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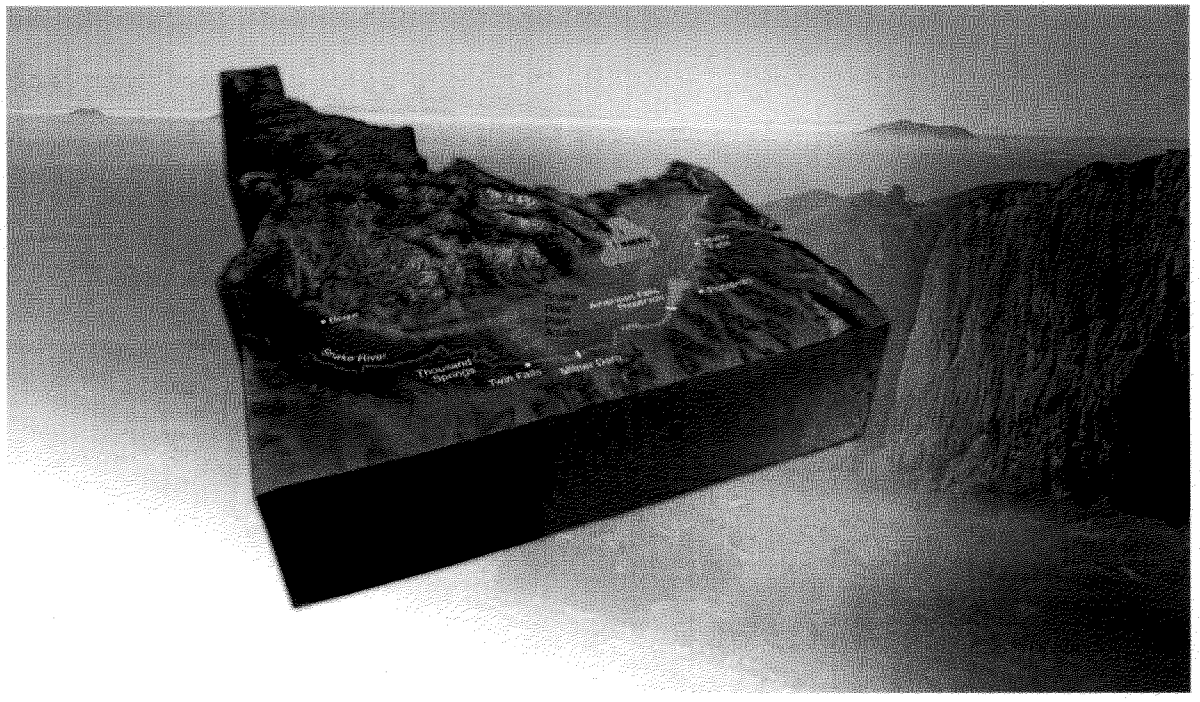
July 2002

U.S. Department of Energy
Idaho Operations Office

Environmental Management Performance Management Plan for Accelerating Cleanup of the Idaho National Engineering and Environmental Laboratory



INEEL
Home of Science and Engineering Solutions
Idaho National Engineering and Environmental Laboratory

DOE/ID-11006

Environmental Management Performance Management Plan for Accelerating Cleanup of the Idaho National Engineering and Environmental Laboratory

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EXECUTIVE SUMMARY

This Environmental Management Performance Management Plan for Accelerating Cleanup of the Idaho National Engineering and Environmental Laboratory, describes the U.S. Department of Energy's approach to accelerate the reduction of environmental risk at the INEEL by completing its cleanup responsibility faster and more efficiently. We believe this acceleration is possible by integration of work processes emphasizing risk reduction without compromising protection of the environment, site workers, and the public. This plan will provide the Department of Energy, the Office of Management and Budget, Congress, our regulators, and our stakeholders with a significantly improved approach to our cleanup mission and the way we do business. The plan describes an investment strategy for cleanup funding including the benefits of increased funding through the cleanup reform account. This plan is a product of the DOE-Idaho Operations Office and its contractors in consultation with the state of Idaho and the Environmental Protection Agency. It is ambitious and at this point, we do not have solutions to all the potential barriers that may inhibit achievement of all its objectives. But, we owe it to our citizens and taxpayers to attack, eliminate, and reduce risk as quickly as possible without compromising protection of the public and the environment. This plan is supported by our regulators and many of our stakeholders.

In May 2002, DOE, the Idaho Department of Environmental Quality, and the Environmental Protection Agency signed a letter of intent formalizing an agreement to pursue accelerated risk reduction and cleanup at the INEEL. The letter provides the foundation for a collaborative plan for the accelerated cleanup of the INEEL, and this is DOE's plan to implement the letter of intent as we continue to work with regulators to ensure the plan will fulfill the following agreed upon vision:

> ***By 2012, the INEEL will have achieved significant risk reduction and will have placed materials in safe storage ready for disposal. By 2020, the INEEL will have completed all active cleanup work with potential to further accelerate cleanup to 2016.***

Section 3 describes the flowdown from this vision and the environmental priorities agreed upon in the letter of intent and two overarching objectives. Section 4 describes nine strategic initiatives DOE proposes to eliminate or reduce the environmental risks at the INEEL. The strategic initiatives are:

- Accelerate Tank Farm Closure
- Accelerate High-Level Waste Calcine Removal from Idaho
- Accelerate Consolidation of Spent Nuclear Fuel to the Idaho Nuclear Technology and Engineering Center
- Accelerate Off-site Shipments of Transuranic Waste Stored at the Transuranic Storage Area
- Accelerate Remediation of Miscellaneous Contaminated Areas
- Eliminate On-Site Treatment and Disposal of Low-Level and Mixed Low-Level Waste
- Transfer All EM-Managed Special Nuclear Material Off-Site
- Remediate Buried Waste at the Radioactive Waste Management Complex

- Accelerate Consolidation of INEEL Facilities and Reduce Footprint.

These strategic initiatives, described in Section 4, form the backbone of this plan. Successfully executing these initiatives will ensure that the vision articulated in the letter of intent is achieved.

