

# *Project Baseline Summary Report*

Data Source: **EM CDB**

Operations/Field Office: **Savannah River**

Site Summary Level: **Savannah River Site**

Project **SR-HL07 / Effluent Treatment Facility**

Report Number: **GEN-01b**

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

HQ ID: **0042**

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## **General Project Information**

### **Project Description Narratives**

#### **Purpose, Scope, and Technical Approach:**

##### **Purpose:**

The Effluent Treatment Facility (ETF) collects, treats, and discharges radioactively and chemically contaminated waste water ( primarily evaporator overheads ) from the High Level Waste Division ( i.e. Tank Farm Evaporators ) and also from the Nuclear Materials Stabilization & Storage Division. Additional sources of wastewater include the blowdown water from the Consolidated Incinerator Facility, and sample water from Environmental Restoration wells. The ETF process " splits" the influent wastewater into two streams: the high volume " treated effluent", and the low volume " waste concentrate".

The ETF treatment plant decontaminates the influent wastewater through a series of steps consisting of pH adjustment, sub micron filtration, heavy metal ion exchange, organic removal, reverse osmosis, and polishing ion exchange. Various chemicals are added to the process to restore process efficiency. ( filter cleaning solutions, ion exchange regeneration, etc.) After the treatment steps remove specific contaminants, the treated effluent is analyzed and released to the environment through a National Pollution Discharge Elimination System ( NPDES ) permitted outfall. The contaminants removed by the treatment process are further concentrated through evaporation. The ETF evaporator bottoms are pH adjusted, then sent to H Area Tank 50 for storage before eventual disposal in the Saltstone facility.

ETF is also responsible for the operation of two 6 million-gallon retention basins, and two 2 million-gallon Cooling Water collection basins. Activities associated with these basins include the collection, sampling, analyses, and release of storm water and cooling water from both High Level Waste and Nuclear Materials Stabilization and Storage Division facilities.

##### **Scope:**

##### **Scope includes:**

- 24 hour surveillance, monitoring, inspection, and maintenance of the ETF facility, 2 cooling water basins, 2 retention basins, numerous piping and pumping systems.
- 24 hour manning of the ETF Control Room
- Receipt and processing of routine and peak transfers of wastewater to support the safe operation of the Separations Areas (whether material processing is being accomplished or not) as well as Tank Farm Evaporator operations.
- Support unloading and treatment of purge water from Site well sampling
- Discharge approximately 18 million gallons ( based on estimated influent feed) of treated water to site streams
- Transfer approximately 150,000 to 300,000 gallons of concentrated contaminants to H Area Tank 50 for eventual disposal in the Saltstone facility (Project SR-HL08).
- Support unloading and treatment of Consolidated Incinerator Facility (CIF) Blowdown water.
- Critical maintenance activities include: predictive, preventive, and corrective maintenance, troubleshooting, rigging and heavy equipment support,

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## **Project Description Narratives**

excavations, and facility outage scheduling.

### Technical Approach:

The key technologies used at the Effluent Treatment Facility are:

- Filtration
- Reverse Osmosis
- Ion Exchange
- Evaporation
- Chemical Additions
- Activated Carbon Organic Removal

### Technology Needs:

The Effluent Treatment Facility (ETF) uses activated carbon columns to remove organics from wastewater prior to discharge at a permitted outfall. After breakthrough of a carbon column occurs, the old column is removed and replaced with a new one. Currently, the old carbon columns, including both the container and media, are not reused and must be disposed of as low-level waste. However, disposal of the carbon beds in the SRS LLW vaults may not be possible because of a high concentration of iodine-129 in the carbon. SR99-1016 identifies a need to either remove the carbon for regeneration and iodine removal, or replacement of the carbon with an alternative technology. An improved organics removal technology for wastewater treatment can provide a potential cost saving of \$100,000 per year.

Norton cross flow filters are used at ETF to provide suspended solids removal from wastewater. These filters cannot maintain the design flow capacity of 100 GPM because fouling causes a decrease in water flow rate. This results in frequent chemical cleanings and increases maintenance and operating costs. The poor filter performance also limits the ETF wastewater treatment capacity. SR99-1020 identifies a need to improve the performance of the ETF filtration system and can provide a potential cost saving of \$50,000 per year.

The existing processing program results in the concentrated contaminants from the process being transferred to H Area Tank 50 for eventual disposal in the Saltstone facility. New technology will be needed to process concentrated contaminants coming from ETF; CIF; ER; facilities that will go directly to Saltstone.

### **Project Status in FY 2006:**

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## Project Description Narratives

- ETF will have processed up to 180 million gallons of wastewater ( depending on feed) in support of continued Tank Farm, Canyon, and other specific customer needs.
- ETF will continue to utilize cross-trained personnel to support Waste Sorting activities and ETF processing.
- ETF will have replaced the Nitric Acid process piping
- ETF will have modified the Organic Removal Carbon system.
- ETF will have replaced one Cooling Water Basin liner.

