Draft Action Plan

for

Spent Nuclear Fuel Stabilization

Date: February 20, 1997

Issue No.: 8.18

Source of Issue: Environmental Defense Institute Letter of September 17, 1996

Issue: INEEL Ten-Year Plan advocates unnecessary Spent Nuclear Fuel Stabilization Programs. Experimental Breeder Reactor-II Spent Nuclear Fuel can be stored safely in dry interim monitored storage facilities or in long-term repositories.

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Approved by DOE-Idaho Operations Office:

DOE-Idaho Program Manager	Jerry L. Lyle Assistant Manager Office of Program Execution

The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

SPENT NUCLEAR FUEL STABILIZATION

Issue: 8.18

Issue Statement

INEEL Ten-Year Plan advocates unnecessary Spent Nuclear Fuel Stabilization Programs. Experimental Breeder Reactor-II Spent Nuclear Fuel can be stored safely in dry interim monitored storage facilities or in long-term repositories.

Planning Assumptions

The Department of Energy's goal is to remove spent nuclear fuel from the state of Idaho, and to safely and permanently dispose of the fuel in a geologic repository. In order to achieve this goal, fuel stabilization programs are required to develop technology for elimination of reactive hazards of some spent nuclear fuel prior to repository storage. The 10 CFR 60 regulations for storage of spent nuclear fuel in a repository require the elimination of all chemically reactive materials, explicitly those with potential for spontaneous ignition and generation of explosive gases. For example, Experimental Breeder Reactor-II fuels incorporate elemental sodium as a component of the fuel pins within the fuel cladding system. Sodium metal reacts violently when exposed to water, liberating hydrogen gas, and creating a potential explosion. The resulting reaction can likewise affect the uranium metal fuel, causing a second oxidation reaction. Sodium also introduces potential for caustic stress corrosion from sodium hydroxide derived from atmospheric moisture. Extensive corrosion is expected to result in a loss of geometric configuration. This change of configuration may increase the potential for a nuclear reaction.

Elimination of the elemental sodium removes the risk for inadvertent chemical and nuclear reactions. Electrometallurgical treatment provides for controlled removal of the sodium from the fuel matrix in a molten salt environment limiting the potential for combustion reaction while bonded to the uranium metal fuel components. At the same time, it limits the undesirable mobilization of fission products by sequestering them into a phase that can become a stable waste form. Isolation of the uranium metal introduces the option of conversion of the metal to oxide, which is the maximally stable chemical form. Discussion of alternative processes for achieving this stable state for the reactive components concluded that a closed system using molten salt achieves a desired high degree of stability.

Some means of removing the reactivity and stabilization issues are required prior to repository disposition. The environmental assessment for the Electrometallurgical Treatment and Demonstration Project noted that the spent nuclear fuel is subject to stress corrosion cracking once the sodium has been washed from the external surfaces of the fuel. This also causes an instability with the fuel which also creates problems with repository disposal. The Electrometallurgical Treatment Program is a demonstration intended to determine full scale process efficacy to resolve these issues.

Resolution Approach

The ongoing Electrometallurgical Treatment demonstration will ascertain the viability of the treatment method including resultant waste product disposal performance and special nuclear material safeguard approaches. If the demonstration is sucessful, further NEPA review, including public participation, will be the primary approach to reach resolution of this issue. Communication with all interested and affected stakeholders will continue with the Ten-Year Plan process and the NEPA process.

Schedule

The demonstration is scheduled to be completed in the Summer or 1999. Further NEPA review will be performed upon its completion, if warranted. Communication with stakeholders will also continue through use of the Ten Year Plan, which will address this and similar issues on an on-going basis.

Participants

DOE-Idaho, Argonne National Laboratory-West, and Lockheed Martin Idaho Technologies Company spent nuclear fuel program managers or designated alternates.

Analysis/Documentation

The description of the fuel as noted in the Environmental Assessment of Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facility at Argonne National Laboratory-West (DOE/EA-1148-F) notes the presence of integral sodium metal within the fuel matrix. Options for controlled disassembly and reconfiguration of the fuel to eliminate the chemically reactive components have been discussed, and supporting analysis for the selected options has been provided within that document.

Stakeholder Involvement

Commenting organization will be contacted to assure timely communication of the NEPA process.

Continue to prepare and distribute spent nuclear fuel information to the public and targeted interest groups, and occasionally prepare specific information concerning topics of public interest. For example, the brochure released by the Spent Nuclear Fuel Program to the public entitled, "*What's Happening with Spent Nuclear Fuel in Idaho?*" released in November 1996.

Continue to offer and provide briefings to the INEEL Site-Specific Advisory Board, the Shoshone-Bannock Tribes, and interest groups.

Draft Action Plan

for

Decontamination and Dismantlement Milestones

Date: February 20, 1997

Issue No.: 8.25

Source of Issue: Idaho Ten-Year Letter of October 3, 1996

Issue: Key Milestones. Key milestones for the decontamination and dismantlement of the Experimental Test Reactor and Materials Test Reactor at Waste Area Group 2, the Test Reactor Area, should be developed.

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The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

Decontamination and Dismantlement Milestones

Issue: 8.25

Issue Statement

Key Milestones. Key milestones for the decontamination and dismantlement of the Experimental Test Reactor and Materials Test Reactor at Waste Area Group 2, the Test Reactor Area, should be developed.

Clarification

The July 1996 draft INEEL Environmental Management Ten-Year Plan did reflect "Start" and "Complete D&D Milestones" as indicated on pages 74 and 75.

The Environmental Management Integration Program process utilized a Parametric Model that projected the Deactivation, Surveillance and Maintenance, and Decontamination and Dismantlement costs; Deactivation and Decontamination and Dismantlement waste streams; and Deactivation, Surveillance and Maintenance, and Decontamination and Dismantlement scheduled start/complete years for every known existing and future radiologically-contaminated facility at the INEEL. The 96 Baseline Environmental Management Report, which was verified and validated in 1996, contains these facilities dates that were generated to match funding profiles and facility availability.