Achieving this kind of significant risk reduction, and the attendant cost and schedule savings, will be accomplished only through fundamental changes in the way we do business at the INEEL. The challenge represented by these goals will dramatically affect how we think and act and will result in an acceleration of risk reduction at the INEEL and earlier completion, by decades, of the Environmental Management (EM) cleanup activities. Section 5 discusses the changes in business strategy we plan to pursue. Roles and responsibilities for DOE-ID, DOE-HQ, and site contractors are defined and new acquisition strategies explored. Cleanup of the INEEL is currently governed by compliance agreements that are coordinated, but whose schedules are not fully integrated. This plan reflects DOE's approach to managing the cleanup of the INEEL as a single project. Integrating the implementation of those agreements, and ongoing cooperation and collaboration among DOE and its regulators are a critical part of this plan. In addition, DOE agrees to smoothly transition laboratory sponsorship from EM to other program sponsors.

Accelerating cleanup at the INEEL will reduce the risk of contamination of the Snake River Plain Aquifer from nuclear and hazardous waste. It will also reduce the risk to workers, the environment, and the public by cleaning up, stabilizing, and disposing of waste much sooner than currently planned. Eliminating and reducing risk will be the governing strategy versus managing risk as we have done in the past. The plan describes how DOE will address risk reduction and risk elimination by stabilizing and dispositioning materials such as sodium-bearing liquid wastes, spent nuclear fuel, and special nuclear materials many years earlier than currently planned. DOE will ship stored transuranic waste offsite and remediate soils in accordance with existing agreements, but many years sooner than planned. By accelerating the cleanup mission at INEEL, we can significantly reduce and consolidate EM activities at the site and reduce site maintenance costs.

At our 2020 end state in the plan, some activities will continue: shipment of spent nuclear fuel to a repository; retrieval, treatment, packaging, and shipment of calcine high-level waste to a repository; and final dismantlement of remaining EM buildings. Additionally, the site will continue with ongoing activities such as ground water monitoring well beyond the 2020 end state identified in this plan. These activities will be complete by 2035 with the exception of some minor activities leading to long-term stewardship. Even with these continuing activities, the cleanup costs can be reduced by up to $19 billion, and the cleanup schedule can be completed decades earlier. But this plan is not the end of our efforts. This plan is a living document that will be revised and improved as necessary to reflect the decisions and progress made towards accelerated cleanup. As we implement this plan, we will continue to work with the Assistant Secretary for Environmental Management, our regulators, and stakeholders to further accelerate cleanup activities.

We believe this plan provides a basis for the Department's management of cleanup work at INEEL focused on risk reduction and consolidation of EM activities freeing up resources for reinvestment into cleanup. The plan also provides a basis for predictable, stable and sufficient funding as we and our contractors meet these commitments. Achieving the integrated approach and holding ourselves accountable for meeting the objectives and schedule of the plan is the key to completing this work by 2020 or sooner.

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1. PURPOSE

This Performance Management Plan describes and builds upon the planning under way for the past year at the Idaho National Engineering and Environmental Laboratory (INEEL). The INEEL has been exploring ways to remove high-level waste and spent nuclear fuel from Idaho sooner than 2035 and to complete overall cleanup prior to the 2070 scheduled date.

Accelerated Cleanup Vision

By 2012, the INEEL will have achieved significant risk reduction and will have placed materials in safe storage ready for disposal. By 2020, the INEEL will have completed all active cleanup work with potential to further accelerate cleanup to 2016.

By accelerating high-priority cleanup, it is also possible to complete all active cleanup of the INEEL much earlier than the existing baseline plans. The work will continue to be carried out utilizing existing regulatory processes and meeting all regulatory requirements. Under this accelerated strategy active cleanup can be completed by 2020, with the potential to further accelerate that cleanup to 2016.

This plan:

- Describes DOE's commitment to accelerate cleanup at the INEEL. This commitment is based on agreements to integrate those compliance activities. This reinforces a 'bias for action' philosophy and further enables coordination of work activities, facilitating accelerated cleanup. Cleanup activities are more focused on risk reduction and elimination.

- Commits the DOE to change from practices and processes that manage risk to those focused on reducing and eliminating risk. Operations office and headquarters functions will be aligned to allow contractors to complete work safely with focused DOE oversight.

- Incorporates recommendations of the Office of Environmental Management's Top-to-Bottom Review issued in February 2002. These recommendations include new acquisition strategies, risk-prioritization methods, and business processes to enable accelerated cleanup of environmental risks.

- Is a living document that will be revised and improved as necessary to reflect the decisions, and progress made towards accelerated cleanup at the INEEL.

- Reflects the vision of the EM cleanup program at the INEEL. Although significant interfaces exist and need to be worked with other DOE tenant programs, this plan does not address the future multi-program aspects of the INEEL.

It is DOE's intent that the work described herein be managed as a single integrated project, with all subsequent planning and budgeting activities for cleanup based on this plan's strategies and commitments.

2. BACKGROUND

Since its establishment in 1949, the INEEL has fulfilled numerous DOE missions including designing and testing nuclear reactors; reprocessing spent nuclear fuel to recover fissile materials; storing spent nuclear fuel; and storage, treatment, and disposal of waste. The INEEL's Environmental Management Program is responsible for managing a variety of radioactive and hazardous wastes that originated from those missions and from other DOE facilities. The EM program is treating, storing, and disposing of a variety of waste streams, cleaning up the environment, removing or deactivating unneeded facilities, and will remove DOE's inventory of spent nuclear fuel and high-level waste from Idaho.

Since 1991, the INEEL has been managing a significant cleanup legacy including:

- Millions of gallons of contaminated groundwater
- Nearly 600 known or suspected contaminated sites, including hundreds of acres of contaminated soil
- 88 acres of buried radioactive waste
- Numerous wastewater ponds, underground storage tanks, unexploded ordnance sites, and uncharacterized landfills
- 2.3 million gallons of liquids as high-level waste at the Idaho Nuclear Technology and Engineering Center tank farm
- 65,000 cubic meters of transuranic waste in aboveground storage
- Large amounts of low-level and mixed low-level radioactive waste in storage
- 250 metric tonnes heavy metal of spent nuclear fuel in storage
- 527 buildings totaling 5 million square feet.

