

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Idaho**

Site Summary Level: **Idaho National Engineering and Environmental Laboratory**

Project **ID-HLW-103 / HLW Treatment and Storage**

Report Number: **GEN-01b**

Print Date: **3/10/2000**

HQ ID: **0565**

General Project Information

Project Description Narratives

Purpose, Scope, and Technical Approach:

Definition of Scope: The overall scope for PBS ID-HLW-103 is to perform the planning for the Idaho National Engineering and Environmental Laboratory (INEEL) High Level Waste (HLW) Program. It also includes operation of the facilities for treatment of the calcine to a final disposable form. The scope includes preparation of an Environmental Impact Statement (EIS), feasibility studies, other project support, and technology development to support improved or new treatment processes. Work related to RCRA delisting, an incidental waste ruling, NRC licensing, and permitting of new facilities is performed within this PBS. Radioactive liquid waste, calcine, debris, and used HEPA filters are generated and stored at the Idaho Nuclear Technology and Engineering Center (INTEC). During the course of PBS ID-HLW-101, radioactive liquid waste is converted to calcine and debris and filters are treated to prepare them for disposal. After 2014, when PBS ID-HLW-101 is completed, production costs for the continuing INTEC waste storage and treatment operations are also included within this scope. For example, used filters continue to be treated by the Filter Leach Facility and mixed debris is treated by the Debris Treatment Facility. The resulting liquids from these processes, as well as newly generated liquid wastes from other INTEC activities, are concentrated by the High Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal System to minimize stored volume and are collected in new RCRA-compliant tankage. Process offgases are treated, monitored, and released. A new HLW Immobilization Facility, that is to be designed and built in PBS ID-HLW-102, begins operation in FY-2020 under this scope. It separates both radioactive liquid (accumulated from 2012 to 2020) and calcine into high activity waste (HAW) and low activity waste (LAW) fractions. These waste fractions are both immobilized for final disposal under this scope: the HAW to a glass and the LAW to a grout.

The scope of PBS ID-HLW-103 also includes two line item projects. The first is the Newly Generated Liquid Waste Treatment project. This facility will store and/or treat newly generated liquid waste (NGLW) separately from storage (and possibly treatment) of sodium bearing waste (SBW). This project will ultimately result in lower costs for waste disposal and improved ability to meet enforceable agreement milestones by selecting the most efficient treatment method for NGLW. The second project is a new pilot plant facility. This facility is needed to develop and demonstrate the technology called for by the EIS ROD for the HLW Immobilization Facility.

Technical Approach: Four major types of material are stored, treated and disposed: radioactive liquid, calcine solids, debris, and used HEPA filters. The newly generated liquid waste will be stored in new RCRA-compliant tankage. An aggressive program of waste minimization continues under this scope and is employed to eliminate or reduce the volume of liquid waste generated. Newly generated radioactive liquid wastes are concentrated by evaporation to minimize stored volume and then are stored and treated by the method provided by the Newly Generated Liquid Waste Treatment project. The calcine remains safely stored in stainless steel bins, which are contained in concrete vaults, until 2020 when the new HLW Immobilization Facility begins operation. This facility, using methods demonstrated in the new pilot plant facility, separates both liquid (accumulated from 2012 to 2020) and calcine into HAW and LAW fractions by dissolution, ion exchange, and solvent extraction. These waste fractions are both immobilized for final disposal: the HAW to a glass and the LAW to a grout. The glass is stored on an interim basis on site until an off-site repository is available. The LAW grout is disposed on site. Used filters are treated in the Filter Leach Facility, and mixed debris is treated in the Debris Treatment Facility, with the use of decontamination solutions. The products from each of these operations is a solid LLW, which is disposed to the Radioactive Waste Management Complex (RWMC), and a mixed liquid waste which is sent to new tankage to await treatment along with other newly generated liquid wastes.

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Project Description Narratives

Project Status in FY 2006:

The Idaho High Level Waste and Facility Disposition Environmental Impact Statement (EIS) and its associated Record of Decision (ROD) is issued. The long-term planning, process development work and project planning required to implement the decisions called for in the ROD is in progress. Work to implement RCRA delisting, an incidental waste ruling, NRC licensing, and new facility permitting is also in progress. Line item projects for storage and/or treatment of NGLW and a new pilot plant facility are in progress.

