SUMMARY

The U.S. Department of Energy (DOE) prepared this environmental impact statement (EIS) on the proposed Advanced Mixed Waste Treatment Project (AMWTP) at the Idaho National Environmental and Engineering Laboratory (INEEL) in compliance with the *National Environmental Policy Act* (NEPA).

The ***National Environmental Policy Act*** Process

NEPA is a Federal law that serves as the basic national charter for protection of the environment. For major Federal actions that may significantly affect the quality of the human environment, NEPA requires Federal agencies to prepare a detailed statement that includes the potential environmental impacts of the proposed action and other specified information. A fundamental objective of NEPA is to foster better decision making by ensuring that high quality environmental information is available to public officials and members of the public before decisions are made and action taken.

Procedures for implementing NEPA and preparing EISs are contained in government-wide regulations issued by the Council on Environmental Quality (CEQ) (40 CFR Parts 1500-1508), and in DOE NEPA regulations (10 CFR Part 1021).

There are several steps that DOE follows in preparing an EIS. A Notice of Intent is published in the *Federal Register* to notify the public that the agency plans to prepare an EIS and seek comment on the scope of the EIS. DOE's NEPA implementing procedures require a minimum 30-day public scoping period and at least one public meeting be held. Following scoping, an agency issues a draft EIS for public review and comment. The public comment period on the draft EIS must be at least 45 days in length, and under DOE's NEPA implementing procedures, at least one public meeting on the draft EIS must be held. DOE must consider all substantive comments on the draft EIS and address these comments in a final EIS. No sooner than 30 days after the final EIS is issued, the agency may issue a Record of Decision (ROD); DOE publishes ROD's in the *Federal Register*.

This is the Final EIS. The Draft EIS was issued July 24, 1998, and the public comment period was held from July 24 to September 26, 1998. In the Final EIS, DOE responds to the public comments and, where appropriate, has made revisions to the document based on the public comments.

INTRODUCTION

DOE proposes to implement a contract with BNFL Inc. to construct and operate the proposed AMWTP facility at the INEEL. The proposed AMWTP would retrieve, sort, characterize, and treat approximately 65,000 cubic meters of transuranic (TRU) waste, alpha-contaminated low-level mixed waste (alpha LLMW), and LLMW currently stored at the INEEL Radioactive Waste Management Complex (RWMC), and package the treated waste for shipment offsite for disposal. The AMWTP facility could also treat an additional 120,000 cubic meters of waste from INEEL and other DOE sites. This EIS considers the impacts of treating the 65,000 and the 120,000 cubic meters of waste.

The INEEL is located on 569,135 acres west of the City of Idaho Falls in southeast Idaho. The site sits on the Eastern Snake River Plain and is bordered by the Bitterroot, Lemhi, and Lost River mountain ranges. The land comprising the INEEL is used to support DOE facility and program operations and as safety-and-security zones around facilities. About two percent of the total INEEL area (11,400 acres) is used for facilities and operations.

INEEL is one of DOE's primary centers for research and development activities on reactor performance, materials testing, environmental monitoring, natural resources research and planning, and waste processing. In addition to nuclear reactor research, other INEEL facilities support reactor operations; processing and storage of high-level waste, LLMW, and low-level waste; disposal of low-level waste; and storage of TRU waste generated by defense program activities. Figure S-1 shows the location of the RWMC and INEEL within the region and state.

BACKGROUND AND PROJECT HISTORY

DOE has been storing TRU waste at the INEEL since the early 1970s. Most of this waste came from the DOE Rocky Flats Plant and is in drums and boxes placed on an asphalt pad at the RWMC at the INEEL. The waste is covered with tarps, plywood, and soil and is referred to as an earthern-covered berm. Some waste is also stored in modules at the RWMC. The total volume of waste is approximately 65,000 cubic meters.

The drums and boxes, in which the waste is stored, have a 20-year design life and were not intended to provide permanent containment of the waste. The drums and boxes in the earthen-covered berm are subject to breaching and failure through corrosion or decomposition, creating a potential for the wastes to be released to the environment. In addition, the hazardous wastes (approximately 95 percent of the 65,000 cubic meters) are subject to treatment under a *Resource Conservation Recovery Act* (RCRA) *Federal Facility Compliance Act* (FFCA) Site Treatment Plan (STP) and Consent Order.

In the early 1990s, DOE considered plans to retrieve the stored waste from the earthen-covered berm, segregate the intermingled alpha LLMW from the TRU waste, and build and operate a two-phased treatment facility. Alpha LLMW was to be treated to comply with RCRA land disposal restriction (LDR) standards and the TRU waste was to be treated to meet the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria (WAC). (WIPP is a disposal facility for TRU waste that DOE has developed near Carlsbad, New Mexico.) Additional RCRA storage modules were also planned for the retrieved and/or treated waste.

Land Disposal Restrictions In 1984 the Hazardous and Solid Waste Amendments (HSWA) of RCRA added LDRs which require that all hazardous waste be treated before being placed "in or on the land" (40 CFR 268) and set forth treatment standards that must be met before land disposal can occur. The HSWAs prohibited long-term storage of hazardous wastes unless wastes were being stored solely for the purpose of accumulating sufficient quantities for treatment and disposal.

In 1992 and 1993, DOE undertook studies to examine the potential for private sector treatment of alpha LLMW. These studies concluded that cost savings could be achieved and the schedule shortened by seven years from that proposed by the INEEL Management and Operating (M&O) contractor if DOE were to undertake the waste treatment. As a result, DOE issued a Scope of Work for a "Feasibility Study of Treatment Services for Alpha-Contaminated Mixed Low Level Waste." Three private sector teams provided feasibility studies in 1994. After extensive evaluation, DOE decided to pursue the procurement of treatment, assay, and characterization services for waste from the private sector, and to treat the alpha LLMW and TRU waste together to RCRA LDR standards. Information from the feasibility studies was provided for analysis in the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement* (DOE INEL EIS, DOE/EIS-0203-F, April 1995). In the 1995 DOE INEL EIS ROD, DOE decided to construct treatment facilities at INEEL to treat TRU waste and alpha LLMW necessary to comply with the FFCA. Treatment of TRU waste at a minimum was to be for the purpose of meeting the WAC for disposal at WIPP and to occur on a schedule to be negotiated with the State of Idaho. This EIS tiers from the information and environmental analysis contained in the DOE INEL EIS.

Figure S-1. INEEL, Idaho, and region.

On October 17, 1995, the State of Idaho, the Department of the Navy, and DOE settled the case of *Public Service Co. of Colorado v. Batt,* Civil No. CV 91-0035-S-EJL (D. Idaho) (Lead case). Certain conditions of the Settlement Agreement/Consent Order obligated DOE to:

- Commence procurement of a treatment facility at the INEEL for the treatment of TRU waste, alpha LLMW, and LLMW, and
- Execute a procurement contract for a treatment facility by June 1, 1997, complete construction of the facility by December 31, 2002, and commence operation by March 31, 2003.

Also, the INEEL STP, negotiated with the State of Idaho in accordance with the FFCA, includes a schedule for constructing treatment capacity for the TRU waste and alpha LLMW, which is consistent with the milestones in the Settlement Agreement/Consent Order. In accordance with the Settlement Agreement/Consent Order and STP, DOE conducted a procurement for a facility to treat the wastes described above.

