Supplement Analysis Environmental Impacts Resulting From Modifications in the Defense Waste Processing Facility

U.S. Department of Energy
Savannah River Operations Office
Environmental and Laboratory Programs Division

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SUPPLEMENT ANALYSIS
ENVIRONMENTAL IMPACTS RESULTING FROM MODIFICATIONS IN THE DEFENSE WASTE PROCESSING FACILITY

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INTRODUCTION

The Savannah River Site (SRS) is a 300-square-mile controlled area in southwestern South Carolina purchased by the U.S. Government in the 1950s for the production of nuclear materials for the national defense. Augusta, Georgia, is about 23 miles northwest of the Site; Aiken, South Carolina, is about 17 miles north; and Barnwell, South Carolina, is about 6 miles east.

The nuclear fuel cycle at SRS includes fuel and target fabrication, nuclear reactor operation for materials production, and chemical separations. Fuel-cycle activities generate a variety of wastes, including hazardous, high- and low-level radioactive, and mixed (combined hazardous and radioactive) waste.

Figure 1 shows the location of the major facilities at SRS. The high-level radioactive liquid waste is currently stored in underground tanks in F- and H-Areas. The Defense Waste Processing Facility (DWPF) is designed to immobilize the radioactivity in this waste. The DWPF process involves separation of the waste into a high-activity fraction for immobilization in the S-Area Vitrification Facility and a partially decontaminated salt solution for solidification and disposal as low-activity waste in Z-Area (see Figure 1).

In February 1982, the U.S. Department of Energy (DOE) published the *Final Environmental Impact Statement (EIS), Defense Waste Processing Facility, Savannah River Plant, Aiken, South Carolina* (DOE, 1982a), referred to as the DWPF EIS. On June 1, 1982, DOE published its Record of Decision (ROD) in the *Federal Register* (47 FR 23801). In a subsequent Environmental Assessment (EA), DOE evaluated the impacts of various waste forms for immobilizing the high-level radioactive waste and selected borosilicate glass (DOE, 1982b).

In the ROD, DOE selected an alternative that would enable incorporation of improvements from ongoing research and development into the design of the DWPF. The ROD stated that "ongoing research and development efforts will further refine design, construction, the operational aspects of the DWPF. The process for the actual DWPF, as build [sic], may therefore differ from the present descriptions due to the incorporation of such refinements."

As anticipated, DOE has modified the DWPF process and facility since it issued the ROD and EA. These modifications were made to reduce cost and improve the facility efficiency, safety, and production; they include in-tank precipitation, saltstone manufacturing and disposal, hydrogen modifications, late wash additions, nitric acid introduction, ammonia scrub, and sludge-only startup. In addition to these process modifications, other actions since the issuance of this documentation and connected to the DWPF might affect the National Environmental Policy Act (NEPA) status of the DWPF EIS.

