Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Savannah River**

Print Date: **3/9/2000**

Site Summary Level: **Savannah River Site**

HQ ID: **0488**

Project **SR-NM02 / H-Area Stabilization Project**

General Project Information

Project Description Narratives

Purpose, Scope, and Technical Approach:

The sudden halt in nuclear materials production at the end of the Cold War suspended the manufacturing pipeline in a state that, for safety reasons, could not be allowed to remain uncorrected. Utilizing existing facilities, specifically designed for processing these legacy materials and with a proven history of safe operation, optimizes material stabilization. The general scope of this project is to convert (stabilize) certain "at risk" legacy nuclear materials to forms suitable for long term storage, transfer these materials to the designated storage location and prepare facilities for deactivation. DOE is evaluating the possibility of assigning additional material from other sites to SRS for stabilization, possibly extending the time line for this project.

The Secretary of Energy approved the operation of H-Area facilities (H-Canyon and HB-Line) for nuclear material stabilization in July 1997 as part of the Phased Canyon Strategy. Stabilization changes the form and/or storage conditions of the nuclear materials so they present minimal risk to workers, the public, and the environment. H-Area material stabilization began in 1996 and is projected for completion in FY 2006 for the currently identified materials. H-Area facilities will be operated in compliance with applicable laws, regulations, and DOE Orders and such that safety risks are less than the Department's safety goals and worker health and safety is protected.

Firm missions for H-Canyon and HB-Line include stabilization of 34,000 liters of Pu-239 bearing solutions, 230,000 liters of enriched uranium bearing solutions, 6,000 liters of neptunium solutions, 1,883 assemblies of SR fuels, 900 other aluminum-clad fuel rods and targets, and approximately 1,000 packages of plutonium and uranium vault materials. Scheduled for stabilization in H-Canyon is a limited quantity of spent nuclear fuel (Table 5.2-1 SNF) that will be difficult to dispose of in a geologic repository without extensive pre-treatment or reprocessing. A National Environmental Policy Act (NEPA) decision for the management of these fuels is planned following the completion of the SRS Spent Nuclear Fuel Management EIS. Actual stabilization of this fuel in H-Canyon would begin in FY 2000. Also scheduled are other SNF (Mk-14, Mk-42, etc.) and off-specification HEU alloy. A Record of Decision is required for the SNF and a TVA agreement is required for the HEU.

Also included in the scope is the safe Surveillance and Maintenance (S&M) of H-Canyon and HB-Line. S&M includes security, radiation protection, material control and accountability, training and certification of operations and maintenance personnel, essential safety system operation, emergency response capability, sampling and monitoring, configuration management, fire protection and maintenance of the Safety Authorization Basis, etc.

The surplus sections of "old" HB-Line facility will be maintained in a safe shutdown surveillance and maintenance mode until funding is available to develop the required (DOE Order 430.1) Deactivation Project Plan and to resume decontamination and deactivation.

Project Status in FY 2006:

Stabilization of all the materials currently assigned for processing in H-Area chemical separation facilities will be complete by the end of FY 2006. Stabilized plutonium has been transferred to FB-Line and 235-F vaults and diluted uranium solutions shipped to a contractor(s) for conversion to power reactor fuel. The conversion of the neptunium solution to oxide will be completed in FY 2006 and the oxide shipped off site in shielded containers for long-term storage or shielded and temporarily stored in F-Area vaults until APSF comes on line in FY 2006.

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Decisions leading to an Interagency Agreement between DOE and Tennessee Valley Authority (TVA) for transfer of the uranium solutions (and other off-spec HEU) are anticipated in 1999, at which time a firm schedule for blending down and shipping to a commercial facility will be finalized. SRS continues to evaluate alternative options for stabilization of HEU solutions in the event the anticipated TVA arrangement cannot be negotiated successfully.

If SRS has not been assigned any of the proposed or potential missions beyond the currently identified baseline program, as process areas complete their stabilization mission they will seamlessly transition to deactivation activities. Efforts will be made to complete the required deactivation planning for each process prior to completing operation but is dependent upon availability of funding. By 2006 any outstanding deactivation planning will be in progress and deactivation of some process areas may have begun if funding is available. If H-Area chemical separation facilities are assigned additional missions, facility operations would be significantly extended and final deactivation would be postponed until the additional stabilization mission(s) is completed.

