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## Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory—West; Finding of No Significant Impact (FONSI)

**AGENCY:** Department of Energy.

**ACTION:** Finding of no significant impact.

**SUMMARY:** The United States Department of Energy has prepared an environmental assessment, DOE/EA–1148 (finalized on May 15, 1996), on the proposed *Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory—West.* The Proposed Action is to conduct a research and demonstration project involving electrometallurgical processing of up to 100 Experimental Breeder Reactor–II driver assemblies and 25 Experimental Breeder Reactor–II blanket assemblies in the Fuel Conditioning Facility at Argonne National Laboratory—West. Electrometallurgical processing involves the dissolution of spent nuclear fuel by use of an electric current in a molten salt mixture. The uranium in the fuel is collected at the cathode and subsequently melted to form a metal ingot; the structural metals and some fission products are retrieved undissolved from the anode and are cast into a metal ingot; and eventually most fission products and all transuranic elements are isolated in a ceramic waste form. The number of driver fuel assemblies covered by the Proposed Action would provide the minimum fission product loading (3 percent) necessary to evaluate the effectiveness of the removal of fission products from the electrorefiner salt and their concentration in the ceramic waste form. In addition, the 25 blanket assemblies proposed would provide a sufficient quantity of material to evaluate the higher efficiency electrorefining necessary to process the much larger blanket assemblies. The Proposed Action would require approximately three years, and is designed to address demonstration goals for electrometallurgical treatment technology outlined by the National Research Council in a 1995 report to the Department. In accordance with the Council on Environmental Quality requirements contained in 40 CFR Parts 1500–1508, the environmental assessment examined the environmental impacts of the Proposed Action and potential alternatives.

The Department distributed a draft environmental assessment for public review and comment from February 5, 1996 to March 22, 1996 (61 FR 3922, January 29, 1996), and conducted public meetings on the draft assessment in Idaho Falls, Idaho on February 21, 1996, and Washington, D.C. on February 27, 1996. In response to several requests, the Department reopened the public review period until May 3, 1996 (61 FR 16471, April 15, 1996).

The Department has considered all comments on the draft environmental assessment, including comments submitted by 5 members of Congress, 17 organizations, and 53 individuals. Those comments and the Department's responses are presented in an appendix to the final environmental assessment entitled, ''Comment Response Document.'' A summary of the major public comments and the Department's responses is provided under Supplementary Information below.

The Department has decided to proceed with the proposed demonstration. Even if successful, however, the demonstration will not automatically lead to the treatment of more Experimental Breeder Reactor–II spent nuclear fuel or to other broader applications of electrometallurgical technology. The Department will not make any significant additional use of the electrometallurgical refining technology without first preparing an environmental impact statement. Specifically, the Department will not use this technology to treat the remaining Experimental Breeder Reactor–II spent fuel or make another production-scale use of the technology without preparing an environmental impact statement.

The Department would exercise its authority to prevent proliferation sensitive information and technology advances resulting from the proposed demonstration from becoming available to potential proliferant-risk countries, including exercising its authority under the Atomic Energy Act, the Nuclear Nonproliferation Act of 1978 and the Department's implementing regulations.

Based on the analysis in the environmental assessment, which is incorporated herein by reference, and after consideration of all the comments received as a result of the public review process, the Department of Energy 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. Therefore, an environmental impact statement is not required.

**FOR FURTHER INFORMATION CONTACT:** Persons requesting additional information regarding the Electrometallurgical Treatment Project or a copy of the environmental assessment should contact: Mr. Robert G. Lange, Associate Director for Facilities (NE–40), Office of Nuclear Energy, Science and Technology, U.S. Department of Energy (GTN), 19901 Germantown Road, Germantown, Maryland 20874.

Mr. Lange may also be reached by calling (301) 903–2915.

Persons requesting general information on the Department of Energy's National Environmental Policy Act process should contact: Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Assistance (EH–42), U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585.

Ms. Borgstrom may also be reached by calling (202) 586–4600, or by leaving a message at (800) 472–2756.

**SUPPLEMENTARY INFORMATION:**

### Background

The Department of Energy is responsible for managing spent nuclear fuel in its inventory, including spent nuclear fuel from the Experimental Breeder Reactor-II. The Department manages 25.5 metric tons (heavy metal) of Experimental Breeder Reactor-II fuel at Argonne National Laboratory-West and the Idaho Chemical Processing Plant, both located at the Idaho National Engineering Laboratory near Idaho Falls. The Department has a legally binding commitment to remove spent nuclear fuel from the State of Idaho by the year 2035, including fuel from the Experimental Breeder Reactor-II. The Experimental Breeder Reactor-II fuel is unlikely to be suitable for direct disposal in a geologic repository because it is saturated with sodium, which is a reactive material. Experimental Breeder Reactor-II spent fuel may also be unsuitable for direct disposal in a geologic repository because of criticality concerns associated with fuels containing highly-enriched uranium.

The Department has identified electrometallurgical treatment as a promising technology to treat

Experimental Breeder Reactor-II spent nuclear fuel to make it suitable for repository disposal, but an appropriate demonstration is needed to provide sufficient information for the Department to evaluate the feasibility of the technology. At the Department's request, the National Research Council conducted an independent assessment of the potential application of electrometallurgical technology to treat spent nuclear fuel from the Experimental Breeder Reactor-II. In its 1995 report, the Council recommended that the Department proceed to demonstrate the feasibility of electrometallurgical technology using Experimental Breeder Reactor-II spent nuclear fuel. A successful demonstration of the electrometallurgical technology on a sufficient sample of the Experimental Breeder Reactor-II spent nuclear fuel, combined with research and testing of the resulting waste forms, is expected to provide information the Department needs to determine whether to propose applying this technology to the remainder of the Experimental Breeder Reactor-II spent nuclear fuel or other spent nuclear fuel.