Post-2006 Project Scope:

After 2014, newly generated liquid wastes are concentrated by the High Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal System to minimize stored volume and are collected in new RCRA-compliant tankage. Used filters and debris continue to be treated. Stored calcine is monitored. Process development and support for the Immobilization Facility design is completed. The Immobilization Facility begins operation in 2020 and completes calcine treatment in 2035 to comply with the Settlement Agreement. After 2035, the waste treatment facilities are flushed and readied for closure activities to begin.

Project End State

When this project is complete, all HLW related materials are converted to LLW, grout, and glass forms. The LLW and LAW grout are disposed on site. The glass is in interim storage on site awaiting transfer to an off-site repository. Most of the INTEC facilities are closed and the remaining waste treatment facilities are ready for closure activities to begin.

Cost Baseline Comments:

The cost estimates contain no contingency. An escalation factor of 2.1% per year is applied to the costs for all years. The cost estimates were originally developed as part of the EM Integration activity performed at the INEEL during March 1996. The costs were then updated in February 1997 to reflect program changes during the intervening 12 months. The costs were updated again in November 1997, April 1998, and March 1999 to incorporate additional program changes and increasing program knowledge. The costs are compliance driven; the primary drivers are the INEEL Site Treatment Plan, the Notice of Noncompliance consent Order (and its two modifications), and the Settlement Agreement with the State of Idaho. If these activities are not done, the major Settlement Agreement milestone to have the HLW ready to leave the state by 2035 will not be met.

Safety & Health Hazards:

This PBS currently contains safety and health (S&H) related work in support of technology development activities. After 2014 when it is a follow on to PBS ID-HLW-101, this PBS includes additional S&H activities to maintain safe, compliant, and operable facilities in compliance with surveillances, compensatory measures, and maintenance and calibration of vital systems. The principal hazard in the project will be the large quantities of highly radioactive waste, but the waste will be contained in shielded facilities and will be processed in remotely operated and maintained facilities. Chemicals pose significant industrial hazards. In addition, there are safety concerns associated with normal occupational hazards such as lifting, tripping, and falling. From 2015 through 2019 only the minimum waste collection, evaporation, and storage facilities are operated, so risk is low. From 2020 through 2035 calcine is retrieved and separations and immobilization facilities are operated, so risk increases. After 2035 the waste is immobilized and awaiting shipment to a repository and risk falls to a very low level.

Safety & Health Work Performance:

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Project Description Narratives

The resources necessary to accomplish the work safely are provided through the site health and safety program requirements, and through the resources allocated to the site's integrated safety management system in the following functional categories: radiological safety, emergency management, fire safety, industrial hygiene, nuclear safety, occupational safety, safeguards and security, safety integration, performance oversight, and standards management. Safety and Health resources are planned and allocated into these categories by cost centers through the work breakdown structure and resources loaded into the project for each fiscal year. When the project activities from PBS ID-HLW-101 continue on into this project; the same type of safety activities continue. Before starting new facilities or restarting old facilities, operational readiness reviews are performed. Industrial Health reviews test plans and prepares job hazard analyses for technical development work. Industrial Safety also reviews scoping and feasibility studies. Radiation Protection monitors tracer studies and surveys waste in the technical development area. Management Oversight monitors work for compliance with requirements.

PBS Comments:

This project converts the HLW calcine to a final disposable form. This activity is of great interest to the State of Idaho and other stakeholders because it is required so that this inventory of waste can be removed from storage over the Snake River Plain aquifer. This is one of the issues which prompted the legal action that resulted in the Settlement Agreement with the State of Idaho. The Settlement Agreement requires all HLW currently at INEEL to be treated so that it is ready to be moved out of Idaho for disposal by a target date of 2035.

Baseline Validation Narrative:

General PBS Information

Project Validated?

Date Validated:

Has Headquarters reviewed and approved project?

