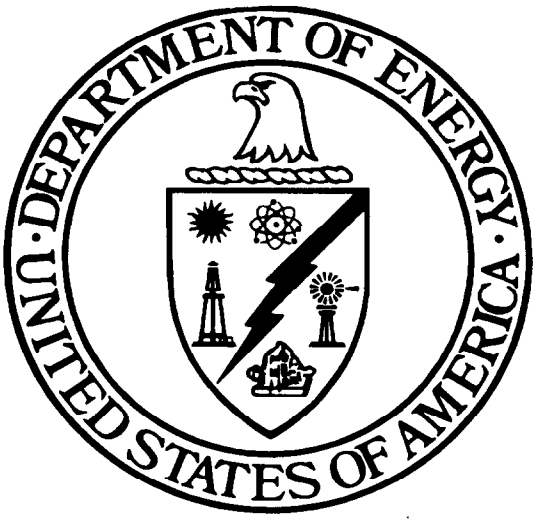
DOE/EIS-0287

RECORD OF DECISION

For The

Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement



December 2005

United States Department of Energy

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Record of Decision for the *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement*

SUMMARY: DOE is making decisions pursuant to the *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement* (Final EIS) (DOE/EIS-287), issued in October 2002. The Final EIS presents the analysis of a proposed action containing two sets of alternatives:

(1) waste processing alternatives for treating, storing and disposing of liquid mixed (radioactive and hazardous) transuranic (TRU) waste/sodium-bearing waste (SBW)[1] and newly-generated liquid radioactive waste (NGLW) stored in below-grade tanks and solid high-level radioactive waste (HLW) calcine stored in bin sets at the Idaho Nuclear Technology and Engineering Center (INTEC) on the Idaho National Laboratory (INL) Site, previously named the Idaho National Engineering and Environmental Laboratory (INEEL); and

(2) facility disposition alternatives for final disposition of facilities directly related to the HLW Program at INTEC after their missions are complete, including any new facilities necessary to implement the waste processing alternatives.

DOE plans a phased decision making process. DOE considered the information in the Final EIS, a related Supplement Analysis (DOE/EIS-0287-SA-01) (SA), and comments received on the *Federal Register* Notice (70 FR 44598; August 3, 2005) that announced DOE's preferred treatment technology for SBW when making the decisions in this ROD. This first ROD addresses SBW treatment, facilities disposition, excluding the INTEC Tank Farm Facility (Tank Farm) and bin sets closure, and DOE's strategy for HLW calcine.

DOE has decided to treat SBW using the steam reforming technology. The Department's preferred disposal path for this waste is disposal as TRU waste at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Until such time as the regulatory approvals are obtained and a determination that the waste is TRU is made, the Department will manage the waste to allow disposal at WIPP or at a geologic repository for spent nuclear fuel (SNF) and HLW.

For facilities disposition, DOE has decided to conduct performance-based closure (to contamination levels below those that would impact the human health and the environment as established by applicable regulations and DOE Orders as determined on a case-by-case basis depending on risk) of existing facilities directly related to the HLW Program at INTEC once their missions are complete. Newly constructed waste processing facilities needed to implement the decisions in this ROD, such as the steam reforming facility for SBW treatment, will be designed consistent with clean closure methods and planned to be clean closed when their missions are complete, regardless of the classification of the waste they treat. All INTEC

[1] The Final EIS refers to SBW as mixed transuranic waste/SBW. However a determination that SBW is transuranic waste has not been made.

facilities directly related to the HLW Program will be closed in accordance with applicable regulations and DOE Orders.

Further, consistent with DOE's *Environmental Management Performance Management Plan for Accelerating Cleanup at the INEEL* (July 2002), DOE's strategy for HLW calcine is to retrieve the calcine for disposal outside the State of Idaho. Accordingly, DOE will develop calcine retrieval demonstration processes and conduct risk-based analyses, including disposal options, focused on the calcine stored at the INTEC.

After the Final EIS was issued, the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA), Pub. L. 108-375, was enacted. Section 3116 of the NDAA provides that certain waste resulting from reprocessing of SNF is not high-level waste if the Secretary of Energy, in consultation with the Nuclear Regulatory Commission (NRC), makes certain determinations. Therefore, DOE plans to issue an amended ROD in 2006 specifically addressing closure of the Tank Farm Facility, which stored certain wastes resulting from reprocessing, in coordination with the Secretary of Energy's determination, in consultation with the NRC, under Section 3116.

In a future ROD, DOE will decide the final strategy for HLW calcine retrieval, including determining whether and how to further treat, if applicable, package, and store calcine pending disposal. DOE expects to issue the amended ROD for HLW calcine disposition and bin set closure in 2009.

The State of Idaho participated as a cooperating agency in the preparation of the *Idaho High-Level Waste and Facilities Disposition Environmental Impact Statement.* The State provided the following input to DOE's decisions for waste processing and facility disposition.

Waste Processing: The State of Idaho concurs with DOE's selection of steam reforming as the technology for solidifying remaining INTEC Tank Farm liquids, provided DOE obtains required permits for its treatment facility and post-treatment storage, and produces a waste form acceptable for disposal at a repository outside Idaho.

Facility Disposition: The State concurs with the performance-based closure of existing facilities directly related to the high-level waste program at INTEC, once their missions are complete, subject to the State's separate approval of individual closure plans under the Idaho Hazardous Waste Management Act and compliance with Section 3116 of the NDAA. The State also concurs with DOE's decision to clean close newly constructed waste processing facilities.