## Proposed Action

The Proposed Action is to conduct a research and demonstration project involving electrometallurgical processing of up to 100 Experimental Breeder Reactor-II driver assemblies and 25 Experimental Breeder Reactor-II blanket assemblies in the Fuel Conditioning Facility at Argonne National Laboratory-West. Electrometallurgical processing involves the dissolution of spent nuclear fuel by use of an electric current in a molten salt mixture. The uranium in the fuel is collected at the cathode and subsequently melted to form a metal ingot; the structural metals and some fission products are retrieved undissolved from the anode and are cast into a metal ingot; and eventually most fission products and all transuranic elements are isolated in a ceramic waste form. The number of driver fuel assemblies covered by the Proposed Action would provide the minimum fission product loading (3 percent) necessary to evaluate the effectiveness of the removal of fission products from the electrorefiner salt and their concentration in the ceramic waste form. In addition, the 25 blanket assemblies would provide a sufficient quantity of material to evaluate the higher efficiency electrorefining necessary to process the much larger blanket assemblies. The Proposed Action would require approximately three years, and is designed to address demonstration goals for electrometallurgical treatment technology outlined by the National Research Council in its 1995 report.

The one hundred driver assemblies involved in the Proposed Action would require multiple batch operations of the processing equipment in a remote, radioactive hot cell with an inert argon atmosphere. These operations would be sufficient to demonstrate the overall dependability and predictability of the process, considering equipment reliability, repair and maintenance, and operability of linked process steps. In addition, processing 100 driver fuel assemblies is expected to produce waste-form samples with representative radioactive waste loadings in quantities sufficient for testing. It is expected that the testing of these samples will assist in the development and characterization for future repository acceptance of the two process waste forms (ceramic and metal) produced by the electrometallurgical processing technique.

In order to evaluate higher efficiency electrorefining, 25 blanket assemblies would be processed in a second electrorefiner to be installed in the Fuel Conditioning Facility hot cell. Testing of the electrorefining concept with nonradioactive surrogate materials and construction of the second electrorefiner are currently underway at the Argonne National Laboratory-East site near Chicago, Illinois. Under the Proposed Action, this electrorefiner would be transported to Argonne National Laboratory-West, installed in the Fuel Conditioning Facility hot cell, and used to process the 25 blanket assemblies. This processing would require about seven batch operations in the high efficiency electrorefiner. These operations would demonstrate a one-day throughput of approximately 160 kilograms (353 pounds) per batch.

The Fuel Conditioning Facility is a small research facility, and its material handling equipment could not sustain the continued preparation of spent nuclear fuel for operation of the high-efficiency electrorefiner at a throughput equivalent to a production operation. Even though a production-scale operation in the Fuel Conditioning Facility is not possible with existing equipment, however, this demonstration would show the feasibility of batch operation electrorefining at a capacity approaching 200 kilograms per day (441 pounds per day) of radioactive Experimental Breeder Reactor-II spent nuclear fuel in a suitably designed and equipped facility, as recommended by the National Research Council. Seven batch operations should be sufficient to evaluate the reliability of the equipment and to meet the intent of the National Research Council's recommendation regarding high-efficiency electrorefining.

## Alternatives Analyzed

The environmental assessment analyzed in detail the following alternatives to the Proposed Action:

1. Conducting the research and demonstration project in a facility at an alternative location, i.e., the Test Area North Hot Shop at the Idaho National Engineering Laboratory;
2. Conducting an equipment performance verification project by treating 50 driver assemblies and 10 blanket assemblies in the Fuel Conditioning Facility; and
3. Taking no action, i.e., placing all the Experimental Breeder Reactor-II spent nuclear fuel in interim storage, and not demonstrating the electrometallurgical treatment technology.

Alternative 1, Demonstration at an Alternative Facility and Location, would result in higher program cost and extensive additional waste generated from required facility modifications and relocation of the nuclear materials presently stored in the Test Area North Hot Shop to allow for the appropriate reconfiguration of that facility to accommodate electrorefining equipment. This alternative would also require the transportation on public highways of spent nuclear fuel and the electrometallurgical equipment from the Argonne National Laboratory-West to the Test Area North Hot Shop, which would not be necessary for the Proposed Action.

Alternative 2, Equipment Performance Verification, is very similar to the Proposed Action in terms of its environmental impacts. However, this alternative would not fully satisfy the purpose and need for Department of Energy action because this alternative would not provide sufficient quantities of fission products, transuranics, and sodium impurities to test the electrorefiner under conditions comparable to production-scale operation and to address the recommendations of the National Research Council.

Alternative 3, No Action, is also similar to the Proposed Action in that the environmental impacts that would result from packaging and storing all the Experimental Breeder Reactor-II spent nuclear fuel would be small. However, the No-Action Alternative would not provide the information and data needed to determine whether to

continue the development of this technology as a potential management option for the disposal of Experimental Breeder Reactor-II sodium-bonded spent nuclear fuel.

Alternatives Considered But Not Analyzed in Detail in the Environmental Assessment

Demonstration of a technology other than electrometallurgical processing was not analyzed in detail because there are no other ''innovative'' spent nuclear fuel treatment technologies that have reached a stage of development to warrant testing by the Department of Energy with irradiated fuel. The environmental assessment discussed, but did not analyze in detail, the following alternative treatment technologies:

- *Chloride Volatility:* This very high temperature process would convert spent nuclear fuel to chloride compounds in a gaseous state, from which the constituents could be separated into appropriate streams for further treatment. Demonstration of chloride volatility technology would require development of very high temperature, corrosion-resistant equipment. This technology has not reached a stage of development suitable for demonstration with spent nuclear fuel.
- *Glass Material Oxidation and Dissolution:* This treatment concept would dissolve spent nuclear fuel using a system of lead and lead oxide with the intent of incorporating most spent nuclear fuel constituents in a glass waste form. It too has not reached a stage of development suitable for demonstration with spent nuclear fuel.
- *Plasma Arc Process:* This extremely high temperature process would use an electric arc to melt spent nuclear fuel, allowing the constituents to separate into glass and metal phases. However, this technology is still in the early stages of research and development and is not currently suitable for demonstration with spent nuclear fuel.
- *Hot, Water-Saturated Carbon Dioxide and Alcohol/Water Rinsing Processes:* These processes, which would react the sodium to form sodium carbonate, would require extensive development to safely control the reactions and to stabilize the products of the reactions before they could be considered ready for a demonstration with sodium-bonded fuel.
- *Low-Temperature Vacuum Distillation:* This process would evaporate the sodium from around the uranium fuel. It would not work for the Experimental Breeder Reactor-II driver fuel, however, because from 20 to 40 percent of the sodium in the driver fuel has been absorbed into the porous metal fuel alloy.