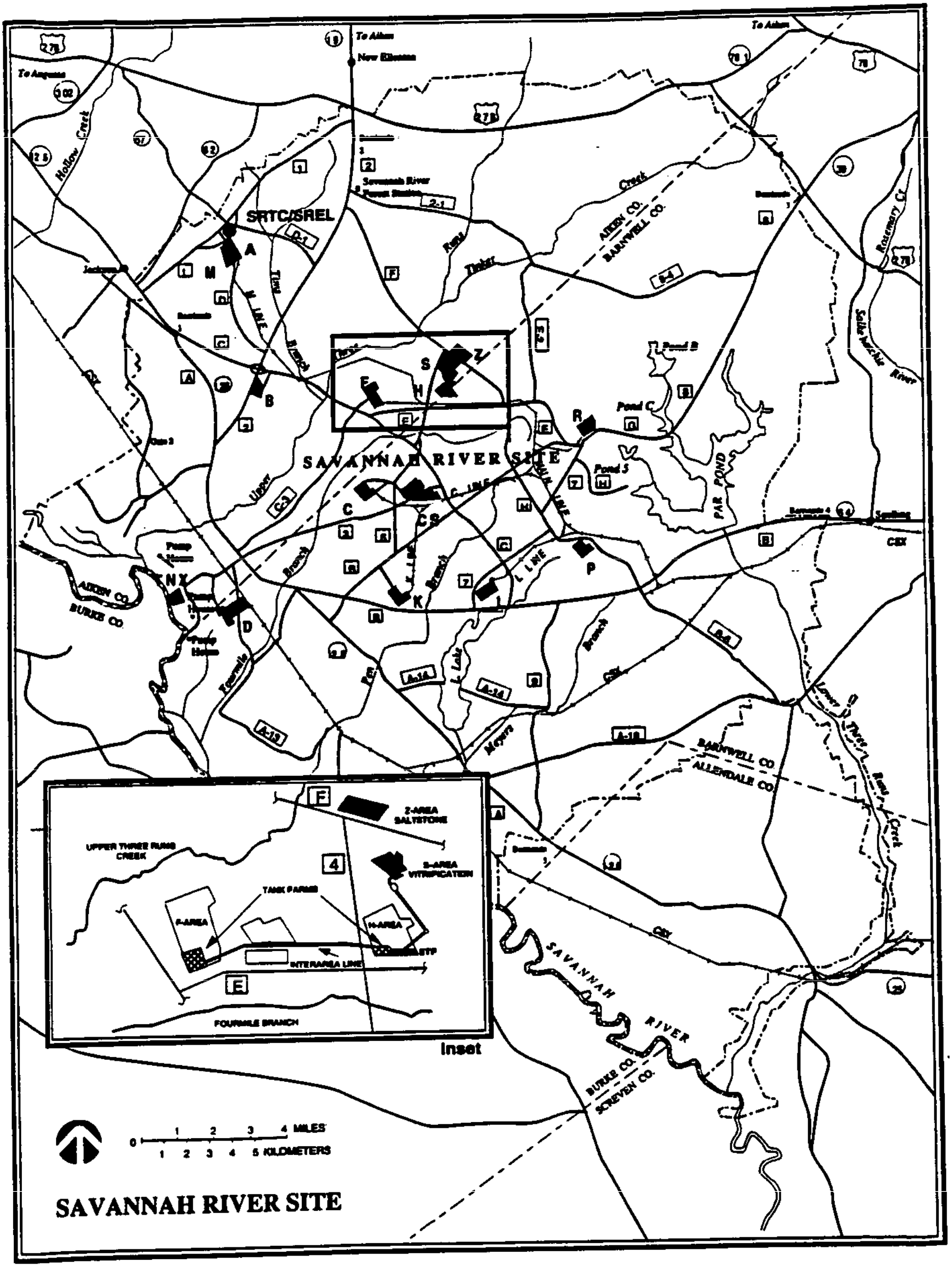


Figure 1. Location of DWPF Site

PURPOSE AND SCOPE

The purpose of this analysis is to enable DOE to determine if it should prepare a supplement to the DWPF EIS that would assess the environmental consequences of DWPF operation based on design and operation modifications developed after DOE issued the original EIS and its ROD. The Council on Environmental Quality (CEQ) regulations, Title 40 of the Code of Federal Regulations Section 1502.9(c) [40 CFR 1502.9(c)], directs a Federal agency to prepare supplements to its EIS when the agency "makes substantial changes in the proposed action that are relevant to environmental concerns, or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." Further, the regulations state that an agency "may also prepare supplements when the agency determines that the purpose of the Act (NEPA) will be furthered by doing so."

DOE prepared this analysis in accordance with the DOE NEPA Implementing Procedures, 10 CFR 1021 (57 FR 15144), which direct the preparation of a Supplement Analysis when it is unclear if an EIS supplement is required. This analysis compares the environmental consequences of DWPF operation presented in the DWPF EIS to those that would occur under current design and operational plans. It contains information for DOE to determine whether:

(i) An existing EIS should be supplemented;
(ii) A new EIS should be prepared; or
(iii) No further NEPA documentation is required.
[10 CFR 1021.314(c)(2)]

BACKGROUND

The DWPF is designed to immobilize the radioactivity in the high-level radioactive waste stored in the F- and H-Area waste tank system. The waste consists of three components: (1) an insoluble sludge, (2) a crystallized salt cake, and (3) a supernatant aqueous solution. The process involves separation of the high-level radioactive sludge solids from the soluble salt solution (salt cake and supernatant) and separation of the soluble high-activity components from the salt solution. Three waste streams are formed: a sludge slurry, a high-activity precipitate slurry, and a low-activity salt solution.