The facilities in question, Experimental Test Reactor, Materials Test Reactor, and the Advanced Test Reactor are outlined in the following table.

Description	**Deactivation**		**Surveillance & Maintenance**		**Decontamination and Dismantlement**	
	Start	Complete	Start	Complete	Start	Complete
Experimental Test Reactor (TRA-642)	2004	2005	N/A	N/A	2004	2016
Materials Test Reactor (TRA-603)	2001	2003	2003	2022	2023	2031
Advanced Test Reactor (TRA-670)	2025	2029	N/A	N/A	2030	2044

Funding restraints on the Decontamination and Dismantlement Program didn't allow for the starting of Experimental Test Reactor on the scheduled 2004 to 2016 date. Therefore the 96 Baseline Environmental Management Report dates were not utilized in the development of the Environmental Management Ten-Year Plan. The decontamination and dismantlement of this reactor facility was moved to 2023 to

2031 to be worked in conjunction with the decontamination and dismantlement work at the Materials Test Reactor.

Special Note

This is a scheduling issue in the sense that the Ten-Year Plan window from 1996 to 2006 wasn't large enough to see the Experimental Test Reactor and Materials Test Reactor decontamination and dismantlement projects scheduled by the 96 Baseline Environmental Management Report. DOE-Headquarters funding levels change on an annual basis and as such the INEEL Ten-Year Plan will be revised to reflect site-wide Environmental Management prioritization of projects based upon compliance and risk issues. This means that the INEEL Environmental Restoration decontamination and dismantlement projects will be tied directly to funding levels established and may be accelerated and/or delayed accordingly.

Recommendation

Since the information in question already exists in the INEEL Ten-Year Plan, it is recommended that this issue be addressed editorially in the Plan. This action would close the issue of developing key milestones that already exist.

Draft Action Plan

for

Consolidation of Radionuclide—Contaminated Soil

Date: February 20, 1997

Issue No.: 8.26

Source of Issue: Idaho Ten-Year Plan Letter of October 3, 1996

Issue: The Ten-Year Plan action is to "incorporate a schedule for development and operation of a site-wide soil repository pursuant to CERCLA at the INEEL." This repository will be sited under a CERCLA Record of Decision only if on-site disposal proves to be the most appropriate alternative chosen in accordance with the nine CERCLA criteria by DOE-Idaho, EPA, state of Idaho, and the public. Schedule constraints dictate the consolidation of radionuclide-contaminated soil at an existing CERCLA site would not occur sooner than the 1999 field season, which may leave some radiologically-contaminated soil without this disposal option between 1997 and 1999.

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DOE-Idaho Program Manager	Jerry L. Lyle Assistant Manager Office of Program Execution

The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

Consolidation of Radionuclide-Contaminated Soil

Issue: 8.26

Issue Statement

The Ten-Year Plan action is to "incorporate a schedule for development and operation of a site-wide soil repository pursuant to CERCLA at the INEEL." This repository will be sited under a CERCLA Record of Decision only if on-site disposal proves to be the most appropriate alternative chosen in accordance with the nine CERCLA criteria by DOE-Idaho, EPA, state of Idaho, and the public. Schedule constraints dictate that consolidation of radionuclide-contaminated soil at an existing CERCLA site could not occur sooner than the 1999 field season, which may leave some radiologically-contaminated soil without this disposal option between 1997 and 1999.

Planning Assumptions

The INEEL expects to encounter large volumes of radiologically-contaminated soil and debris under CERCLA and Decontamination and Dismantlement programs, as well as through normal facility operations. The following assumptions were made to support the concept of an existing centralized CERCLA site where radionuclide-contaminated soil, generated by environmental restoration activities at the INEEL, could be consolidated.

- A variety of alternatives preventing the release of contaminants to the environment should be considered—including among others, capping in place, consolidation at a CERCLA site and capping, disposal at the Radioactive Waste Management Complex, and off-site disposal at a licensed facility. In situations where treatment may be necessary for some of these alternatives, some form of final disposal would be necessary since treatment alone doesn't protect human health and the environment from the radioactive constituents in contaminated soil. The INEEL has identified better characterization technologies and use of physical treatment methods that result in minimizing the generation of waste, and reducing the volumes of soil requiring disposal.

- The Federal Facility Agreement and Consent Order requires that a comprehensive remedial investigation/feasibility study be developed for each of the ten Waste Area Groups at the INEEL. Each investigation will evaluate alternatives to meet remedial action objectives. Compliance with Applicable or Relevant and Appropriate Requirements, as required by CERCLA, will be evaluated for each detailed alternative considered. If some form of on-site disposal is determined to be the best alternative for radionuclide-contaminated soil and debris, the determination would be summarized in a proposed plan and released for public comment. A Record of Decision would be issued detailing the resolution of pubic comments and documenting the reasons for selecting the remedy.

- The Waste Area Group 3 Comprehensive Remedial Investigation/Feasibility Study may demonstrate that an on-site disposal facility at the location of the percolation ponds at the Idaho Chemical Processing Plant is the preferred remedy for the approximately 45,000 cubic yards of radiologically-

contaminated soil from Waste Area Group 3 for which an excavation and disposal option is appropriate. In addition, the Waste Area Group 3 Remedial Investigation/Feasibility Study will also include an analysis of the cost/benefit of a centralized disposal facility located at Waste Area Group 3 for a larger volume of soil, including soil from other locations within the INEEL. The total volume of soil used in the cost/benefit analysis for the soil disposal facility would be 200,000 cubic yards, which includes soil expected to be generated as a result of decontamination and dismantlement activities in the next 10 years.

- The information generated in the Waste Area Group 3 Remedial Investigation/Feasibility Study will be provided to other Waste Area Groups for use in individual comprehensive investigations and Records of Decision that will determine the fate of CERCLA soils at other INEEL locations. There is no guarantee that these individual Records of Decision will choose disposal at a centralized soil disposal facility as the selected remedy, but, it is assumed this alternative could be the selected remedy.

