

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Rocky Flats**

Site Summary Level: **Rocky Flats Environmental Technology Site**

Project **RF010 / Pu Liquid Stabilization**

Report Number: **GEN-01b**

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

HQ ID: **0343**

General Project Information

Project Description Narratives

Purpose, Scope, and Technical Approach:

Purpose: The presence of actinide solution in process equipment in certain facilities creates an increasing safety risk due to the age and condition of the process equipment. The presence of these residue liquids also causes hydrogen generation, which requires mitigation. These risks were addressed by the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1. In addition, the solutions are hazardous waste subject to the Resource Conservation and Recovery Act (RCRA) which is regulated by the Colorado Department of Public Health and Environment (CDPHE). CDPHE's jurisdiction was documented in the Settlement Agreement and Compliance Order on Consent No. 93-04-23-01 (Mixed Residue Consent Order).

In response to DNFSB Recommendation 94-1 and the Mixed Residue Consent Order, the Liquid Stabilization Program's scope includes the tasks outlined in the Site Integrated Stabilization Management Plan (SISMP, Version 7.0), the Mixed Residue Tank Systems Management Plan (required by the Mixed Residue Consent Order and updated annually), and the Mixed Residue Reduction Report (also required by the Mixed Residue Consent Order and updated quarterly). Liquid stabilization involves the liquid removal from tanks, piping, and other containers stored in Buildings 371, 559, 771, 776/777, and 779; processing of the liquids to convert them to various forms for safe interim storage; mitigation of hydrogen in tanks; and mixed residue RCRA tank closure support. The Liquid Stabilization Program is implemented in compliance with DOE orders, environmental regulations, and established plant safety systems.

The Liquid Stabilization Project determines where the processes developed for actinide solution removal will be required to support residue stabilization, waste processing, RCRA closure activities, or other programs, and will provide support of DNFSB activities and other regulatory agencies, including programmatic updates as required.

The commitment to the DNFSB was to have the liquids in Building 771 removed by September 30, 1998, and the liquids from Buildings 371 and 771 treated by June 30, 1999. Liquid removal in Building 771 has been combined with deactivation activities and is no longer part of Liquid Stabilization. Backlog liquids from Buildings 559, 776/777, and 779 will have been transported to either Building 371 or Building 771 and processed.

Additionally, the Liquid Stabilization Project directly supports the Rocky Flats Cleanup Agreement (RFCA) Vision in that the project is dispositioning actinide liquid waste in an accelerated manner that does not pose an unacceptable risk to the public or workers.

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In FY99, a revised baseline was approved to drain actinide liquids only and a reduction in the number of HCA Rooms requiring decon (fogging/Instacote). This scope change transferred the draining of non-actinide and any applicable deconning of HCA Rooms to support deactivation to PBS 16.

Scope: The Liquid Stabilization Project includes the following:

- Drain 23 tanks in B771 for a total of approximately 3,000 liters of plutonium and uranium solutions.
- Drain approximately 3,100 liters from rooms (operationally empty tanks and piping systems) in B771 (Now part of B771 deactivation).
- Drain eight tanks in B371 for a total of approximately 8,500 liters of plutonium solutions.
- Drain approximately 12,300 liters from rooms (operationally empty tanks and piping systems) in B371.
- Process 300 liters of uranium solutions through hydroxide precipitation in B771.
- Process approximately 21,550 liters of plutonium solutions (plus water generated as part of room decontamination and solution generated from wet combustible residue processing through June 1999) through the Caustic Waste Treatment Systems (CWTS) in B371.
- Process approximately 10,900 liters of backlog and newly generated solutions in bottles, solutions from tank draining, hydroxide precipitation filtrate, and resins through the bottle box.
- Assay multiple cans of plutonium oxide and multiple cans of magnesium uranates.
- Sample 84 tanks and piping systems for excess hydrogen gas.
- Purge 28 tanks and piping systems of excess hydrogen gas.

Raschig ring and sludge removal from mixed residue tanks in Building 771, 776/777, 707, and 371 was originally included in this scope. Further definition of deactivation activities has determined that the scope is more appropriately included in deactivation.

Once the mixed residue tanks are physically empty, they are ready for deactivation and will be handled by the Cluster projects for Buildings 771, 371, 776/777, and 707.

Technical Approach: As stated previously, the Liquid Stabilization Project is comprised of liquid removal, liquid processing, hydrogen mitigation, and mixed residue RCRA tanks closure support. The processes used for the Liquid Stabilization Project are based on existing processes and proven

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technologies. While specific operating parameters need to be established, major technology development is not required to support the program success.

Project Status in FY 2006:

This project will be completed.

Post-2006 Project Scope:

No activities are currently scheduled to occur after 2006 for this project.

Project End State

The project objective is that the final waste forms meet LDR criteria and WIPP WAC. However, the Liquid Stabilization Project does not take each stream to its ultimate end state. As described CWTS filtrate and bottlebox drums will be transferred to the Waste Management Project PBS 2. CWTS filtrate will be further treated in Building 374 and bottlebox drums require certification of meeting WIPP WAC. The precipitates will have been calcined and assayed prior to transfer to the SNM Consolidation PBS 6. However, they will require additional stabilization prior to offsite shipment.