In addition, the environmental assessment considered, but did not analyze in detail, existing technologies that would require some development and modification. These technologies include:

- *Mechanical Processing:* This process has been used on some Experimental Breeder Reactor-II blanket fuel assemblies to strip away the layer of metallic sodium under the fuel's cladding. Considerable development of optical and control systems would be required for safe and reliable remote operation of a high-power laser to remove the fuel cladding in a radioactive hot cell environment. The sodium adhering to the cladding material, as well as the uranium, would be contaminated by cesium-137 during the cutting process and would require additional treatment and perhaps creation of a new waste form for disposal purposes. Mechanical processing would not work for the driver fuel assemblies, however, because from 20 to 40 percent of the sodium in the driver assemblies has been absorbed within the fuel, and therefore could not be removed except by dissolving or melting the fuel.
- *Plutonium Uranium Extraction (PUREX) Processing at the Idaho Chemical Processing Plant:* Modifying this reprocessing plant to dissolve the modern Experimental Breeder Reactor-II spent nuclear fuel would require changes in the dissolution process. These changes would be necessary because the zirconium in the modern Experimental Breeder Reactor-II fuel alloy inside a stainless steel cladding would require chemical additives to control the dissolution reaction safely. In addition, the plant would have to be restarted to carry out the demonstration. Because of excessive cost and the development required, processing of Experimental Breeder Reactor-II spent nuclear fuel at the Idaho Chemical Processing Plant is not a reasonable alternative to the proposed limited demonstration of electrometallurgical treatment technology.
- *Dissolution and Vitrification:* This process, which would dissolve spent nuclear fuel in acid (initial stage of PUREX process) and then vitrify it in borosilicate glass, would require a major modification to the existing dissolution process at the Savannah River site in order to be used in a demonstration with Experimental Breeder Reactor-II fuel. This modification would be similar to the modification that would be required for the Idaho Chemical Processing Plant discussed above. Further, the fuel would have to be packaged and shipped to Savannah River, which would be inconsistent with the Records of Decision (60 Fed. Reg. 28680, June 1, 1995 and 61 Fed. Reg. 9441, March 8, 1996) for the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Environmental Impact Statement. These decisions require the regionalization of the type of spent fuel that would be involved in the demonstration to the Idaho National Engineering Laboratory.

Treatment at a Location Outside of the Idaho National Engineering Laboratory

The Department also considered electrometallurgical treatment at a location outside of the Idaho National Engineering Laboratory. This alternative would require the removal, decontamination and relocation of existing equipment to a newly constructed hot cell facility where the demonstration project would be conducted. This is not considered a reasonable alternative for a limited demonstration, because of the excessive cost and time involved for these preparative activities. This alternative would also be contrary to the Records of Decision for the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Environmental Impact Statement.

Spent Fuel, Byproduct, and Waste Material Management

The Proposed Action would generate process wastes from the treatment operations and incidental wastes from the normal support operations of a hot cell facility. The process wastes include the fuel assembly hardware, metal waste form and ceramic waste form. The incidental wastes include operational wastes such as broken equipment, rags, packaging materials and other miscellaneous items. After use of the demonstration equipment has been completed, decommissioning wastes would include the disposal of the process equipment and process fluids such as the electrorefiner salt and cadmium. These materials would be categorized and disposed of according to existing Department of Energy orders and the Argonne National Laboratory radioactive waste management procedures. Two uranium byproducts would be recovered from the demonstration: low-enriched uranium blended down from the highly-enriched uranium in the driver fuel assemblies,

and depleted uranium from the blanket fuel assemblies. The uranium byproducts would be characterized according to the level of residual contamination. Adequate storage locations exist at Argonne National Laboratory-West to accommodate the small volume of spent nuclear fuel, waste materials, and byproduct uranium.

These materials, except the metal waste form and ceramic waste form, are currently produced at the Argonne National Laboratory-West site and would continue to be produced under all alternatives. The metal waste form and ceramic waste form, which would be classified as high level waste, would contain the fission products from the spent nuclear fuel and would be stored in the Radioactive Scrap and Waste Facility at Argonne National Laboratory-West. Both the high-level waste forms and the spent nuclear fuel elements are highly radioactive, requiring identical double containment and shielding, as well as special handling procedures.

Because processing assemblies would result in waste forms that are more compact, less storage volume would be required for the waste forms and uranium byproducts of the treated assemblies than for the untreated spent nuclear fuel assemblies. Under the Proposed Action, the Radioactive Scrap and Waste Facility storage requirement would be 38 liners (vertical underground storage cylinders). Byproduct uranium ingots would total 0.15 cubic meters (5.3 cubic feet) in volume [equivalent to two Radioactive Waste and Scrap Facility canisters (engineered storage containers with welded tops that fit into the storage liners)]. The Equipment Performance Verification Alternative (see Alternatives Analyzed, above) would require 59 Radioactive Waste and Scrap Facility storage liners and storage space for 0.07 cubic meters (2.5 cubic feet) of uranium byproduct ingots (equivalent to one Radioactive Waste and Scrap Facility canister). A larger number of storage liners would be required in this alternative because more spent fuel would have to be stored. The No-Action Alternative would require 81 Radioactive Waste and Scrap Facility storage liners. The number of storage liners required under the Demonstration in the Alternative Facility at the Test Area North Hot Shops at the Idaho National Engineering Laboratory is the same as the Proposed Action because only the location of the treatment process is different.

Low level radioactive wastes would be generated by routine facility operations under all alternatives, ranging in volume from 20 cubic meters (700 cubic feet) in the Proposed Action to 70 cubic meters (2475 cubic feet) in the No-Action Alternative. Fifty cubic meters (1750 cubic feet) of transuranic waste would be generated in the action alternatives.

Comparisons of waste that would be generated under the Proposed Action and the current Idaho National Engineering Laboratory inventory of similar waste are shown in Table 1. Adequate waste storage capacity exists for all alternatives.