- The Waste Area Group 3 Record of Decision will not become final until July 1998, resulting in the summer of 1999 as the earliest opening date of a disposal facility. Other solutions would be utilized for soil generated before the opening of the new centralized disposal facility. It is assumed other solutions would be available for these soils, such as disposal at the Radioactive Waste Management Complex, temporary storage, or off-site disposal.

- The end state for the centralized soil disposal facility would consist of the two Waste Area Group 3 percolation ponds filled to ground-level with radiologically-contaminated soil, with a multi-layer cap, including an infiltration barrier and an erosion resistant top layer. The disposal facility would be filled and capped no later than 2045, when decontamination and dismantlement of the Idaho Chemical Processing Plant is expected to be complete.

Several of the assumptions for the soil disposal facility involve some risk because there has yet to be any stakeholder acceptance of the concept of a centralized soil disposal facility. Chief among them is the assumption that the Records of Decision for soils from locations other than Waste Area Group 3 would select on-site disposal at a centralized disposal facility resulting in a minimum volume of 200,000 cubic yards of soil, including soil from Waste Area Group 3. There is also a risk that consolidation at a soil disposal facility may not prove to be the most cost-effective remedy for most INEEL radiologically-contaminated soil, although the risk is not considered high.

Resolution Approach

Most of the assumptions raise issues requiring resolution through the on-going CERCLA process in progress at the INEEL. The proposed plan and Record of Decision for Waste Area Group 3 and the other Waste Area Groups will reflect the resolutions agreed to by the DOE, EPA, and IDHW once stakeholder input has been evaluated and considered. Coordination between the Environmental Restoration Program and facility operations will occur in support of the Remedial Investigation/Feasibility Study to better define planning assumptions and remedial alternatives.

Schedule

- The draft Waste Area Group 3 Comprehensive Remedial Investigation/Feasibility Study will be submitted to EPA and IDHW for review on April 22, 1997. This date is well ahead of the enforceable deadline of September 30, 1997.

- The Waste Area Group 3 Remedial Investigation/Feasibility Study is expected to become final on August 18, 1997.

- The proposed plan will become final on October 27, 1997, with a public comment period from November 3, 1997 to January 21, 1998.

- The draft Record of Decision will be submitted to the EPA and IDHW on March 11, 1998 for review. This date is prior to the enforceable date of July 31, 1998.

- The Record of Decision will become final on July 8, 1998, at which time most of the resolutions to the above issues would be considered complete.

- The resolution of issues associated with the disposal of soil from other Waste Area Groups will be tied to the schedules for the finalization of each of the Waste Area Group-specific comprehensive Records of Decision.

Participants

The Environmental Restoration Program is implementing the Waste Area Group 3 Comprehensive Remedial Investigation/Feasibility Study, proposed plan, and Record of Decision. The DOE-Idaho decision-maker is Nolan Jensen. Key stakeholders include the EPA and IDHW as described above. Other DOE-Idaho and Lockheed Martin Idaho Technologies Company organizations will support the coordination activities for the Remedial Investigation/Feasibility Study, including facility staff and regulatory compliance staff.

Analysis/Documentation

The comprehensive Remedial Investigation/Feasibility Study, the proposed plan, and the Record of Decision will document the analysis of alternatives for Waste Area Group 3 soil remediation. The analysis will consider coordination with other Waste Area Groups for soil disposal at Waste Area Group 3. The comprehensive Remedial Investigations/Feasibility Studies, proposed plans, and Records of Decision for other Waste Area Groups will document the analysis of radiologically-contaminated soil within each individual Waste Area Group.

Stakeholder Involvement

Stakeholders will be involved through the normal CERCLA process. The EPA and IDHW will participate in the development of documents and strategies as provided for in the Federal Facility Agreement and Consent Order. The INEEL Site-Specific Advisory Board will be involved in discussions over the planning

assumptions prior to finalization of any decisions. The public will have an opportunity to participate through public comment periods required by the INEEL Community Relations Plan.

Opportunities to brief interested parties will be solicited by DOE-Idaho. Additional contacts will be coordinated between DOE-Idaho and the Shoshone-Bannock Tribes. Technical briefings will be offered to the Tribal Council, the Tribe's technical staff and to Tribal members.

Articles concerning this topic will be covered in bimonthly issues of the *INEEL Reporter*, which is distributed to 6,800 readers.

Draft Action Plan

for

Idaho Chemical Processing Plant Facility Closure Integration

Date: February 17, 1997

Issue No.: 10.14

Source of Issue: Idaho Ten-Year Letter of October 3, 1996

Issue: ER Integration. Define the cleanup process, end state, and significant issues to completing restoration of Waste Area Group 3 (i.e., the Idaho Chemical Processing plant). It is not clear how restoration activities will be integrated with facility operations that continue beyond 2006.

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DOE-Idaho Program Manager	Jerry L. Lyle Assistant Manager Office of Program Execution

The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

Idaho Chemical Processing Plant
Facility Closure Integration

Issue: 10.14

Issue Statement

ER Integration. Define the cleanup process, end state, and significant issues to completing restoration of Waste Area Group 3 (i.e., The Idaho Chemical Processing Plant). It is not clear how restoration activities will be integrated with facility operations that continue beyond 2006.

Planning Assumptions

The cleanup of CERCLA sites at Waste Area Group 3 is governed by the INEEL Federal Facility Agreement and Consent Order, under which a Comprehensive Remedial Investigation/Feasibility Study for Waste Area Group 3 is in progress. The decision-making process for integration of environmental restoration cleanup and facility operations is tied to the CERCLA Record of Decision, which includes stakeholder participation. Until the Record of Decision is signed, the following assumptions have been used as a basis for planning.