Frit (a glass former) slurried with water is mixed with the sludge and high-activity precipitate, after some feed preparation steps. The resulting slurry is melted and poured into stainless steel canisters. The canisters are transferred to temporary storage for ultimate disposal in a Federal geologic repository. The low-activity salt solution is mixed with a grout and disposed of as low-activity radioactive waste. These basic concepts for immobilization of the SRS high-level waste have not changed since DOE evaluated the environmental impacts of constructing and operating the DWPF in the DWPF EIS. DOE has nearly completed construction, has been testing, and will prepare sludge and precipitate feed streams for radioactive operation of the DWPF in the near future. However, DOE has made a number of design and operation modifications that might bear on the environmental impacts of operating the DWPF.

The process modifications were made or proposed to reduce cost and improve the facility efficiency, safety, and production; they include the following:

- In-Tank Precipitation

  Separation of soluble cesium, strontium, and plutonium from the salt solution was originally to be accomplished by ion exchange. Through subsequent research and development, DOE determined that an in-tank precipitation (ITP) process using sodium tetraphenyl borate (STPB) and sodium titanate (ST) would remove more than 99.9 percent of the radioactivity in the salt solution (DOE, 1984, 1985).

- Saltstone Manufacturing and Disposal

  The original process of dewatering the decontaminated salt solution, mixing it with cement to form "saltcrete," and burying it in an engineered trench has been replaced by blending decontaminated salt solution from the ITP process with a waste concentrate stream from the F- and H-Area Effluent Treatment Facility, mixing it with a cement-slag-flyash grout to form "saltstone" (to reduce permeability), and disposing of it in reinforced concrete vaults (DOE, 1988a,b).

- Late Wash Facility

  In the Late Wash Facility (LWF), the precipitate slurry from the ITP process would be given a final wash to reduce the concentrations of nitrite and radiolysis products. Laboratory-scale studies demonstrated that this reduction would have significant operational advantages in the vitrification facility (WSRC, 1992a,b).

- Nitric Acid Introduction

  This process would add nitric acid (rather than formic acid) to the sludge in the Sludge Receipt and Adjustment Tank (SRAT). This would bring nitrate concentrations to the desired level and satisfy the formic acid's previous sludge processing functions (WSRC, 1992c). As discussed below, formic acid is still used to hydrolyze the precipitate feed stream.

- Hydrogen Modifications

  This modification to the ventilation system would provide additional dilution air to components within the vitrification facility to mitigate the potential formation of hydrogen gas in flammable concentrations during radioactive operations (WSRC, 1991a).

- Ammonia Mitigation Modification

  Ammonia reducing scrubbers will be installed at several locations in the process vessel ventilation system within the Vitrification Building. This will mitigate a potential safety hazard from the accumulation of significant amounts of solid ammonium nitrate (WSRC, 1992d).

- Sludge-Only Startup

  This is an option to enable earlier startup of the DWPF. At startup, DOE would mix radioactive sludge with a simulated nonradioactive precipitate until the radioactive precipitate from the ITP process is ready for processing (WSRC, 1991b).

Other actions connected to the DWPF include treatment of wastewater discharges in the F- and H-Area Effluent Treatment Facility (ETF), incineration of organic byproducts in the Consolidated Incineration Facility (CIF), construction and operation of a high-level radioactive waste evaporator in the F- and H-Area Tank Farm, and temporary storage of failed equipment for ultimate disposal in a Federal geologic repository.