No

Date Project was Added: 12/1/1997

Baseline Submission Date:

FEDPLAN Project? Yes

Drivers:	CERCLA	RCRA	DNFSB	AEA	UMTRCA	State	DOE Orders	Other
	N	Y	N	N	N	Y	Y	N

Project Identification Information

DOE Project Manager: T.L. Wichmann

DOE Project Manager Phone Number: 208-526-0535

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Project **ID-HLW-103 / HLW Treatment and Storage**

General PBS Information

DOE Project Manager Fax Number: 208-526-5678
DOE Project Manager e-mail address: WICHMATL@inel.gov
Is this a High Visibility Project (Y/N): Y

Planning Section

Baseline Costs (in thousands of dollars)

	1997-2006 Total	2007-2070 Total	1997-2070 Total	1997	Actual 1997	1998	Actual 1998	1999	2000	2001	2002	2003	2004	2005	2006	
PBS Baseline (current year dollars)	335,300	2,890,854	3,226,154	9,531	9,531	14,590	14,590	13,053	24,674	22,574	26,117	41,841	54,950	54,524	73,446	
PBS Baseline (constant 1999 dollars)	305,619	1,669,223	1,974,842	9,531	9,531	14,590	14,590	13,053	24,025	21,528	24,395	38,278	49,237	47,851	63,131	
PBS EM Baseline (current year dollars)	335,300	2,890,854	3,226,154	9,531	9,531	14,590	14,590	13,053	24,674	22,574	26,117	41,841	54,950	54,524	73,446	
PBS EM Baseline (constant 1999 dollars)	305,619	1,669,223	1,974,842	9,531	9,531	14,590	14,590	13,053	24,025	21,528	24,395	38,278	49,237	47,851	63,131	
	2007	2008	2009	2010	2011- 2015	2016- 2020	2021- 2025	2026- 2030	2031- 2035	2036- 2040	2041- 2045	2046- 2050	2051- 2055	2056- 2060	2061- 2065	2066- 2070
PBS Baseline (current year dollars)	74,828	66,192	30,648	24,975	119,089	386,133	580,131	630,492	693,333	285,033	0	0	0	0	0	0
PBS Baseline (constant 1999 dollars)	62,996	54,579	24,751	19,755	88,543	258,756	350,391	343,223	340,181	126,048	0	0	0	0	0	0
PBS EM Baseline (current year dollars)	74,828	66,192	30,648	24,975	119,089	386,133	580,131	630,492	693,333	285,033	0	0	0	0	0	0
PBS EM Baseline (constant 1999 dollars)	62,996	54,579	24,751	19,755	88,543	258,756	350,391	343,223	340,181	126,048	0	0	0	0	0	0

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2007	2008	2009	2010	2011- 2015	2016- 2020	2021- 2025	2026- 2030	2031- 2035	2036- 2040	2041- 2045	2046- 2050	2051- 2055	2056- 2060	2061- 2065	2066- 2070
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Baseline Escalation Rates

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0.00%	0.00%	0.00%	2.70%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%
2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	2051-2055	2056-2060	2061-2065	2066-2070
2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%

Project Reconciliation

Project Completion Date Changes:

Previously Projected End Date of Project: 12/1/2037

Current Projected End Date of Project: 12/1/2037

Explanation of Project Completion Date Difference (if applicable):

The previous date was an error. The PBS completion date is fiscal year end 2037.

Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	2,364,550	Actual 1997 Cost:	9,531	Actual 1998 Cost:	14,590
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	2,340,429	Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):			63,192
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	2,403,621				

Project Cost Changes

	Cost Adjustments	Reconciliation Narratives
Cost Change Due to Scope Deletions (-):	649,644	Transfer of RHIF project support costs to PBS-102 and waste storage LICP to PBS-101.
Cost Reductions Due to Efficiencies (-):	13,310	Future operating costs were more carefully developed resulting in reduced estimates.