Cleanup Process

The cleanup process will include remediation of sites at Waste Area Group 3 with unacceptable risk by 2005, with the cleanup of the tank farm and other inaccessible sites continuing beyond 2006. Cleanup of contaminated soil around the tank farm under CERCLA would likely be integrated with RCRA closure of the high-level waste tanks at the tank farm. A cap to prevent water infiltration and surface exposure to contaminants at the tank farm is currently assumed to be installed under the CERCLA program. Other contaminated soil sites would be remediated using an appropriate combination of institutional controls, caps, treatment, and excavation for disposal at an appropriate facility. Interim measures would be implemented between 1998 and 2005 to reduce contaminant migration below the tank farm. Cleanup of contaminated soil sites located under buildings would be coordinated with D&D, with completion of cleanup anticipated beyond 2006.

End State Assumptions

1. By 2006, all contaminated soil sites, except the tank farm and soil under buildings, would be remediated. Tank farm soil and soil under buildings would be under institutional controls to meet remedial action objectives by 2005. Institutional controls would be in place for all Waste Area Group 3 sites by 2005. Monitoring and maintenance activities will continue beyond 2006.

2. An interim remedy would be implemented at the tank farm by 2005.

3. RCRA closure of the tank farm will begin in 2009 and will be completed before 2035. This will include stabilization of the tank heels, filling the voids inside all tanks and vaults with grout, and removing all support buildings within the tank farm fence line.

4. Facilities that are immediately adjacent to the tank farm are expected to have undergone D&D by 2044.

5. A cap would be constructed over the tank farm at a point in time when the RCRA closure and D&D actions have sufficiently progressed. The cap will prevent water infiltration and exposure to contaminants at the surface. It will meet all requirements for CERCLA remediation and RCRA closure. Monitoring and maintenance of the tank farm cap would begin after completion of the cap construction. New tanks needed for the high-level waste program will not interfere with installation of the cap.

The cleanup process and end states described here are purely assumptions. Regulator or other stakeholder acceptance has not been received. A number of the assumptions involve some risk. The first end state assumption's risk is because the regulators may want to include remedial action objectives in the Record of Decision that could only be met after RCRA closure of the tank farm. If that occurs, deletion of Waste Area Group 3 from the National Priority List would not be possible until after 2035. Assumption "5" is risky in that it is contingent on regulator acceptance that installation of a final cap for CERCLA remediation of the tank farm soil would be delayed until after RCRA closure of the tank farm and surrounding facilities. Assumptions 2, 3, 4 and 5 require significant coordination of tank farm operational requirements and remediation activities from present until implementation of D&D activities.

Resolution Approach

Most of the assumptions raise issues which will require resolution through the on-going Waste Area Group 3 CERCLA process. The proposed plan and Record of Decision for Waste Area Group 3 will reflect the resolutions agreed to by the DOE, EPA, and IDHW, with other stakeholder input. Internal coordination between the Environmental Restoration Program and facility operations will occur in support of the RI/FS to better define planning assumptions and remedial alternatives. The "Compliance Re-Engineering" effort underway at the INEEL is focusing on the integration of CERCLA and RCRA, which will support its application at Waste Area Group 3.

Schedule

- The draft Waste Area Group 3 Comprehensive RI/FS will be submitted to EPA, IDHW for review on September 30, 1997.

- The Waste Area Group 3 RI/FS Report will become final on October 27, 1997.

- The proposed plan will become final on January 13, 1998, with the public comment period beginning on January 20, 1998.

- The Draft Record of Decision will be submitted to the EPA and IDHW for review on July 31, 1998.

- The Record of Decision will become final on September 16, 1998, at which time the resolutions to the above issues can be considered complete.

Participants

The Environmental Restoration Program is implementing the Waste Area Group 3 Comprehensive RI/FS, proposed plan, and Record of Decision. The DOE decision-maker is Nolan Jensen (DOE-ID). Key stakeholders include the EPA and IDHW, as described above. Other DOE and Lockheed Martin Idaho Technologies Company programs will support coordination activities for the RI/FS, including facility staff, the high-level waste program, and regulatory compliance staff.

Analysis/Documentation

As indicated above, the Waste Area Group 3 Comprehensive RI/FS, the proposed plan, and the Record of Decision will document the analysis of alternatives for remediation, including consideration of coordination activities.

Stakeholder Involvement

Stakeholders will be involved through the normal CERCLA process. The EPA and IDHW will participate in the development of documents and strategies as provided for in the Federal Facility Agreement and Consent Order. The INEEL Site-Specific Advisory Board (SSAB) will be involved in discussions over the planning assumptions prior to finalization of any decisions. The public and other stakeholders will participate through the public comment periods, as established in the INEEL Community Relations Plan.

A list of proposed alternatives for evaluation in the Feasibility Study was taken before the SSAB in January, 1997. The Board's recommendation on these alternatives will be solicited during the March, 1997 SSAB meeting.

Opportunities to brief interested parties will be solicited by DOE-Idaho. Additional contacts will be coordinated between DOE-Idaho and the Shoshone-Bannock Tribes. Technical briefings will be offered to the Tribal Council, the Tribe's technical staff and to Tribal members.

Articles concerning this topic will be covered in bi-monthly issues of the *INEEL Reporter*, which is distributed to 6,800 readers.

Draft Action Plan
for

National Priorities List Deletion Strategy

Date: February 20, 1997

Issue No.: 15.8

Source of Issue: Idaho Ten-Year Plan Letter of October 3, 1996

Issue: The plan for deletion or partial deletion from the National Priorities List and release of portions of the INEEL from Environmental Management control must be included in the Ten-Year Plan. Partial deletion of major portions of the INEEL can be accomplished by 2006. Final deletion of the INEEL from the National Priorities List will occur post 2046, when all long-term response actions under CERCLA are completed.

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The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

National Priorities List
Deletion Strategy

Issue: 15.8

Issue Statement

Issue Statement

The plan for deletion or partial deletion from the National Priorities List and release of portions of the INEEL from Environmental Management control must be included in the Ten-Year Plan. Partial deletion of major portions of the INEEL can be accomplished by 2006. Final deletion of the INEEL from the National Priorities List will occur post 2046, when all long term response actions under CERCLA are completed.