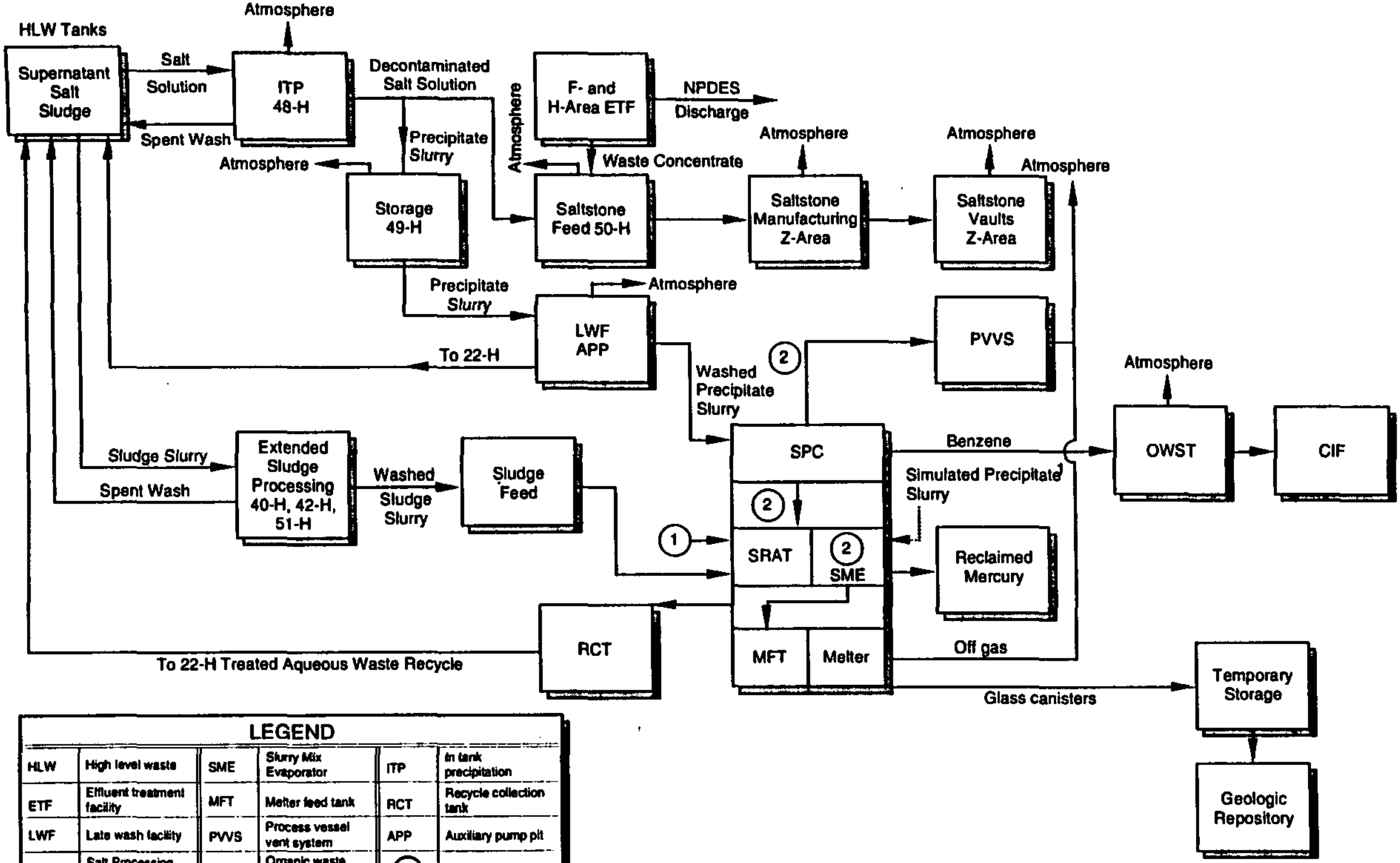
DESCRIPTION OF DWPF PROCESS MODIFICATIONS

Figure 2 is a schematic illustration of the modified DWPF process. The sections that follow describe the modifications in further detail using, primarily, the references identified above.