Remaining Decisions: The State will provide additional input on DOE's remaining decisions for HLW facility disposition and calcine treatment, which DOE must make by December 31, 2009, in accordance with our 1995 Settlement Agreement. The State will continue to coordinate with DOE and the NRC as appropriate regarding the classification of tank residuals under Section 3116 of the NDAA, as well as the classification of other wastes.

FOR FURTHER INFORMATION CONTACT: For further information on the ROD and the Idaho Cleanup Project, contact Joel Case, Team Lead, U.S. Department of Energy, Idaho Operations Office, 1955 Fremont Avenue, MS-1222, Idaho Falls, ID 83415, Telephone: (208) 526-6795.

For general information on DOE's National Environmental Policy Act (NEPA) process, please contact: Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (EH-42), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, D.C. 20585, Telephone: (202) 586-4600 or leave a message at (800) 472-2756.

SUPPLEMENTARY INFORMATION:

I. Background

From 1952 to 1991, DOE and its predecessor agencies reprocessed SNF at INTEC, prior to 1998 known as the Idaho Chemical Processing Plant, on the INL Site. Reprocessing operations used solvent extraction systems to remove mostly uranium-235 from SNF. The waste product from the first extraction cycle of the reprocessing operation was liquid HLW mixed with hazardous materials. Subsequent extraction cycles, treatment processes, and follow-on decontamination activities generated additional liquids that were combined to form liquid SBW, which is generally much less radioactive than HLW generated from the first extraction cycle. These liquid wastes were stored in eleven 300,000-gallon below-grade storage tanks. The last campaign of SNF reprocessing at INTEC was in 1991 and HLW is no longer generated at INTEC. From 1963 to 1998, DOE processed HLW and some SBW through calcination that converted the liquid waste into a dry powder calcine. Additional SBW was processed by calcination from 1998 to 2000. At present, approximately 4,400 cubic meters of HLW calcine remain stored in six bin sets (a series of reinforced concrete vaults, each containing three to seven stainless steel storage bins), and approximately one million gallons of SBW remain in three 300,000 gallon below-grade tanks. Liquid SBW and newly generated liquid waste (NGLW) has continued to accumulate in the tanks from the calcination process, decontamination, and other activities. NGLW continued to be collected in the tank farm tanks from a number of sources at INTEC (e.g., laboratory drains, snow melt, sumps, and evaporator operations) until September 2005 and is now being stored in other permitted storage tanks.

As a result of litigation, DOE and the State of Idaho reached an agreement in 1995 referred to as the Idaho Settlement Agreement/Consent Order (Settlement Agreement) that, among other things, provides for DOE to complete calcination of SBW liquid wastes by a target date of December 31, 2012. Although the agreement requires treatment of SBW by calcination, it also provides for modifying this requirement if supported by analysis and decisions under NEPA. The agreement also sets a target date of December 31, 2035, for treating all HLW and SBW to be "road-ready" for shipment out of Idaho.

In 1997, DOE issued a Notice of Intent to prepare an EIS to evaluate the environmental impacts of the range of reasonable alternatives for treating Idaho HLW calcine, SBW, associated radioactive waste such as NGLW, and for the disposition of related HLW Program facilities at

INTEC. The State of Idaho participated as a cooperating agency in the development of the EIS to support the Settlement Agreement and to facilitate the EIS review process.

In January 2000, DOE issued the Draft *Idaho High-Level Waste and Facilities Disposition Environmental Impact Statement* (Draft EIS) (DOE/EIS-0287D) for public review and comment. Subsequently, DOE and the State of Idaho received approximately 1,000 comments on the Draft EIS and considered those comments while revising the EIS.

DOE issued the *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement* (Final EIS) (DOE/EIS-0287) in October 2002. The Final EIS presents the analysis of a proposed action containing two sets of alternatives: 1) *waste processing alternatives* for treating, storing and disposing of liquid SBW and NGLW stored in below-grade tanks and solid HLW calcine stored in bin sets at the INTEC on the INL Site; and 2) *facility disposition alternatives* for final disposition of facilities directly related to the HLW Program after their missions are complete, including any new facilities necessary to implement the waste processing alternatives.

After the Final EIS was issued, DOE conducted four workshops to inform the public about the five technologies that the DOE was considering for treatment of the SBW with the preferred disposition at WIPP. The five technologies were Direct Vitrification, Cesium Ion Exchange with a grout waste form, Calcination with Maximum Achievable Control Technology upgrades, Direct Evaporation, and Steam Reforming. Workshops were held from March 13 to April 28, 2003, in Jackson, Wyoming, and Idaho Falls, Twin Falls, and Fort Hall, Idaho. In addition, briefings were held with individual stakeholders through June 2003. The public was given the opportunity to provide comments on all technologies presented through August 31, 2003, via e-mail or regular mail.

During the workshops and briefings, DOE informed the public that the DOE strategy was to select one of the five technologies for treatment of the SBW. Subsequently, DOE modified this strategy by incorporating the requirement for a contractor to propose a treatment technology for SBW in a draft Request for Proposals (RFP) for the Idaho Cleanup Project (ICP) contract. At public meetings of the Idaho Environmental Management Citizens Advisory Board (CAB), public meetings conducted by the National Academy of Sciences in Idaho, and other meetings with local stakeholders, DOE informed the public that the DOE would identify a preferred treatment technology for SBW after the contract was awarded. At these meetings, DOE also informed the public that they would have an opportunity to provide comments on the draft RFP.