Post-2006 Project Scope:

Post 2006 activities are highly dependent on the HEU stabilization option selected and when it is finalized. The assumption for this project is that the decision to dilute the HEU solutions and ship them to TVA is made in FY 1999. SR-NM02 project completion is projected for 2010. The stabilization mission will be complete. Facilities will be deinventoried and flushed. Deactivation planning will be complete and all the facilities will have seamlessly transitioned to deactivation activities. These facilities will them be transferred to the appropriate PtC project(s) for final deactivation and monitoring. The H-Area chemical separation facilities will move toward final decommissioning under these deactivation projects if additional stabilization or recovery missions are not assigned.

Project End State

The stabilization of the materials currently approved for H-Area chemical separation facilities will be complete. The facilities have been deinventoried, flushed and transferred to the appropriate deactivation and monitoring project(s). This will mark the end of the H-Area Stabilization Project.

Cost Baseline Comments:

Historical actual costs form the basis for estimating the costs for this project. FY 1999 and 2000 funding limitations extended the HB-Line Phase II start up schedule. Phase II operation is necessary to stabilize the existing plutonium and neptunium solutions in H-Canyon. This delay has extended the completion date for this project. The FY 1999 project funding assumes Congress approves a request to reprogram $44M from SR-NM03 APSF by the end of June 1999. Ten million of this $44M will be used to recover some of the schedule slippage in HB-Line Phase II restart. The proposed H-Area Stabilization Project funding supports the safe Surveillance and Maintenance of H-Canyon and HB-Line and progress toward the stabilization of "at risk" nuclear materials per DOE's Implementation Plan for the DNFSB's 94-1 Recommendations and the seamless transition to deactivation activities upon completion of material stabilization. Various Capital Equipment (CE) and General Plant Projects (GPP) will be funded in support of H-Area S & M and stabilization programs. However, Capital Project funding in FY 1999-2001 is not sufficient to support the desired level of capability assurance.

If the funding levels of this or related projects (SR-NM01 and/or SR-NM03) are reduced from the requested levels, the scope and commitment dates

Project Description Narratives

may not be achievable. The current funding level for this project may not support scope or milestone commitments made under previous requests. Operation of H Canyon and HB Line is not assured for all of FY 2001 at the allocated target funding level.

Highly enriched uranium (HEU) solution is a product of the stabilization of spent nuclear fuels (SNF) in H-Canyon. There are 60,000 gallons of HEU in H-Canyon inventory. Additional HEU storage is necessary to maintain the DNFSB 94-1 Implementation Plan (IP) schedule for stabilization of the remaining SNF, primarily Mk16-22s, until the disposition path for the HEU is finalized. The $10 million need for a FY 2001 project for this has not been included in the planning for this PBS due to insufficient funding. If alternatives that for storing HEU that do not required additional funding can not be found, this additional funding will be required in FY 2001 to maintain the DNFSB IP schedules.

Additional facilities are required at SRS for the proposed TVA HEU Blend Program. Eighteen ($18) million is needed in FY 2000 and $7M in FY 2001 for installation of equipment at SRS to blend, sample, load, safeguard and ship the LEU solution to the TVA vendor. LEU solution shipments are scheduled to begin in 2001 and end in 2003as stated in Revision 1 of the 94-1 IP. This $25 million is suppose to be provided by the DOE Material Disposition Program (MD) and has not been included in this project's funding profile. If MD does not provide this funding, the EM funding request on this project must increase by $25M to support the DNFSB stabilization program IP.

The full cost of PBS work scope may change based on the authorized funding and priorities in any given year due to changes in site overhead assumptions. For planning and budgeting purposes, work scope costs were estimated using site overhead rates sized for clearance at a funding target of $1222.5 million. For FY 2001 (the budget year), the site overhead is applied and cleared at the funding target, while the work scope below the funding target (planning level) is incremental direct cost. For FY 2002 and beyond, the site overhead is applied and cleared over the total planning level of scope.