Environmental Consequences of the Proposed Action

*Surface Water Impacts:* As described in Section 4.3.5 of the environmental assessment, the Proposed Action would not produce liquid effluents, so there would not be any impacts to surface waters or groundwater from effluents. To prevent potential releases to surface or subsurface waters resulting from spills of hazardous materials used in buildings, the Fuel Conditioning Facility and other buildings are designed, constructed and maintained to contain these materials.

TABLE 1. COMPARISONS OF WASTE GENERATED UNDER THE PROPOSED ACTION

| Waste streams | Proposed Action ($m^3$) | Current INEL inventory* ($m^3$) | Percent of INEL inventory (%) |
|---|---|---|---|
| High level waste | 0.52 | 10,000 | 0.0052 |
| TRU waste | 50 | 65,000 | 0.092 |
| Low level waste | 20 | 9,500 | 0.21 |
| Mixed waste | 1 | 1,100 | 0.10 |
| Greater than class C waste | 1.4 | 9,100 | 0.015 |
| Environmental restoration waste** | 192 | 320,000 | 0.06 |

*Source: ''Intergration of EM activities at the INEL,'' Idaho National Engineering Laboratory, March 31, 1995.
**Waste that would be generated from decommissioning activities following the demonstration.

*Land Impacts:* Land use at Argonne National Laboratory-West has been dedicated to nuclear reactor and spent fuel research since 1955. All activities associated with the Proposed Action would take place on previously disturbed land and within existing structures.

*Cultural Resources:* All activities associated with the Proposed Action would be conducted within existing facilities. No archeological or historic sites and structures would be affected.

*Threatened or Endangered Species:* There are no known threatened or endangered species or sensitive habitats that would be affected by the Proposed Action.

*Nonradioactive Air Emissions:* As summarized in Section 4.1.1.1 of the environmental assessment, potential impacts from nonradioactive releases associated with the Proposed Action are very small. A small amount of refrigerant gas (freon R–22) may escape from the argon cell cooling system at the Fuel Conditioning Facility and electrical equipment cleaning will also contribute a small amount. No adverse consequences would be expected to result from the estimated total refrigerant gas release of about 90 kilograms (200 pounds) per year, which is small (400 times less) compared with the 36,000 kilograms per year (40 tons per year) Idaho regulatory threshold for ''significant'' release of volatile organic compounds.

*Radioactive Air Emissions:* As summarized in Section 4.1.1.2 of the environmental assessment, potential offsite doses from routine operations during this Proposed Action are quite small, less than $1.1\times10^{-6}$ rem per year to the maximally exposed individual. This is more than a factor of 9,000 less than the 0.01 rem per year annual dose limit imposed by the National Emission Standards for Hazardous Air Pollutents program. No increased radiation levels, above background, would be detectable at the Argonne National Laboratory-West site or at the Idaho National Engineering Laboratory site boundary.

*Worker Health Effects* (Normal Operating Conditions): As described in Section 4.1.2 of the environmental assessment, under the Proposed Action, the average exposure of workers to radiation is small, and is not expected to increase to levels above those of the No-Action Alternative. The average annual exposure for a worker in the Fuel Conditioning Facility directly involved in the project is estimated to be 0.06 rem per year, and 0.03 rem per year for those not directly involved. These numbers are less than the 0.35 rem per year annual natural background radiation in the surrounding Eastern Snake River Plain. The probability of a single additional latent cancer fatality among workers involved in the project from the increased exposure is estimated to be one chance in 1,000.

*Transportation Impacts:* Transportation risks at the Idaho National Engineering Laboratory are small and would not be increased as a result of this Proposed Action. The Argonne National Laboratory-West workers travel over public highways to reach work. Since the Proposed Action would not require an increase in the total number of employees, there is no increase in transportation risk for employees. Likewise, there would be no increase in waste shipments over public highways from Argonne National Laboratory-West facilities to the Radioactive Waste Management Complex (such shipments are associated with routine facility operations and would also be required for the No-Action Alternative). High-level waste, spent nuclear fuel and low-enriched uranium transfers between Argonne National Laboratory-West facilities do not use public highways. The net number of transfers within the Argonne National Laboratory-West site would not increase as a result of the Proposed Action.

*Socioeconomic Impacts:* As described in Section 4.3.2 of the environmental assessment, it is not anticipated that the Proposed Action would have any measurable socioeconomic impacts on the area surrounding the Idaho National Engineering Laboratory. Any additional research personnel hired to help plan, conduct and interpret the experiments would be more than offset by a reduction in force that has been occurring due to shutdown of Experimental Breeder Reactor-II. No net additional personnel would be hired as a result of the Proposed Action.

Procurements of materials or services required for the Proposed Action would be minimal, and would be very small compared to the overall Idaho National Engineering Laboratory budget.

*Potential Environmental Impacts of Facility Accidents:* As described in Section 4.2 of the environmental assessment, the Final Safety Analysis Report (Revision 0, May 1, 1995) for the Fuel Conditioning Facility evaluated the consequences of a broad range of potential facility accidents which could possibly release radioactivity to the environment.

The largest radiological risk to an individual worker from any of the reasonably foreseeable accidents would be an increase of 3 chances in 10,000 of death by cancer due to radiation exposure following an accidental spent fuel transfer cask drop outside the facility. (The estimated probability of this accident is in a range from 1 chance in 100 to 1 chance in 10,000.) Since this accident would involve spent nuclear fuel, it would apply to each of the alternatives, including the No-Action Alternative. If such an accident occurred, up to 600 workers might be exposed to radiation, resulting in approximately 0.2 latent cancer fatalities; an estimated 0.003 latent cancer fatalities among the off-site population (within 50 miles of the site) could occur. This accident also represents the largest risk to the maximally exposed (public) individual, with an increase of 1 chance in 20 million of developing a fatal cancer if the accident did occur. The probability of developing a nonfatal cancer would be 1 chance in 2 million for the maximally exposed individual worker and 1 chance in 100 million for the maximally exposed individual member of the public.