DOE issued the draft RFP for the ICP contract for comment in February 2004. The draft RFP required bidders to propose technologies for treating SBW for disposal at WIPP and an alternative technical approach to prepare this waste for disposal as HLW in a geologic repository for SNF/HLW if this waste could not be disposed of at WIPP. The RFP also included the DOE strategy to meet the settlement agreement milestones for HLW calcine, facilities disposition, and segregating the NGLW from the Tank Farm Facility to other storage by September 30, 2005. DOE responded to comments received on the draft RFP and issued the final RFP in July 2004. On October 28, 2004, the NDAA was enacted. Among other provisions of the Act, Section 3116 of this NDAA provides that certain wastes from reprocessing is not HLW if the Secretary of Energy (the Secretary), in consultation with the Nuclear Regulatory Commission (NRC),

determines that the criteria in 3116 have been met. Section 3116 provides that with respect to materials stored at a DOE site in Idaho, which activities are regulated by Idaho pursuant to closure plans or permits issued by the State, the term "high-level radioactive waste" does not include radioactive waste resulting from the reprocessing of SNF if the Secretary, in consultation with the NRC, makes certain determinations. Section 3116 is related to the requirements for the INTEC Tank Farm closure; therefore, tank closure will be addressed in an amended ROD in coordination with the Secretary's determination.

In July 2005, DOE issued a SA (DOE/EIS-0287-SA-01) that documented DOE's review of changes in the proposed action and new information obtained (e.g. updated waste inventory) since the 2002 Final EIS was issued. Based on the analysis in the SA, DOE determined that there were no substantial changes in the proposed action and no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts, and that a supplemental EIS was not required. DOE then issued a *Federal Register* Notice (70 FR 44598, August 3, 2005) that announced steam reforming as DOE's preferred treatment technology for SBW.

II. Waste Processing Alternatives Considered

The Final EIS analyzed six waste processing alternatives for HLW calcine, SBW, and NGLW: No Action; Continued Current Operations; Separations with three treatment options; Non-Separations with four treatment options; Minimum INEEL Processing; and Direct Vitrification with two treatment options. These alternatives are briefly described as follows:

No Action Alternative
Under this alternative, the New Waste Calcining Facility (NWCF) calciner would remain in standby, the SBW would remain in the Tank Farm, and the calcine would remain in the bin sets indefinitely.

Continued Current Operations Alternative
This alternative involves calcining the SBW and adding it to the bin sets, where it would be stored indefinitely with calcined HLW. Under this alternative, the NWCF calciner would remain in standby pending receipt of a RCRA permit from the State of Idaho and upgrades to air emission controls required by the U. S. Environmental Protection Agency (EPA).

Separations Alternative
This alternative comprises three treatment options, each of which would use a chemical separations process, such as solvent extraction, to divide the SBW and calcine into fractions suitable for disposal in either a geologic repository or a low-level waste disposal facility, depending on waste characteristics. Separating the radionuclides in the waste into fractions would decrease the amount of waste that would have to be shipped to a geologic repository, saving repository space and reducing disposal costs. The three waste treatment options under the Separations Alternative are described below.

1. Full Separations Option:
   This option would separate the radioisotopes in the SBW and the HLW calcine into high-level and low-level waste fractions. The HLW fraction would be vitrified in a new facility at INTEC, placed in stainless steel canisters, and stored onsite until shipped to a storage facility or geologic repository. DOE would dispose of the low-level waste fraction on site, or at an offsite DOE or commercial low-level waste disposal facility.

2. Planning Basis Option:
   This option reflects previously announced DOE decisions and agreements with the State of Idaho regarding the management of HLW and SBW. The NWCF calciner would remain in standby, pending receipt of a RCRA permit from the State and upgrades to air emission controls required by EPA. It is similar to the Full Separations Option, except that, prior to separation, the SBW would be calcined and stored in the bin sets along with the HLW calcine. After separations, the HLW fraction would be vitrified in a new facility at INTEC, placed in stainless steel canisters, and stored onsite until shipped to a storage facility or geologic repository. DOE would dispose of the low-level waste fraction at an offsite DOE or commercial low-level waste disposal facility.

3. Transuranic Separations Option:
   This option would consist of separating the HLW and SBW into two fractions. The resulting fractions would be managed as TRU and low-level waste. There would be no HLW after separations under this option. The TRU fraction would be solidified, packaged, and shipped to WIPP for disposal. DOE would dispose of the low-level waste fraction on site or at an offsite DOE or commercial low-level waste disposal facility.

Non-Separations Alternative

This alternative includes four treatment options for solidifying HLW calcine and SBW. In the Hot Isostatic Pressed Waste Option and Direct Cement Waste Option, SBW would be removed from the Tank Farm and, after receipt of a RCRA permit from the State and upgrades to air emission controls required by the EPA, treated in the NWCF calciner. In the Early Vitrification Option and Steam Reforming Option, SBW would be retrieved from the Tank Farm and sent directly to a treatment facility. The four treatment options are briefly described as follows:

1. Hot Isostatic Pressed Waste Option:
   Under this option, SBW would be calcined and added to the 4,400 cubic meters of HLW calcine currently stored in the bin sets. HLW and SBW calcine would then be treated in a high pressure, high temperature process that would convert the calcine into a glass-ceramic waste form. The final product would be packaged for storage and subsequent disposal in a geologic repository.

2. Direct Cement Waste Option:
   Under this option the remaining SBW would be calcined and placed in the bin sets. HLW and SBW calcine would then be retrieved, mixed with cement, poured into stainless-steel canisters, and cured at elevated temperature and pressure. The canisters would be placed in storage for subsequent disposal in a geologic repository. Some secondary waste (e.g. tank farm heels) would be treated and sent to WIPP.