Significant progress is being made at the INEEL to reduce risk to human health and the environment. To date, the following have been accomplished:

- 70% of the sites identified as being potentially contaminated have been either remediated or determined not to pose any risk.
- Over 2 million gallons of liquid waste have been calcined, reducing the volume of liquid waste to less than 900,000 gallons and emptying 6 of 11 tanks to the heel.
- Transuranic waste is being sent for permanent disposal on a routine basis to the Waste Isolation Pilot Plant in New Mexico. As of June 30, 2002, 1,927 cubic meters have been shipped with another 500 cubic meters ready for shipment.
- The backlog of low-level waste has been reduced by 18,000 cubic meters and mixed low-level waste by 2,500 cubic meters.
- 89% of EM spent nuclear fuel has been consolidated into dry storage.
- 99% of enforceable deadlines have been met.

Several compliance agreements and consent orders executed between 1991 and 2000 govern the cleanup work at the INEEL. Those agreements encompass the majority of the cleanup requirements and commitments. While these compliance agreements were coordinated in principle, they are not fully integrated, presenting opportunities for improved project execution. The two primary agreements are:

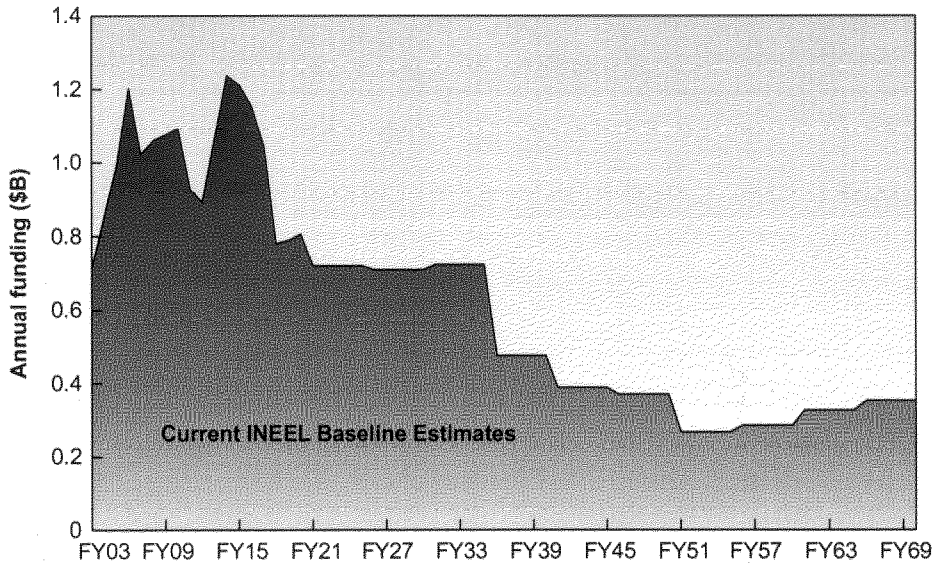
- Federal Facility Agreement and Consent Order (FFA/CO) (1991)

  Tri-party Comprehensive Environmental Response, Compensation, and Liability Act agreement with the Idaho Department of Environmental Quality and Environmental Protection Agency that defines the regulatory path and action plan to assess and clean up historical release sites and associated waste from remediation activities. Actions under this agreement satisfy Resource Conservation and Recovery Act and Hazardous Waste Management Act corrective action requirements.

- Idaho Settlement Agreement (1995)

  Tri-party court-ordered agreement between the DOE, the state of Idaho, and the U.S. Navy governs receipt and disposition of spent nuclear fuel, and treatment and disposition of stored transuranic waste and high-level waste.

Significant challenges face the INEEL in completing its cleanup responsibilities. Given the amount of waste and the hazards of handling radioactive materials, the scope of the cleanup program is lengthy and costly. Completion of the current life-cycle baseline is projected to take more than 70 years, at a total cost of $41 billion from FY 2003 through FY 2070. The cost profile for the existing baseline currently anticipated to meet the provisions of the INEEL's compliance agreements and other applicable regulatory requirements is shown in the figure below. This baseline plan is based on historical management and contracting methodologies. This profile, which peaks at nearly $1.2 billion in annual funding, does not reflect best available business practices and conflicts with requirements for a balanced federal budget, other funding demands (including cleanup of other DOE sites), emerging fiscal priorities, and wise stewardship of taxpayer funds.



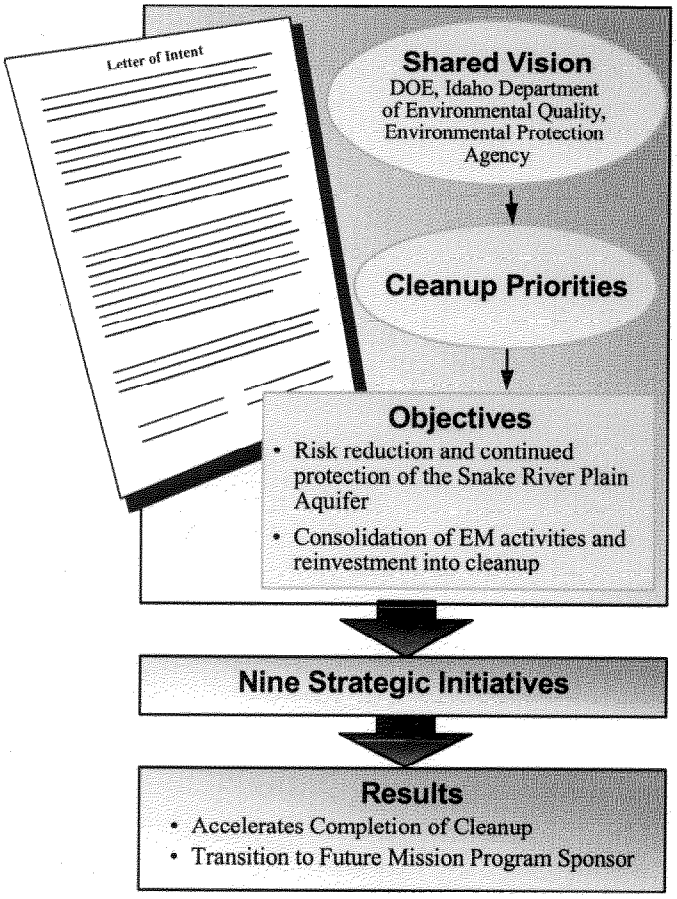
INEEL EM life-cycle baseline through 2070.