In January 1996, DOE issued a final request for treatment of TRU waste, alpha LLMW, and LLMW. Proposals were

received from four teams, three of which were determined to be in the competitive range. Each proposal contained a suite of treatment technologies evaluated for use on the INEEL stored wastes. The process set forth in DOE's Implementing Regulations (10 CFR 1021.216) was used to allow DOE to compare the potential environmental impacts between approaches suggested by competing offerors during this procurement process. DOE compared these impacts in an Environmental Critique (November 22, 1996). The environmental considerations detailed in the critique were made available to DOE's Source Evaluation Board, and became a part of the technical criteria against which the competing offerors were evaluated during the procurement process. The results of the Environmental Critique were summarized in an Environmental Synopsis that was made available to the public (DOE 1998e).

As a result of this competition and the comparison of potential environmental impacts associated with the competing proposals, the Source Evaluation Board chose BNFL Inc. in December 1996 as the winning contractor for Phase I of the project. Phase I of the contract addresses permitting, a NEPA review, and an environment, safety and health (ES&H) evaluation process. Before deciding whether to authorize BNFL Inc. to proceed with construction (Phase II) and operations (Phase III), DOE must complete this EIS. If, after completing this EIS, DOE decides not to move forward with construction and operations of the project, the contract will be terminated.

Purpose and Need for Agency Action

DOE currently stores approximately 65,000 cubic meters of TRU waste, alpha LLMW, and LLMW at the RWMC on the INEEL. Approximately 95 percent of this radioactive waste is classified as mixed waste which, because it contains chemically hazardous waste, is regulated under RCRA. Some of the wastes also contain polychlorinated biphenyls (PCBs), which are regulated under the *Toxic Substances Control Act* (TSCA). These wastes (i.e., radioactive, RCRA, and TSCA wastes) are intermingled in common containers. DOE needs to place these wastes in a configuration that will allow for their disposal at the WIPP or another appropriate facility, in a manner consistent with state and Federal law and consistent with the schedule contained in the October 17, 1995, Settlement Agreement/Consent Order in the case of *Public Service Co. of Colorado v. Batt,* Civil No. CV91-0035-S-EJL (D. Idaho) (Consent Order).

DOE anticipates that it may treat up to an additional 120,000 cubic meters of TRU waste, alpha **LLMW, and LLMW as analyzed in this EIS. These wastes are currently located, or may be generated, at other areas on the INEEL and at other DOE sites. Depending on future DOE decisions, the treatment of** these wastes could occur at the INEEL, subject to agreements, such as those between DOE and states, relating to the treatment and storage of TRU waste. Transfers of TRU waste from other sites for treatment and interim storage at INEEL could involve revision of the TRU ROD that DOE issued on the *Final Waste Management Programmatic Environmental Impact Statement* (WM PEIS) (January 1998).

Transuranic (TRU) waste	Radioactive waste that is not classified as high-level radioactive waste and that contains more than 100 nanocuries per gram (nCi/g) of alpha-emitting transuranic isotopes with half-lives greater than 20 years.
Alpha low-level mixed waste (alpha LLMW)	Low-level mixed waste containing, at the time of assay, concentrations of at least 10 but less than 100 nCi/g of waste of alpha-emitting radionuclides with an atomic number greater than 92 and half-lives greater than 20 years. The term "mixed" cannotes waste containing both radioactive and hazardous constituents as defined by the *Atomic Energy Act* (AEA) and RCRA, respectively.

Low-level waste	Waste that contains radioactivity and is not classified as high-level waste, TRU waste, or spent nuclear fuel. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of TRU elements is less than 100 nCi/g of waste.
Mixed waste	Waste that contains both hazardous waste, as defined under RCRA, and source, special nuclear, or by-product material subject to the AEA.

Description of the Proposed Action

Advanced Mixed Waste Treatment Project Facility

To treat the wastes described above, DOE proposes that the AMWTP facility be constructed and operated. The proposed AMWTP facility would be located at the RWMC in the southwestern corner of the INEEL, as shown by Figure S-2. The AMWTP facility would be designed, built, and operated by BNFL Inc. under a contract with DOE. The facility would be designed with an operational life of approximately 30 years. Operation of the facility for its entire design life would depend on DOE approval and the availability of additional waste for treatment beyond the 65,000 cubic meters of waste stored at the RWMC. The AMWTP RCRA Part B Permit Application located in the INEEL Technical Library in Idaho Falls, Idaho, is available to those interested in reviewing more detailed aspects of the waste to be treated and the AMWTP facility design.

The proposed AMWTP facility would be a two-story industrial-type structure. There would be

Figure S-2. Layout of Radioactive Waste Management Complex

approximately 60,000 square feet on each of the two floors. The height of the two floors would be about 44 feet. A rooftop mechanical penthouse would enclose approximately 20,000 square feet of additional space and would be about 67 feet above ground level. The facility stack (actually a windscreen enclosing seven individual flues) would be about 15 feet in diameter and approximately 90 feet high.

The AMWTP treatment processes would be designed to contract specifications that require: 65 percent volume reduction, treatment to RCRA LDR standards and TSCA requirements, and treatment to meet WIPP WAC. The facility and equipment would be designed to process up to 85,000 cubic meters of waste in the first 13 years of operation. In the event WIPP is unable to receive and dispose of INEEL TRU waste, or if there are changes to the WIPP WAC, no major changes to the facility design are anticipated since the waste would be treated to RCRA LDR standards, which are the most stringent existing requirements for disposal. Some changes or substitutions to the proposed processes may occur, provided the performance requirements specified in the contract are met. Any proposed substitutions or major change in a treatment process would be evaluated as appropriate under NEPA before a final decision is made.

Several technologies proposed under the various action alternatives are analyzed in this EIS. They are:

Supercompaction. Supercompaction is a volume reduction process that would receive drums of debris waste from the pretreatment lines where characterization, sorting, segregation, and size reduction would be performed, or from direct feed drums from the waste receiving and staging area. The drums of waste would be punctured so that gases could be expelled, then compacted by a hydraulic press. Under the extreme pressure of supercompaction, gas would be vented and processed through the facility air pollution control system. The volume reduction achieved for each drum would depend on the drum contents and packing fraction, but is expected to average 80 percent. The supercompacted drums or "pucks" would then be placed into a puck drum for macroencapsulation. The puck drum would be the final waste form's outermost container.

Macroencapsulation. The macroencapsulation system would be used to encapsulate pucks and large pieces of metal debris not suitable for compaction. Waste would be fed into the macroencapsulation process in two forms: containers of pucks and noncompactible debris waste sent directly from the pretreatment lines. In the macroencapsulation process, grout would be piped from the grout preparation area to the post-compaction glovebox where it would be poured into final waste form containers to stabilize and immobilize noncompactible waste or pucks. Lids would be placed on the grout-filled drums and the drums would then be moved to a designated area to cure. After curing, the final waste form containers would be radioassayed and certified for disposal. The throughput for the macroencapsulation system would be approximately 20 final waste form containers/puck drums per day.

Glovebox	Typically, an airtight box used to work with radioactive hazardous material, vented to a closed filtering system, having gloves attached inside of the box to protect the worker.

Incineration. Wastes identified for incineration would be crushed and shredded by size-reducing equipment at the head of the incineration process. The size-reduced waste would be conveyed to a waste hopper, from which it would be fed at a controlled rate into the incinerator. The incinerator as currently proposed would be a dual-chamber auger hearth system fired by propane gas. The primary combustion chamber would operate at from 1,500° to 1,600°F and the

secondary chamber at from 2,200^{o} to 2,400^{o}F. The incinerator would have a feed capacity of 650 pounds per hour.

Microencapsulation. Microencapsulation is a grouting process that would be used to stabilize the incinerator ash and salts evaporated from the air pollution control system. The microencapsulation process is similar in concept to the macroencapsulation process described previously. Cement powder (ordinary Portland™ cement), pulverized incinerator ash, and water would be mixed in 55-gallon drums. The process would be performed within a glovebox. Samples of the mixture would be obtained for analysis before an inner lid is placed on the drum. Once the lid is in place, the drums would be manually swabbed for external contamination, fitted with an outer lid, and transferred to the drum cure area. Once cured, the drums of microencapsulated ash and salts would be ready for final shipping and disposal.