3. Early Vitrification Option:
   This option would involve vitrifying both the HLW calcine and the SBW into a glass-like solid. The vitrified SBW would be sent to WIPP for disposal and the vitrified HLW would be placed in interim storage pending disposal in a geologic repository.

4. Steam Reforming Option:
   This option would involve treatment of SBW by steam reforming. The central feature of the steam reforming process is the reformer, a fluidized bed reactor in which steam is used as the fluidizing gas. A solid, remote-handled waste form consisting of primarily inorganic salts is produced that is similar in form to HLW calcine. This option also includes packaging of HLW calcine without additional treatment for shipment to a geologic repository.

Minimum INEEL Processing Alternative

This alternative would minimize the amount of waste treatment at the INEEL by using the vitrification facility planned for the DOE Hanford Site in the State of Washington. The HLW calcine would be placed into shipping containers and sent to the Hanford Site where it would be vitrified. The SBW would be treated at INTEC where it would be separated into fractions in an ion exchange column to remove cesium. The HLW fraction would be packaged and sent to the Hanford Site for treatment with the calcine. The remaining TRU fraction would be grouted and disposed of at WIPP.

Direct Vitrification Alternative

This alternative includes two treatment options: Vitrification without Calcine Separations and Vitrification with Calcine Separations. The option to vitrify SBW and calcine without separations would be similar to the Early Vitrification Option. The option to vitrify SBW and the HLW fraction from calcine separations would be similar to the Full Separations Option. Under either option, SBW would be retrieved from the Tank Farm, vitrified, and disposed of in an appropriate disposal facility. Under the Vitrification with Calcine Separations Option, calcine would be retrieved from the bin sets, chemically separated into a HLW fraction to be vitrified and a low-level waste (LLW) fraction to be grouted. Under the Vitrification without Calcine Separations Option, calcine would be directly vitrified. Under either option, vitrified HLW would be stored pending disposal in a geologic repository.

Under either option, DOE would segregate NGLW from the SBW. The post-2005 NGLW could be vitrified in the same facility as the SBW or DOE could construct a separate facility to grout the NGLW. The vitrified or grouted waste would be packaged and disposed of as low-level or TRU waste, depending on its characteristics.

Preferred Waste Processing Alternatives

From the range of waste processing alternatives/options analyzed, two Preferred Alternatives were identified in the Final EIS, one by DOE and one by the State of Idaho. The Preferred Alternatives were identified after consideration of public comment and the following factors: technical maturity, environment, safety and health (ES&H), cost, schedule, and programmatic risk.

The DOE Preferred Alternative identified in the Final EIS for waste processing was to implement the proposed action by selecting from among the action alternatives, options, and technologies analyzed in the Final EIS. The selection of any one of, or combination of, technologies or options used to implement the proposed action would be based on the performance criteria of technical maturity, ES&H, consideration of public comment, cost, schedule and programmatic risk. Options excluded from DOE's preferred alternative were storage of calcine in bin sets for an indefinite period of time (analyzed under the Continued Current Operations Alternative), shipment of calcine to the Hanford Site for treatment (analyzed under the Minimum INEEL Processing Alternative), and disposal of mixed-LLW at INEEL (analyzed under multiple alternatives). On August 3, 2005, after the Final EIS was issued, DOE published a *Federal Register* Notice (70 FR 44598) identifying steam reforming as its preferred treatment technology for SBW. Steam Reforming is one of options under the Non-Separations Alternative in the Final EIS.

The State of Idaho Preferred Alternative identified in the Final EIS for waste processing was the Direct Vitrification Alternative. The State of Idaho preferred vitrification based on the belief that it was the treatment alternative with the lowest technical and regulatory uncertainty for meeting waste removal goals and provided a clear baseline for fulfilling the objectives of removal of waste from Idaho within the timelines envisioned by the Settlement Agreement. The State of Idaho was willing to consider other waste treatment options, if they were comparable or better than the Direct Vitrification Alternative in terms of environmental impact, schedule and/or cost.

III. Facility Disposition Alternatives Considered

The Final EIS analyzed six facility disposition alternatives: No Action, Clean Closure, Performance-Based Closure, Closure to Landfill Standards, Performance-Based Closure with Class A Grout Disposal, and Performance-Based Closure with Class C Grout Disposal. These alternatives reflect different ways to address the final risk component of the proposed action and close facilities directly related to the HLW Program at INTEC after their missions are complete. These alternatives differ in the degree to which land is considered "cleaned up" and in the type of use that could be made of the land as a result. These alternatives are briefly described as follows:

No Action Alternative

Under this alternative, DOE would not close the facilities identified in the Final EIS. Nevertheless, over the period of analysis through 2035, many of the facilities could be placed in an industrially safe condition (deactivated). Surveillance and maintenance of facilities would be performed to ensure the safety and health of workers and the public until 2095. For purposes of analysis, DOE assumed that institutional controls to protect human health and the environment would not be in effect after 2095.

Clean Closure Alternative

Under this alternative, hazardous wastes and radiological contaminants, including contaminated equipment, would be removed from the site or treated so the hazardous and radiological contaminants are indistinguishable from background concentrations.

Performance-Based Closure Alternative
Under this alternative, contamination would remain that is below the levels that would impact human health and the environment as established by applicable regulations (e.g. RCRA, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)), and by DOE Orders. Once the performance-based levels are achieved, the unit/facility is considered closed according to RCRA and/or DOE requirements. The residual contaminants would no longer pose an unacceptable risk to workers, the public, or the environment. Closure methods would be determined on a case-by-case basis.