The current NEPA status of each of the modifications to the DWPF process or connected actions has been summarized in Appendix A. Process changes for which no NEPA documentation was prepared are not addressed in Table A-1. As Appendix A illustrates, a wide variety of NEPA documentation has been approved for portions of the DWPF in the period since the issuance of the 1982 EIS. The majority of these documents have been memoranda to file and categorical exclusions written to address the incremental impacts resulting from individual additions or modifications to the overall process. The changes to the DWPF process have resulted in an uncertain picture of current NEPA coverage, especially when cumulative impacts are considered.

In-Tank Precipitation

In the original process, water was to be injected into high-level waste tanks and the resulting salt solution was to be pumped through sand filters to ion-exchange columns in S-Area. This has been replaced by an in-tank precipitation process. The process takes place in Tank 48 in H-Area. Waste salt that has aged at least 15 years (or equivalent with respect to dose) will be dissolved in water. An ST slurry will be added to adsorb strontium and plutonium, and STPB will be added to precipitate cesium. The precipitate slurry will be pumped through a microfiltration process and washed to yield a high-activity, low-volume precipitate stream that will be transferred to the precipitate storage tank, Tank 49 (WSRC, 1992e). Sodium nitrite additions are required to prevent pitting corrosion of these carbon steel tanks. Decomposition of STPB produces benzene, and small amounts of iso-propanol remain from the ST manufacturing process. The benzene and iso-propanol from Tanks 48 and 49 will be released to the atmosphere. ITP necessitates processing to remove nitrites and organics from the radioactive precipitate. This is to be accomplished by the Late Wash Facility and hydrolysis, respectively. The precipitate hydrolysis process will take place inside the vitrification building in the Salt Processing Cell (SPC). The ITP process is shown in Figure 3. The facilities for ITP have been constructed and are capable of operation; testing and process refinements have not been completed.



LEGEND

HLW	High level waste	SME	Slurry Mix Evaporator	ITP	In tank precipitation
ETF	Effluent treatment facility	MFT	Melter feed tank	RCT	Recycle collection tank
LWF	Late wash facility	PVVS	Process vessel vent system	APP	Auxiliary pump pit
SPC	Salt Processing Cell	OWST	Organic waste storage tank	①	Nitric acid addition
SRAT	Sludge receipt and adjustment tank	CIF	Consolidated Incineration Facility	②	Ammonia scrubbers

Notes:

1 The optional sludge-only process at startup would inject a simulated aqueous precipitate slurry in the CPC. SPC, LWF, ITP, and salt processing would not be operated under this option.