Since the release of the Draft EIS, vitrification has been replaced with microencapsulation as the preferred ash stabilization process. The processes of incineration, supercompaction, and macroencapsulation described in the Draft EIS remain the same, as does the amount of waste planned for incineration (approximately 25 percent).

Microencapsulation is a slight variation of the macroencapsulation process described in the Draft EIS. In microencapsulation, cement powder and water are mixed with incineration ash in 55-gallon drums; in macroencapsulation, cement powder and water are mixed and then poured into containers to stabilize and immobilize non-compatible waste or pucks.

BNFL Inc. has extensive experience with microencapsulation. The use of microencapsulation also has fewer environmental impacts than vitrification, except for a small increase in water use, and an increase in propane consumption. Both vitrification and microencapsulation produce very stable final waste forms meeting RCRA LDR standards and the WIPP WAC. The Final EIS analyzes the potential impacts of both microencapsulation and vitrification.

Vitrification. Vitrification is an alternative to microencapsulation for stabilization of incinerator ash. Resultant ash from the incinerator would be fed into transfer drums, which would then be closed and transported to the vitrification unit feed staging area. Ash would be placed into a hopper and fed at a controlled rate into the vitrification unit. Glass-forming chemicals would be continuously fed with the ash to control the glass quality of the final waste form. A Joule melter, the vitrification unit, is analyzed in this EIS, even though other types of melters may be used.

Resource Conservation and Recovery Act Closure and Decontamination and Decommissioning

Because the proposed project is subject to RCRA permit conditions, a proposed RCRA Closure Plan was submitted to the State of Idaho in September 1998. That draft Closure Plan provided the State RCRA regulators with the technical information necessary to analyze generally the overall impacts of the proposed project through the RCRA closure process. The draft Closure Plan is included in the Administrative Record for this EIS.

Closure is usually analyzed under RCRA only from the standpoint of the potential risks during the cleanup of hazardous constituents. Because it is quite likely that the contamination on the equipment would be both hazardous and radioactive, the closure process would actually involve both RCRA closure and some decontamination and decommissioning (D&D) activities. Generation of waste from RCRA closure is expected to be minimal and is within the types and quantities of waste analyzed in this Final EIS.

The nature, extent and timing of future D&D activities are not known at this time. Choices currently exist, both technically and under the environmental regulations, for performing final D&D, and DOE expects that there will be additional options available in the future. No meaningful alternatives or analysis of impacts can be formulated at this time since D&D is so remote in time that neither the means to conduct D&D, nor the impacts of the actions, are foreseeable in the sense of being susceptible to meaningful analysis now. Accordingly, D&D activities are not analyzed in detail. Once proposals concerning D&D activities are developed, DOE will undertake any additional NEPA analysis that may be necessary or appropriate.

Alternatives Analyzed

No Action Alternative

Under the No Action Alternative, ongoing TRU waste, alpha LLMW, and LLMW management operations and projects would continue and existing facilities would remain in use (see Figure S-3). The M&O contractor would continue preparation to ship 3,100 cubic meters of TRU waste to WIPP using existing facilities. Retrieval of waste from the Transuranic Storage Area Retrieval Enclosure (TSA-RE) would be initiated with re-storage of the retrieved waste in the RWMC RCRA-compliant storage facilities as described in the *Environmental Assessment for Retrieval and Re-Storage of TSA Waste at the Idaho National Engineering Laboratory* (DOE/EA-0692). Shipments to WIPP would occur that could be supported by existing facilities at the INEEL. Waste that could not meet the WIPP WAC would be returned to the RCRA storage modules at the RWMC. Under this alternative, in addition to the initial 3,100 cubic meters, between 3,500 to 7,000 cubic meters of waste would be prepared for offsite disposal and 58,000 to 61,500 cubic meters of waste would remain stored at the RWMC because of the lack of facilities to treat waste for transportation and disposal[1]. If implemented, this alternative would not meet negotiated agreements and commitments (i.e., Settlement Agreement/Consent Order) nor would it meet regulatory requirements under RCRA and TSCA.

Proposed Action/Preferred Alternative

The Proposed Action is DOE's Preferred Alternative. Under this alternative, the M&O contractor would continue preparation to ship 3,100 cubic meters of TRU waste to WIPP using existing facilities. Construction (Phase II) and operation (Phase III) of the AMWTP facility would occur in accordance with DOE's contract with BNFL Inc. Construction of the treatment facility would begin as early as the 1999 construction season and be completed no later than December 2002. The facility would begin operation no later than March 2003. DOE expects that retrieval of waste from the TSA-RE would begin in calendar year 2001 to establish a sufficient quantity for efficient treatment. The AMWTP facility would be built and operated using the preferred treatment options of supercompaction, macroencapsulation, incineration, and microencapsulation (see Figure S-4). The facility would have sufficient operating capacity to treat approximately 6,500 cubic meters of waste per year. This would accommodate the treatment of 65,000 cubic meters of INEEL waste during the initial time frame (by 2015) and up to another 120,000 cubic meters of additional waste from the INEEL or other DOE sites by 2033, for a total of 185,000 cubic meters. Only DOE waste that meets the AMWTP facility WAC, and for non-INEEL waste only that waste that also satisfies the requirements of the STP Consent Order for receipt and treatment, could be accepted. Under this alternative, 65,000 cubic meters of waste would be treated, resulting in approximately 30,000 cubic meters (containerized volume) of waste for offsite disposal[1]. If implemented, this alternative would satisfy negotiated agreements and commitments (i.e., Settlement Agreement/Consent Order) and meet regulatory requirements under RCRA and TSCA.

Non-Thermal Treatment Alternative

Under the Non-Thermal Treatment Alternative, the M&O contractor would continue preparation to ship 3,100 cubic meters of TRU waste to WIPP using existing facilities. The AMWTP facility would be constructed but without incineration or microencapsulation processes (see Figure S-5). Supercompaction and macroencapsulation would be used to treat wastes. Wastes that require thermal treatment to meet disposal criteria would be repackaged and re-stored until a treatment option is identified and evaluated under NEPA. Facility construction and completion would be as described for the Preferred Alternative. As with the Preferred Alternative, the facility would receive waste retrieved from the TSA-RE and newly generated INEEL waste. Although the facility could receive wastes from other DOE sites, treatment of non-INEEL waste is anticipated to be minimal. All waste that could be treated to meet WIPP WAC without incineration would be prepared for shipment to WIPP. Operation of the facility would continue until 2015, when DOE expects such a facility to no longer be needed. Under this alternative, 65,000 cubic meters of waste would be treated, resulting in between approximately 8,000 to 14,000 cubic
meters of containerized waste that would remain in storage at the RWMC, and approximately 23,000 to 29,000 cubic meters that would be prepared for offsite disposal after supercompaction and macroencapsulation[1]. If implemented, this alternative would not meet negotiated agreements and commitments (i.e., Settlement Agreement/Consent Order) nor would it meet regulatory requirements under RCRA and TSCA.