In this new approach to cleanup, as described in this plan, DOE is diverging from the past, where the focus was on risk management, and shifting to a future where the focus is on risk reduction and risk elimination. This approach will require a level of cooperation among DOE, its regulators, contractors and stakeholders unlike that in the past. The INEEL will transition from a culture of "business as usual" to a culture of "finish the job and move on to other missions." Business strategies will be developed which have not been attempted in the past. Decisions will be made based on what makes sense for the whole cleanup program, rather than those that make sense for one program or one regulatory agreement alone. Funding will be prioritized across the EM Program based on what actually reduces risk at the INEEL, rather than on programmatic or "stovepiped" priorities.

Not every initiative will be executed exactly as envisioned in this plan. But, by treating the cleanup at the INEEL as a single project, with defined milestones and performance measures, and with the cooperation of all stakeholders, which include DOE, its regulators, contractors, and the public, course corrections and technical improvements can be implemented to keep the project on track. In the end, the INEEL will be cleaned up many years sooner and for billions of dollars less than currently planned, and more importantly, the risk to workers, the public and the environment will have been substantially reduced, rather than just managed.

3. SHARED VISION FOR THE INEEL'S ACCELERATED CLEANUP PLAN

The DOE, the Idaho Department of Environmental Quality, and the Environmental Protection Agency have developed a shared vision for accelerating cleanup of the INEEL. This vision is described in the letter of intent signed by the agencies and identifies seven priorities for accelerating cleanup, which the Department has translated into two objectives and nine strategic initiatives to accomplish the vision. The seven priorities are:



- Continued cleanup and protection of the Snake River Plain Aquifer
- Consolidation of EM activities to the Idaho Nuclear Technology and Engineering Center, reducing the actively managed EM footprint by over 51%
- Removal and stabilization of sodium-bearing liquid wastes from the Idaho Nuclear Technology and Engineering Center tank farm and Resource Conservation and Recovery Act closure of the high-level waste tanks
- Placement of all DOE spent nuclear fuel managed by EM into dry storage
- Transfer of all Special Nuclear Material managed by EM to other sites
- Completion of the shipments of transuranic waste required by section B.1 of the Settlement Agreement entered in *Public Services of Colorado v. Batt*, Nos. 91-0035-S-EJL & 91-0054-S-EJL (Oct. 17, 1995)
- Making significant progress in the remediation of the buried waste in accordance with the comprehensive remedial investigation and feasibility study and record of decision for the Subsurface Disposal Area.

The two objectives are:

- **Risk reduction and continued protection of the Snake River Plain Aquifer**
- **Consolidation of EM activities and reinvestment into cleanup.**

The first objective addresses the continued protection of the Snake River Plain Aquifer, a sole source aquifer supporting much of southern Idaho. Risk reduction and continued protection of the Snake River Plain Aquifer is and will remain the principal objective of the INEEL's cleanup program. Achieving this objective requires continued focus on active cleanup of aquifer contamination posing a risk, as well as cleanup of contamination that could pose a future threat to the aquifer.

The second objective is to consolidate EM activities and reinvest funds into cleanup. As cleanup is completed and risk reduced, further consolidation and footprint reduction continue, resulting in lower mortgage costs and an increase in funding available for additional cleanup acceleration. Currently, over 40% of INEEL's cleanup funding is committed to maintaining site infrastructure. As that mortgage is significantly reduced, the ability to reinvest funds to active cleanup builds upon itself and will have a large influence on completing cleanup work much sooner than the existing baseline.

The nine strategic initiatives are described in Section 4 and focus on accelerating completion of most of these priorities from the current baseline. The cleanup approach ensures that material without a near-term disposition path is placed into safe storage and ready for ultimate disposition. The cleanup approach also incorporates opportunities for dramatic footprint reduction within INEEL's major facilities. In developing this approach, it became clear that the cleanup program could rapidly consolidate its activities to the Idaho Nuclear Technology and Engineering Center and significantly reduce infrastructure, surveillance, and maintenance costs.

4. INEEL'S ACCELERATED CLEANUP STRATEGY

Using the priorities and objectives outlined in Section 3, the INEEL has identified nine strategic initiatives for accelerating cleanup of the INEEL. These initiatives focus on significantly reducing risk and placing materials in safe storage ready for disposal. These strategic initiatives are described in the following sections and are compared to the baseline in Table 1.

Table 1. Comparison of current baseline to accelerated cleanup strategy.

Strategic Initiative	Current INEEL Baseline	Accelerated Strategy
Strategic Initiative 4.1 **Accelerate Tank Farm Closure**	• Empty pillar and panel vaulted tanks by June 2003 • Treat remaining sodium-bearing waste by 2015 • Close remaining tank farm tanks by 2016 • Ensure that treated liquids are ready to ship to the geologic repository by 2035 • Complete soils remediation by 2024 (not coordinated with tank farm closure)	• Empty pillar and panel vaulted tanks by January 2002 (Complete) • Cease receipt of newly generated liquid waste into the tank farm by 2005 • Close remaining tank farm tanks by 2012 • Treat, package and ship sodium-bearing waste offsite by 2012 • Coordinate tank farm soils remediation with tank closure actions and complete before 2020
Strategic Initiative 4.2 **Accelerate High-Level Waste Calcine Removal from Idaho**	• Complete characterization of calcine to support repository waste form acceptance criteria by 2012 • Vitrify calcine and have ready to ship to repository by 2035 • Ship calcine to repository by 2070	• Complete characterization of calcine to support repository waste form acceptance criteria by 2012 • Complete construction of calcine retrieval and packaging facility by 2020 • Retrieve, stabilize, package, and ship calcine to a repository by 2035
Strategic Initiative 4.3 **Accelerate Consolidation of Spent Nuclear Fuel to the Idaho Nuclear Technology and Engineering Center**	• Consolidate spent nuclear fuel from Test Area North to the Idaho Nuclear Technology and Engineering Center by 2017 • Complete transfer from wet to dry storage by December 2023 • Prepare and have spent nuclear fuel shipped from Idaho by January 1, 2035	• Consolidate spent nuclear fuel from Test Area North to the Idaho Nuclear Technology and Engineering Center by 2005 • Begin transfer to Spent Nuclear Fuel Dry Storage Project in 2005 • Complete transfer from wet to dry storage by 2012 • Complete shipping of spent nuclear fuel to repository by January 1, 2035
Strategic Initiative 4.4 **Accelerate Off-site Shipments of Transuranic Waste Stored at Transuranic Storage Area**	• Ship 3,100 cubic meters by December 31, 2002 • Begin remote-handled transuranic waste shipments in 2010 and complete by 2018 • Ship remaining stored transuranic waste to the Waste Isolation Pilot Plant by 2018 with target of 2015	• Ship 3,100 cubic meters by December 31, 2002 • Begin shipment of remote-handled transuranic waste offsite as early as 2004 and complete by 2012 • Ship remaining stored transuranic waste to the Waste Isolation Pilot Plant by 2012