Background

There is currently no regulatory driver for partial deletion, nor is there complete regulator acceptance of the concept of partial deletion at the INEEL. The INEEL Federal Facility Agreement and Consent Order was written such that there would be a single, final National Priorities List deletion event, once all remedial actions have been completed. No date was set in the Federal Facility Agreement and Consent Order for final deletion. Operating facilities are co-located with some CERCLA sites (such as the Idaho Chemical Processing Plant Tank Farm, facilities to be decontaminated and dismantled, and the active low-level waste disposal portion of the Radioactive Waste Management Complex). The cleanup of CERCLA sites associated with operating facilities may be delayed until facility closure. These constraints could prove to be barriers to achieving the goal of early deletion of the INEEL from the National Priorities List. Final deletion of the INEEL from the National Priorities List is not likely to be possible by 2006, but partial deletion is possible for certain areas.

Planning Assumptions

Proposals and open issues:

- Partial deletion(s) prior to 2006 will be accomplished as individual Waste Area Groups complete CERCLA remedial action. The first partial deletion could be initiated as early as 2002, and may include Waste Area Groups 1 (surface sites only), 2, 4, 5, 6, and 10. (Note: Waste Area Groups 8, Naval Reactors Facility, and 9, Argonne National Laboratory-West, are not administered or managed by DOE-Idaho.)

- The entire site cannot be deleted from the National Priorities List by 2006 because certain remedial actions and Long-Term Response Actions will continue, some under Environmental Management control. Key assumptions include:

1. The groundwater pump and treat remedy at Waste Area Group 1 will continue in an operations and maintenance phase as a Long-Term Response Action until at least 2026. The remedial action will continue through natural attenuation until the cleanup levels specified in the Record of Decision are met, which will be sometime after 2026. The operable unit will be eligible for deletion once the cleanup levels are achieved.

2. Retrieval and treatment of the pits and trenches at Waste Area Group 7 will continue until approximately 2023 as an active remedial action. The operable unit will be eligible for National Priorities List deletion at that time.

3. The Record of Decision for the Tank Farm at Waste Area Group 3 will indicate that final action on the Tank Farm soils must be postponed until after the High-Level Waste Program completes Tank Farm closure. The cleanup of Tank Farm soil under CERCLA will be completed in 2046. The operable unit will then be eligible for NPL deletion.

- The assumptions noted in the previous bullet form the basis for the determination that final deletion of the INEEL from the National Priorities List is not possible until after 2046. This Action Plan is therefore focused on a partial deletion strategy.

  (Note: Because of the high risk of these assumptions, implementation is not currently reflected in the Ten Year Plan scope, schedule, and budget for affected projects. Incorporation of these changes will await resolution of final stakeholder comments on the Ten Year Plan.)

- In order to initiate deletion of any operable unit, all remedial actions (including Long-Term Response Actions) must be completed and the final "Close Out Reports" submitted to EPA and IDHW.

- Long-Term Response Actions and other operation and maintenance actions (e.g., monitoring) will be turned over to organizations other than Environmental Management for implementation and final close out at non-Environmental Management facilities.

- At all applicable Waste Area Groups, CERCLA Records of Decision will be written such that remediation of certain sites will be postponed until facility closure where the cleanup action would interfere with current operations or facilities. This postponement will delay deletion from the National Priorities List until after facility closure and cleanup completion.

Decisions:

- D&D activities and RCRA closures were not considered in the determination that most Waste Area Groups will be eligible for partial deletion from the National Priorities List before 2006. The partial deletion strategy is based on the scope of the Federal Facility Agreement and Consent Order as it currently stands. It may prove advantageous from a cost and coordination perspective to add certain D&D or RCRA sites to the CERCLA process under the Federal Facility Agreement and Consent Order. If such sites are added, the proposed schedule for partial National Priorities List deletion by 2006 may require modification.

Resolution Approach

DOE, EPA, and IDHW have initiated a team effort to address National Priorities List deletion issues at the INEEL. This team is examining issues such as the definition of the INEEL National Priorities List site, the possibility of partial deletion, RCRA/CERCLA integration impacts on deletion, and the impacts of co-located facilities on deletion. The team has developed a proposed administrative process for National Priorities List deletion. This team will propose whether partial deletion is desirable and, if so, the strategy for partial deletion. The results of the team effort will be proposed to the DOE, EPA, and IDHW Federal Facility Agreement and Consent Order Project Managers for approval. The proposal may be reviewed by the INEEL Site Specific Advisory Board.

Once approved, the process will be incorporated into the ongoing CERCLA activities at the site. A plan will be developed to implement the strategy.

Schedule

The team has completed a draft of the administrative process for National Priorities List deletion at the INEEL. This was submitted to the DOE, EPA, and IDHW Federal Facility Agreement and Consent Order Project Managers in February, 1997. The strategy for INEEL National Priorities List deletion will be submitted to the DOE, EPA, and IDHW Federal Facility Agreement and Consent Order Project Managers as early as April, 1997. Once the strategy is approved, a plan for implementing the strategy would be completed as early as September 30, 1997.

Participants

Team Members:	Nolan Jensen, DOE-Idaho; Lorie Cahn, Lockheed Martin Idaho Technologies Company (including subcontract support); Matt Wilkening, EPA Region 10; and Margie English, IDHW.
Decision Makers:	Nolan Jensen, DOE-Idaho; Wayne Pierre, EPA Region 10; and Dean Nygard, IDHW.

Analysis/Documentation

The analyses to be undertaken are described in general under “Resolution Approach,” above. Additional factors to be weighed in deciding to proceed with a partial deletion strategy include cost effectiveness, political benefits, the most appropriate way to divide up the site, and surface versus groundwater considerations.

The documentation that will be produced includes: Administrative Aspects of National Priorities List Deletion at the INEEL; National Priorities List Deletion Strategy; and National Priorities List Deletion Plan.

