of potential effects, as defined at 36 CFR 800.2(c), to be the Argonne Illinois site; and

WHEREAS the Department of Energy has determined that the 314/315/316 building complex may be eligible for inclusion in the National Register of Historic Places; and

WHEREAS the Department of Energy has determined that the D&D of ATSR will have an adverse effect on the ATSR which may be a contributing component of the 314/315/316 building complex at Argonne National Laboratory-East; and

WHEREAS the Department of Energy has consulted with the Illinois State Historic Preservation Officer (SHPO) in accordance with Section 106 of the National Historic Preservation Act, 16 U.S.C. Section 470 (NHPA), and its implementing regulations (36 CFR Part 800) to resolve any adverse effect of the D&D of ATSR on potentially historic properties;

NOW, THEREFORE, DOE-ARG and the SHPO agree that upon acceptance of the MOA by the Advisory Council on Historic Preservation (Council), and upon DOE-ARG's decision to proceed with the D&D of ATSR, DOE-ARG shall ensure that the following stipulations are implemented in order to take into account the effects of D&D of ATSR on historic properties.

STIPULATIONS

DOE-CH will ensure that the following measures are carried out:

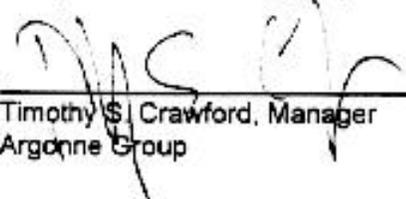
1. Prior to and during the D&D of ATSR, DOE-ARG shall document ATSR in accordance with the Illinois Historic American Buildings Survey/Historic American Engineering Record (IL HABS/HAER) Standards.

- A. IL HAER recordation number will be DU-1998-1.
 - B. Level II shall be required.
 - C. DOE-ARG will ensure that the recordation will be conducted by a person qualified to perform the work as required under 36 CFR Part 61, Appendix A and agrees to meet IL HABS/HAER Standards.
 - D. The SHPO will review the completed IL HABS/HAER documentation and accept the final submittal in accordance with IL HABS/HAER Standards.
 - E. After SHPO acceptance, completed IL HABS/HAER documentation will be deposited with the archives section of the Illinois State Historical Library. The SHPO requires one standard and one microfiche copy of accepted documentation.
- II. In the event a party to this MOA determines the terms of the MOA cannot be met or that a change is necessary to meet the requirements of the law, that party will immediately request that the other parties to this MOA consider an amendment or addendum. Any necessary amendment or addenda will be executed in accordance with 36 CFR 800.5(e)(5).

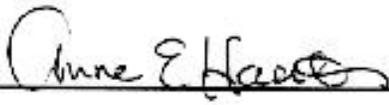
Execution of this MOA by the DOE-ARG and the Illinois SHPO, its subsequent acceptance by the Advisory Council on Historic Preservation (Council), and implementation of its terms, shall constitute evidence that the DOE-ARG has afforded the Council an opportunity to comment of the nature and extent of the planned D&D of ATSR and that DOE-ARG has taken into account the effects of the undertaking on historic properties as required by Section 106 of the National Historic Preservation Act.

Signature sheet for the foregoing Memorandum of Agreement Among the United States Department of Energy and the Illinois State Historic Preservation Office covering D&D work at the ATSR at Argonne National Laboratory-East.

U.S. Department of Energy, Argonne Group

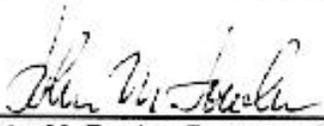
By:  Date: 5/21/98
Timothy S. Crawford, Manager
Argonne Group

Illinois State Historic Preservation Officer

By:  Date: 6/12/98

This Memorandum of Agreement Among the United States Department of Energy and the Illinois State Historic Preservation Officer covering D&D work at the ATSR at Argonne National Laboratory-East has been accepted for the Advisory Council on Historic Preservation.

Advisory Council on Historic Preservation

By:  Date: 7/6/98
Mr. John M. Fowler, Executive Director

FINDING OF NO SIGNIFICANT IMPACT

Proposed Decontamination and Disassembly of the
Argonne Thermal Source Reactor
at Argonne National Laboratory-East



**U. S. Department of Energy
Chicago Operations Office**

July 15, 1998

U. S. Department of Energy

Finding of No Significant Impact

**Proposed Decontamination and Disassembly of the Argonne Thermal Source Reactor
at Argonne National Laboratory-East**

AGENCY: U. S. Department of Energy

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The Department of Energy (DOE) has prepared an Environmental Assessment (EA) DOE/EA-1266, evaluating proposed decontamination and disassembly (D&D) of the Argonne Thermal Source Reactor (ATSR) at Argonne National Laboratory-East (ANL-E), Argonne, Illinois. The ATSR was one of several early “zero power” reactors (ZPRs) developed and operated from 1950 to 1989 within the Building 314, 315, 316 complex at ANL-E. The reactor was used to conduct research from 1953 until the late 1980's when it was shut down and the fuel removed. The ATSR facility is located in Building 316.