Strategic Initiative	Current INEEL Baseline	Accelerated Strategy
Strategic Initiative 4.5 **Accelerate Remediation of Miscellaneous Contaminated Areas**	• Complete all voluntary consent order characterization work by 2006 • Complete voluntary consent order tank closures by 2019 • Remediate Power Burst Facility, Central Facilities Area, Test Area North, and Test Reactor Area by 2024 • Complete site-wide remediation in 2070	• Complete all voluntary consent order characterization work by 2005 • Complete all voluntary consent order actions by 2012 • Remediate Power Burst Facility, Central Facilities Area, Test Area North, and Test Reactor Area by 2005 • Complete site-wide active remediation by 2020
Strategic Initiative 4.6 **Eliminate On-Site Treatment and Disposal of Low-Level Waste and Mixed Low-Level Waste**	• Maintain six mixed waste storage facilities • Eliminate mixed waste backlog by 2006 • Cease on-site disposal of low-level waste in 2020	• Consolidate mixed waste storage to one facility by 2004 • Eliminate mixed waste backlog by 2004 • Cease on-site disposal of low-level waste in 2009
Strategic Initiative 4.7 **Transfer All EM-Managed Special Nuclear Material Off-Site**	• Package and ship off-site by 2044	• Package and ship to off-site locations by 2009 • Cease EM management services for Special Nuclear Material by 2009
Strategic Initiative 4.8 **Remediate Buried Waste in the Radioactive Waste Management Complex**	• Perform remediation in accordance with CERCLA by 2020 while Advanced Mixed Waste Treatment Project and Radioactive Waste Management Complex disposal are operating	• Complete Pit 9 retrieval demonstration in support of Subsurface Disposal Area CERCLA remediation decision by 2007
Strategic Initiative 4.9 **Accelerate Consolidation of INEEL Facilities and Reduce Footprint**	• Perform EM facility-by-facility shutdown and decontamination and decommission and complete by 2070	• Consolidate EM activities to the Idaho Nuclear Technology and Engineering Center by 2012 • Reduce EM footprint by 51% by 2012

4.1 Accelerate Tank Farm Closure

4.1.1 Initiative Completion Criteria

Benefits

- Disposes of liquid sodium-bearing waste by 2012
- Accelerates tank farm facility closure by four years to 2012
- Integrates approach and schedule for tank farm soils cleanup with tank closure thus reducing costs and overall schedule

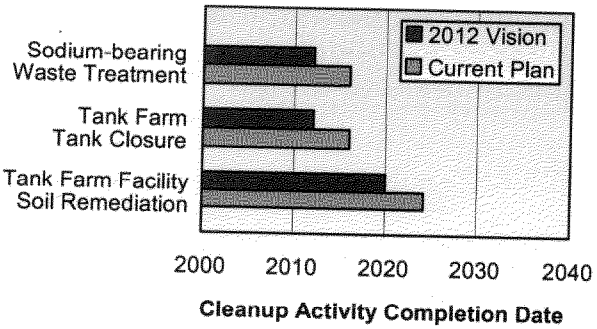
The tank farm at the Idaho Nuclear Technology and Engineering Center has approximately 900,000 gallons of liquid sodium-bearing waste currently stored in 11 underground stainless steel tanks. The DOE and the Idaho Department of Environmental Quality's priority is to remove this liquid waste from above the Snake River Plain Aquifer. This initiative accelerates treatment and removal of liquid sodium-bearing waste and associated tank solids from the tanks and transports it out of the state of Idaho for disposal by 2012. As of January 2002, all five tank farm pillar and panel vaulted tanks have been emptied to the lowest level possible using existing equipment. The initiative accelerates closure of the tanks by 2012, four years earlier than the current baseline. The project will integrate the following key activities in the tank farm to allow cost effective cleanup and closure of the entire tank farm system and remediation of surrounding contaminated soils by 2020:

- Treatment and removal of liquid sodium-bearing waste
- Closure of tank farm tanks in accordance with Resource Conservation and Recovery Act and DOE requirements
- Treatment of newly generated liquid waste from the Idaho Nuclear Technology and Engineering Center operations
- CERCLA remediation of soils around the tank farm.

The Idaho Nuclear Technology and Engineering Center continues to generate liquid waste from decontamination and demolition activities and operations of waste management and spent nuclear fuel storage facilities. This initiative also identifies and implements cost effective technologies to treat and dispose of future generation of this waste so that continued tank storage is not required. By 2005 the tank farm will no longer receive newly generated liquid waste.

4.1.2 Strategy

Previously, the Department was working toward a single treatment process for both high-level waste calcine and liquid sodium-bearing waste. Under this initiative, treatment of the liquid sodium-bearing waste is decoupled from the preparation of high-level waste calcine for disposal. This decoupling is prudent since the liquid sodium-bearing waste, although stored in the tank farm, was mainly generated from activities ancillary to fuel reprocessing, and may be classified under existing waste classification processes as mixed-transuranic waste.



A Waste Incidental to Reprocessing determination that is currently under way could formally classify the liquid sodium-bearing waste as mixed-transuranic waste. As a transuranic waste, the treated liquid sodium-bearing waste could be disposed offsite, for example at the Waste Isolation Pilot Plant. Sending the waste offsite would allow the INEEL to accelerate shipments of waste out of Idaho 25 years ahead of the current baseline.