Stakeholder Involvement

As described above, the primary stakeholders involved in the development of the National Priorities List deletion strategy are the EPA and IDHW. If the DOE, EPA, and IDHW decision-makers determine it to be appropriate, the strategy may be brought before the INEEL SSAB for review prior to finalization. In any case, the deletion of any site at the INEEL from the National Priorities List will follow EPA's National Priorities List deletion process, including the solicitation of public comment, and notification of the Natural Resources Trustees. Section 300.425(e)(4) of the National Contingency Plan identifies the requirements for public participation in the National Priorities List deletion process. In addition, EPA's *Procedures for Completion and Deletion of National Priorities List Sites* (OSWER Directive 9320.2-3A, B, C) further describes the public participation process.

For a site to qualify for National Priorities List deletion, the remedial action objectives that were established in Records of Decision must be met, and the site must be protective of human health and the environment across all pathways of exposure. This tie to CERCLA Record of Decisions translates to stakeholder participation in the development of the criteria for National Priorities List deletion for each site at the INEEL. The assumptions described above will be addressed through the corresponding RI/FS and Record of Decision processes, in accordance with the existing schedules in the Federal Facility Agreement and Consent Order.

Draft Action Plan

for

INEEL High-Level Waste

Date: February 20, 1997

Issue No.: 20.9

Source of Issue: Idaho Ten-Year Plan Letter of October 3, 1996

Issue: "While continued calcination of the liquid high-level waste should remain as the near-term strategy, conduct an analysis to evaluate potential accelerated separations and final waste form alternatives. The final form should not be limited to vitrified glass unnecessarily."

Points of Contact:

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Approved by DOE-Idaho Operations Office:

Jerry L. Lyle Assistant Manager
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The proposed resolution is in accordance with the Ten-Year Plan Guidance dated December 20, 1996.

HIGH-LEVEL WASTE ISSUE
RESOLUTION AND ACTION PLAN

Issue: 20.9

Background

Irradiated nuclear fuel has been reprocessed at the Idaho Chemical Processing Plant since 1953 to recover uranium-235 and krypton-85 for the U. S. Department of Energy. The resulting acidic high-level liquid radioactive waste has been solidified to a high-level waste calcine since 1963 and stored in stainless steel bins enclosed by concrete vaults. Residual high-level liquid radioactive waste and radioactive sodium bearing liquid waste are stored in stainless-steel tanks contained in concrete vaults.

In April, 1992, DOE announced that spent fuel would no longer be reprocessed to recover enriched uranium and called for a shutdown of the reprocessing facilities at the Idaho Chemical Processing Plant. Since that time, no more high-level waste has been (or will be) generated and nearly all of the high-level liquid radioactive waste has been calcined.

Approximately 1,085 cubic meters of high-level liquid radioactive waste remain to be calcined; the current calcine inventory is approximately 3,800 cubic meters. The tank farm also contains about 5,500 cubic meters of sodium bearing waste, which was produced during decontamination and other incidental plant operations rather than during spent nuclear fuel reprocessing.

The plan for treating the high-level waste as presented in the Ten-Year Plan would be to continue the calcination process through 2012 to empty the Tank Farm; collect newly generated waste in RCRA compliant tanks from 2013 to 2020; and treat the newly generated liquid waste and existing calcine using a new facility beginning in 2020. The proposed treatment method would consist of calcine retrieval, calcine dissolution, separation of the liquid (either liquid waste or dissolved calcine) into high- and low-activity portions, grouting of the low-activity portion, and vitrification of the high-activity portion. This process would be complete in 2035 so that the high-level waste would be ready to be shipped to a geologic repository. Although this is a possible approach, it has some disadvantages; the major one is that it has a significantly greater life-cycle cost than other possible alternatives.

Issue Statement

While continued calcination of the liquid high-level waste should remain as the near-term strategy, conduct an analysis to evaluate potential accelerated separations and final waste form alternatives. The final waste form should not be limited to vitrified glass unnecessarily.

Planning Assumption

Although this issue was raised during reviews of the Ten-Year Plan, it is not a new issue. The Department of Energy and its contractors (previously Westinghouse Idaho Nuclear Company; currently Lockheed

Martin Idaho Technologies Company) have been working on this issue since the decision was made in 1992 to discontinue fuel reprocessing. Two major studies have been completed to determine the preferred method for treating the Idaho Chemical Processing Plant high-level waste inventory. These studies are reported in two documents:

1. W. B. Palmer et al., "ICPP Tank Farm Systems Analysis," WINCO-1192, January 1994.

2. James A. Murphy et al., "ICPP Radioactive Liquid and Calcine Waste Technologies Evaluation Final Report and Recommendation," INEL.-94/0119, April 1995.

Each study came to a similar conclusion: to meet regulatory requirements[a] and minimize life-cycle costs of the waste treatment process, two major actions should occur. The first action would be to initiate high-level liquid waste evaporator operation and continue calciner operation for approximately two campaigns. The second action would be to construct and operate a new treatment facility as soon as possible to immobilize current as well as future wastes. The only significant difference in the recommendations in the two documents was that the later study recommended the immobilization facility be built in two phases to flatten the cost as a function of time. The first phase would treat only the liquid waste and would consist of radionuclide separations and grouting. The second phase would consist of calcine dissolution, solids/liquid separations, and vitrification.

Since these studies were completed, several other studies[b] have been performed to define the technologies which would be used to carry out these process steps. In addition, other studies have been conducted to improve upon the basic scenario described above. For example, shipping the high activity portion to another site to be vitrified was investigated so that a vitrification process would not have to be built at the INEEL. Additional studies are being conducted to assure all reasonable alternatives are addressed.

Until this issue is resolved, the planning assumption for the Ten-Year Plan will be based on a dual approach of pursuing both Calcination and Separations options until 1999 and the Calcination option after 1999.