Closure to Landfill Standards Alternative
Under this alternative, the facilities would be closed as established by regulations such as RCRA or CERCLA, and by DOE Orders for closure of landfills. Once the wastes within tanks, vaults, and piping are removed to the extent practicable and the remaining residuals are stabilized, protection of the public, workers, and the environment would be ensured by installing an engineered cap, installing a groundwater monitoring system, and providing post-closure monitoring. Care of the waste containment system would be provided, appropriate for the type of contaminants. Also, a landfill closure would include post closure activities such as monitoring and plans for appropriate response/corrective actions to be taken in the event of migration of contaminants above health based action levels.

Performance-Based Closure with Class A Grout Disposal Alternative
This is one of two alternatives that would accommodate the potential use of the Tank Farm and bin sets for disposal of the low-level waste fraction. These facilities would be closed as described above for the Performance-Based Closure Alternative. Following completion of those activities, the Tank Farm or bin sets would be used to dispose of low-level waste Class A-type grout (suitable for near surface disposal and would have radioactive concentrations in the grout that are less than Class A concentration limits specified in NRC regulation 10 CFR 61.55).

Performance-Based Closure with Class C Grout Disposal Alternative
This alternative would also accommodate the potential use of the Tank Farm and bin sets for disposal of the low-level waste fraction. The facility would be closed as described above for the Performance-Based Closure Alternative. Following completion of those activities, the Tank Farm or bin sets would be used to dispose of low-level waste Class C-type grout (suitable for near surface disposal but would have higher radioactive concentrations in the grout than Class A-type grout, but would not exceed Class C concentration limits specified in 10 CFR 61.55).

Preferred Facility Disposition Alternative
In the Final EIS, both DOE and the State of Idaho identified performance-based closure methods as the Preferred Alternative for disposition of existing facilities directly related to the HLW Program at INTEC. These methods encompass three of the six facility disposition alternatives analyzed in the Final EIS: Clean Closure, Performance-Based Closure, and Closure to Landfill Standards. Performance-based closure methods would be implemented in accordance with applicable regulations and DOE Orders. Also, as analyzed in the Final EIS, consistent with the objectives and requirements of DOE Order 430.1B, *Real Property Asset Management* (previously DOE Order 430.1A, *Life Cycle Management)*, and DOE Order 435.1 and Manual 435.1-1, *Radioactive Waste Management and its Manual,* all newly constructed facilities

necessary to implement the waste processing alternatives would be designed and constructed consistent with measures that facilitate clean closure. Therefore, the preferred alternative for disposition of new facilities is clean closure. DOE and the State of Idaho weighed several factors in selecting the Preferred Alternative for facility disposition, including size and complexity of facilities, volume of waste streams generated during facility disposition, residual waste/contaminant risk reduction, technical and economic feasibility, and protection of the workers, public and environment.

IV. Environmentally Preferable Alternative

The Final EIS presents the environmental impacts for 14 areas of interest for the waste processing alternatives and the facility disposition alternatives. DOE considered those impacts in its evaluation of the environmentally preferable alternatives as described below.

Waste Processing:

In 9 of the 14 areas of interest, the Final EIS indicates little or no environmental impact would occur under all of the action alternatives. In the remaining 5 areas analyzed (air, traffic and transportation, health and safety, waste and materials, and facility accidents), the results indicate short-term impacts from routine exposures, but they are small and do not differ significantly among action alternatives. Under normal operations, none of the waste processing action alternatives analyzed in the Final EIS would result in large short-term or long-term impacts to human health or the environment. Also, none of the action alternatives would result in appreciably different impacts on historic, cultural and natural resources.

Under normal operations, the risk to workers and the public in terms of anticipated latent cancer fatalities over the life cycle of any waste treatment alternative (including No Action) would be less than one. Under the No Action and Continued Current Operations waste treatment alternatives, however, waste would remain in storage at INTEC indefinitely and would result in continued long-term risks. Under the No Action Alternative liquid SBW and solid HLW calcine would remain in storage indefinitely, and under the Continued Current Operations Alternative liquid SBW would be calcined, but the calcine would remain stored in the bin sets indefinitely. Though much of the radioactivity in the liquid SBW and solid HLW calcine would decay during the first 500 years, the material would continue to present a long-term risk to human health and the environment from potential releases of both radiological and hazardous waste.

Waste processing alternatives that result in indefinite waste storage exhibit the longest window of vulnerability to accidental releases and therefore the highest anticipated risk of environmental impact. The Final EIS shows that, although unlikely, the estimated probability of the maximum reasonably foreseeable accident for the No Action and Continued Current Operations Alternatives is a factor of nine more likely than the comparable accidents for the other waste treatment alternatives that place waste in a road-ready form over a 35-year period.

For these reasons, any of the waste treatment alternatives that place SBW and calcine in a waste form suitable for disposal would be environmentally preferable compared to the No Action and Continued Current Operations Alternatives.

Facilities Disposition

The Final EIS also evaluates the impacts of the facilities disposition alternatives. Under normal operations, the risk to workers and the public in terms of anticipated latent cancer fatalities over the life cycle of any facility disposition alternative would be less than one. Clean closure of facilities would restore the land to a condition that "presents no risk to workers or the public" and would be environmentally preferable in the long-term, but such action also would pose the highest short-term risk to workers because clean closure would require the most activity and result in the most impacts. Performance-based closure of facilities would also be protective of the public and environment in the short- and long-term, but would balance the risk to workers by tailoring activity to risk reduction.