Emptying the high-level waste tank farm tanks is considered by both the DOE and the state of Idaho to be of highest priority. The five pillar and panel vaulted tanks were emptied to the heel level in January 2002, over one year ahead of the June 2003 milestone. To accomplish the treatment and removal of the liquid sodium-bearing waste from the remaining tanks, as well as treatment of the tank solids (heel), the INEEL is analyzing the feasibility of multiple technologies that have been utilized in the commercial sector or at other government facilities. This analysis will culminate in the DOE selection of a cost effective technology that accelerates treatment times while simultaneously reducing risks.

Once a treatment technology is selected and implemented, the waste will be treated and the containers of the final waste form will be shipped offsite as produced, thus eliminating the need for interim storage capabilities. To further accelerate baseline schedules, tank closure operations will take place concurrently with treatment and removal of the liquid sodium-bearing waste. As each of the remaining tanks is emptied, it will be closed in accordance with Resource Conservation and Recovery Act, as well as DOE requirements to ensure protection of human health and the environment.

Soil contamination at the tank farm resulted from transfer line and valve box leaks. No leaks have occurred from the tanks themselves. Remediation of the contaminated tank farm soils will be coordinated with Resource Conservation and Recovery Act closure of the tanks and will follow the CERCLA process for selection of the final remedy, thus mitigating risks to human health and the environment. The remedial investigation and feasibility study will be completed following liquid sodium-bearing waste technology selection in 2004. The CERCLA process allows for public comments on the proposed plan. Integration of the Resource Conservation and Recovery Act tank closure with the CERCLA tank farm remediation will allow for optimum risk reduction, schedule acceleration and cost reduction. Accelerated tank closure will facilitate soils remediation well ahead of the baseline schedule.

4.1.3 Rationale

Together, the key activities of this initiative create a viable and fiscally responsible approach for dealing with the wide spectrum of activities integral to successfully enabling early treatment and removal of liquid sodium-bearing waste, resulting in early tank closure, which, in turn enables early tank farm soil remediation.

Decoupling the treatment of liquid sodium-bearing waste from the preparation of high-level waste calcine for disposal alleviates the overly conservative, costly, and time consuming approach of vitrifying this waste. In addition, correct classification of the liquid sodium-bearing waste provides opportunities to evaluate and use proven technologies, which have been used in other commercial and government applications and only need to be adapted to the INEEL's specific needs. Using such technologies will serve to reduce cost, accelerate schedules, and reduce risk to the workers and the environment. The initiative is proceeding with multiple treatment processing options up to final design as a program risk mitigation strategy. Mitigation of this risk is directly dependent on the systematic selection of a final sodium-bearing waste treatment technology to address multiple and changing requirements.

These requirements include such factors as disposal locations, waste classification, regulatory requirements and schedule risks. By proceeding with multiple treatment options, further changes in program requirements are expected to leave at least one viable processing solution. The waste volume resulting from the potential treatment under evaluation and to be shipped for disposal is up to 1,000 cubic

meters of remote-handled transuranic waste and up to 4,000 cubic meters of contact-handled transuranic waste.

The tank farm project will also benefit from use of a commercial approach, within government regulations, to accelerate the design and construction.

4.1.4 Key Milestones

Sodium-bearing waste treated and ready for shipment

- Submit Critical Decision-0: justification of mission need by September 2002
- Cease receipt of newly generated liquid waste in the 11 high-level waste tank farm tanks by September 2005
- Start construction of sodium-bearing waste treatment facility by December 2005
- Complete construction and readiness review of a treatment facility for sodium-bearing waste by September 2008
- Complete sodium-bearing waste and tank solids treatment and ship offsite by 2012

Closure of the high-level waste tanks

- Empty the five pillar and panel vaulted tanks by June 2003
- Complete cleaning and grouting of first pillar and panel vaulted tank by September 2003
- Complete cleaning and grouting of second pillar and panel vaulted tank by September 2004
- Complete cleaning and grouting of the remaining pillar and panel vaulted tanks by December 2006
- Close remaining pillar and panel vaulted tanks by December 2006
- Complete cleaning and grouting of two more tanks by September 2008
- Close remaining tank farm tanks by September 2012.

4.1.5 Metrics

The following are examples of performance metrics. These metrics will be further developed in detailed plans:

- Number of tanks closed
- Volume of sodium-bearing waste shipped offsite

4.2 Accelerate High-Level Waste Calcine Removal from Idaho

4.2.1 Initiative Completion Criteria

In 1992, spent fuel reprocessing was discontinued, resulting in the elimination of liquid high-level waste generation at the INEEL. To date, liquid high-level waste at the INEEL has been converted to a dry granular material, called calcine, and is currently safely stored in dry storage bins.

The current INEEL baseline describes current disposal plans for INEEL calcined high-level waste, specifying construction of a retrieval and vitrification facility, interim storage, and final disposition of the waste at a repository. Total cost for that disposal plan is approximately $7 billion.

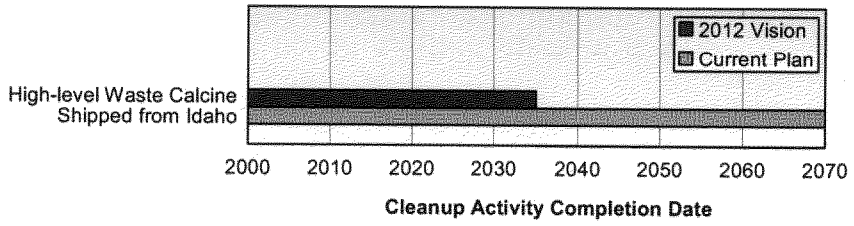
Benefits

- Eliminates the need to construct then decontaminate and decommission a large vitrification facility
- Accelerates shipments of calcine to the repository by up to 35 years
- Makes possible a life-cycle cost savings on the order of $6 billion
- Reduces the volume of waste destined for the repository by 50%
- Eliminates need for an interim storage facility

The high cost of the vitrification methodology has caused DOE to reconsider this approach. This initiative eliminates vitrification of the calcine; instead disposing of it directly or with alternative preparations for disposal. The calcine will be characterized, retrieved, prepared for disposal, packaged, and shipped to a repository. Cost savings of up to $6 billion could be realized while maintaining protection of human health and the environment.