Figure 2. Integrated HLW and LLW Treatment System

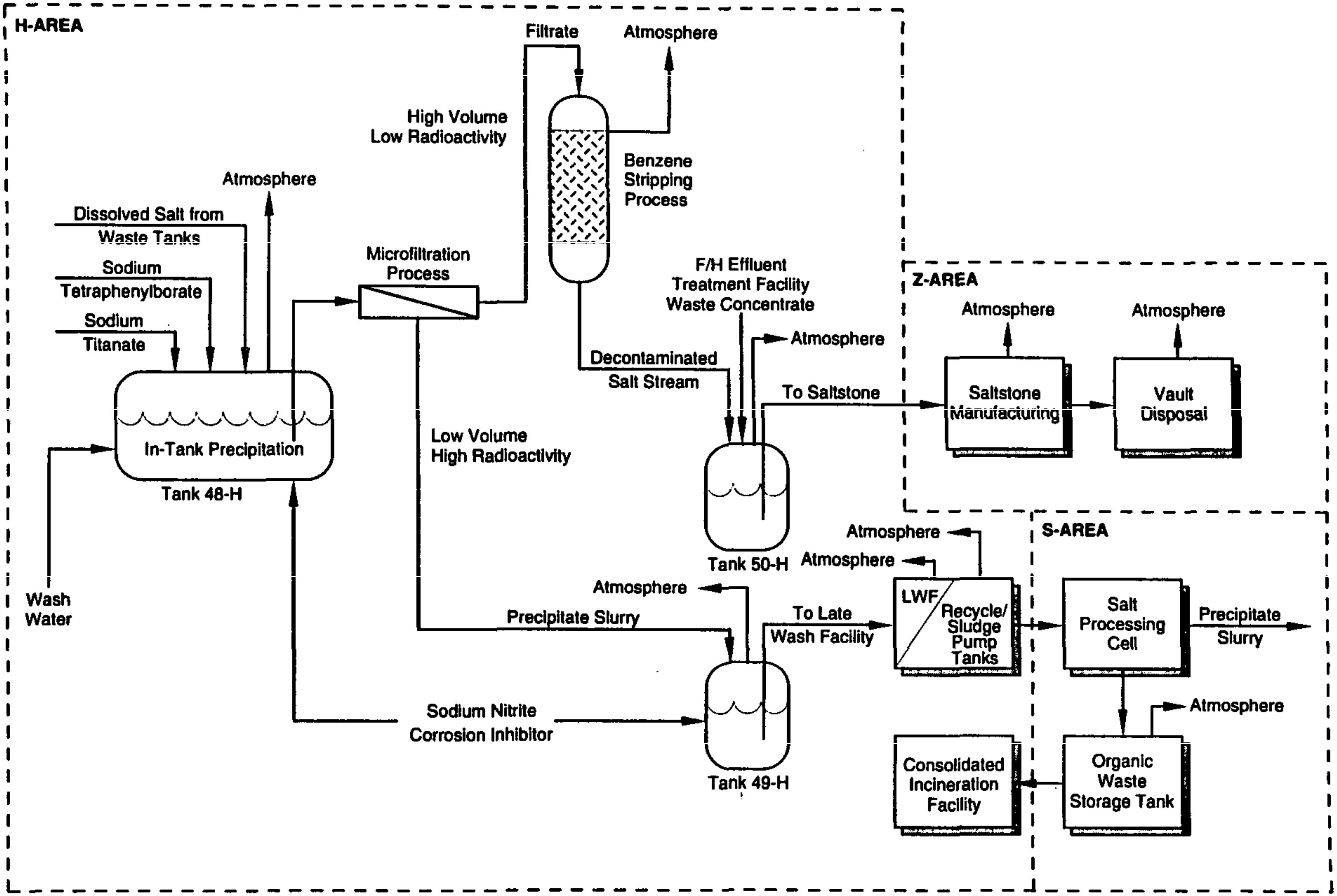


Figure 3. In-Tank Precipitation Process/Saltstone Manufacturing and Disposal

Saltstone Manufacturing and Disposal

In the original process, the decontaminated salt solution from the ion-exchange units in S-Area would have been dewatered by evaporation in Z-Area, mixed with cement and solidified into a cement matrix called "saltcrete." The saltcrete was believed to be suitable for direct burial in an engineered trench as low-level radioactive waste. In the modified process, the high-volume, low-activity filtrate from the microfiltration process is passed through a benzene stripping process, transferred to H-Area Tank 50 (WSRC, 1992e), and blended with a waste concentrate stream from the F- and H-Area ETF. The salt stream is transferred to the Z-Area Saltstone Manufacturing Facility where it is mixed into a cement, slag, and flyash-based grout. The saltstone grout is pumped into reinforced concrete disposal vaults. Figure 3 also shows saltstone manufacturing and disposal. This modification substantially increased the requirements for Z-Area. It required reinforced concrete disposal vaults, 8 m high x 180 m long x 60 m wide and 3 m below grade. The average salt solution processing rate will increase from 530 to 1,300 cubic meters per week, and land area requirements for disposal will increase from 35 to 161 acres (DOE, 1991). The Z-Area Facilities are permitted and operating; they receive the waste concentrate from the F- and H-Area ETF, via H-Area Tank 50.