Treatment and Storage Alternative

Under the Treatment and Storage Alternative, the M&O contractor would continue preparation to ship 3,100 cubic meters of TRU waste to WIPP using existing facilities. The AMWTP facility would be built in the same location, contain the same treatment processes, and produce the same final waste forms as in the Preferred Alternative (see Figure S-6). The potential environmental impacts associated with the treatment facility would be the same. The difference between this alternative and the Preferred Alternative is that the treated waste would not be shipped to an offsite disposal facility but, instead, would be placed into RCRA-permitted storage units at the RWMC. This alternative is being evaluated as a contingency in the event WIPP is unable to receive and dispose of INEEL waste. Wastes from other DOE sites could still come to the AMWTP facility for treatment. Such offsite wastes would only be accepted at the AMWTP facility for treatment in accordance with the STP and treated waste would be returned to the waste generator. Under this alternative, 65,000 cubic meters of waste would be treated, resulting in approximately 30,000 cubic meters (containerized volume) of waste that would be stored onsite[1]. If implemented, this alternative does not satisfy the terms of the Settlement Agreement/Consent Order with the State of Idaho, and may not satisfy the requirements of RCRA because the waste would be stored at the INEEL indefinitely.

Alternatives Considered But Not Analyzed

DOE also considered but did not analyze treatment of wastes at existing offsite treatment facilities, siting of the AMWTP at other locations on the INEEL, treatment using other non-thermal treatment processes and treatment using other thermal treatment processes.

Affected Environment

The INEEL is an 890 square mile DOE site located on the Eastern Snake River Plain in southeastern Idaho (see Figure S-1). Bordered by the Bitterroot, Lemhi, and Lost River mountain ranges, the INEEL is primarily a level, open, semi-arid, undeveloped natural area. The primary vegetation types are sagebrush and grassland. The Big Lost River and Birch Creek drainages terminate within the boundaries of the INEEL in sinks and playas, but most surface water is diverted for irrigation before it reaches the site boundaries. The INEEL overlies a portion of the Snake River Plain Aquifer, a sole source aquifer and the largest aquifer in Idaho. Previous waste discharges to unlined ponds and wells have introduced radioactive and chemical compounds into the subsurface. Because of improved waste management practices, these discharges no longer occur. Ongoing INEEL operations result in air emissions that have a radiological component; however, the radiological impacts are very low and well within Federal and state standards.

There are no listed threatened or endangered species that inhabit or reproduce on the INEEL and there are no designated critical habitats within or adjacent to the INEEL boundaries. The peregrine falcon, listed as endangered, and the bald eagle, listed as threatened, may winter or forage within the boundaries of the INEEL.

Land areas within the INEEL of importance to the Shoshone-Bannock Tribes include the buttes, wetlands, sinks, grasslands, juniper woodlands, Birch Creek, and the Big Lost River. The INEEL has diverse cultural resources that include fossils, prehistoric archaeological sites, historic sites, and facilities associated with the development of nuclear science in the United States. Similarly, because Native American people hold the land sacred, the entire INEEL is

culturally important.

About two percent of the INEEL is developed by DOE for facilities and operations and, about six percent is set aside for public roads and utility rights-of-way. Over 97 percent of INEEL employees live in the seven counties surrounding the site. The regional economy relies on farming, ranching, and mining. The INEEL accounts for approximately 10 percent of the total regional employment. Minority and low income populations reside within 50 miles of the INEEL but represent a relatively small proportion of the total population within this area. The subsistence of these populations is not known to be entirely dependent on locally harvested fish, wildlife or native plants.

Under any of the three action alternatives analyzed in this EIS, the AMWTP facility would be constructed within the RWMC. The RWMC is located in the southwestern portion of the INEEL about three miles north of INEEL's southern boundary and six miles east of the western boundary. The RWMC is a fenced, access controlled, 187-acre industrial-type site. All of the land surface within the RWMC fence is occupied by administrative or waste storage facilities, is used for subsurface waste disposal, or has been leveled or modified to drain surface water flows away from the complex. The depth to the Snake River Plain aquifer beneath the RWMC is approximately 590 feet.

MAJOR CONCLUSIONS/CUMULATIVE IMPACTS

Based on the environmental analyses presented in the EIS, the No Action Alternative would have the least short-term environmental impacts and the greatest long-term impacts. There would be few and small potential adverse impacts from the three action alternatives. The Non-Thermal Treatment Alternative would have the least impact of the three action alternatives in air quality, water and energy use, worker and public health, and industrial safety, but the differences among the action alternatives are comparatively small.

The incremental impacts of the construction and operation of the AMWTP facility were added to the impacts of other past, present, and reasonably foreseeable future actions in the vicinity of the INEEL and RWMC. The proposed AMWTP would use a small percentage of the INEEL’s available land, less than seven acres within the RWMC. The facility would require an increase of 0.3 percent over INEEL current water use, which is cumulatively about 11 percent of available water rights. Taken together, air resources, cultural resources, aesthetic and scenic resources, geology and soils, waste management, and ecological resource cumulative impacts would be negligible. Cumulative socioeconomic impacts would be minor since the project would generate only about 146 direct jobs during operation.

The maximum estimated excess fatal cancers to the population from the radiological air emissions of any of the action alternatives would be less than one (2.8×10^{-5}); cumulatively, about one excess fatal cancer would be expected in the population within 50 miles of the project site resulting from INEEL operations. Nonradiological health impacts from the AMWTP would be very small.

For the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative, the impacts of microencapsulation or vitrification to radiation health, air resources, water resources, and INEEL services are very low. Microencapsulation uses less electricity than the vitrification process, while consuming slightly more water and more propane. Both microencapsulation and vitrification processes produce very stable long-term waste forms acceptable for disposal. Overall, the impacts of either microencapsulation or vitrification are essentially the same.

Potential Environmental IMPACTS OF CONCERN

The potential environmental impacts of the alternatives have been assessed for the INEEL and surrounding region and are identified in this section. For most resource areas (land use, cultural resources, aesthetic and scenic resources, groundwater, geology, ecology, noise, and traffic and transportation) there are no material difference in impacts between the Proposed Action, the Non-Thermal Treatment, and the Treatment and Storage Alternatives.

The No Action Alternative is the environmental baseline established in the DOE INEL EIS. In the No Action Alternative, there would be no change in impacts to land use, cultural resources, aesthetic and scenic resources, and ecology. There would be minor adverse impacts to geologic resources due to the extraction of aggregate, clay, sand, and soil to support ongoing environmental restoration and waste management activities. Criteria pollutant and radiological and toxic pollutant levels would continue to be well within applicable standards. No contamination of the vadose zone would occur from the storage of hazardous and radioactive waste in the short-term. In the long-term, however, the potential for chronic leakage and contamination of the vadose zone would increase.

For the three action alternatives, construction impacts are not expected to be significantly greater than those resulting from the No Action Alternative. About seven acres of land located within the RWMC that have been previously disturbed by waste management activities would be used for the AMWTP facility. Therefore, the potential to affect cultural, aesthetic and scenic, and biotic resources is low and not expected to be significant.

All three action alternatives would have the same minor adverse impacts on the geology and geologic resources of the INEEL. Construction of the AMWTP facility would require the excavation of approximately 16,000 cubic yards of material and possibly 1,000 cubic yards for expansion of the existing sewage lagoon system. Construction activities would also require approximately 20,000 cubic yards of aggregate, clay, and sand from INEEL borrow areas.

Because the Proposed Action and the Treatment and Storage Alternative would utilize the same facilities, procedures, resources, and number of workers during operation, both alternatives would produce similar environmental impacts. The Non-Thermal Treatment Alternative would not include incineration and microencapsulation of incinerator ash as part of the facility and would thus have lower emissions and air quality impacts and lower water and energy resource requirements than all other action alternatives.

Air Resources

Impacts to air quality were modeled for construction and operation, and results indicate very small impacts for all three action alternatives. Projected criteria pollutant levels associated with each of the alternatives would be well below the limits of applicable standards (<1 percent). On a comparative basis, impacts of the Proposed Action and Treatment and Storage Alternative are greater than the Non-Thermal Treatment Alternative, since the former include incinerator emissions as well as higher boiler and diesel generator emission rates.