Under the facilities disposition No Action alternative, it is assumed for analytical purposes that institutional control would be lost after 2095. After that date, access would be uncontrolled, natural processes would degrade the facilities, and they could also be breached and the contents dispersed by human and animal activity. The deteriorating facilities would present some risk to the environment and human health over a long, indefinite period of time. It is estimated that 270 latent cancer fatalities could result from seismic induced failure of a degraded calcine bin set after 500 years. Also, the likelihood of an external event resulting in a release would increase over time.

The maximum reasonably foreseeable impact from accidents during implementation of the facility disposition action alternatives result in an estimated two fatalities from non-radiological hazards, such as trauma, fire, spills, or falls, during clean closure of the Tank Farm.

For these reasons, any of the facility disposition alternatives that actively close facilities under environmentally based standards would be environmentally preferable to the No Action Alternative.

V.A. Comments on the Final EIS

DOE received two letters commenting on the Final EIS.

By letter dated November 18, 2002, the EPA raised four issues:

1) reclassification of HLW and the nature and extent of separations or decontamination necessary to meet the requirements of DOE Manual 435.1-1, *Radioactive Waste Management Manual,* which poses programmatic risk due to ongoing litigation and regulatory uncertainty, 2) the viability of the Minimum INEEL Processing Alternative (option of treating waste at Hanford), 3) DOE identifying a broad scoped Preferred Alternative in the Final EIS, which the EPA said did not meet the objectives of NEPA, and 4) the viability of the calciner as an alternative, its cost, and use of the EIS to delay closure of the calciner.

DOE provides the following responses to the EPA comments:

1. The Final EIS presents the analysis of the potential environmental impacts of retrieving and treating HLW, SBW, NGLW, and facilities disposition using various technologies and managing the wastes as either HLW, TRU waste, or LLW. Moreover, the analysis is not based on particular waste classification but is based on the estimated volume and radioisotopic content of the HLW, SBW, NGLW, and waste from facilities disposition. By preparing the analysis in a manner that is not dependent on waste classification, DOE has mitigated the impact of litigation and reduced the programmatic risks. Specifically, for SBW some EIS alternatives included an evaluation of retrieved SBW as HLW to be treated for disposal at a geologic repository for SNF/HLW; some alternatives evaluate retrieved SBW as TRU to be treated and disposed of at the Waste Isolation Pilot Plant; and some alternatives evaluate SBW to be separated into HLW, TRU waste and LLW fractions. Moreover, DOE will manage the SBW to permit disposal at either WIPP or at a geologic repository for SNF/HLW and will evaluate the waste form to determine its suitability for disposal.

2. The Final EIS presents an alternative that would treat INL Site waste at Hanford by taking advantage of a national investment in significant waste treatment capabilities and facilities in the State of Washington. Both the INL Site and Hanford are DOE facilities in the Northwest region of the U.S. and have wastes derived from similar sources. INL Site wastes could be treated using treatment processes being developed at Hanford prior to being transported to WIPP or a geologic repository for SNF/HLW for disposal. Therefore, DOE believes this alternative is reasonable and analyzed the alternative as required by NEPA. Further, DOE believes it is important to inform national and state decision makers of this alternative for treating INL Site wastes at Hanford, especially in view of the costs and risk involved in developing the same capabilities at two sites about 550 miles apart. The Final EIS presents associated risks, including transportation, and considers issues associated with meeting Hanford's schedule for waste treatment of Hanford waste.

3. Regarding EPA's concern with DOE's broad expression of its preferred alternative in the Final EIS, DOE believes that the phased decision making process under this EIS not only meets the objectives of NEPA, but also includes meaningful public participation opportunities that substantially exceed the applicable regulatory requirements.

   DOE identified its preferred alternative in the Final EIS as follows: "DOE's preferred waste processing alternative is to implement the proposed action by selecting from among the action alternatives, options and technologies analyzed in this EIS. The selection of any one of, or combination of, technologies or options used to implement the proposed action would be based on performance criteria that include risk, cost, time, and compliance factors." DOE did not identify a preference for a specific SBW treatment technology in this expression of preferred alternative. Rather, DOE first provided additional opportunities for public participation as part of its evaluation of the alternative technologies analyzed in the EIS, which included steam reforming, the technology that DOE is selecting today.

   Under this phased decision making strategy, after issuing the Final EIS, DOE conducted four public workshops to inform the public about the five technologies that DOE was considering.

Further, DOE provided additional public comment opportunities on the draft RFP for the Idaho Cleanup Project, which required bidders to propose technologies for SBW treatment. Finally, DOE announced its preference for a specific SBW treatment technology, steam reforming, in a *Federal Register* Notice (70 FR 44598; August 3, 2005), and again provided the opportunity for the public to comment. Section V.B. summarizes the comments received and DOE's responses.

4. DOE has determined that the alternative of reconfiguring the calciner in the New Waste Calcining Facility with Maximum Achievable Control Technology (MACT) upgrades is reasonable because calcination is a proven process for reliably placing liquid HLW and SBW into a powder form. The Final EIS analyzes the potential environmental impacts of operating the calciner with MACT air emission upgrades. Compliance requirements and potential conflicts with state and Federal law are also considered. Prematurely taking irreversible closure actions on the calciner would limit the choice of reasonable alternatives analyzed in the Final EIS.

In a November 21, 2002 letter, the INEEL CAB raised some of the same issues expressed by the EPA. In addition, the CAB recommended that DOE re-issue the Final EIS or issue a supplemental EIS and that DOE provide meaningful opportunities for the public to review and comment on the selection of technologies.