Safety & Health Hazards:

The DNFSB issued Recommendation 94-1 on May 26, 1994. Specifically, the DNFSB expressed safety and health concerns associated with the liquids and solids containing fissile materials trapped in spent fuel storage pools, reactor basins, reprocessing canyons, and various other facilities at SRS and other DOE sites by the sudden halt in the production. Many of these materials are packaged in configurations that are not suitable for extended storage. Other materials remain in the processing systems where they were when production stopped. These materials pose a number of potential hazards if not handled and stored properly including criticality, the spread of radioactive contamination and exposure of workers to radiation. The DOE submitted its Implementation Plan (IP) for the Remediation of Nuclear Materials in the Defense Nuclear Facilities Complex on February 28, 1995 and updated it on December 22, 1998. The IP calls for the conversion of the "at risk" nuclear materials to forms suitable for extended storage and the packaging of these materials to conform to DOE Standards.

Safety & Health Work Performance:

The SRS Integrated Management System describes activities and checkpoints for control of work. The conditions and requirements are clearly established and agreed upon prior to the starting of any project and those requirements are contractually binding upon WSRC. WSRC uses the Integrated Safety Management System (ISMS). The key elements of ISMS are to define the scope of work, identify and analyze hazards associated with the work, develop and implement hazard controls, perform work within controls, and provide feedback on adequacy of controls and continue to improve safety management. The WSRC Integrated Procedures Management System is the primary mechanism for implementing the objective, principles and functions of the Integrated Safety Management System. This system establishes Company-Level, Division-level, and Program-specific

Project Description Narratives

procedures consistent with organizational roles, and ensures a consistent, discipline site-wide approach to safety while performing work.

PBS Comments:

The chemical re-processing facilities covered by this project are located in H-Area. Chemical separation and stabilization of these legacy nuclear materials are accomplished in facilities known as canyons, which are supported by ancillary facilities that provide further chemical conversion, cold chemical feeds, or general facility services. The facilities covered by this project are: H-Canyon, HB-Line and its supporting facilities. Under this project, H-Area facilities will complete their currently supported role in the stabilization of identified "at risk" nuclear materials by the end of FY2004. At the present time, there are no additional missions authorized for these facilities. Proposed or potential missions are being reviewed and evaluated. Options being explored include the future disposition of fissile material and the support of continuing defense programs. Pending no future missions the facilities will transition to Long Term Monitoring in FY06. The guiding principles for execution of this project are to manage and eliminate the most serious risks, protect workers' health and safety during operation, minimize generation of waste, create a collaborative relationship between DOE and its regulator and stakeholders, focus technology development on cost and risk reduction, and strengthen management and fiscal control. Material stabilization activities will be performed in accordance with the Phased Canyon Strategy as approved by the Secretary of Energy on July 17, 1997. The schedule for the H-Canyon and supporting facilities includes the following key activities:
1997 - Deinventory HB-Line vault. Receive depleted uranium solutions from F Area. Initiate stabilization of uranium bearing materials.
1998 -Continue to receive DU from F-Canyon for blend down. Begin blend down process for HEU to LEU. Continue stabilization of uranium bearing materials. Begin stabilization of miscellaneous Pu material.
1999 - Continue to receive DU solutions from F Area. Continue HEU blend down effort. Continue stabilization of uranium bearing materials, and miscellaneous Pu material.
2000 - Continue to receive DU solutions from F Area. Continue to blend down HEU to LEU levels. Continue stabilization of uranium bearing materials, and miscellaneous Pu material. Begin stabilization of Np solutions.
2001 - Complete transfer of DU solutions from F Area. Complete blend down of HEU. Continue stabilization of miscellaneous Pu material and Np solutions. Complete the stabilization of uranium bearing materials.
2002 - Continue stabilization of Pu materials and Np solutions.
2003 - Complete stabilization of Pu materials and continue stabilization of Np solutions.
2004 - Complete stabilization of Np solutions.
2005 - Place facilities in a safe condition that supports LTS&M, deactivation planning or supplemental mission activities.
2006 - Transfer to Long Term Monitoring Project.

Baseline Validation Narrative:

An internal SRS validation is scheduled for the spring of 1999. A DOE-HQ validation is anticipated in the next couple of years.

General PBS Information

Project Validated? **Date Validated:**

Has Headquarters reviewed and approved project? No

Date Project was Added: 12/1/1997

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General PBS Information

Baseline Submission Date: 7/3/1999

FEDPLAN Project? Yes

Drivers:

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

Project Identification Information

DOE Project Manager: Gordon M. Nichols, Jr.