This initiative will have the calcine ready for shipment prior to 2035 and will allow just-in-time shipping to a repository, thereby eliminating the interim storage requirements. Moreover, it completes processing of all calcine by 2032, three years faster than the vitrification process. The initiative avoids the need for extensive intrusive sampling and characterization activities through utilization of existing process data and non-intrusive sampling/characterization methodologies. This results in significant cost savings and worker risk reduction.

Directly packaging the calcine can reduce the volume of waste destined for the repository by up to 50% from the vitrification baseline. This reduction will significantly reduce the shipments to the repository. The large vitrification facility and potential separations facility will not be constructed, thereby eliminating the need for future facility decontamination and decommission, and significantly reducing the risk to the environment and workers.



4.2.2 Strategy

This initiative focuses on completing calcine packaging and disposal which will occur after the sodium-bearing waste treatment and tank farm closure in 2012. It prepares the calcine by retrieving, packaging, and alternately treating (instead of vitrifying) the high-level waste calcine for disposal, which allows significant cost and schedule improvements. This strategy significantly improves the possibility that calcine can be shipped as it is retrieved and packaged by 2035, 35 years ahead of the 2070 schedule.

The Department will focus on actions to accelerate calcine characterization and to ensure calcine meets appropriate requirements eliminating vitrification as a process needed for material disposal. The calcine would be directly packaged, or packaged with an alternative less costly treatment (Department of Transportation requirements may still prompt some immobilization treatment). An innovative approach to characterize the calcine material to meet both Resource Conservation and Recovery Act and repository equivalency will be developed in conjunction with retrieval studies. For example, a non-intrusive way to characterize calcine in-situ is a key technology gap that will be implemented through this initiative. Eliminating vitrification, and thereby simplifying the treatment, reduces cost and allows acceleration of the schedule. Final design, construction, and operation occur after 2012, allowing completion of other high-priority, high-cost initiatives first. Proof of principle activities, such as characterization and retrieval techniques, will occur before 2012 in conjunction with the preliminary design.

Completing construction of the calcine retrieval, alternate treatment, and packaging facility between 2012 and 2020 significantly improves the possibility that calcine can be shipped as it is retrieved (with minimal lag or interim storage). Assuming no further immobilization, approximately 4,400 cubic meters would be shipped to a repository. By packaging in standard canisters and using the new spent nuclear fuel dry storage facility, as the transportation load out facility will result in lower construction costs. Completion of shipping could occur by 2035, 35 years ahead of the current shipment schedule. Eliminating the need for an interim facility, alone, results in an approximated $250 million cost reduction.

4.2.3 Rationale

Adequate characterization of the calcine may be accomplished in place with the application of new technology. Current characterization plans assume extensive "hands on" and intrusive sampling of the calcine. Use of less aggressive, non-intrusive techniques can simplify calcine characterization, resulting in less costly and quicker characterization. Characterization will be coordinated with the demonstration of calcine retrievability. Characterization data are necessary to support regulatory and waste acceptance requirements that form the largest project risk. Additionally, characterization is necessary to evaluate alternate treatments. The demonstration of retrievability will address previously identified technical risks associated with the ability to retrieve calcine. Together, characterization and retrieval form the basis for proof of principle leading to conceptual design and allow new evaluation/analysis to show calcine can meet acceptance requirements at the repository as an acceptable waste form. Packaging of stabilized calcine in a standard canister will facilitate the use of the new spent nuclear fuel dry storage facility for transportation loading.

Calcine disposition is planned to occur in three phases: 1) Complete characterization, waste acceptance, regulatory requirements, and initiate process design - 2003 to 2012; 2) Complete final design and construction - 2012 to 2020; and 3) Alternately treat, package, and ship calcine to a repository - 2020 to 2035.

4.2.4 Key Milestones

- Complete characterization analysis of bin set 2 calcine samples by September 2003

- Define technology development needs and initiate development work for non-intrusive calcine characterization by September 2004
- Complete a sample retrieval and characterization demonstration by September 2007
- Issue record of decision on calcine treatment path forward by December 2009
- Submit Resource Conservation and Recovery Act Part B Permit for calcine treatment, retrieval, and packaging process by TBD
- Complete retrieval, packaging, alternative treatment and shipping to repository by December 2035

4.2.5 Metrics

The following are examples of performance metrics. These metrics will be further developed in detailed plans:

- Cubic meters of calcined shipped to the repository
- Cubic meters of calcine packaged
- Amount of curies remaining

4.3 Accelerate Consolidation of Spent Nuclear Fuel to the Idaho Nuclear Technology and Engineering Center

4.3.1 Initiative Completion Criteria

Benefits

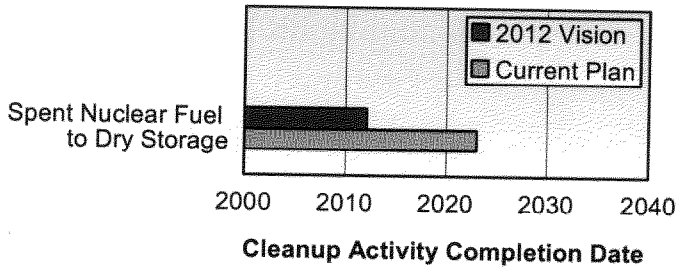
- Consolidates spent nuclear fuel into one site area
- Eliminates the risks of underwater storage
- Reduces facility costs and ensures safer storage pending shipment to repository
- Links packaging and characterization to establishment of repository acceptance criteria

Under this initiative, the INEEL will: 1) accelerate the transfer of spent nuclear fuel from wet to dry storage located at the Idaho Nuclear Technology and Engineering Center; 2) accelerate the consolidation of spent nuclear fuel from other INEEL site areas to the Idaho Nuclear Technology and Engineering Center; and 3) disposition Fermi blanket spent nuclear fuel.