An air cell exhaust system flow reversal accident represents the largest risk from an accident that distinguishes the action alternatives, including the Proposed Action, from the No-Action Alternative. (The probability of this accident is estimated to be between 1 chance in 10,000 and 1 chance in 1 million.) If this accident occurred, an individual worker would have 1 chance in 400,000 of developing a fatal cancer. A member of the public at the site boundary receiving the maximum dose would have 1 chance in 20 million of contracting a fatal cancer as a result of such an accident.

*Consequences of Beyond-Design-Basis Accidents:* Beyond-design-basis accidents are those accidents with probabilities of occurrence estimated to be between 1 in a million and 1 in 10 million. As described in Section 4.2.1.2 of the environmental assessment, two beyond-design-basis accidents have been evaluated for the modified Fuel Conditioning Facility. The first accident is a metal fire occurring simultaneously with small breaches in the argon cell confinement and with concurrent failure of abatement by the two separate stages of high-efficiency particulate air filtration provided by the safety exhaust system. The second accident, an aircraft crash into the facility, is described in detail in DOE/ID–10471, ''Accident Assessments for Idaho National Engineering Laboratory Facilities.''

The airplane crash accident assumes that a large commercial jet crashes into the Fuel Conditioning Facility, resulting in penetration of the argon cell and a fire in the facility involving aviation fuel. This accident would result in a radiation dose of 250 person-rem among the potentially exposed population within an 80 kilometer (50 mile) radius. The estimated increase in latent cancer fatalities is 0.13, or approximately 1 chance in 8, of an additional cancer fatality. The corresponding increase in nonfatal cancers is estimated to be 0.025, or 1 chance in 40, of an additional nonfatal cancer. Based on conservative estimates (i.e., estimates that tend to overstate the impacts), 2 radiation-induced cancer fatalities among 600 potentially-exposed workers would result.

In the metal fire accident, a fire in the hot process metal is assumed to start after sufficient oxygen enters through argon cell breaches resulting from a beyond-design-basis earthquake. This accident would result in a radiation dose of 74 person-rem among the population within an 80 kilometer (50 mile) radius. The estimated increase in latent cancer fatalities is 0.037, or approximately 1 chance in 24, of an additional cancer fatality among potentially exposed members of the public. Based on conservative estimates, three radiation-induced cancer fatalities among workers would result.

Taking account of the potential consequences and probabilities of occurrence, the accident risks associated with the Proposed Action are small.

*Natural Hazards:* As described in Section 4.2.2 of the environmental assessment, the Fuel Conditioning Facility Final Safety Analysis Report provides a discussion of natural phenomena hazards. The principal potential natural hazard is earthquakes. The air cell, argon cell, general building and safety equipment building were analyzed and were confirmed to maintain structural integrity during and after the design-basis earthquake (0.21 g acceleration). All structures can easily accommodate the straight wind loading of 95 mph and the snow loading of 40 pounds per square foot.

*Spent Nuclear Fuel, Uranium By-Products and Waste Management*

*Impacts:* As discussed in Section 4.5 of the environmental assessment, using a common comparison basis for estimating waste volumes for each alternative, implementation of the Proposed Action would result in a net decrease in the combined volume of high-level waste and spent nuclear fuel at Argonne National Laboratory-West. For the volume of high level wastes generated by the process, adequate storage capacity currently exists on-site. The Proposed Action would increase the volume of low-enriched uranium and high-level radioactive waste stored at the Argonne National Laboratory-West site. The increased volumes, however, would occupy a small percentage of the available storage space.

Compared to the No-Action Alternative, the Proposed Action would also result in a net decrease in the amount of low-level waste generated and shipped to the Idaho National Engineering Laboratory Radioactive Waste Management Complex, because some of the waste generated from normal facility operations would be characterized as transuranic waste. Therefore, the reduction in low-level waste volumes would be offset by a net increase in the amount of transuranic waste. Argonne National Laboratory-West and the Idaho National Engineering Laboratory Radioactive Waste Management Complex have adequate interim storage capacity to accommodate the transuranic waste, which would be less than one-tenth of one percent of the current inventory at the Idaho National Engineering Laboratory.

The amounts of mixed waste and nonradioactive waste generated under the Proposed Action are the same as would be expected under the No-Action Alternative. Existing, adequate storage capacity exists for any of the wastes that would be generated.

*Cumulative Impacts:* A cumulative impact is the result of the incremental impact of the Proposed Action added to all other past, present, and reasonably foreseeable future actions. Cumulative impacts associated with Idaho National Engineering Laboratory spent nuclear fuel, environmental restoration, and waste management activities have been described and analyzed in Volume 2, Section 5.15 of the Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Impact Statement. As discussed in Section 4.3 of the environmental assessment, the environmental impacts of the Proposed Action would be small and would add only a small increment to past, present or reasonably foreseeable impacts at the Idaho National Engineering Laboratory. Therefore, the Proposed Action would not result in significant cumulative impacts.

*Environmental Justice:* As discussed above and described in Section 4.6 of the environmental assessment, the potential environmental impacts calculated for activities associated with the Proposed Action are small, and present little or no risk to any segment of the surrounding population. Therefore, the impacts also do not constitute disproportionately high or adverse impacts on any minority or low-income population.

*Consistency with United States Nonproliferation Policy:* It is the policy of the United States not to encourage the civil use of plutonium. The proposed demonstration project would not separate plutonium from the processed Experimental Breeder Reactor-II fuel. Moreover, the technology employed is not capable of separating plutonium. Even with extensive modification, the technology would not be capable of separating plutonium that would be suitable for a proliferant nuclear weapons program. Further, by removing and then blending down the highly enriched uranium in the Experimental Breeder Reactor-II driver fuel, the project supports the United States goal of seeking to eliminate, where possible, the accumulation of stockpiles of highly enriched uranium. As a result, the proposed demonstration project is consistent with United States nonproliferation policy.

*Principal Concerns Raised During Public Comment Period:* As noted above, a draft environmental assessment was available for public comment from February 5, 1996 through May 3, 1996. The Department carefully considered all comments received and prepared a detailed ''Comment Response Document,'' which is an appendix to the final environmental assessment. The following discussion summarizes the principal concerns raised by commentors and the Department's responses.