Late Wash Facility

The LWF will be able to produce a batch of washed precipitate slurry with a nitrite content equal to or less than 0.01 M every 43 hours to meet the DWPF design-basis. Each batch received in the LWF will be treated with STPB to precipitate any soluble cesium-137; the insoluble solids concentration will be increased to 10% by cross-flow filtration; and finally, the slurry will be washed to reduce the nitrite content to 0.01 M or less. The LWF eliminates the need for hydroxylamine nitrate (HAN) during hydrolysis in the SPC, enables a catalyst concentration during hydrolysis that will not exceed the copper solubility in glass, and significantly reduces the nonpolar organic production during hydrolysis. After the selection of ITP but before the conceptualization of the LWF, approximately 2,400 metric tons per year of HAN would have been needed for hydrolysis (DOE, 1991).

Filtrate (spent wash) produced during the concentration/washing cycles will be accumulated in the Recycle Pump Tank (RPT) and the Sludge Pump Tank (SPT). Sodium hydroxide will be added to the spent wash to adjust the hydroxide concentration. The benzene will be stripped from the wash into the LWF process vessel vent system by a combination of nitrogen sparging and spraying. After analytical confirmation that the Tank 22 receipt limits have been met, the spent wash will be transferred to Tank 22, which supplies recycled wash water for ITP. The Late Wash process is shown in Figure 4.

The LWF has not been constructed; it will be located between the H-Area Tank Farm and the DWPF along the route of existing interarea transfer lines, preferably at the location of the Auxiliary Pump Pit (APP).

After receiving a final wash in the LWF, the precipitate feed stream will be pumped to the SPC where it will be hydrolyzed with formic acid, forming an aqueous solution and organics (primarily benzene); the organics will be transferred to the Organic Waste Storage Tank (OWST) and then to the CIF. Material balances verify that approximately 85 percent of the total benzene generation