The maximum increment of carcinogenic and noncarcinogenic air pollutants is projected to occur at the INEEL boundary, and levels of all substances would be well below the current applicable standards. When the increment is combined with baseline carcinogenic and noncarcinogenic air pollutant levels, the cumulative levels would still be well below applicable current standards (1 percent or less). Under the Proposed Action/Preferred Alternative or Treatment and Storage Alternative, incremental levels of all carcinogenic substances would be less than 0.3 percent of the applicable standard. All noncarcinogenic levels would be less than 0.1 percent of applicable standards. Carcinogenic incremental levels under the Non-Thermal Treatment Alternative would not exceed 0.1 percent of any standard, while noncarcinogenic levels would be less than 0.001 percent of applicable standards (see Tables S-1 and S-2).

Table S-1. Comparison of radiation doses associated with airborne radionuclide emissions from the EIS alternatives.

Radiological				
Case	**INEEL Baseline[a]**	**INEEL Projected Increases[b]**	**AMWTP operation**	**Cumulative Dose**
Highest onsite (worker) location (millirem per year)				
No Action Alternative	0.21	0.023	0	0.23
Proposed Action with microencapsulation [c]	0.21	0.023	0.058	0.29
Proposed Action with vitrification	0.21	0.023	0.36	0.59

Non-Thermal Treatment Alternative	0.21	0.023	0.003	0.24
Maximally exposed offsite individual (millirem per year)				
No Action Alternative	0.031	0.11	0	0.14
Proposed Action with microencapsulation	0.031	0.11	0.022	0.16
Proposed Action with vitrification	0.031	0.11	0.09	0.23
Non-Thermal Treatment Alternative	0.031	0.11	0.0031	0.14
Collective population dose (person-rem per year)				
No Action Alternative	0.085	0.41	0	0.5
Proposed Action with microencapsulation	0.085	0.41	0.0089	0.5
Proposed Action with vitrification	0.085	0.41	0.048	0.54
Non-Thermal Treatment Alternative	0.085	0.41	0.00085	0.5

a. a. Based on monitoring assessment data for 1996 for the INEEL.

b. b. Increases in radionuclide emissions and radiation doses projected to occur between the present and the year 2003 when AMWTP becomes operational.

c. Doses from the Treatment and Storage Alternative would be the same as those from the Proposed Action.

Table S-2. Ambient air concentrations of toxic air pollutants for proposed AMWTP treatment alternatives.

Area	No Action Alternative	Proposed Action		Non-Thermal Treatment	Treatment and Storage	
		Microencapsulation	Vitrification		Microencapsulation	Vitrification
Criteria pollutant emission levels	Within applicable standards	<1% of standards	<1% of standards	<1% of standards	<1% of standards	<1% of standards
Carcinogenic-carbon tetrachloride	0.067 $\mu g/m^3$ applicable standard	1.9E-04 $\mu g/m^3$ 0.28% of standard	1.9E-04 $\mu g/m^3$ 0.28% of standard	1.4E-05 $\mu g/m^3$ 0.02% of standard	1.9E-04 $\mu g/m^3$ 0.28% of standard	1.9E-04 $\mu g/m^3$ 0.28% of standard
Noncarcinogenic-chlorine	150 $\mu g/m^3$ applicable standard	0.16 $\mu g/m^3$ 0.11% of standard	0.16 $\mu g/m^3$ 0.11% of standard	<0.001% not emitted	0.16 $\mu g/m^3$ 0.11% of standard	0.16 $\mu g/m^3$ 0.11% of standard

Note: Only highest percentages of standard at the INEEL boundary pollutant is given.

Water Resources and INEEL Services

Under normal operating conditions, there would be no discharges to surface water or groundwater under any of the alternatives, therefore no impacts to the aquifer are expected.

Compared to the No Action Alternative baseline, there are small increases in water and electricity usage in all three action alternatives. Propane use for the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative would increase due to the incinerator. However, the increase in propane usage is not significant in itself. Impacts to air quality due to incineration are analyzed in the Air Resources section, and transportation of the propane over the road to the AMWTP facility have been previously considered in the transportation analysis prepared for the 1995 DOE INEL EIS. Electricity and water requirements for all alternatives would be well within the INEEL existing infrastructure capabilities (see Table S-3).

Table S-3. Water resources and INEEL services.

Area	No Action Alternative	Proposed Action		Non-Thermal Treatment	Treatment and Storage	
		Microencapsulation	Vitrification		Microencapsulation	Vitrification
Water consumption (million gallons/yr)	No change over baseline (which is 1.3 billion)	4.2	2.7	3.9	4.2	2.7
Electricity (MWh/yr)	No change to baseline (which is 173,862)	33,000	35,000	24,850	33,000	35,000
Propane (million gallons/yr)	No change to baseline (which is 0.13)	1.1	0.925	0.36	1.1	0.925

Socioeconomic Impacts

Under the No Action Alternative, there would be no change in socioeconomic or community services. Socioeconomic impacts from construction of the AMWTP facility would be the same for all action alternatives. The project would generate a total of 254 jobs (125 direct and 129 indirect) in the Region of Influence (ROI) during the peak year of construction. These 254 jobs would result in an increase of less than 1 percent in the ROI employment. Socioeconomic impacts from operation of the AMWTP facility would be the same for the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative, and less for the Non-Thermal Treatment Alternative. Operation under the Proposed Action and Treatment and Storage Alternative would require 146 workers and would generate 406 jobs (146 direct and 260 indirect) in the ROI. Operation of the Non-Thermal Treatment Alternative facility would require 133 workers and would generate 369 jobs (133 direct and 236 indirect) in the ROI. There would be no significant impacts to the ROI's population, housing sector, or community services from any of the alternatives.

Radiation Health Impacts

The measure of impact used for evaluation of potential health effects from radiation exposure is the risk of fatal cancer. Worker and maximally exposed individual (MEI) effects are reported as individual radiation dose (in millirem) and the estimated lifetime probability of cancer fatality. Population effects are reported as collective radiation dose (in person-rem) and the estimated number of latent cancer fatalities in the affected population. The radiation exposure and health effects from the operation of the AMWTP facility in each action alternative are summarized in Tables S-4, S-5, and S-6. The added risk to the public due to these levels of radiation exposure is small.

The collective (or population) dose to an exposed population is calculated by summing the estimated doses received by each member of the exposed population. This total dose received by the exposed population is measured in person-rem. For example, if 1,000 people each received a dose of 1 millirem (0.001 rem), the collective dose would be 1,000 persons x 0.001 rem = 1.0 person-rem. Alternatively, the same collective dose (1.0 person-rem) would result from 500 people each of whom received a dose of 2 millirem.

The factor that this EIS uses to relate a dose to its effect is 0.0004 latent cancer fatalities per person-rem for workers and 0.0005 latent cancer fatalities per person-rem for individuals among the general population. The latter factor is slightly higher because of the presence of individuals in the general public that may be more sensitive to

radiation than workers (for example, infants).

These concepts may be applied to estimate the effects of exposing a population to radiation. For example, in a population of 100,000 people exposed only to background radiation (0.3 rem per year), 15 latent cancer fatalities per year would be inferred to be caused by the radiation (100,000 persons x 0.3 rem per year x 0.0005 latent cancer fatalities per person-rem = 15 latent cancer fatalities per year).

These same concepts apply to estimating the effects of radiation exposure on a single individual. Consider the effects, for example, of exposure to background radiation over a lifetime. The number of latent cancer fatalities corresponding to a single individual's exposure over a (presumed) 72-year lifetime to 0.3 rem per year is the following:

1 person x 0.3 rem/yr x 72 years x 0.0005 latent cancer fatalities/person-rem

= 0.011 latent cancer fatalities.