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Project Reconciliation

Cost Associated with New Scope (+):	210,050	Two new LICPs were added: Pilot Plant & Newly Generated Liquid Waste
Cost Growth Associated with Scope Previously Reported (+):		
Cost Reductions Due to Science & Technology Efficiencies (-):		
Subtotal:	1,950,717	
Additional Amount to Reconcile (+):	4	
<hr/>		
Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	1,950,721	

Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Commence negotiating plan and schedule with State	ID-HLW-103-03		12/31/1999	12/31/1999	12/31/1999		Y				
Identify Immobilization Facility funding requirements	ID-HLW-103-04		12/31/1999	12/31/1999	12/31/1999		Y				
Issue Record of Decision	ID-HLW-103-02		12/31/2009	12/31/2009	12/31/1999		Y				
Project End	ID-HLW-103-08		9/30/2037		12/1/2037						
Submit application for RCRA Part B permit for calcined waste	ID-HLW-103-06		12/1/2012	12/1/2012	12/1/2012		Y				
Submit milestones/planning dates for the Immobilization Facility	ID-HLW-103-05		9/30/2005	9/30/2005	9/30/2005		Y				
Treat all HLW so that it is ready to be moved out of Idaho	ID-HLW-103-07		12/31/2035	12/31/2035	12/1/2035		Y				
Updated Technology Development Program (TDP) Plan issued	ID-HLW-103-01		10/31/1998		2/5/1999						
Project Start			10/1/1996								

Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
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Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Commence negotiating plan and schedule with State	ID-HLW-103-03		Y				4	5	5		"By December 31, 1999, DOE shall commence negotiating a plan and schedule with the State of Idaho for calcined waste treatment."
Identify Immobilization Facility funding requirements	ID-HLW-103-04										
Issue Record of Decision	ID-HLW-103-02		Y				4	5	5		"The plan and schedule shall provide for completion of the treatment of all calcined waste located at INEL by a date established by the Record of Decision for the Environmental Impact Statement that analyzes the alternatives for treatment of such waste.
Project End	ID-HLW-103-08				Y						All HLW, both liquid and solid, treated to a final immobilized form. All low activity waste disposed on site and all HAW in interim storage and ready for disposal when an off-site repository is available.
Submit application for RCRA Part B permit for calcined waste	ID-HLW-103-06									Y	This milestone has been moved to PBS ID-HLW-102
Submit milestones/planning dates for the Immobilization Facility	ID-HLW-103-05									Y	This milestone has been moved to PBS ID-HLW-102
Treat all HLW so that it is ready to be moved out of Idaho	ID-HLW-103-07		Y				4	5	5		"DOE shall treat all high-level waste currently at INEL so that it is ready to be moved out of Idaho for disposal by a target date of 2035." "It is presently contemplated by DOE that the plan and schedule shall provide for the completion of the

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Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Updated Technology Development Program (TDP) Plan issued	ID-HLW-103-01										treatme
Project Start				Y							

Performance Measure Metrics

Category/Subcategory	Units	1997-2006 Total	2007-2070 Total	1997-2070 Total	Actual Pre-1997	Planned 1997	Actual 1997	Planned 1998	Planned 1999	Planned 2000	Planned 2001	Planned 2002	Planned 2003	Planned 2004
HLW														
Treatment	M3	0.00	131,123.85	131,123.85				0.00	0.00	0.00	0.00	0.00	0.00	0.00
HLW														
Storage	M3							0.00	0.00	0.00	0.00	0.00	0.00	0.00
HLW														
Canisters	NC	0.00	834.00	834.00										
MLLW														
Treatment	M3	0.00	866.29	866.29										
MLLW														
Storage	M3													
LLW														
Treatment	M3	0.00	108,488.39	108,488.39				0.00	0.00	0.00	0.00	0.00	0.00	0.00
LLW														
Storage	M3							0.00	0.00	0.00	0.00	0.00	0.00	0.00
LLW														
On-Site Disp.	M3	0.00	32,507.10	32,507.10				0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Performance Measure Metrics

Category/Subcategory	Units	1997-2006 Total	2007-2070 Total	1997-2070 Total	Actual Pre-1997	Planned 1997	Actual 1997	Planned 1998	Planned 1999	Planned 2000	Planned 2001	Planned 2002	Planned 2003	Planned 2004
LLW														
Tech.														
Deployed	Ntd	5.00	4.00	9.00					4.00					
Category/Subcategory	Units	Planned 2004	Planned 2005	Planned 2006	Planned 2007	Planned 2008	Planned 2009	Planned 2010	Planned 2011 - 2015	Planned 2016 - 2020	Planned 2021 - 2025	Planned 2026 - 2030	Planned 2031 - 2035	Planned 2036 - 2040
HLW														
Treatment	M3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,666.50	42,819.15	42,819.15	42,819.05	
HLW														
Storage	M3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,949.20	4,136.00	2,757.30	1,378.60	0.00	
HLW														
Canisters	NC									14.00	273.00	273.00	274.00	
MLLW														
Treatment	M3									216.54	216.54	216.54	216.66	
MLLW														
Storage	M3									0.00	0.00	0.00	0.00	
LLW														
Treatment	M3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,756.20	35,577.40	35,577.40	35,577.40	
LLW														
Storage	M3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LLW														
On-Site Disp.	M3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	526.20	10,660.30	10,660.30	10,660.30	
Tech.														
Deployed	Ntd		1.00							4.00				