DOE provides the following response to the INEEL CAB (Now the INL EM CAB) comments:

As described in Section I of this ROD, DOE prepared a Supplement Analysis to examine whether a supplemental EIS is required. Based on the Supplement Analysis, DOE determined that there has been no change in the proposed action or significant new information or circumstances relevant to environmental concerns that would require DOE to re-issue the Final EIS or prepare a supplemental EIS. If DOE were to re-issue the Final EIS or prepare a supplemental EIS that identified a preferred alternative focusing on a single technology, it would not enhance the detail or precision of the environmental analysis. As part of continued public involvement, DOE held workshops in 2003 to obtain public input on the technologies being considered for treatment of the SBW.

Further, as described above, DOE provided meaningful opportunities for the public to participate in identifying their concerns related to the proposed technologies for treatment of the SBW in the DOE technology selection process. The public also was provided an opportunity to comment on the draft RFP. DOE believes that these public participation opportunities, which exceed DOE's obligations under NEPA, were responsive to the CAB's comment.

V. B. Comments in response to the August 3, 2005, *Federal Register* Notice of Preferred Sodium Bearing Waste Treatment Technology (70 FR 44599), that invited public comments on DOE's preferred treatment technology.

DOE received comments from the Shoshone-Bannock Tribes, INL EM Citizens Advisory Board, Coalition 21, Snake River Alliance, Mr. Barry O'Brian, Mr. G. V. Wieg, and Mr. D. Siemer in

response to the August 3, 2005, Notice. The comments in these documents did not raise any new issues relevant to environmental concerns that were not addressed in the Final EIS.

The commentors expressed five general areas of concern: (1) Several commentors expressed concerns regarding the disposition uncertainty for the treated SBW and recommended deferral of the SBW treatment decision until a waste determination is made for the SBW and a disposal facility is identified (i.e., WIPP or a geologic repository for SNF/HLW). Commentors also stated if the Department does make a SBW treatment technology selection, the selected treatment method should be neutral with regard to repository requirements; (2) Several commentors questioned whether DOE adequately considered all the alternatives for the treatment of SBW and some suggested that vitrification is the best technology for the treatment of SBW; (3) There were several comments related to the type and availability of shipping containers and the mode of transportation; (4) Several commentors expressed concerns related to the design of the steam reformer facility and the type of product created, and whether that waste form can be properly disposed of; and (5) Some commentors recommended that facilities disposition decisions should be addressed in a future, separate, ROD.

DOE provides the following responses to the comments received:

1. DOE believes that delaying the SBW treatment technology decision does not support both the Department's and the State of Idaho's priority to reduce potential risk to the Snake River Plain Aquifer. In addition, the product resulting from steam reforming is neutral regarding repository requirements and can be integrated with the calcine disposition path if it cannot be disposed of at WIPP.

2. During the NEPA process, DOE evaluated the environmental impacts of the range of reasonable alternatives, including vitrification, in the preparation of the Final EIS. DOE identified steam reforming as its preferred treatment technology for SBW after consideration of public comment and the following factors: technical maturity, environment, safety and health (ES&H), schedule, and programmatic risk, as presented in the Final EIS. DOE also considered the cost of the various alternatives. This technology supports the Settlement Agreement milestone to treat SBW by December 31, 2012 (see Section VII of this ROD, Basis for Decision).

3. DOE evaluated the environmental impacts of transportation in the Final EIS, which shows that transportation risks would be small. It should be noted that the Department of Transportation regulates the shipment of the waste while the NRC regulates the packaging of the material for shipment. DOE will ship all wastes in accordance with applicable regulations regardless of the mode of shipment. There are no known regulatory issues associated with the packaging and shipping of the reformed product.

4. The steam reformer facility will be designed and constructed to meet all applicable regulatory and safety requirements (e.g., emission and radiological controls). DOE must also obtain the appropriate permits to construct and operate the facility. Presently, DOE is planning to create a carbonate waste product from the steam reformer which is similar in form to the HLW calcine. DOE anticipates the solid waste form will be acceptable for disposal at WIPP, or if

not acceptable at WIPP, would be integrated into the strategy for management of HLW calcine.

5. The Department believes it is prudent to proceed with facilities disposition decisions at INTEC to reduce the overall risk to the Snake River Plain Aquifer and to support the cleanup at the INL Site.

VI. Decision

DOE plans a phased decision making process. This first ROD focuses on SBW treatment, NGLW, facilities disposition excluding the Tank Farm Facility and bin sets closure, and DOE's strategy for HLW calcine.

SBW Treatment: The existing INTEC Evaporators will continue to operate to reduce SBW volume to enable DOE to cease use of the Tank Farm tanks by December 31, 2012, pursuant to the Notice of Noncompliance Consent Order between DOE and State of Idaho. DOE has decided that SBW will be treated using the steam reforming technology. The Department's preference for this treated waste is disposal as TRU waste at WIPP near Carlsbad, New Mexico. Until such time as the regulatory approvals are obtained and a determination the waste is TRU is made, the Department will manage the waste to allow disposal at WIPP or at a geologic repository for SNF and HLW.

The State of Idaho concurs with DOE's selection of steam reforming as the technology for solidifying remaining INTEC Tank Farm liquids, provided DOE obtains required permits for its treatment facility and post-treatment storage, and produces a waste form acceptable for disposal at a repository outside Idaho.

NGLW: NGLW is no longer being sent to the Tank Farm and is being stored in other permitted storage tanks. This NGLW may be treated in the same facility and with the same technology used to treat SBW, or grouted in a facility constructed for that purpose, and disposed of as either low-level or TRU waste, depending on its radioactive waste characteristics, at an offsite DOE or commercial facility.