In FY99, a revised baseline was approved as to drain the actinide liquids only and a reduction in the number of HCA Rooms requiring decon (fogging/Instacote). This scope change transferred the draining of non-actinide and any applicable deconning of HCA Rooms to support deactivation PBS 16.

The draining of all actinide liquids will complete in FY99. The intent is to close PBS 10 at the end of FY99.

Cost Baseline Comments:

Cost estimates are based on assumptions and data developed by the technical groups that have responsibility for managing the work. To the extent practical, all cost estimates are Activity-Based Costs (ABC) and tied directly to a defined and detailed work scope. The estimates are developed at the activity level and are further divided into line items. Line items represent individual resource contributions to activities and are the lowest level of input to the planning system. Once the cost estimate is developed, each activity is evaluated for cost, technical and schedule risk and the appropriate contingency is determined. Detailed estimates and the basis of estimates (BOEs) for the 2006 Closure Plan are available at the Site.

Safety & Health Hazards:

The principle hazards in the Pu Liquid Stabilization Project are radiological, criticality, hydrogen, chemical, and other standard industrial hazards commonly found in Pu buildings at RFETS. Most of these hazards will exist throughout the project and are related to SNM material movement, maintenance, surveillance, inspection, tank draining, liquid stabilization and processing in CWTS, bottle and drum handling, tap and drain operations, packaging, and storage. These hazards will be analyzed and categorized in accordance with the RFETS Safety and Health Program infrastructure policies, manuals, and procedures.

Safety & Health Work Performance:

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This project will be completed within the RFETS Safety and Health Program and within the controls and authorization basis documents defined above to ensure the safety and health of the worker, public and the environment. RFETS has implemented an integrated safety management system consisting of the following elements: radiological safety, criticality safety, emergency management, fire safety, industrial hygiene, nuclear safety, occupational medicine, occupational safety, safeguards and security, safety integration, performance oversight, and standards management. RFETS provides site wide infrastructure programs for each functional area to establish consistent safety standards and support for this project. Safety and health success results from the efficient and effective implementation of these programs. This project is responsible for ensuring that the necessary elements of the safety and health programs are incorporated into the specific project plans and implementing documents, and that an appropriate Readiness Determination and Safety Evaluation Screen (SES)/Unreviewed Safety Question Determination (USQD) have been performed.

PBS Comments:

The Liquid Stabilization Project is one of the highest-priority risk-reduction activity at RFETS. This project has been accelerated to the maximum extent possible and DNFSB commitments will be completed in June 1999. RCRA closure support activities will remain and will be completed as funding allows.

Baseline Validation Narrative:

Although the 2006 Closure Plan has not been officially validated, it has undergone a high level review by Rocky Flats Field Office (RFFO) and Headquarter personnel. Current independent validation efforts include the following: 1) RFFO has contracted an independent firm to perform a baseline confidence review of the 2006 Closure Plan by the end of FY99, and 2) the Office of Field Management (FM) has contracted a big-five accounting firm to validate the 2006 Closure Plan.

In addition to the 2006 Closure Plan validation efforts, results/recommendations from several previous baseline validation efforts were used in the development of the 2006 Closure Plan. These validations included: 1) The U.S. Army Corps of Engineers (USACE) performed a validation of the Rocky Flats Ten Year Plan in FY97/FY98, 2) Kaiser-Hill contracted Price Waterhouse Coopers, LLP to conduct an independent validation effort of the 2010 Closure Project Baseline that concluded in May of FY99, and 3) Kaiser-Hill engaged Arthur Andersen, LLP to conduct a schedule and cost risk review of the 2010 Closure Project Baseline.

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

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General PBS Information

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

Project Identification Information

DOE Project Manager: Jessie Roberson

DOE Project Manager Phone Number: 303-966-2263

DOE Project Manager Fax Number: 303-966-4775

DOE Project Manager e-mail address: ten.year.plan@rfets.gov

Is this a High Visibility Project (Y/N):

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)	28,685	0	28,685	11,122	11,122	11,923		5,640	0	0	0	0	0	0	0	
PBS Baseline (constant 1999 dollars)	28,685	0	28,685	11,122	11,122	11,923		5,640	0	0	0	0	0	0	0	
PBS EM Baseline (current year dollars)	28,685	0	28,685	11,122	11,122	11,923		5,640	0	0	0	0	0	0	0	
PBS EM Baseline (constant 1999 dollars)	28,685	0	28,685	11,122	11,122	11,923		5,640	0	0	0	0	0	0	0	
	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

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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 (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%	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: 9/30/1999

Current Projected End Date of Project: 9/30/1999

Explanation of Project Completion Date Difference (if applicable):

Scope Deletion

Efficiencies

New Scope

Cost Growth

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Project Reconciliation

Science & Technology

Other

The scope of work and end state conditions for the 2006 Plan are similar to the current 2010 Baseline, with a four-year acceleration and a reduction in cost being the two most significant differences. The bottom-up estimate for the 2006 Plan is a \$1.65 billion improvement over the comparable activity-based bottoms-up detail estimate for 2010.