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Category/Subcategory	Units	Planned 2036 - 2040	Planned 2041 - 2045	Planned 2046 - 2050	Planned 2051 - 2055	Planned 2056 - 2060	Planned 2061 - 2035	Planned 2066 - 2070	Exceptions	Lifecycle Total
HLW										
Treatment	M3									131,123.85
HLW										
Storage	M3									
HLW										
Canisters	NC									834.00
MLLW										
Treatment	M3									866.29
MLLW										
Storage	M3									
LLW										
Treatment	M3									108,488.39
LLW										
Storage	M3									
LLW										
On-Site Disp. Tech.	M3									32,507.10
Deployed	Ntd								2.00	9.00

Technology Needs

Site Need Code: ID-2.1.06

Site Need Name: TRU, Cs and Sr Removal from High Activity Wastes

Focus Area Work Package ID: TFA-6

Focus Area Work Package: Pretreatment to Reduce Volume of HLW and LLW Waste Forms at SRS, Idaho, Hanford and Oak Ridge

Focus Area: TFA

Agree with Technology Link: N

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Technology Needs

Benefits (Cost, Risk Reduction, Both): Cost

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Technetium Removal	0	Unknown
Technetium Removal	0	
TRUEX/SREX	1,100,000	Medium
TRUEX/SREX	1,100,000	Medium

Related CCP Milestones

Related Waste Streams

Agree? Change?

00751: -	Y	N
00747: A - Liquids	Y	N

Site Need Code: ID-2.1.15

Site Need Name: Neutralization of Newly Generated Liquid Wastes

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

Technologies

Cost Savings (in thousands of dollars) Range of Estimate

Related CCP Milestones

Related Waste Streams

Agree? Change?

00747: A - Liquids	Y	N
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Site Need Code: ID-2.1.16

Site Need Name: Decontamination Facility/Analytical Facility Waste Reduction

Focus Area Work Package ID: Pu-02-Stabilization

Focus Area Work Package: Miscellaneous Pu Residue Stabilization and Disposition

Focus Area: PLUTOFA

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Cost

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Technology Needs

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
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Site Need Code: ID-2.1.20
Site Need Name: Tank Annulus/Vault Inspection
Focus Area Work Package ID:
Focus Area:
Benefits (Cost, Risk Reduction, Both): Risk Reduction

Focus Area Work Package:
Agree with Technology Link: N

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
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Light Duty Utility Arm	0	
Topographical Mapping System (TMS)/Laser Range Finder (LRF)	0	
LDUA Stereo Viewing System	0	
Non-Destructive Examination End-Effector	0	

Site Need Code: ID-2.1.23
Site Need Name: Low-Activity Wasteform Qualification
Focus Area Work Package ID: MW-08
Focus Area: MWFA
Benefits (Cost, Risk Reduction, Both): Cost

Focus Area Work Package: Facilitating Deployment for Unique Wastes
Agree with Technology Link: N

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
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Technology Needs

Low Activity Waste Forms	10,000	Medium
Salt and Ash Stabilization - Stabilize Waste using Phosphate Ceramic Process		
Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Cementitious Process	0	

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.24
Site Need Name: Integration/Optimization of High Activity Waste/Low Activity Waste Process Flowsheet

Focus Area Work Package ID:
Focus Area Work Package:
Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Both

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Cesium Removal Using Crystalline Silicotitanate	0	
Low Activity Waste Forms	0	
TRUEX/SREX	0	
Cobalt Dicarbolide Development (U.S.)	0	
Calcine Dissolution	0	
High Activity Waste Forms and Processes	0	