### Post-2006 Project Scope:

- ETF will operate as required to support continued Canyon, Tank Farm and other specific customer needs.
- ETF will process up to 324 million gallons of wastewater ( depending on feed) by the end of FY 28.
- ETF will support cleanup commitments from Canyons and Tank Farms for streams that are sent to the Cooling Water and Retention Basins.
- ETF will support site facility D & D efforts by treating liquid residues from site programs and operations.
- ETF will repair or replace basin liners in support of continued operations

### Project End State

The project will end in FY28 when all Tank Farm and Canyon closure activities, including stormwater system decontamination, are completed. After ETF has completed its mission, ETF disposition will be implemented with minimal maintenance costs that are assumed each year for long term monitoring of the facility. Deactivation and disposition of ETF will be carried out in accordance with PBS FA-25. Future waste monitoring will be maintained by a subcontract that will support site requirements as necessary for the long term.

### Cost Baseline Comments:

Note: This narrative describes the major changes from year to year in this project.

FY97 - In December 1996, the High Level Waste Program, in taking on a major management challenge to further reduce operating costs, implemented a \$1.3 million productivity improvement for FY97 and an additional \$1.3 million productivity improvement for FY98. These combined savings are included in the estimates for each year through FY28 when the facility is removed from service. Escalation is assumed for each year of the project.

FY98: Operating costs are reduced \$1.3 million for productivity improvements. Pension contributions in the amount of \$0.6 million will resume after several years in which pension payments were paid out of a separate DOE fund, which had resulted from over funding of the pension fund in previous years. FY99-00: A required DCS upgrade project is scheduled for FY99-00 at a total cost of \$3.0 million. Redesign of the existing Organic Removal Carbon Columns and implementation of the new design is scheduled for FY99-00 at an estimated cost of \$0.4 million. FY01-FY27: Periodic replacement of basin liners scheduled throughout the life of the project. No further substantive changes in the project. FY28: The facility will be de inventoried and deactivated.

### Safety & Health Hazards:

The main hazards in this facility are nitric acid used to perform pH adjustments and filter cleanings, and common industrial hazards such as confined spaces, and fall hazards. The hazards associated with the operation of this facility are addressed in the ETF Audible Safety Analysis ( WSRC-TR-98-00379 ).

### Safety & Health Work Performance:

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## Project Description Narratives

All work is performed using a WSRC Integrated Safety Management System (ISMS) approach. The ISMS integrates safety considerations into management and work practices at all levels to accomplish missions while protecting the public, the worker, and the environment. The key elements of the WSRC 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 ISMS. This system establishes Company-Level, Division-level, and Program-specific procedures consistent with organizational roles, and ensures a consistent, disciplined site-wide approach to safety while performing work.

### PBS Comments:

Funding for ETF is at the minimum level necessary (see Cost Baseline Narrative) to ensure safe processing and management of contaminated wastewater per SCDHEC requirements and directly support F & H-Tank Farms (Projects SR-HL01 & SR-HL02) and the SRS high level waste vitrification process (Project SR-HL05) as well as F and H -Area Nuclear Material Stabilization Activities (Projects SR-NM01 and SR-NM02) required to meet DNFSB 94-1 commitments, and continued support of environmental activities (IDW Purge Water) (Ground Water Remediation) and support for facility D&D i.e.; L-Basin sludge treatment.

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### 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: 7/3/1999

FEDPLAN Project? Yes

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

## Project Identification Information

DOE Project Manager: H. Gnann

DOE Project Manager Phone Number: 803-208-6076

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## General PBS Information

DOE Project Manager Fax Number: 803-208-7414

DOE Project Manager e-mail address: howard.gnann@srs.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)	222,777	895,809	1,118,586	35,955	16,919	19,126	17,667	22,404	17,580	18,599	20,995	20,684	21,170	21,789	24,475	
PBS Baseline (constant 1999 dollars)	205,519	521,691	727,210	35,955	16,919	19,126	17,667	22,404	16,969	17,329	19,047	18,271	18,209	18,249	19,960	
PBS EM Baseline (current year dollars)	222,777	895,809	1,118,586	35,955	16,919	19,126	17,667	22,404	17,580	18,599	20,995	20,684	21,170	21,789	24,475	
PBS EM Baseline (constant 1999 dollars)	205,519	521,691	727,210	35,955	16,919	19,126	17,667	22,404	16,969	17,329	19,047	18,271	18,209	18,249	19,960	
	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)	25,579	27,406	28,219	30,926	158,097	209,789	247,561	168,232	0	0	0	0	0	0	0	0
PBS Baseline (constant 1999 dollars)	20,311	21,190	21,245	22,671	107,070	124,358	128,446	76,400	0	0	0	0	0	0	0	0
PBS EM Baseline (current year dollars)	25,579	27,406	28,219	30,926	158,097	209,789	247,561	168,232	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 EM Baseline (constant 1999 dollars)	20,311	21,190	21,245	22,671	107,070	124,358	128,446	76,400	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%	2.70%
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
2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%

## Project Reconciliation

### Project Completion Date Changes:

Previously Projected End Date of Project: 10/1/2025

Current Projected End Date of Project: 10/1/2028

### Explanation of Project Completion Date Difference (if applicable):

Schedule extended to FY28 to match new HLW schedule.

### Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	572,038	Actual 1997 Cost:	16,919	Actual 1998 Cost:	17,667
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	537,452	Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):			14,511
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	551,963				

### Project Cost Changes

Cost Adjustments    Reconciliation Narratives

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## Project Reconciliation

<b>Cost Change Due to Scope Deletions (-):</b>		
<b>Cost Reductions Due to Efficiencies (-):</b>		
<b>Cost Associated with New Scope (+):</b>		
<b>Cost Growth Associated with Scope Previously Reported (+):</b>	17,823	Revised project estimates and schedule to coincide with HLW schedule.
<b>Cost Reductions Due to Science &amp; Technology Efficiencies (-):</b>		
<b>Subtotal:</b>	569,786	
<b>Additional Amount to Reconcile (+):</b>	102,343	
<hr/>		
<b>Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):</b>	<b>672,129</b>	

## Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Project Mission Complete	SR-HL07-004		10/1/2028								
Complete Phase I of DCS Upgrade	SR-HL07-002		9/30/2000								
Complete Phase II of DCS Upgrade	SR-HL07-003		9/30/2001								
Project Start	SR-HL07-001		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
Project Mission Complete	SR-HL07-004					Y					
Complete Phase I of DCS Upgrade	SR-HL07-002										Complete Phase I of DCS Upgrade
Complete Phase II of DCS Upgrade	SR-HL07-003										Complete Phase II of DCS Upgrade
Project Start	SR-HL07-001					Y					

## Performance Measure Metrics

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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
<b>MLLW</b>														
Treatment	M3	0.00	0.00	0.00										
<b>LLW</b>														
Storage	M3							0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Tech.</b>														
Deployed	Ntd	1.00	0.00	1.00					1.00					
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
<b>MLLW</b>														
Treatment	M3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>LLW</b>														
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	
<b>Tech.</b>														
Deployed	Ntd													
Category/Subcategory	Units	Planned 2036 - 2040	Planned 2041 - 2045	Planned 2046 - 2050	Planned 2051 - 2055	Planned 2056 - 2060	Planned 2061 - 2065	Planned 2066 - 2070	Exceptions	Lifecycle Total				
<b>MLLW</b>														
Treatment	M3									0.00				
<b>LLW</b>														
Storage	M3													
<b>Tech.</b>														
Deployed	Ntd								1.00	1.00				

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## Technology Needs

**Site Need Code:** SR99-2034  
**Site Need Name:** Second Generation Salt Feed Preparation

**Focus Area Work Package ID:** TFA-3  
**Focus Area:** TFA

**Focus Area Work Package:** Alternative Paths to In-Tank Precipitation at SRS  
**Agree with Technology Link:** Y

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

Technologies

INEEL HLW Processing  
 High Activity Waste Forms and Processes

Cost Savings (in thousands of dollars)

999

Range of Estimate

High

Related CCP Milestones

Related Waste Streams

00502: -  
 00501: -

Agree?

Change?

Y N  
 Y N

**Site Need Code:** SR99-1016

**Site Need Name:** Demonstration of a Method to Regenerate the Activated Carbon and/or Reuse the Carbon Vessels Used at the ETF

**Focus Area Work Package ID:** MW-08  
**Focus Area:** MWFA

**Focus Area Work Package:** Facilitating Deployment for Unique Wastes  
**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

00514: LAX - Waste Water Effluents  
 02214: BS - LLW Groundwater (ETF)

Agree?

Change?

Y N  
 Y N

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## Technology Needs

**Site Need Code:** SR99-1020  
**Site Need Name:** Enhance the Performance of ETF Norton Filters  
**Focus Area Work Package ID:** MW-08      **Focus Area Work Package:** Facilitating Deployment for Unique Wastes  
**Focus Area:** MWFA      **Agree with Technology Link:** Y  
**Benefits (Cost, Risk Reduction, Both):**

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

<u>Related CCP Milestones</u>	<u>Related Waste Streams</u>	<u>Agree?</u>	<u>Change?</u>
	00514: LAX - Waste Water Effluents	Y	N
	02214: BS - LLW Groundwater (ETF)	Y	N

## Technology Deployments

Deployment Year
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<u>Deployment Status</u>	<u>Planned</u>	<u>Forecast</u>	<u>Actual Date</u>
<b>Technology Name:</b> Treatment of CIF Blowdown			
Deployment Commitment	1999		