This initiative will accelerate the removal of the fuel from underwater storage from 2023 to September 2012 and consolidate it into dry storage at one site area, the Idaho Nuclear Technology and Engineering Center. Transferring the fuel into dry storage eliminates the environmental risks inherent in underwater storage, reduces the EM footprint, reduces the number of facilities requiring intensive security, and reduces the annual costs of managing the spent nuclear fuel in wet storage. This initiative will also consolidate spent nuclear fuel management to the Idaho Nuclear Technology and Engineering Center, further reducing spent nuclear fuel management costs and removing infrastructure requirements at Test Area North, Power Burst Facility, and Test Reactor Area. Finally, this initiative will determine final dispositioning of Fermi blanket spent nuclear fuel, a special category of sodium-bonded spent nuclear fuel.

4.3.2 Strategy

The INEEL is currently managing approximately 250 metric tonnes heavy metal of spent nuclear fuel at the INEEL. Of this, approximately 26 metric tonnes heavy metal is stored in water-filled pools at four locations. Some of the pools are older and may be susceptible to leaking. These wet storage facilities are located at Test Area North, Power Burst Facility, Test Reactor Area, and the Idaho Nuclear Technology and Engineering Center. The strategy is to transfer the fuel from these areas to a single site area at the Idaho Nuclear Technology and Engineering Center for dry storage. Dry storage eliminates the potential for leaking radioactively contaminated water and reduces the potential for corrosion of the fuel. This initiative removes the spent nuclear fuel from wet storage 11 years ahead of the 2023 current baseline. It is substantially less expensive to operate one dry storage area than four wet storage areas, thereby reducing the infrastructure costs relating to fuel storage. Spent nuclear fuel incoming from other DOE sites and domestic and foreign research reactors will continue to be placed in dry storage at the Idaho Nuclear Technology and Engineering Center.



Consolidation of spent nuclear fuel from Test Area North to the Idaho Nuclear Technology and Engineering Center will be accelerated from 2017 to 2005. This initiative is enabled by the construction of a new pad at the Idaho Nuclear Technology and Engineering Center. This pad will hold spent nuclear fuel from West Valley, the repackaged spent nuclear fuel removed from wet storage at Test Area North, and existing

spent nuclear fuel in dry storage at Test Area North. This consolidation effort will reduce spent nuclear fuel management costs and remove infrastructure responsibilities at Test Area North.

The Fermi blanket spent nuclear fuel is a sodium-bonded fuel for which a disposition path has not been finalized. Alternative disposition paths being pursued include transfer to another program (i.e., the Office of Nuclear Energy, Science and Technology), evaluation of several process technologies to remove the sodium, or development of a methodology for direct disposal in a repository.

After the privatized Spent Nuclear Fuel Dry Storage Project is constructed and operational at INEEL in 2005 and repository acceptance criteria are finalized, the fuel will be packaged in repository-ready standard canisters. The canisters will be stored in this Nuclear Regulatory Commission-licensed dry storage facility while awaiting shipment to the repository. Storage capacity of this facility can be expanded if packaging rates exceed transportation rates to the repository. Management of this spent nuclear fuel in a Nuclear Regulatory Commission-licensed facility ensures entry of this fuel into the Nuclear Regulatory Commission-licensed repository. In addition, all activities are performed under the quality assurance program adopted by the repository. This further ensures entry of this fuel into a repository with completion of shipments by 2035.

Characterization and packaging the fuel in standard canisters based on established repository criteria minimizes the number of fuel shipments from the INEEL to the repository by a factor of six (from over 1000 truck and rail shipments to ~186 rail shipments) and minimizes the amount of fuel characterization required before disposal. Use of the standard canister also substantially reduces the risk that DOE spent nuclear fuel would be considered a nonstandard fuel. Nonstandard fuel incurs much greater characterization costs and will be placed at the end of the queue for receipt at the repository, thereby requiring INEEL storage facilities to operate longer and jeopardizing the completion of shipment of spent nuclear fuel offsite by January 1, 2035. Some intact commercial-type fuels stored at the INEEL for experimental purposes may be sent directly to the repository without packaging into standard canisters. Finally, to decrease the EM efforts for storage and packaging costs at the INEEL, foreign research reactor fuel and domestic research reactor fuel will be sent directly from the generators to the repository after the repository opens. This includes spent nuclear fuel from DOE test reactors.

4.3.3 Rationale

The strategy outlined above reduces risks and costs and accelerates the ability of the INEEL to remove existing and future receipt of spent nuclear fuel from Idaho. The strategy ensures that spent nuclear fuel will be accepted at the repository at the earliest possible timeframe by use of the INEEL-designed and tested standard canister. The Idaho Settlement Agreement milestone for removal of DOE-ID spent nuclear fuel from wet storage will be achieved 11 years ahead of the current baseline.

Early opening of the repository allows a minimization of shipments to the INEEL after 2010.

4.3.4 Key Milestones

- Complete transfer of all spent nuclear fuel from the Test Area North pool to existing dry storage casks on a storage pad by September 2002
- Complete transfer, dry, and store all spent nuclear fuel from the Materials Test Reactor canal to the Idaho Nuclear Technology and Engineering Center in the Irradiated Fuel Storage Facility by December 2002

- Complete transfer of all spent nuclear fuel from the Power Burst Facility pool to the Idaho Nuclear Technology and Engineering Center and store in the Irradiated Fuel Storage Facility by December 2003

- Complete transfer of all spent nuclear fuel from the Test Area North storage pad to a new cask storage pad at the Idaho Nuclear Technology and Engineering Center by September 2005

- Initiate repackaging into and storage of repository-ready standard canisters for shipment to the repository by December 2005

- Cease acceptance of Advanced Test Reactor fuel by September 2010

- Remove sodium-bonded fuels (Experimental Breeder Reactor, EBR-II) by September 2011

- Remove all spent nuclear fuel from underwater storage pools at the Idaho Nuclear Technology and Engineering Center by September 2012

- Remove naval fuels from the Idaho Nuclear Technology and Engineering Center by September 2012

- Complete final shipment of all EM-managed legacy spent nuclear fuel to a repository by January 1, 2035

4.3.5 Metrics

The following are examples of performance metrics. These metrics will be further developed in detailed plans:

- Metric tonnes heavy metal of spent nuclear fuel shipped to a repository

- Metric tonnes heavy metal of spent nuclear fuel transferred to dry storage

- Metric tonnes heavy metal received from offsite sources