Site Need Code: ID-2.1.27
Site Need Name: Blowback Metal Filters for Solids (Calcine) Retrieval

Focus Area Work Package ID:
Focus Area Work Package:
Focus Area: **Agree with Technology Link:** N

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Technology Needs

Benefits (Cost, Risk Reduction, Both): Cost

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Metal Filters for Waste Tank Ventilation	0	

Site Need Code: ID-2.1.28

Site Need Name: Cs Removal from Newly Generated Liquid Waste

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Both

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Cesium Removal Using Crystalline Silicotitanate	250,000	Medium
Cesium Removal Using Crystalline Silicotitanate	100,000	High
Low Activity Waste Forms	10,000	

Site Need Code: ID-2.1.31

Site Need Name: Characterization of Entrainable Solids in Tank Waste

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>

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Technology Needs

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.35
Site Need Name: Direct Immobilization of INTEC Sodium-Bearing and Newly Generated Liquid Wastes
Focus Area Work Package ID: WT-07-01 **Focus Area Work Package:** Acceptance Criteria and Canister Storage
Focus Area: TFA **Agree with Technology Link:** Y
Benefits (Cost, Risk Reduction, Both): Both

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Low Activity Waste Forms	0	
Salt and Ash Stabilization - Stabilize Waste using Phosphate Ceramic Process		
Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Cementitious Process		
Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Polysiloxane Process		

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.38
Site Need Name: Conditioning of Low Activity Waste for Treatment
Focus Area Work Package ID: WT-07-01 **Focus Area Work Package:** Acceptance Criteria and Canister Storage
Focus Area: TFA **Agree with Technology Link:** Y
Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Low Activity Waste Forms	0	
Salt and Ash Stabilization - Stabilize Waste using Phosphate Ceramic Process		
Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Cementitious Process		

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Technology Needs

Full Scale Mixed Waste Stabilization Demo

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00751: -	Y	N
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.39

Site Need Name: Acceptance Criteria for LAW Disposal in Underground Storage Tanks.

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
In Tank Grouting/Tank Closure	0	
Low Activity Waste Forms	0	

Site Need Code: ID-2.1.40

Site Need Name: Low Activity Waste Grout Sorbent Addition to Reduce Leachability

Focus Area Work Package ID: WT-07-01

Focus Area Work Package: Acceptance Criteria and Canister Storage

Focus Area: TFA

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Cesium Removal Using Crystalline Silicotitanate	0	
Low Activity Waste Forms	0	
Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Cementitious Process		

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Technology Needs

Salt and Ash Stabilization - Stabilize High Salt Content Waste Using Polysiloxane Process
 Full Scale Mixed Waste Stabilization Demo

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.43

Site Need Name: Certify LDUA Sampler as EPA-Approved Method of Sampling Tank Heel Liquids

Focus Area Work Package ID: WT-01-01 **Focus Area Work Package:** Transfer Line/Unplugging/Feed Analysis

Focus Area: TFA **Agree with Technology Link:** Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Light Duty Utility Arm	0	
LDUA - Grab Sampler End Effector	0	
LDUA - Grab Sampler End Effector	0	
Variable Depth Fluidic Sampler	0	
At-Tank Sampling for High-Level Waste	0	

Site Need Code: ID-2.1.44

Site Need Name: Certify LDUA Sampler as EPA-Approved Method of Sampling Tank Heel Solids

Focus Area Work Package ID: WT-01-01 **Focus Area Work Package:** Transfer Line/Unplugging/Feed Analysis

Focus Area: TFA **Agree with Technology Link:** Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Light Duty Utility Arm	0	

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Technology Needs

LDUA - Grab Sampler End Effector	0
LDUA - Grab Sampler End Effector	0
Variable Depth Fluidic Sampler	0
At-Tank Sampling for High-Level Waste	0

Site Need Code: ID-2.1.45
Site Need Name: Acceptance Criteria for Grouting Tank Heels

Focus Area Work Package ID: **Focus Area Work Package:**
Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
In Tank Grouting/Tank Closure	0	
Low Activity Waste Forms	0	

Site Need Code: ID-2.1.48
Site Need Name: Wasteform Qualification for Low-Activity Waste in Underground Storage Tanks