The State of Idaho concurs with DOE's decision to segregate newly generated liquid waste at INTEC and manage it in compliance with the Idaho Hazardous Waste Management Act and other legal requirements.

Facilities Disposition: DOE has decided to conduct performance-based closure of existing facilities directly related to the HLW Program at INTEC, excluding the tank farm and bin sets, once their missions are complete. Performance based closure activities will be implemented in accordance with applicable regulations and DOE Orders. The method of closure for specific facilities will be determined on a case-by-case basis depending on risk, and may include closure to landfill standards. Newly constructed waste processing facilities, such as the steam reforming treatment facility, at INTEC necessary to implement the decisions in this ROD will be designed consistent with clean closure methods in accordance with the objectives and requirements of DOE Order 430.1B, *Real Property Asset Management* (previously DOE Order 430.1A, *Life*

Cycle Management), and DOE Order 435.1 and Manual 435.1-1, *Radioactive Waste Management and its Manual* and closed when their missions are complete regardless of the characteristics of the waste they treat. These closure activities are analyzed in the Final EIS. The State concurs with the performance-based closure of existing facilities directly related to the high-level waste program at INTEC, once their missions are complete, subject to the State's separate approval of individual closure plans under the Idaho Hazardous Waste Management Act and compliance with Section 3116 of the NDAA, where applicable. The State also concurs with DOE's decision to clean close newly constructed waste processing facilities.

HLW Calcine: Consistent with DOE's *Environmental Management Performance Management Plan for Accelerating Cleanup at INEEL*, DOE's strategy for HLW calcine is to retrieve the calcine for disposal outside the State of Idaho. Accordingly, DOE will develop calcine retrieval demonstration processes and conduct risk-based analyses, including disposal options, focused on the calcine stored at the INTEC. This strategy will culminate in the issuance of a future ROD, as discussed below.

The State of Idaho will provide additional input on DOE's remaining decisions for calcine treatment, which DOE must make by December 31, 2009 in accordance with the Settlement Agreement.

Future RODs

DOE will issue an amended ROD addressing closure of the Tank Farm in coordination with the Secretary's determination, in consultation with the NRC, as to whether or not the waste residuals in the tank system, the tanks, vaults, piping and associated ancillary equipment are HLW in accordance with Section 3116 the NDAA. That determination and amended ROD are expected to be issued in calendar year 2006. The State of Idaho has stated that: The State will continue to coordinate with DOE and the NRC as appropriate regarding the classification of tank residuals under Section 3116 of the NDAA, as well as the classification of other wastes.

DOE plans to issue another amended ROD in 2009 that will contain DOE's decision on the final strategy for HLW calcine retrieval and the technology for additional treatment, if necessary, packaging and safe storage based on transportation and disposal requirements. Following that amended ROD, DOE would begin to manage the HLW calcine so it is ready to be moved out of Idaho for disposal by a target date of 2035, in accordance with the 1995 Settlement Agreement. Additionally, it is DOE's goal to complete calcine retrieval, packaging, additional treatment (if required) and shipping to a geologic repository for SNF/HLW by December 2035, as described in DOE's *Environmental Management Performance Management Plan for Accelerating Cleanup at INEEL*. In addition, the amended ROD will address closure of the bin sets and their associated facilities.

VII. Basis for Decision

Based on the analysis in the Final EIS, all of the waste processing alternatives that treat the SBW and remove the calcine would have small environmental impacts. The long-term impacts of the No Action and Continued Current Operations alternatives (i.e., the uncertainty of leaving the

SBW and calcine in storage), however, are uncertain and could be high. Implementing any of the action alternatives through the technologies or options analyzed in the Final EIS and a related SA (DOE/EIS-0287-SA-01) would eliminate the element of uncertainty and provide the most certain long-term protection of the environment.

DOE's decision to use the steam reforming technology for the treatment of SBW is based on DOE's consideration of environmental impacts, programmatic needs, safety and health risks, technical viability, ability to meet regulatory requirements and agreement milestones, public comments, and cost. DOE believes steam reforming provides the best value to the Government and meets its need for treatment flexibility, acceptable cost, and probability of success.

DOE's decision to defer a final decision on calcine is based on the need to continue detailed evaluation of repository performance criteria, regulatory requirements, cost, schedule, and programmatic risk.

DOE's decision to implement performance-based closure methods for disposition of existing facilities directly related to the HLW Program at INTEC and plan to clean close newly constructed facilities, such as the steam reforming facility for SBW treatment, was based on the analysis of the potential environmental impacts identified in the Final EIS as well as to meet regulatory requirements, such as RCRA, and because each method of closure is determined on a case-by-case basis.

DOE's decision to defer a final decision for closure of the Tank Farm was based on DOE's intent to coordinate this decision with the Secretary's determination, in consultation with the NRC, under Section 3116 of the NDAA that will allow DOE to decide the appropriate performance-based closure method.

No impact resulting from normal operations under any of the alternatives or options analyzed would require specifically designed mitigation measures. DOE will, however, adopt all practicable means to avoid or minimize environmental harm when implementing the actions described in this ROD. Those measures include employing engineering design features to address flooding, emission controls to reduce or eliminate releases of pollutants and meet regulatory requirements, maintaining a rigorous health and safety program to protect workers from radiological and chemical contaminates, and continuing efforts to reduce the generation of wastes.

These decisions are also consistent with the objectives of the DOE *Environmental Management Performance Management Plan for Accelerating Cleanup at INEEL.*

Issued in Washington, D.C., this 13th day of December 2005.

James A. Rispoli
Assistant Secretary for
Environmental Management