DOE Project Manager Phone Number: 803-952-2021

DOE Project Manager Fax Number: 803-952-2495

DOE Project Manager e-mail address: gordon.nichols@srs.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)	1,635,476	0	1,635,476	136,113	136,113	142,149	142,149	141,672	155,813	168,529	173,100	177,800	182,600	175,900	181,800
PBS Baseline (constant 1999 dollars)	1,494,096	0	1,494,096	136,113	136,113	142,149	142,149	141,672	150,399	157,020	157,039	157,062	157,062	147,321	148,259
PBS EM Baseline (current year dollars)	1,635,476	0	1,635,476	136,113	136,113	142,149	142,149	141,672	155,813	168,529	173,100	177,800	182,600	175,900	181,800
PBS EM Baseline (constant 1999 dollars)	1,494,096	0	1,494,096	136,113	136,113	142,149	142,149	141,672	150,399	157,020	157,039	157,062	157,062	147,321	148,259

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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	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)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PBS Baseline (constant 1999 dollars)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PBS EM Baseline (current year dollars)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PBS EM Baseline (constant 1999 dollars)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Baseline Escalation Rates

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0.00%	0.00%	0.00%	3.60%	3.60%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	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: 9/30/2005

Current Projected End Date of Project: 9/30/2006

Explanation of Project Completion Date Difference (if applicable):

Insufficient FY1999 & 2000 funding allocations and low FY2001-2006 funding targets have and/or will delay the restart of equipment necessary to complete this stabilization project, extending project completion by a year. It has been assumed that FY2001 funding for SRS will exceed the proposed target cap. If this assumption proves to be incorrect then the LCC of this project will increase even more. Also a shift in the stabilization method for highly enriched uranium solution in cooperation with TVA has added to the project.

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Project **SR-NM02 / H-Area Stabilization Project**

Project Reconciliation

Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	1,289,751	**Actual 1997 Cost:**	136,113	**Actual 1998 Cost:**	142,149
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	1,011,489	**Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):**			27,310
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	1,038,799				

Project Cost Changes

	Cost Adjustments	Reconciliation Narratives
Cost Change Due to Scope Deletions (-):		
Cost Reductions Due to Efficiencies (-):		
Cost Associated with New Scope (+):	35,000	Blending HEU solution with material from offsite prior to shipping to TVA.
Cost Growth Associated with Scope Previously Reported (+):	142,035	LCC due to funding forced delays in the restart of stabilization process.
Cost Reductions Due to Science & Technology Efficiencies (-):		Utilization of existing facilities with adaptations to material type, and process efficiencies.
Subtotal:	1,215,834	
Additional Amount to Reconcile (+):	0	
Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	**1,215,834**	

Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Begin stabilization of H-Canyon Pu solution.	SR-NM02		10/1/1999		7/31/2001			Y			
Complete Mk-16/22s dissolution.	SR-NM02-004		9/30/2002					Y			
Complete processing H-Canyon Pu solution.	SR-NM02-003		6/30/2002		6/30/2002			Y			
Complete Np solution conversion to oxide.	SR-NM02-007		12/31/2005		12/31/2005			Y			
Decision on Canyon Use for Backup Stabilization	SR-NM02		4/1/1999								
Decision on Pretreatment for Pu Disposition	SR-NM0X		4/1/1999								

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Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Decision on Pu Disposition (MOX / Immobilization)	SR-NM0X-002		12/1/1998			12/22/1998					
Project SR-NM02 Mission Complete.	SR-NM02-099		9/30/2006								
Pu Residue Stabilization Complete	SR-NM02		9/30/2004								
Stabilize all remaining Pu residues	SR-NM02		2/1/2003					Y			
Start up HB-Line Phase II	SR-NM02-002		6/30/2001		7/31/2001						
H-Area Stabilization Project: Complete charging K14.1 Mk 22 fuel in H-Canyon.	SR-NM02		9/30/1999						Y		
Complete dissolving miscellaneous fuels/targets.	SR-NM02-005		12/31/2002								
Begin SR-NM02 H-Area Stabilization Project	SR-NM02-001		10/1/1996								
Complete disposition of existing & Mk-16/22 HEU Solutions.	SR-NM02-006		12/31/2003					Y			

Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critial Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Begin stabilization of H-Canyon Pu solution.	SR-NM02									Y	Conversion of Pu solutions currently held in 221-H
Complete Mk-16/22s dissolution.	SR-NM02-004										All MK16 and MK22 assemblies identified as "at risk" by the DNFSB will have been charged to a disolver. SEG milestone = NMP02. DNFSB IP milestone = 208. Wording changed to match Field Office.
Complete processing H-Canyon Pu solution.	SR-NM02-003										Conversion to oxide of 34,000 liters of Pu solution held in 221-H will have been completed. SEG milestone = NMP01. DNFSB IP milestone = 201.