The D&D work would protect human health and the environment from risks associated with the contaminated surplus ATSR, a former experimental reactor that contains residual radioactivity and hazardous materials.

Based on the analysis in the EA, the DOE has determined that the proposed action does not constitute a major federal action significantly affecting 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 would include activities such as equipment and systems disassembly; size reduction by cutting with saws or cut-off wheels; and packaging and disposal of the resultant waste. Some lead-based paint would be removed by grit blasting using a High Efficiency Particulate Air (HEPA)-filtered recovery system. Reactor components such as lead shielding bricks, graphite piles, concrete shielding, a fume hood, duct work, and a dump tank would be disassembled and packaged for removal. The work would be performed indoors in Building 316.

ALTERNATIVES:

Under the no action alternative, the ATSR would not be decontaminated and the existing equipment would not be removed. The ATSR would be maintained as at present in a safe lay-up condition. Surveillance and monitoring activities would continue to ensure adequate containment of radioactive materials, provide physical safety and security controls and to allow for personnel access. The use of the space for other activities would be precluded. Surveillance and maintenance personnel would continue to be exposed to radioactivity and the risk of release of material due to accidents or natural hazards would remain.

ENVIRONMENTAL IMPACTS:

Impacts of activities associated with D&D of the ATSR were analyzed in the EA. The finding of no significant impact for the proposed action is based on the following factors which are supported by information and analysis in the EA.

Cultural Resource Impacts: DOE has determined that the Building 314, 315, 316 complex is eligible for listing on the National Register of Historic Places because of its importance in the development of ANL-E and nuclear reactor technology. The ATSR may be a contributing component of the Building 314, 315, 316 complex and the D&D of ATSR may be an adverse effect. DOE will mitigate for this adverse effect by completing Illinois Historic American Engineering Record documentation for ATSR in accordance with a memorandum of agreement with the Illinois Historic Preservation Agency and the Advisory Council on Historic Preservation.

Air Quality Impacts: This project would generate very small amounts of particulate air emissions (dust) which would include a small amount of radioactivity. Air emissions would be controlled by portable HEPA filters.

Transportation Impacts: Approximately six truckloads of wastes would leave ANL-E for shipment to disposal sites. No transportation accidents would be expected to occur.

Human Health Impacts: Worker personnel radiation exposures are expected to average less than 100 mrem per worker and the estimated collective worker dose would be approximately 0.313 person-rem. Workers engaged in the proposed action would incur a 1.24×10^{-4} collective increased risk for a fatal cancer.

Accidents and Natural Hazards: The risks of accidental injury to workers from the proposed action would be similar to risks from construction projects of comparable size. No fatal accidents and no nonfatal occupational injuries or illnesses would be expected to occur based on construction industry statistics.

Waste Management: The proposed action would generate approximately 11.3 m³ of conventional waste, 25.2 m³ of low-level radioactive waste, 2.7 m³ of low-level radioactive and hazardous mixed waste, and 0.06 m³ of hazardous waste.

All wastes generated by the proposed action (except for lead shielding bricks that may be recycled as shielding at other projects and wastewater) would be disposed of at off-property permitted facilities with available capacity.

Noise Impacts: Noise would be produced by D&D equipment during normal working hours for the duration of the project. Workers located in areas where equipment would be used for remediation would use hearing protection if necessary. Noise would not be noticed by persons away from the Building 316 area.

Environmental Justice: DOE has analyzed the effects of the proposed action and determined that implementing the action would not have adverse human health or environmental impacts in any area occupied by predominantly low-income or minority populations. Off-property impacts of the proposed action would be minimal and limited to the area immediately surrounding the ANL-E property. The area immediately surrounding ANL-E contains neither predominantly low-income nor minority populations.

Cumulative Impacts: The incremental impact of the proposed action would not be significant if added to all other past, present and reasonably foreseeable future actions at ANL-E. No known off-property activity is adversely affecting human health or the environment on the ANL-E property or in immediately adjacent areas.

DETERMINATION:

Based on the analysis in the EA, the DOE has determined that the proposed D&D of the ATSR at Argonne National Laboratory-East does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, an Environmental Impact Statement on the Proposed Action is not required.

PUBLIC AVAILABILITY: Copies of the EA (DOE/EA-1266) are available from:

Timothy S. Crawford
Argonne Group Manager
9800 South Cass Avenue
Argonne, Illinois 60439
(630) 252-2436

For further information regarding the Department of Energy's National Environmental Policy Act process contact:

W. S. White
NEPA Compliance Officer
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439
(630) 252-2101

Issued in Argonne, Illinois, this 15th Day of July, 1998

John P. Kennedy
Acting Manager