Again, this should be interpreted in a statistical sense; that is, the estimated effect of background radiation exposure on the exposed individual would produce a 1.1 percent chance that the individual might incur a fatal cancer caused by the exposure. Said another way, this method estimates that about 1.1 percent of the population might die of cancers induced by the radiation background.

Table S-4. Fatal cancer risk from radiological exposures resulting from routine annual AMWTP operations and radiological emissions (based on a population of 100,000).

Area	Proposed Action		Non-Thermal Treatment	Treatment and Storage	
	Microencapsulation	Vitrification		Microencapsulation	Vitrification
Annual estimated fatal cancer incidence and dose					
MEI onsite	1 in 43 million (0.058 mrem/yr)	1 in 7 million (0.36 mrem/yr)	1 in 830 million (0.003 mrem/yr)	1 in 43 million (0.058 mrem/yr)	1 in 7 million (0.36 mrem/yr)
MEI offsite	1 in 90 million (0.022 mrem/yr)	1 in 22 million (0.09 mrem/yr)	1 in 620 million (0.0031 mrem/yr)	1 in 90 million (0.022 mrem/yr)	1 in 22 million (0.09 mrem/yr)
MEI and average involved workers	1 in 1600 (1500 mrem/yr) and 1 in 30,000 (81 mrem/yr)	1 in 1600 (1500 mrem/yr) and 1 in 30,000 (81 mrem/yr)	1 in 1600 (1500 mrem/yr) and 1 in 30,000 (81 mrem/yr)	1 in 1600 (1500 mrem/yr) and 1 in 30,000 (81 mrem/yr)	1 in 1600 (1500 mrem/yr) and 1 in 30,000 (81 mrem/yr)
Annual for population	4.45E-06 LCF[a] (0.0089 person rem)	2.4E-05 LCF[a] (0.048 person-rem)	2.4E-05 LCF[a] (0.00085 person-rem)	4.45E-06 LCF[a] (0.0089 person rem)	2.4E-05 LCF[a] (0.048 person-rem)

a. LCF=Latent Cancer Fatality.

Table S-5. Radiation dose and human health impacts associated with routine airborne emissions over the projected operating lifetime of the AMWTP.

Area	Proposed Action		Non-Thermal Treatment	Treatment and Storage	
	Microencapsulation	Vitrification		Microencapsulation	Vitrification
30-year operation estimated fatal cancer risk and dose			13 years of operation	30-year projection from AMWTP airborne emissions	
MEI onsite	1 in 285,000 (8.7 mrem)	1 in 140,000 (18 mrem)	1 in 833,000 (3.1 rem/yr)	1 in 285,000 or 8.7 mrem	1 in 140,000 (18 mrem)
MEI offsite	1 in 400,000 (4.9 mrem)	1 in 285,000 (6.9 mrem)	1 in 1 million (1.9 mrem)	1 in 400,000 (4.9 mrem)	1 in 285,000 (6.9 mrem)
30-year operation - population	1.1E-02 LCF[a] (23 person-rem)	1.2E-02 LCF[a] (24 person-rem)	4.2E-03 LCF[a] (8.4 person-rem)	1.1E-02 LCF[a] (23 person-rem)	1.2E-02 LCF[a] (24 person-rem)

a. LCF=Latent Cancer Fatality.

Table S-6. Cumulative radiation dose and human health impacts associated with annual radiological airborne emissions from the AMWTP.

			Proposed Action[a]					
Receptor	No Action Alternative		With microencapsulation		With vitrification		Non-Thermal Treatment Alternative	
	Dose (millirem)	Chance of an LCF[b]	Dose (millirem)	Chance of an LCF[b]	Dose (millirem)	Chance of an LCF[b]	Dose (millirem)	Chance of an LCF[b]
MEI involved worker[c]	1500	1 in 1600	1500	1 in 1600	1500	1 in 1600	1500	1 in 1600
Average involved worker[d]	81	1 in 30,000	81	1 in 30,000	81	1 in 30,000	81	1 in 30,000
MEI onsite	0.23	1 in 10,000,000	0.29	1 in 8,000,000	0.59	1 in 4,000,000	0.24	1 in 10,000,000
MEI offsite	0.14	1 in 14,000,000	0.16	1 in 12,000,000	0.23	1 in 8,000,000	0.14	1 in 14,000,000
Population	Dose person-rem 0.50	Number of LCF 2.5E-04	Dose person-rem 0.50	Number of LCF 2.5E-04	Dose person-rem 0.54	Number of LCF 2.7E-04	Dose person-rem 0.50	Number of LCF 25E-04

a. Doses and estimated LCF from the Treatment and Storage Alternative would be the same as the Proposed Action Alternative for airborne radionuclides.

b. LCF=Latent Cancer Fatality.

c. The MEI involved worker dose is 1500 mrem based on the INEEL administrative dose limit.

d. The average involved worker dose is based on historical records for the RWMC.

Nonradiation Health Impacts

Under the No Action Alternative, no adverse health effects would occur as a result of criteria and noncarcinogenic emissions. Annual injury and illness rates for INEEL operations would not change.

The health impacts associated with potential exposure to criteria and toxic air pollutants would be well within applicable standards and regulations for all alternatives (Hazard Quotient less than one in all cases, indicating that no adverse health effects would be expected. Hazard quotient is the ratio of the concentration to the standard). Lifetime cancer risks from concentrations of carcinogenic air pollutants were calculated. The total cancer risk under the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative for all nonradiological carcinogenic chemicals would be 1 in 85 million for an individual at the site boundary and 1 in 3 billion at the Craters of the Moon, respectively. The total cancer risk under the Non-Thermal Treatment Alternative for all nonradiological carcinogenic chemicals would be 1 in 360 million for an individual at the site boundary and 1 in 14 billion for an individual at the Craters of the Moon (see Table S-7).

Table S-7. Nonradiation health impacts (risk).

Area	No Action Alternative	Proposed Action		Non-thermal Treatment	Treatment and Storage	
		Microencapsulation	Vitrification		Microencapsulation	Vitrification
Hazard quotient	<1	<1	<1	<1	<1	<1
Highest risk category - emissions at site boundary	No impact	1 fatal cancer incidence in 260 million from carbon tetrachloride	1 fatal cancer incidence in 260 million from carbon tetrachloride	1 fatal cancer incidence in 600 million for formaldehyde	1 fatal cancer incidence in 260 million from carbon tetrachloride	1 fatal cancer incidence in 260 million from carbon tetrachloride
All chemical carcinogenics emissions at site boundary	No impact	1 in 85 million	1 in 85 million	1 in 360 million	1 in 85 million	1 in 85 million
Emissions at Craters of the Moon		1 in 3 billion	1 in 3 billion	1 in 14 billion	1 in 3 billion	1 in 3 billion

Industrial safety impacts would be the same during the 4-year construction period for the Proposed Action/Preferred Alternative, Treatment and Storage Alternative, and Non-Thermal Treatment Alternative. Estimated total injuries and illnesses would be 28 and total fatalities would be 0.07 during the construction period. For the 30-year facility operation period, the Proposed Action/Preferred Alternative, and Treatment and Storage Alternative would have the same number of estimated total injuries and illnesses (135) and total fatalities (0.65). The Non-Thermal Treatment Alternative would have an estimated 53 total injuries and illnesses and 0.26 total fatalities over a 13-year operation period. When compared to 1996 INEEL activities (6,645 employees, 192 injury/illnesses, and 1 fatality) potential injury/illnesses and fatalities are not significant.