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Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critial Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
											Wording changed to match that of DNFSB milestone.
Complete Np solution conversion to oxide.	SR-NM02-007		Y				4	5	5		Conversion to oxide of Np solution currently held
Decision on Canyon Use for Backup Stabilization	SR-NM02		Y				3	4	4	Y	Scope uncertain.
Decision on Pretreatment for Pu Disposition	SR-NM0X									Y	Scope uncertain.
Decision on Pu Disposition (MOX / Immobilization)	SR-NM0X-002		Y				4	3	3	Y	Scope uncertain and no longer covered under this P
Project SR-NM02 Mission Complete.	SR-NM02-099				Y						Scope of the SR-NM02 H-Area Stabilization project will have been completed. No SEG milestone.
Pu Residue Stabilization Complete	SR-NM02		Y				3	2	2	Y	Stabilization of selected Pu residues by conversio
Stabilize all remaining Pu residues	SR-NM02									Y	Remaining Pu residues will have been stabilized by
Start up HB-Line Phase II	SR-NM02-002										Complete startup preparations and site reviews (i.e., 12Q) for commencement of operations in HBL Phase II. Does not include DOE permission to restart. The scope of this milestone is dependent on reprogramming of funds from the APSF line item by June of
H-Area Stabilization Project: Complete charging K14.1 Mk 22 fuel in H-Canyon.	SR-NM02									Y	MK22s from the K14.1 reactor charge will have been
Complete dissolving miscellaneous fuels/targets.	SR-NM02-005										All "miscellaneous fuels and targets" identified b

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Project **SR-NM02 / H-Area Stabilization Project**

Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critial Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Begin SR-NM02 H-Area Stabilization Project	SR-NM02-001			Y							Initiation of the scope of the H-Area stabilization project. No SEG milestone.
Complete disposition of existing & Mk-16/22 HEU Solutions.	SR-NM02-006										230,000 liters of HEU solutions currently held in 221-H and identified as "at risk" by the DNFSB will be stabilized along with the HEU generated from dissolving Mk-16/22 fuel. DNFSB 94-1 Milestone 207

Technology Needs

Site Need Code: SR99-5006

Site Need Name: Hydrogen Gas Measurement in Remote Nitric Acid Atmospheres

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Both

Technologies	Cost Savings (in thousands of dollars)	Range of Estimate

Technology Needs

Site Need Code: SR99-5009

Site Need Name: Containers for Neptunium Oxide Loadout and Shipment to APSF

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

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

Benefits (Cost, Risk Reduction, Both): Both

Technologies	Cost Savings (in thousands of dollars)	Range of Estimate

Site Need Code: SR99-5019

Site Need Name: Prevention of the Precipitation of Unwanted Solids during Canyon Dissolution

Focus Area Work Package ID: Pu-02-Stabilization **Focus Area Work Package:** Miscellanous Pu Residue Stabilization and Disposition

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

Benefits (Cost, Risk Reduction, Both): Both

Technologies	Cost Savings (in thousands of dollars)	Range of Estimate

Site Need Code: SR99-5020

Site Need Name: Dissolution of Plutonium Metal with Minimal Hydrogen Generation

Focus Area Work Package ID: Pu-02-Stabilization **Focus Area Work Package:** Miscellanous Pu Residue Stabilization and Disposition

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

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

Technologies	Cost Savings (in thousands of dollars)	Range of Estimate

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Project **SR-NM02 / H-Area Stabilization Project**

Technology Needs

Site Need Code: SR99-5021

Site Need Name: Removal of Fluoride Ion from Acid Solutions for Recycle and Reduction of Waste Volume

Focus Area Work Package ID: Pu-02-Stabilization **Focus Area Work Package:** Miscellanous Pu Residue Stabilization and Disposition

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

Benefits (Cost, Risk Reduction, Both): Cost

Technologies	Cost Savings (in thousands of dollars)	Range of Estimate