Focus Area Work Package ID: **Focus Area Work Package:**
Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
In Tank Grouting/Tank Closure	0	

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Technology Needs

Low Activity Waste Forms 0

Site Need Code: ID-2.1.49

Site Need Name: Acceptance Criteria for High Activity Waste/Low Activity Waste

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

High Activity Waste Forms and Processes 0

Site Need Code: ID-2.1.50

Site Need Name: Solids Waste (Calcine) Retrieval

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

Site Need Code: ID-2.1.51

Site Need Name: Develop Calcine Dissolution Kinetics for Solid/Liquid Equilibria

Focus Area Work Package ID:

Focus Area Work Package:

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Technology Needs

Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Both

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Calcine Dissolution	1,000,000	High
Calcine Dissolution	0	

Site Need Code: ID-2.1.52

Site Need Name: Characterization of Solids from Calcine Dissolution

Focus Area Work Package ID: **Focus Area Work Package:**

Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Risk Reduction

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
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Site Need Code: ID-2.1.53

Site Need Name: Cs Removal from High Activity Wastes

Focus Area Work Package ID: **Focus Area Work Package:**

Focus Area: **Agree with Technology Link:** N

Benefits (Cost, Risk Reduction, Both): Cost

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
Cesium Removal Using Crystalline Silicotitanate	0	

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Technology Needs

Fission Products Separations Testing	0
Fission Products Separations Testing	0
Cobalt Dicarbolide Development (U.S.)	0
Cobalt Dicarbolide Development (U.S.)	0
Crystalline Silicotitanates for Removal of Acidic Strontium, Anionic Radionuclides, Actinides, Lead and Cadmium	0

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00751: -	Y	N
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.54

Site Need Name: TRU Removal from High Activity Wastes

Focus Area Work Package ID: Pu-02-Stabilization

Focus Area Work Package: Miscellaneous Pu Residue Stabilization and Disposition

Focus Area: PLUTOFA

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Cost

<u>Technologies</u>	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
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TRUEX/SREX	0
------------	---

TRUEX/SREX	0
------------	---

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00751: -	Y	N
	00747: A - Liquids	Y	N

Site Need Code: ID-2.1.55

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Technology Needs

Site Need Name: Sr Removal from High Activity Wastes

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Cost

Technologies

	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
TRUEX/SREX	0	
TRUEX/SREX	0	
Russian Separations - Cobalt Dicarbollide	0	
Russian Separations - Cobalt Dicarbollide	0	

Site Need Code: ID-2.1.56

Site Need Name: Mercury Treatment for Aluminum Calcine

Focus Area Work Package ID: WT-11-01

Focus Area Work Package: Constituent Separation and Analysis

Focus Area: TFA

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Risk Reduction

Technologies

	<u>Cost Savings (in thousands of dollars)</u>	<u>Range of Estimate</u>
TRUEX/SREX	0	
Mercury Removal Using General Electric Process		
Mercury Contamination - Separate and Remove Mercury using Polymer Filtration		
Mercury Separation from Mixed Waste by Combining ORNL KI/I2 Leaching with PNNL SAMMS Technology		
Mercury Contamination - Separate and Remove Mercury using Sorbent Process		

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Technology Needs

Related CCP Milestones

Site Need Code: ID-2.1.57
Site Need Name: Conditioning of HAW for Treatment
Focus Area Work Package ID:
Focus Area:
Benefits (Cost, Risk Reduction, Both): Risk Reduction

Related Waste Streams

00751: -

Agree?

Y

Change?

N

Technologies

High Activity Waste Forms and Processes

Cost Savings (in thousands of dollars)

0

Range of Estimate

Site Need Code: ID-2.1.58
Site Need Name: HAW Immobilization
Focus Area Work Package ID:
Focus Area:
Benefits (Cost, Risk Reduction, Both): Both

Focus Area Work Package:

Agree with Technology Link: N

Technologies

Vitrification of Ion Exchange Materials
 High Activity Waste Forms and Processes
 High Activity Waste Forms and Processes

Cost Savings (in thousands of dollars)

0

Range of Estimate

0

0

Related CCP Milestones

Related Waste Streams

00751: -

Agree?