To close the Site four years earlier than the current 2010 Baseline requires a strategically different approach. The two key principles followed in preparing the 2006 Baseline were: 1) safely reducing the urgent risks first, and 2) performing work in a sequence that reduces or eliminates operations, maintenance and security costs (often referred to as - mortgage costs) as early as possible. Key to the 2006 Baseline approach is early closure of the secured Protected Area. Closing the Protected Area as soon as possible means that the high security and maintenance costs for this area can be redeployed to accelerate other closure activities. In addition, D&D and SNM risk reduction activities will be performed simultaneously rather than sequentially, supporting both the risk reduction and mortgage reduction principles. The D&D of non- and lower-contaminated facilities and most environmental remediation work will be deferred until later in the project to allow resources to be focused in the areas that result in the greatest reduction in risks and mortgage costs.

Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	41,496	Actual 1997 Cost:	11,122	Actual 1998 Cost:	
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	30,374	Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):		820	
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	31,194				

Project Cost Changes

	Cost Adjustments	Reconciliation Narratives
Cost Change Due to Scope Deletions (-):		
Cost Reductions Due to Efficiencies (-):		
Cost Associated with New Scope (+):	21,489	Rebaselining due to acceleration. New scope dollar estimate is not of audit quality.
Cost Growth Associated with Scope Previously Reported (+):		
Cost Reductions Due to Science & Technology Efficiencies (-):		
Subtotal:	52,683	
Additional Amount to Reconcile (+):	-47,043	
Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	5,640	

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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
IP-309 - Compl Stab. Ion Exch. Resins by 3/31/99	RF-0217		3/31/1999		3/31/1999			Y			
FY00-T6 COMPLETE B371 ROOM DRAINING	RF-0326		6/21/1999	6/21/1999	6/21/1999		Y				
IP - 301 B371 Complete Drain/Proc All Liquids	RF-0328		6/30/1999		6/30/1999			Y			
IP3.1-006(D) Complete Drain Critical Tanks B371	RF-0331		2/23/1998		2/23/1998			Y			
IP3.1-006(G) Cmpl Process Liquids From B771	RF-0332		12/23/1997		12/23/1997			Y			
IP3.1-006(F) B371 Start Tap/Drain of Rooms/Syst	RF-0333		6/30/1998		6/30/1998			Y			
IP3.1-005(E) Complete Drain B771 Hi Level Tanks	RF-0334		12/23/1997		12/23/1997			Y			
IP3.1-005(F) B371 Start Tap/Drain of Rooms/Syst	RF-0335		1/30/1998		1/30/1998			Y			
IP3.1-005(D) B771 Start Drain 4 Hi Level Tanks	RF-0336		10/6/1997		10/6/1997			Y			
Cmpl B774 Bottle Box Ops & Batch Transport	RF-0362		3/31/1999		3/31/1999						
Complete PBD 010 - Pu Liquid Stabilization Proj	RF-OTHE-10		9/30/1999		9/30/1999					Y	
PBD 010 Project Start			10/1/1997								

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
IP-309 - Compl Stab. Ion Exch. Resins by 3/31/99	RF-0217										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
FY00-T6 COMPLETE B371 ROOM DRAINING	RF-0326										Rocky Flats Clean-up Agreement (RFCAs) Milestones
IP - 301 B371 Complete Drain/Proc All Liquids	RF-0328										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
IP3.1-006(D) Complete Drain Critical Tanks B371	RF-0331										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
IP3.1-006(G) Cmpl Process	RF-0332										Defense Nuclear Facility Safety

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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
Liquids From B771											Board (DNFSBs) Milestones
IP3.1-006(F) B371 Start Tap/Drain of Rooms/Syst	RF-0333										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
IP3.1-005(E) Complete Drain B771 Hi Level Tanks	RF-0334										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
IP3.1-005(F) B371 Start Tap/Drain of Rooms/Syst	RF-0335										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
IP3.1-005(D) B771 Start Drain 4 Hi Level Tanks	RF-0336										Defense Nuclear Facility Safety Board (DNFSBs) Milestones
Cmpl B774 Bottle Box Ops & Batch Transport	RF-0362	Y									Kaiser Hill Internal (KHIs) Milestones
Complete PBD 010 - Pu Liquid Stabilization Proj	RF-OTHE-10				Y	Y					Kaiser Hill Internal (KHIs) Milestones
PBD 010 Project Start				Y							PBD 010 Project Start

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
NM														
Stabilized - Pu Sol.	L	0.00	0.00	0.00	0.00		0.00							
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
NM														
Stabilized - Pu Sol.	L													

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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
NM										
Stabilized - Pu Sol.	L									3,035.00