*Reprocessing:* Some commentors suggested that the proposed demonstration of electrometallurgical treatment technology is ''reprocessing'' because it involves the separation of spent nuclear fuel constituents, could involve the future reuse of the separated materials, and/or has evolved from a technology that was originally intended to support the now-terminated Integral Fast Reactor project. As a result, some commentors suggested that the Department's National Environmental Policy Act regulation (10 CFR Part 1021, Appendix D to Subpart D) requires the preparation of an environmental impact statement for the proposed demonstration program.

It is important to note that preparation of an environmental impact statement is not automatically required by Appendix D, which is entitled ''Classes of Actions That *Normally* Require Environmental Impact Statements'' (emphasis added). At most, the inclusion of a class of actions in Appendix D establishes a presumption that activities falling within that class are generally ''major'' activities requiring the preparation of an environmental impact statement. That presumption is overcome when an evaluation of a specific proposal indicates that it is not a ''major'' activity and would not produce any significant environmental impacts.

The particular provision of Appendix D at issue originated in 1990, when the Department issued a Notice of Proposed Rulemaking (55 Federal Register 46444, November 2, 1990) that eventually was promulgated in 1992 as 10 CFR Part 1021. Among the new classes of actions proposed as ''normally requiring Environmental Impact Statements'' was the ''siting, construction, operation, and decommissioning of reprocessing facilities.'' The preamble to the proposed rule described this provision's intended scope as one of several new classes of activity ''related to the siting, construction and operation of *major nuclear facilities''* (emphasis added). It is apparent from this preamble language that the Department regarded the scale of the proposed activity and its potential for significant impacts, not the designation of an activity as ''reprocessing,'' as the important factor in establishing the need for an environmental impact statement.

Unlike the large reprocessing facilities existing at the time the regulations were promulgated, the proposed demonstration project does not generate large volumes of liquid high-level waste or have other significant impacts. The Proposed Action is simply a *demonstration* of electrometallurgical treatment technology involving equipment whose size and configuration cannot accommodate full-scale treatment activities. As demonstrated in the environmental assessment, the demonstration project would generate 640 kilograms (0.52 cubic meters, or approximately the size of a three-drawer file cabinet) of solid high-level waste in metal or ceramic form, but no liquid high-level waste. In light of these minimal impacts, it was appropriate for the Department to prepare an environmental assessment to assist in determining whether to prepare an environmental impact statement.

Indeed, the Department does not regard the proposed treatment process as ''reprocessing'' as that term has been used historically and is used in the Department's National Environmental Policy Act regulations. The purpose of the Department's historical reprocessing activities was to recover plutonium and highly-enriched uranium from spent nuclear fuel for reuse in defense-related activities, including weapons production. These activities required large production-scale buildings and ancillary facilities. The Department of Energy regulations implementing the National Environmental Policy Act were drafted with these reprocessing activities in mind. In contrast, the much smaller-scale proposed demonstration of electrometallurgical technology would not involve the separation of plutonium from fission products or the reuse or recycling of any separated materials for defense-related purposes.

As noted in Section 2.3 of the environmental assessment, this technology does separate spent nuclear fuel constituents into certain groups. For driver spent nuclear fuel, these groups are (1) highly-enriched uranium (which would promptly be blended with depleted uranium to form low-enriched uranium), (2) a mixture of fission products and plutonium, and (3) cladding metal. For the blanket fuel, these groups are (1) low-enriched uranium, (2) a mixture of fission products and plutonium, and (3) cladding metal.

With regard to the potential reuse of separated materials, the treatment of the 100 driver assemblies would result, after blending, in approximately 1400 kilograms (3080 pounds) of low-enriched uranium. As described in Section 2.3 of the environmental assessment, this low-enriched uranium would be stored at Argonne National Laboratory-West until a decision is made regarding its ultimate disposition. The disposition of this material would be consistent with future departmental decisions regarding other similar materials, but it would not involve reuse for defense-related purposes. Potential disposition options for this material include its sale to the commercial nuclear industry for use as power reactor fuel.

For all of these reasons, the Department of Energy does not believe that the proposed demonstration of electrometallurgical technology constitutes ''reprocessing'' within the meaning of 10 CFR Part 1021, Appendix D to Subpart D, even if it does fall within some broader definitions of ''reprocessing'' that are used in other contexts.

*Nonproliferation:* Some commentors suggested that the proposed demonstration project is contrary to the nonproliferation policy of the United States regarding materials that could be used by other countries or groups to construct nuclear weapons. The United States policy on nonproliferation is contained in Presidential Decision Directive 13, a classified document. On September 27, 1993, at the time Presidential Decision Directive-13 was signed, an unclassified press release summarizing its contents was issued. Among other things, the summary states that the United States does not encourage the civil use of plutonium, and accordingly the United States does not itself engage in plutonium reprocessing for either nuclear weapons or nuclear power purposes. As described in Section 4.7 of the environmental assessment, the electrorefining equipment that would be a part of the proposed demonstration project is not capable of separating plutonium from spent nuclear fuel. The plutonium contained in the spent nuclear fuel, along with other actinides and most constituent fission products, would be immobilized in the zeolite ceramic waste form. Thus, because it does not separate plutonium, the proposed demonstration is consistent with the nonproliferation policy of the United States.

Some of the commentors suggested, however, that with adjustment to or refinements of either of the electrorefiners that would be a part of the Proposed Action, this technology could be made to separate plutonium for weapons use. During the Integral Fast Reactor Program, which was canceled in 1994, the Department attempted to develop an electrorefiner that included a liquid cadmium cathode to collect and concentrate plutonium and all other transuranic elements present in the spent nuclear fuel. Successful application of this process would have resulted in a plutonium product contaminated or mixed with uranium, other transuranic elements, and rare earth fission products. Development of the cathode progressed only to the point where the technical feasibility of the concept was established. No prototype or working model was ever commissioned for the Fuel Conditioning Facility.