Y

Change?

N

00747: A - Liquids

Y

N

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Technology Needs

Site Need Code: ID-2.1.62
Site Need Name: Acceptance Criteria for Bin Set Closure
Focus Area Work Package ID:
Focus Area:
Benefits (Cost, Risk Reduction, Both): Risk Reduction

Focus Area Work Package:
Agree with Technology Link: N

Technologies

Cost Savings (in thousands of dollars) Range of Estimate

Related CCP Milestones

Related Waste Streams

Agree? Change?

00751: - Y N

Site Need Code: ID-2.1.63
Site Need Name: Universal Solvent Process for TRU, Cs and Sr Removal
Focus Area Work Package ID:
Focus Area:
Benefits (Cost, Risk Reduction, Both): Cost

Focus Area Work Package:
Agree with Technology Link: N

Technologies

Cost Savings (in thousands of dollars) Range of Estimate

Cobalt Dicarbollide Development (U.S.)	1,000,000	Medium
Cobalt Dicarbollide Development (U.S.)	0	
Cobalt Dicarbollide Development (U.S.)	1,100,000	Medium
Russian Separations - Cobalt Dicarbollide	1,100,000	Medium
Russian Separations - Cobalt Dicarbollide	1,000,000	Medium
Russian Separations - Cobalt Dicarbollide	0	

Site Need Code: ID-S.2.04

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Technology Needs

Site Need Name: Physics and Chemistry of Plasma Processing

Focus Area Work Package ID: MW-06

Focus Area Work Package: Monitoring and Removing Hazardous and Radioactive Contaminants from Off Gas Streams

Focus Area: MWFA

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both):

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

Related CCP Milestones

Related Waste Streams

Agree?

Change?

02497: W2 - MTRU-Soil	Y	N
02488: T10 - LLW-Rubble/Debris	Y	N
00751: -	Y	N
00747: A - Liquids	Y	N
00784: A4 - LLW-Soil/Rubble/Debris	Y	N
00776: A2 - HAZ-Soil	Y	N
00780: A3 - LLW-Liquid	Y	N
02462: I8.1 - Treated MLLW	Y	N
02484: -	Y	N
02426: -	Y	N
02463: T3 - MLLW-Soil	Y	N
02486: -	Y	N
02489: -	Y	N
02492: T8 - HAZ-Soil	Y	N
02487: -	Y	N
02466: T4 - D&D MLLW-Rubble/Debris	Y	N

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<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	02469: O2 - MLLW-Liquid	Y	N
	02470: O2.1 - MLLW-Solids	Y	N
	02491: T7.1 - LLW-Soil	Y	N
	00734: AAD - Wet Aluminum Based SNF	Y	N
	00740: AAH - INTEC 603 Metallic Sodium Bonded	Y	N
	00716: AAA - TAN Wet Stainless Steel, Zirconium, & Misc SNF	Y	N
	00720: AAB - Wet Stainless Steel, Zirconium, & Misc SNF	Y	N
	02485: L3 - LLW-Soil	Y	N
	02464: L1 - HAZ-Soil	Y	N

Technology Deployments

<u>Deployment Status</u>	<u>Deployment Year</u>		
	<u>Planned</u>	<u>Forecast</u>	<u>Actual Date</u>
Technology Name: Low Activity Waste Forms			
Potential Deployment	2005		
Technology Name: Light Duty Utility Arm			
Deployment Commitment	1999		2/15/1999
Technology Name: INEEL HLW Processing			
Potential Deployment	2020		
Technology Name: TRUEX/SREX			
Potential Deployment	2020		

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Technology Deployments

<u>Deployment Status</u>	<u>Deployment Year</u>		
	<u>Planned</u>	<u>Forecast</u>	<u>Actual Date</u>
Technology Name: LDUA - Grab Sampler End Effector			
Deployment Commitment	1999		2/15/1999
Technology Name: Calcine Dissolution			
Potential Deployment	2020		
Technology Name: LDUA Stereo Viewing System			
Deployment Commitment	1999		
Technology Name: High Activity Waste Forms and Processes			
Potential Deployment	2020		
Technology Name: LDUA Tank Inspection End Effector (TMS#278)			
Deployment Commitment	1999		