Resolution Approach

The National Environmental Policy Act process will be used to resolve this issue. Specifically, the Environmental Impact Statement Record of Decision is being moved ahead from 2009, as required by the Settlement Agreement, to completion in 1999 to support the requirement to commence negotiating a plan for calcine treatment with the State of Idaho by the end of 1999. In the Environmental Impact Statement, the various alternatives will be described and their environmental impacts evaluated. The Environmental Impact Statement will be reviewed by the decision makers and other stakeholders, including the State of Idaho. From this review-and-comment process will evolve the path forward for the INEEL high-level waste.

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a. The major regulatory milestones for the INEEL High-Level Waste Program are provided in Table 1.

b. A bibliography of these studies is provided in Table 2.

Schedule

11/96	Brief State INEEL Oversight group on proposal (complete)
11/96 and 1/97	Brief INEEL Site Specific Advisory Board on proposal (complete)
2/97	Brief state regulators on proposal (complete)
2/97	Brief DOE senior management on proposal (complete)
3/97	Conduct high-level waste open house
4/97	Status high-level waste Steering Committee (Oak Ridge)
4/97	Brief Shoshone-Bannock Tribes
9/97	Environmental Impact Statement Scoping Meeting (stakeholder input)
9/97	DOE senior management decision on preferred alternative (decision point)
12/98	Draft Environmental Impact Statement (decision point for preferred alternative)
1/99-3/99	Environmental Impact Statement public comment period (stakeholder input)
6/99	Final Environmental Impact Statement (stakeholder input)
7/99	Record of Decision (decision point)

Participants

The major participants in this decision-making process are the DOE-ID High-Level Waste Program (P. J. Dirkmaat, T. L. Wichmann), the Lockheed Martin Idaho Technologies Company High-Level Waste Program (A. M. Jensen, J. H. Valentine), the State of Idaho (both the oversight and regulatory personnel), and the INEEL Environmental Management Site Specific Advisory Board. The DOE is responsible for the overall direction of the decision-making process, coordinating the decision with DOE-HQ, contracting the Environmental Impact Statement, communicating with the stakeholders, and arranging the funds to carry out the required activities. Lockheed Martin Idaho Technologies Company is responsible for developing the data required to support the decision-making process and the Environmental Impact Statement, performing the technical development work required for facility design, managing the project activities related to the new facilities, and startup and operation of the new facilities. The State and the Site Specific Advisory Board are being included in current discussions regarding the high-level waste path forward and they will be an integral part of the Environmental Impact Statement review process which will lead to the final treatment decision. The State has approval authority for the necessary permits for treatment of the hazardous components.

Analysis/Documentation

The bulk of the analyses and documentation related to various treatment scenarios has been completed and documented (Table 2). The major documents remaining to be developed are the feasibility studies for calcine treatment, the Environmental Impact Statement, and the Record of Decision.

Stakeholder Involvement

Stakeholder involvement in decision-making for the high-level waste treatment process generally involves the formally established methods, specifically, briefings to the State of Idaho and the INEEL Site Specific Advisory Board.

Communications with the State take several forms. Routine meetings, such as the quarterly Site Treatment Plan meetings, are used to convey current status toward meeting short- and long-term waste treatment goals as well as to obtain concurrence for modification of those plans. Letters and reports are used to document meeting of milestones or conveying other information related to waste treatment. The most important method is meetings held to discuss specific issues related to treatment of waste. These meetings have occurred frequently and at various administrative levels since the decision was made to terminate fuel reprocessing. These types of meetings will continue to be held as the high-level waste treatment plan is developed. The State will be a reviewer of the Environmental Impact Statement. The State will also be the primary approver of the high-level waste treatment method since the waste contains RCRA constituents and any new process for treating it must receive proper review and approval prior to beginning operation.

The Site Specific Advisory Board holds regular meetings around the State and high-level waste treatment is often a topic of discussion. Specific presentations have been made to the board on the high-level waste treatment plan. Additional presentations will be made to the board as appropriate as the Environmental Impact Statement process progresses.

To assure all parties are satisfied with the Separations approach, a series of meetings are planned; some have been completed. The completed meetings and their results are described below.

High-Level Waste Steering Committee Meeting, October 1-3, 1996

The non-INEEL attendees at this meeting were S. P. Cowan, A. L. Watkins, J. E. Kinzer, R. E. Erickson, M. A. Hunemuller, C. E. Anderson, R. O. Ramsey, R. L. Sweeney, D. W. Geiser, and H. B. Gnann. The main purpose of the meeting was to obtain the concurrence of the High-Level Waste Steering Committee for the path forward for the INEEL high-level waste program. The history of INEEL high-level waste and the studies performed to determine treatment were provided and discussed. At the conclusion of the meeting, the committee supported the switch from Calcination to Separations and a specific plan for this change was agreed upon:

- The next version of the Ten-Year Plan (November 96) will include Calcination as the baseline with Separations as an attractive alternative to be pursued.

- The final Ten-Year Plan (February 97) to go to Congress will have separations as the baseline, assuming stakeholder acceptance is obtained.

- The Separations approach will be implemented within level funding over the Ten-Year Plan, as a planning basis, if privatized funding is made available.

In summary, the decision of the group was to pursue Separations as a planning basis assuming confirmation of cost analyses, success of stakeholder discussions, and being able to proceed within the Ten Year Plan funding assumptions.

State of Idaho, November 14, 1996

Personnel from both oversight and regulatory groups were represented at the meeting. Information on the Calcination approach and the Separations approach was presented and the proposal was made to change from Calcination to Separations. The State was initially resistant to the proposal because they had erroneously gotten the impression (from other sources) that DOE was attempting to get out of emptying the Tank Farm by 2012. They were also concerned that the change would require modification of the Settlement Agreement. After the proposal was thoroughly explained, the State personnel were receptive to the idea, particularly when they were assured that the Tank Farm would be emptied on schedule and an Environmental Impact Statement would be produced. The oversight personnel remained cautious, but agreed to further meetings; the regulatory personnel said they saw no problem to continuing toward the Separations approach.