Accident Impacts

Accidents analyzed in the Final EIS represent a variety of accident causes and locations, involving different materials. Included are internal events, external events, and events caused by natural phenomena. The accidents analyzed represent all other credible accidents with high and moderate consequences.

Accident risks and consequences for the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative are the same. The Non-Thermal Treatment Alternative would not contain accidents associated with thermal treatment, i.e. incinerator explosion and nuclear criticality in a microencapsulation ash drum.

The waste box drop spill accident has the highest consequences within the anticipated frequency category (³ 0.01 accidents/year). The fire involving a waste transfer vehicle accident has the highest consequences at the site boundary within the unlikely frequency category (³ $1x10^{-4}$ but < $1x10^{-2}$). A type II storage module fire and the propane-fueled fire accidents have the highest consequences within the extremely unlikely frequency category (³ $1x10^{-6}$ but < $1x10^{-4}$) (see Table S-8).

Table S-8. Radiological consequences of AMWTP accidents.

Accident scenario	Location (from AMWTP)		
	100 meters	Nearest INEEL boundary	Population (estimated number of fatal cancers)
Waste box spill (anticipated)	0.569 rem 1 in 4000[a]	0.010 rem 1 in 250,000 [a]	Less than 1 [b]
Fire in a waste transfer vehicle (unlikely)	0.011 rem 1 in 220,000 [a]	1.91 rem 1 in 1000	Less than 1[b]
Type II module fire (extremely unlikely)	0.013 rem 1 in 190,000 [a]	2.23 rem 1 in 800 [a]	Less than 2
Propane-fueled fire (extremely unlikely)	2.62 rem 1 in 900 [a]	2.23 rem 1 in 800 [a]	Less than 2

a. The chance of the individual contracting fatal cancer as a result of the corresponding radiation exposure.

b. This number does not account for the probability of occurrence of the accident.

The accident with the most severe consequences from hazardous chemical release would be the lava flow over the RWMC. The chemical concentrations from nitric acid and mercury would present the greatest concern. The concentration at the MEI would be 16.0 mg/m^3 for nitric acid and 3.0 mg/m^3 for mercury, which would exceed exposure guidelines (found in Emergency Response Planning Guide [ERPG]) by a factor of approximately three in each case. The exposure guideline used for comparison is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their ability to take protective action.

For AMWTP accidents, the chemical concentrations would be below ERPG values in all cases. The most severe consequence from mercury is associated with a propane-fueled fire at the AMWTP resulting in a concentration of $2.6x10^{-5}$ mg/m^3 and the corresponding ERPG value is 0.10 mg/m^3, approximately 4000 times higher. The chemical concentration that comes nearest to its ERPG value is asbestos. In the propane-fueled fire scenario the calculated concentration of asbestos is 2.5E-02 mg/m^3 and the EGRP value is 5.0 E-02 mg/m^3.

Environmental Justice

Because DOE does not expect high and adverse human health or environmental impacts from agency action on the public at large, no minority or low income populations would be expected to experience disproportionately high and adverse consequences under any of the alternatives analyzed in this EIS. Under the action alternatives, modest economic benefits would result from additional jobs created during construction and operation, and there would be small increases in business activity with corresponding small increases in revenue to local governments. These impacts would be small but positive and would not disproportionately affect any single group.

Other Impacts

Under the No Action Alternative, there would be no change in existing noise or traffic and transportation impacts. For

all action alternatives, construction noise impacts would be minor and short-term. Operational noise would be negligible since all process activities would be conducted inside the AMWTP facility. Traffic and transportation impacts due to the three "action" alternatives would be minor and not significant. The Level-of-Service on local access highways would not change, nor would peak hourly traffic increase significantly. Construction-related traffic would be the same for all the alternatives.

Public Comment on the Draft Environmental impact statement

DOE published the Notice of Availability of the AMWTP Draft EIS in the *Federal Register* on July 24, 1998 (63 FR 39836). The 50-day public comment period for the Draft EIS began on July 24, 1998, and ended on September 11, 1998. To accommodate requests from the public, the public comment period on the Draft EIS was extended to September 26, 1998 (63 FR 49101). Public hearings were held in Idaho Falls, Idaho on August 18, 1998, and Twin Falls, Idaho on August 20 and 21, 1998. In addition, the public was encouraged to provide comments via mail and fax. DOE considered and responded to all of the comments received on the Draft EIS. Volume II of the Final EIS, the Comment Response Document (CRD), describes the public comment process in detail, provides copies of all comments received, and provides responses.

Major Comments Received on the Draft Environmental Impact Statement

Many comments received on the Draft EIS related to: (1) the priority of treating this stored waste before dealing with buried waste at the INEEL; (2) the need to treat waste that is, in the commentor's perception, already safely stored; (3) the public health and environmental impacts of incineration; (4) ES&H oversight of the project; and (5) requests that the Draft EIS be revised and reissued. Summary responses to these comments are presented below. All of the issues identified are included and responded to in detail in Volume II of the Final EIS, the CRD. Revisions to the EIS resulting from public comments have been made throughout the Final EIS.

a.

1. *The priority of treating this stored waste before dealing with buried waste at the INEEL.*

   Projects dealing with the buried and stored TRU wastes at the INEEL are both priorities within DOE and proceeding on parallel paths. The buried waste has a higher level of complexity associated with determining what has been buried, what risk it poses to human health and the environment, and what remediation options are most appropriate. The buried waste project is proceeding under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) process, with a draft ROD currently scheduled for December 2002. For the stored wastes that are the subject of this EIS, DOE is under regulatory and legal requirements to build a mixed waste treatment facility and begin operations in 2003. If a CERCLA ROD on the buried wastes requires retrieval and treatment, the AMWTP would be able to provide some of the treatment capacity for the buried wastes, and the potential impacts of such treatment is analyzed in the EIS.

2. *The need to treat waste that was, in the commentor's perception, already safely stored.*

   Waste is stored in the earthen-covered berm in containers which have exceeded their 20-year design life. These containers are subject to breaching and failure through corrosion or decomposition, with potential for wastes to be released into the environment. In addition, under the FFCA of RCRA, DOE must be in compliance with the INEEL STP. The STP contains milestones for the procurement, construction and operation of a treatment facility for the TRU and mixed wastes. Repackaging and re-storage of the waste would not meet requirements of RCRA or TSCA. Further, the Settlement Agreement with the State of Idaho requires the construction and operation of a mixed waste treatment facility, with waste to be shipped out of Idaho no later than 2018.

3. *The public health and environmental impacts attributed to incineration.*

The potential health and environmental impacts from incineration are small. Incineration is the required treatment for PCBs under the U.S. Environmental Protection Agency (EPA) TSCA regulations, and is the Best Demonstrated Available Technology under EPA RCRA regulations for some wastes addressed in this EIS. The amount planned for incineration is approximately 25 percent. Incineration would enhance containment by reducing waste volumes prior to permanent disposal in a geologic repository, and after the ash is stabilized, increase the stability of the disposed residual. The project must comply with applicable laws and regulations that were developed to protect public health and the environment.

The EIS assesses the risks of the potential failure of the incinerator and air pollution control system during treatment. The assessment shows that radiological consequences at the nearest INEEL boundary would be 0.24 rem, total effective does equivalent to the MEI. The risk to the individual of a latent cancer from this exposure is about 1 in 8,000. For all toxic substances released concentrations at the nearest INEEL boundary are all far below evaluation guidelines.

4. *Environment, Safety and Health oversight of the project.*

   The State of Idaho and the EPA would regulate BNFL Inc., according to permits under their purview. DOE regulates occupational safety and health and nuclear safety according to a specific ES&H authorization. Section 7.4 of the Final EIS describes the ES&H oversight provided for this project.