As conceived, however, the liquid cadmium cathode would have produced a metal-alloy product containing up to 70 percent plutonium; this plutonium alloy could have been obtained only after subsequent processing in a high-temperature vacuum furnace. The balance of materials remaining in the plutonium product after electrorefining, but prior to subsequent processing, would be those most difficult to separate from plutonium by any chemical means: uranium, americium, neptunium, curium, and the rare earth fission products. This plutonium metal-alloy product would have high transuranic content, a high heat source, a high neutron radiation source, and a high gamma radiation source, any one of which would make design of a weapon extremely difficult. Neutron and gamma radiation sources would be three to four orders of magnitude higher than weapons-grade or reactor-grade material. These levels of radiation are lethal and would require handling of the material by remote means. As a result of the high heat, neutron, and gamma radiation sources, and the transuranic contamination, any attempt to use plutonium in this form for weapons purposes would add significant difficulties to any potential proliferant's efforts.

The Department requested a study by the Defense Technologies Engineering Division of Lawrence Livermore National Laboratory to determine the feasibility of misusing electrometallurgical technology in order to produce plutonium that could be used in a proliferant nuclear weapons program. While the report from that study is classified, an unclassified presentation on the conclusions from the report was given to the Department by Lawrence Livermore National Laboratory in March 1994 and is summarized in Section 4.7 of the environmental assessment. The unclassified presentation stated that the report concluded that significant new process inventions and new weapons designs would be required before material resulting from the process could be used in a nuclear weapons program. The major problems for prospective weapons designers would be:

(a) the actinides collected with the fission products would result in a very high heat output, which would complicate and might even preclude the design of even a simple nuclear device due to the heat output's effect on high explosive and plutonium components; (b) radiation levels from the material would be incapacitating and lethal to individuals coming in contact with the material for the purpose of weapons fabrication; (c) designing processes to deal with these radiation levels would significantly complicate a proliferant's development and deployment programs and production activities; and (d) over time, high radiation fields would

negatively impact material behavior and electronic circuitry.

Some of the commentors also suggested that, because this technology separates highly-enriched uranium from the Experimental Breeder Reactor-II driver spent nuclear fuel, use of the technology would violate United States policy on nonproliferation. While it is correct that the technology would separate the highly-enriched uranium from the driver spent nuclear fuel, under the proposed demonstration project the highly-enriched uranium would be melted in the casting furnace and combined with depleted uranium to produce low-enriched uranium (less than 20 percent enrichment) without ever leaving the argon cell. This blending-down activity would, in fact, be part of the spent nuclear fuel treatment process. Blending down would be done to reduce costs associated with the higher levels of security required for safeguarding highly-enriched uranium. Also, it should be noted that this technology is incapable of increasing the level of enrichment of uranium contained in spent nuclear fuel being treated. Therefore, this technology would not be useful to a nation seeking to enrich uranium to weapons-grade level. However, because the technology permits the separation of highly-enriched uranium, which could, in the wrong hands, pose a proliferation risk, the Department would exercise its authority to prevent proliferation sensitive information and technology advances resulting from the proposed demonstration from becoming available to potential proliferant-risk countries, including exercising its authority under the Atomic Energy Act, the Nuclear Nonproliferation Act of 1978 and the Department's implementing regulations. Separating the highly-enriched uranium from Experimental Breeder Reactor-II spent nuclear fuel and blending it down to less than 20 percent enrichment is consistent with United States nonproliferation policy.

*Appropriate Level of National Environmental Policy Act Review:* Several commentors suggested that the Proposed Action is part of a larger program, and that the Department must prepare an environmental impact statement that analyzes the larger program, including full-scale implementation of electrometallurgical treatment. Commentors further expressed concern that the Proposed Action would prejudice the Department's choice of options under a larger program, either because of the commitment of resources that would be invested in studying the electrometallurgical technology, or because the proposed demonstration would set a precedent for the technology's further, broader application.

The Department does not agree with these assertions. The Department has no current proposal to apply the technology more broadly. The Department prepared this environmental assessment to assess the environmental impacts of a proposal to apply electrometallurgical treatment technology only to a limited number of Experimental Breeder Reactor-II spent nuclear fuel assemblies sufficient for the purpose of further research and development as recommended by the National Research Council. The Department needs the information from the proposed demonstration to determine whether electrometallurgical treatment is a feasible technology for treating the remainder of the Experimental Breeder Reactor-II spent nuclear fuel or other spent nuclear fuel requiring processing for disposal. Only after data from such a demonstration are analyzed can the Department assess whether to propose a broader application of the technology. In the absence of a proposal for broader application, no ''program'' or broader activity exists to be analyzed.

The Department has decided to proceed with the proposed demonstration. Even if successful, however, the demonstration would not automatically lead to the treatment of more Experimental Breeder Reactor-II spent nuclear fuel or to other broader applications of electrometallurgical technology. The Department will not make any significant additional use of the electrometallurgical refining technology without first preparing an environmental impact statement. Specifically, the Department will not use this technology to treat the remaining Experimental Breeder Reactor-II spent fuel or make another production-scale use of the technology without preparing an environmental impact statement.

*Public Comment Process:* Several commentors suggested that the Department did not allow the public proper and timely access to the documents referenced in the draft environmental assessment. The draft environmental assessment was transmitted for public review and comment on January 29, 1996, with an initial comment period from February 5 to March 22. References cited in the draft environmental assessment originally were not sent to the public reading rooms, but were available upon request from the Department of Energy document manager in Idaho.

In the course of public hearings in Idaho Falls, Idaho, on February 21, 1996, a commentor requested that the documents referenced in the draft environmental assessment be made available in the Department's public reading rooms and that the public comment period be extended by another two months. The Department agreed to place the references in the public reading rooms but deferred the decision on extending the comment period. A member of the Department of Energy panel stated that he would ''* * * try to have them (the references) in the public reading rooms within the next week.'' Thirty-seven of the 48 references were reproduced and sent to each of the nine public reading rooms by March 8. The Department believed the remaining 11 references were already in the reading rooms as references to the Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement (DOE/EIS–0203–F). On March 25, another commentor brought to the Department's attention the fact that not all documents were in the public reading rooms in Washington, D.C. and in Idaho Falls. In response, the missing documents were sent directly to the commentor, and duplicates were placed in the reading rooms. The comment response period was extended to April 5.