State of Idaho, November 15, 1996

The non-INEEL attendees were Bob Ferguson (oversight) and Kathleen Trevor (state attorney general's office). The purpose of the meeting was to review the presentation that was planned for the INEEL Site Specific Advisory Board on the proposed change from Calcination to Separations. This meeting afforded the INEEL personnel the opportunity to provide additional information to the state personnel on the proposals for high-level waste treatment. Again, the state people remained open to further discussions on the revised approach.

Site Specific Advisory Board, November 19, 1996

The history and treatment for high-level waste were explained to the board. After the board understood the background, the proposal for changing from Calcination to Separations was also explained. The board had many questions, mainly focused on understanding all options considered and the criteria used to reach the preferred option, which were answered. The board did not seem to have any specific opposition to the proposal and continued their committee activities to formally develop a recommendation at their January meeting.

Army Corps of Engineers, December 3-5, 1996

One of the Corps of Engineers observations was: "The existing technical scope for the high-level waste Calcination option results in an unmanageable project beginning in year 2013." The Corps of Engineers supported the change from Calcination to Separations due to the above observation and the projected $1 billion cost savings for the Separations approach.

Site Specific Advisory Board, January 21, 1997

Based on the results of the November meeting, the Site Specific Advisory Board submitted several questions to DOE in order to support a formal recommendation in January. Hand-out material and the presentation answered the written questions. Many new questions that came up during the presentation were also answered. On January 22, the board finalized its recommendation on the INEEL high-level waste program. The main points were:

1. The Environmental Impact Statement should be completed early. It should examine a broad range of alternatives and clearly show and verify assumptions, particularly those associated with the high-level waste repository.

2. DOE should meet with the State of Idaho to resolve issues with the Settlement Agreement and the proposal.

3. Sufficient research and development funding should be authorized for both Separations and Calcination to assure the Settlement Agreement is met.

4. DOE should carefully examine, in the Environmental Impact Statement, the risks of low-activity waste disposal over the aquifer and keep the Board and the public informed as more information becomes available.

5. DOE should initiate a public involvement program as part of the Environmental Impact Statement scoping process.

State of Idaho, February 3 and 4, 1997

This meeting was the quarterly INEEL update for the State of Idaho regulators. In this two-day meeting, a presentation was given on the high-level waste regulatory issues and the proposed path forward using the Separations option. The Separations option was well received by the regulators because it is a big step forward towards reaching final forms for the wastes and it provides a direct approach to deal with RCRA constituents and will be amenable to meeting the requirements of the Clean Air Act.

INEEL Senior Management, February 25, 1997

The INEEL senior management and representatives from the State of Idaho INEEL Oversight Office and the Department of Environmental Quality toured the Idaho Chemical Processing Plant on February 25, 1997. They were given a presentation on the High-level Waste Program path forward and a demonstration of separations technology.

Table 1.
High Level Waste Regulatory Milestones FY-97 to FY-35

DATE	REQUIREMENT	SOURCE*
31 Oct 96	Commence operation of the high-level liquid radioactive waste evaporator	SA ¶E3
Q. FY 1997 (31 Mar 97)	Commence NWCF operation	STP Table 5-1
1 July 97	Solicit proposals for feasibility studies for treatment of calcined waste	SA ¶EA.
31 Dec 97	Operate the high-level liquid radioactive waste evaporator to reduce tank farm liquid waste volume by no fewer than 330,000 gallons	SA ¶E3
30 Jun 98	Calcine all remaining non-sodium bearing liquid high-level waste	SA ¶E4
31 Dec 99	Commence negotiating a plan and schedule for calcined waste treatment	SA ¶Ea.
1 Jun 01	Commence calcination of sodium bearing liquid high-level wastes	SA ¶E5
31 Mar 2009	Cease use of waste tanks contained in pillar and panel vaults	NON Consent Order
31 Dec 2009	Issue record of decision for calcined waste treatment	SA ¶Ea.
31 Dec 2012	Complete calcination of sodium bearing liquid high-level wastes	SA ¶E5
31 Dec 2035	Treat all high-level waste so that it is ready to be moved out of Idaho	SA ¶C3, ¶E1, ¶Ea.

* SA = Settlement Agreement with the State of Idaho
STP = INEL Site Treatment Plan

Table 2.
Studies Related to High-Level Waste Treatment

1. Palmer, W. B., et al., "ICPP Tank Farm Systems Analysis," WINCO-1192, Westinghouse Idaho Nuclear Company, Idaho Falls, Idaho, January 1994.

2. "Idaho Chemical Processing Plant Feasibility Design Study for the Waste Immobilization Facility", prepared by Raytheon Engineers & Constructors, Inc., October 1994.

3. "ICPP Radioactive Waste High-level Waste Immobilization Treatment Technologies-Numatec Comments and Recommendations", prepared by Numatec, Inc., January 1995.

4. Murphy, J. A., et al., "ICPP Radioactive Liquid and Calcine Waste Technologies Evaluation Final Report and Recommendation," INEL-94/0119, Idaho National Engineering Laboratory, Idaho Falls, Idaho, April 1995.

5. "Environmental Management Requirements/Defensible Costs Project Final Report", INEL-96/0101, Idaho National Engineering Laboratory, Idaho Falls, Idaho, February 1996.

6. "Technical Evaluation of Research and Development Requirements in Support of INEL ICPP Sodium Bearing Waste Treatment", prepared by Ecology and Environment, Inc., March 1996.

7. "Sodium Waste Alternative Treatment and Disposal Feasibility Study", prepared by Fluor Daniel, Inc., April 1996.

8. "Regulatory Analysis and Proposed Path Forward for the Idaho National Engineering Laboratory High-level Waste Program", DOE/ID-10544, Idaho Falls, Idaho, July 1996.

9. "High-level Waste New Facilities Evaluation Comparison Report", prepared by Numatec, Inc., August 1996.

10. "An Alternative Stabilization Method for ICPP Wastes", prepared by Ecology and Environment, Inc., November 1996.