5. *Requests that the Draft EIS be revised and reissued.*

Some commentors requested that DOE reissue the Draft EIS. One reason for the request was due to the change from vitrification to microencapsulation of incinerator ash. Other reasons given included a belief that waste must be fully characterized, scoping comments not adopted, and the financial impacts of privatization not analyzed in the Draft EIS.

The CEQ NEPA regulations and DOE's Implementing Regulations require that an agency prepare a supplemental EIS (or reissue a draft EIS) when an agency makes substantial changes in the proposed action that are relevant to environmental concerns, or when there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE believes that the Draft EIS was adequate. The microencapsulation process is a minor change that was added to the Proposed Action after the Draft EIS was printed, but early in the public comment period and before the first public hearing. DOE disclosed and discussed this variation in the Proposed Action at the public hearings, and provided the public and other government agencies the opportunity to comment on the addition of the process to the suite of AMWTP processes. In the Final EIS, DOE fully analyzes the environmental impacts of microencapsulation, including cumulative impacts, and considered public comment on the change in process.

BNFL Inc. has extensive experience with microencapsulation. For the Proposed Action/Preferred Alternative and the Treatment and Storage Alternative, impacts of microencapsulation or vitrification to radiation health, air resources, water resources, and INEEL services are very low and essentially the same. Both microencapsulation and vitrification produce very stable final waste forms meeting RCRA LDR standards and the WIPP WAC. The Final EIS analyzes the impacts of both microencapsulation and vitrification. Responses to the other reasons for reissuing the Draft EIS raised by the public are addressed in the CRD.

Other comments on the Draft EIS related to:

- The treatment process technologies.
- The types and volumes of waste to be treated.
- The degree of detail of waste characterization data.
- The need for DOE to provide the necessary oversight to ensure privatization meets the agreed on timetable

for treating the waste, as well as monitoring the operation of the facility to protect the public and the environment.

- The possibility that WIPP may not open and the need for DOE to treat the waste to WIPP WAC.
- The need for DOE to adequately consider the potential health and environmental impacts and risks (specifically impacts to air quality) due to incineration and supercompaction technologies.
- Support for INEEL treating the waste that is currently onsite but opposition to accepting waste from other sites.
- The impacts of the alternatives on human health (both from radiation and hazardous chemicals) and how these risks were determined and evaluated.
- The relationship of this EIS to other DOE documents and programs, particularly the *Surplus Plutonium Disposition Draft Environmental Impact Statement,* WM PEIS, the DOE INEL EIS, and the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement-II,* and the need to make decisions based on all associated program and activities concurrently.

Differences between the Draft and Final Environmental Impact Statement

This section describes changes made since the issuance of the Draft EIS based upon public comment and technical details not available at the time of issuance of the Draft EIS.

Advanced Mixed Waste Treatment Project Process Description. The public was informed of BNFL Inc.'s intention to substitute microencapsulation for vitrification of incinerator ash during DOE's presentations at all of the Draft EIS public hearings. Informational display boards were used. DOE answered questions on the change, and invited public comment during the hearing and the public comment period.

Section 3.1.2.5, Section 3.5 and Appendix B have been expanded to describe why microencapsulation was substituted and its potential effects. Section 3.1.2.5 was modified to describe the microencapsulation process. Section 3.2 was changed to reflect the use of microencapsulation as the incineration ash stabilization process in the Proposed Action/Preferred Alternative. A table comparing specific differences in environmental impacts between microencapsulation and vitrification was added to Section 3.5. The impacts are small and were encompassed within the analyses contained in the Draft EIS. The section on treatment (Section 3.1.2.5) in the Final EIS still includes vitrification, and the potential environmental impacts from vitrification and microencapsulation are presented in Chapter 5.

If DOE decides to proceed with an action alternative, further changes or substitutions to the processes described in the EIS may occur in the future. Any proposed substitution or major change of a treatment process would be evaluated as appropriate under NEPA.

Air Resources. Several commentors were concerned about the air emissions from incineration. More specifically, they stated that the EIS did not present enough information on the air emission control system and high-efficiency particulate air (HEPA) filters and, therefore, they were not convinced that the HEPA filter efficiency was as stated and potential health effects were understated. As a result, a discussion of the AMWTP air emission control system and HEPA filters was added to Section 3.1.2.5. In addition, Section 5.7 now includes an analysis of the emissions from microencapsulation.

Normal Operation Radiological/Chemical Impacts. The radiological impacts in Section 5.12 was revised to include the microencapsulation process as part of the Preferred Alternative/Proposed Action.

Environment, Safety, and Health (ES&H) Oversight. The State of Idaho and the EPA would regulate

BNFL Inc. according to permits under their purview. DOE regulates occupational safety and health and nuclear safety according to a specific ES&H authorization. Section 7.4 of the Final EIS describes the ES&H oversight provided for this project.

New Appendix. A new appendix has been added to the Final EIS (Appendix H, BNFL Inc. Contract) because of public comments requesting more detailed information on the contract between DOE and BNFL Inc. and is included on a CD-ROM enclosed with the Final EIS.

Issues to be Resolved

Issues to be resolved include the EIS decision to be made and its relationship to the purpose and need for agency action.

The basic decision to be made in the ROD, is whether or not to implement Phases II (construction) and III (operations) of the AMWTP. If DOE decides to construct and operate the AMWTP, the ROD will also address whether or not to employ thermal treatment. Storage onsite is being considered as a contingency in the event that WIPP or another appropriate facility is unable to receive and dispose of INEEL waste.

For purposes of this analysis, DOE used waste descriptions based on the best available information. If the project proceeds, additional waste characterization will be performed after the waste is retrieved from earthen-covered storage. Additional environmental analysis may be needed if the waste descriptions in this EIS are found to be significantly inaccurate, or different treatment processes than those analyzed herein are proposed.

For the action alternatives, planned mitigation measures address impacts that would remain after application of design features, administrative controls, and operating practices required by ES&H permits. Additional measures are planned to reduce or avoid potential impacts to cultural resources, aesthetic and scenic resources, geology and geologic resources, air resources, ecology, occupational and public health and safety, and resulting from accidents. No mitigation measures are anticipated in the areas of land use, socioeconomics, water resources, nonradiological impacts, noise, traffic and transportation, and INEEL services, because the potential for impacts is very small. A full discussion of mitigation measures can be found in Section 5.19 of the EIS.

acronyms and abbreviations

AEA	*Atomic Energy Act*
alpha LLMW	alpha-contaminated low-level mixed waste
amwtp	Advanced Mixed Waste Treatment Project
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CRD	Comment Response Document
D&D	Decontamination and Decommisioning
DOE	U.S. Department of Energy
DOE INEL EIS	*Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement*
ES&H	environment, safety and health
EIS	environmental impact statement
ERPG	Emergency Response Planning Guide
FFCA	*Federal Facility Compliance Act*
HEPA	high-efficiency particulate air (filter)
HSWA	Hazardous and Solid Waste Amendments
INEEL	Idaho National Engineering and Environmental Laboratory
LDR	Land Disposal Restrictions
LLMW	low-level mixed waste
M&O	Management and Operating
MEI	maximally exposed individual
mrem	millirem
NEPA	*National Environmental Policy Act*
PCB	polychlorinated biphenyls
RCRA	*Resource Conservation and Recovery Act*
rem	roentgen equivalent man
ROD	Record of Decision
ROI	Region of Influence
RWMC	Radioactive Waste Management Complex

STP	Site Treatment Plan
TRU	transuranic waste
TSA	Transuranic Storage Area
TSA-RE	Transuranic Storage Area Retrieval Enclosure
TSCA	*Toxic Substances Control Act*
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Waste Management Programmatic Environmental Impact Statement*