In response to additional comments that not all documents had been found in the public reading rooms, an inventory of each of the reading rooms was taken by Department of Energy or Argonne National Laboratory personnel on April 6. Missing documents were provided, and all documents were personally verified by Department of Energy or Argonne National Laboratory personnel to be in place in the reading rooms on April 8. Further, an additional document and reference location was established in the main library of the University of California at Irvine. On April 15, 1996, the public comment period was reopened until May 3. The Department believes that making the reference documents available to the public and reopening the comment period have allowed an adequate opportunity to review and comment on the environmental assessment and to consult the reference documents.

## Finding

Based on the analysis in the environmental assessment and after considering all comments received

through the public review process, the Department of Energy has determined that the *Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory - West* 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 is not required.

Issued in Washington, D.C., this 15th day of May 1996.

Terry R. Lash,

*Director Office of Nuclear Energy, Science and Technology U.S. Department of Energy.*

[FR Doc. 96–12861 Filed 5–21–96; 8:45 am]

**BILLING CODE 6450–01–P**

## Final Environmental Impact Statement for the Plutonium Finishing Plant Stabilization, Hanford Site, Richland, Benton County, Washington

**AGENCY:** U.S. Department of Energy.

**ACTION:** Notice of availability.

**SUMMARY:** The U.S. Department of Energy (DOE), Richland Operations Office, announces the availability of the *Plutonium Finishing Plant Stabilization Final Environmental Impact Statement* (DOE/EIS–0244–F). The Final Environmental Impact Statement (EIS) was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), and DOE's Implementing Procedures (10 CFR Part 1021). The continued presence of relatively large quantities of chemically reactive materials in their present form and location within the Plutonium Finishing Plant (PFP) Facility poses an unacceptable long-term risk to workers, the public, and the environment. DOE has identified the need to expeditiously and safely reduce radiation exposure to workers and the risk to the public; reduce future resources needed to safely manage the facility; and remove, stabilize, store, and manage plutonium, pending DOE's future use and disposition decisions.

DOE's preferred alternative is removal of readily retrievable plutonium bearing material in hold-up at the PFP Facility and stabilization of these and other plutonium-bearing materials at the PFP Facility through the following four treatment processes: 1) ion exchange, vertical calcination and thermal stabilization of solutions; 2) thermal stabilization of oxides, fluorides, and process residues in a continuous furnace; 3) repackaging of metals and alloys; and 4) pyrolysis of polycubes and combustibles. In addition, DOE is evaluating other alternatives for stabilizing or immobilizing these materials as well as a ''no action'' alternative.

**FOR FURTHER INFORMATION CONTACT:** Requests for copies or questions concerning the PFP Stabilization EIS should be directed to: Mr. Ben F. Burton, U.S. Department of Energy, Richland Operations Office, Attn: PFP Stabilization EIS, P.O. Box 550, MSIN B1–42, Richland, Washington 99352, (888) 946–3700.

For general information on DOE's EIS process and other matters related to NEPA, please contact: Ms. Carol Borgstrom, Director, Office of NEPA Policy and Assistance (EH–42), U.S. Department of Energy, 1000 Independence Avenue, S.W.,Washington, DC 20585, (202) 586–4600 or (800) 472–2756.

**SUPPLEMENTARY INFORMATION:**

*Background, Purpose and Need for Agency Action.* In the late 1980s, the halt in the production of weapons-grade plutonium froze the existing PFP Facility manufacturing pipeline in a state that was unsuited for long-term storage. On January 24, 1994, the Secretary of Energy commissioned a comprehensive assessment to identify and prioritize the environmental, safety, and health vulnerabilities that arise from the storage of plutonium in DOE facilities and determine which are the most dangerous and urgent. The DOE-wide assessment, commonly referred to as *The Plutonium Vulnerability Study*, identified environmental, safety, and health vulnerabilities at the PFP Facility. These included storage of unstable forms of plutonium, a potential for criticality accidents, and seismic weaknesses.

*Scoping.* A Notice of Intent to prepare the EIS and hold public scoping meetings in Spokane, Richland, and Bellevue, Washington, and Hood River and Portland, Oregon, was published by DOE in the Federal Register on October 27, 1994. A subsequent Notice of Intent was published by DOE in the Federal Register on November 23, 1994, announcing additional meetings in Portland, Oregon, and Seattle, Washington. The Notice of Intent invited oral and written comments and suggestions on the proposed scope of the EIS, including environmental issues and alternatives, and invited public participation in the NEPA process. Overall, scoping comments were received that assisted in identifying major issues for subsequent in-depth analysis in the Draft EIS. As a result of the scoping process, an *Implementation Plan for the PFP Stabilization EIS* was developed to provide guidance for preparing the Draft EIS and record the results of the scoping process.

*Public Hearing.* On December 5, 1995, a Notice of Availability was published in the Federal Register (60 FR 62244) which formally announced the release and availability of the Draft EIS. The public hearing date, time, and location were also published and public comment was requested. A public meeting on the Draft EIS. The public hearing date, time, and location were also published and public comment was requested. A public meeting on the Draft EIS was held in Pasco, Washington, on January 11, 1996. While the comment period officially ended on January 23, 1996, DOE accepted comments through February 15, 1996. Both oral and written comments were received during the comment period.

*Notice of Limited Reopening of Public Comment Period.* On May 3, 1996, a Notice of Limited Reopening of Public Comment Period was published in the Federal Register (61 FR 19914) which formally announced the release and availability of a supplementary alternative which involves immobilization of a portion of the inventory of the plutonium-bearing materials in cement at the PFP Facility. Comments on the analysis of potential impacts described in the supplementary information have been solicited during a 21-day comment period that will end May 24, 1996. Comments received will be considered in the preparation of the Record of Decision.

**AVAILABILITY OF FINALS EIS:** Copies of the Final EIS have been distributed to Federal, state, and local officials and agencies, as well as organizations and individuals known to be interested in or affected by the proposed project. Additional copies may be obtained by contacting Mr. Burton as provided in the section of this notice entitled **FOR FURTHER INFORMATION CONTACT.** Copies of the Final EIS, including appendices and reference material will be available for public review at the locations listed below. Comments received in response to this Federal Register notice will be considered in the preparation of the Record of Decision.

U.S. Department of Energy, Headquarters, Freedom of Information Reading Room, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586–3142