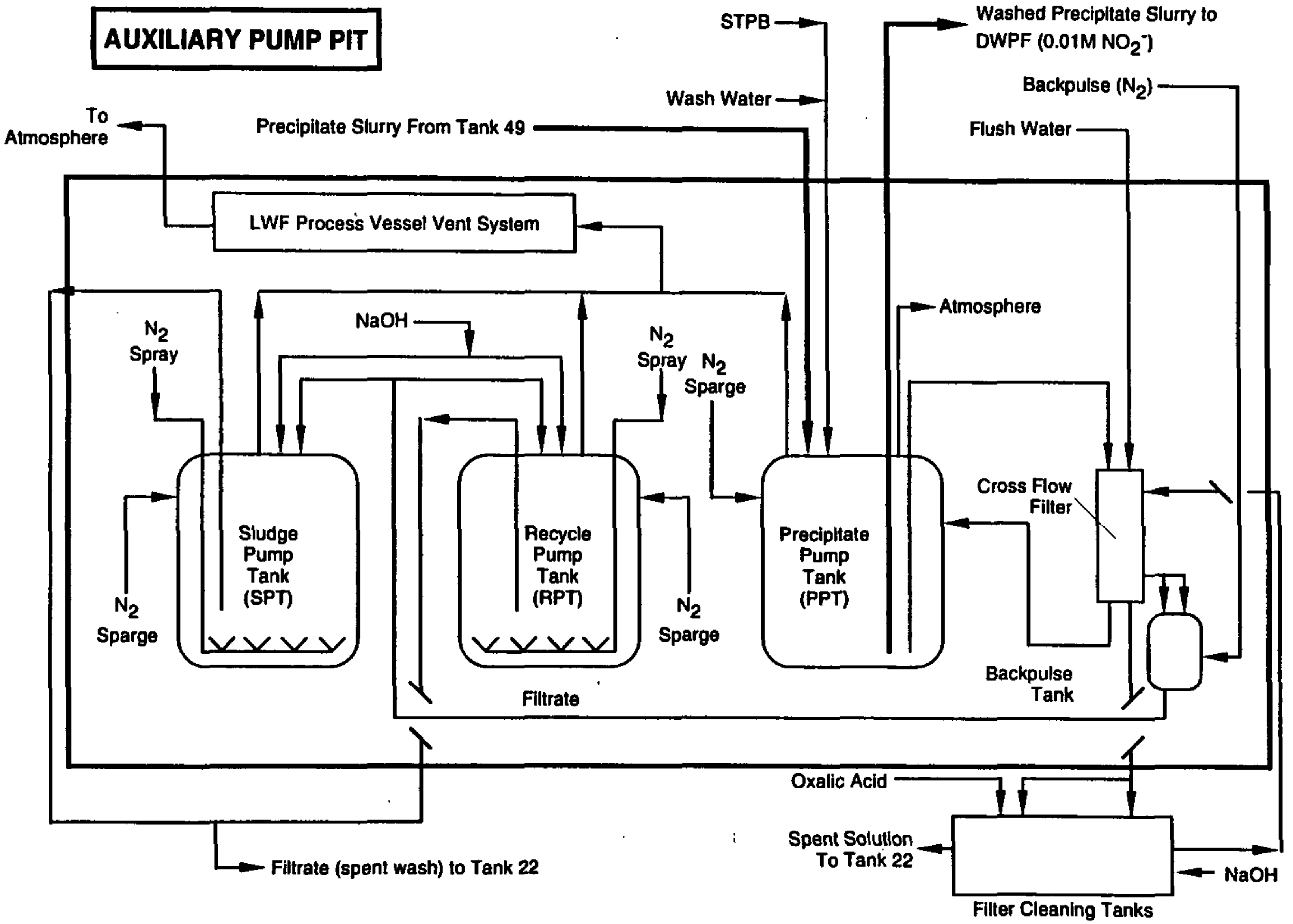


Figure 4. Late Wash Facility Process Flow Diagram

would be transferred to the CIF (WSRC, 1993a). The CIF would destroy at least 99.99 percent of the benzene in this waste stream. The remaining aqueous slurry, called Precipitate Hydrolysis Aqueous (PHA), will be transferred to the Chemical Processing Cell (CPC) where it will be combined with the sludge slurry solution and prepared for vitrification.

Nitric Acid Introduction

Proper reduction-oxidation (redox) is required to ensure enough oxidant to avoid copper, nickel, or other materials from depositing in the Melter, which would substantially shorten Melter service life. Nitric acid addition is the preferred method to adjust the redox potential. With low nitrite precipitate feed, nitric acid is required to maintain Melter feed redox levels within the same operating range that has been tested. The preferred addition location is the Sludge Receipt and Adjustment Tank (SRAT). Figures 2 and 5 show the general location of nitric acid injection. Nitric Acid Introduction is an operational change that does not require new construction or structural modifications.

Nitric acid has the added advantage during radioactive operation to achieve:

- Required rheology
- Reduced hydrogen and ammonia evolution

Hydrogen Modifications

In the CPC, the sludge waste from the tank farm and the PHA from the SPC are chemically adjusted and combined with frit to prepare acceptable feed for the DWPF melter. The first tank in the CPC process is the SRAT, in which sludge waste from the tank farm is treated with nitric acid, as described above. The acidified sludge is blended with PHA from the SPC. The SRAT product is then transferred to the Slurry Mix Evaporator (SME) where frit is added to the sludge and precipitate mixture. Hydrogen is generated during this process from the decomposition of formic acid, which is catalyzed by the noble metals present in the sludge. Because acid, copper, and noble metals can be found in each of the CPC vessels, hydrogen generation is expected in the CPC tanks where temperature is greater than 55°C (see Figure 6).

The action will result in modification of existing systems supporting the ventilation of the CPC Vessel Vent System to mitigate the potential formation of hydrogen gas in flammable concentrations during radioactive operations. Modifications will be performed to the ventilation system to provide dilution air to the Process Vessel Vent System (PVVS), the SRAT, and the SME. In addition, modifications will be performed to accommodate higher air flow rates through the SRAT, SME, the MFT, the SME Condenser, the Formic Acid Vent Condenser (FAVC), and the PVVS. These modifications have not been completed. Figure 6 shows the general locations of the points in the ventilation systems where additional dilution air will be provided.

Ammonia Mitigation Modification

The purpose of the DWPF Ammonia Mitigation Modification is to reduce the quantity of ammonia transported into the PVVS, thereby mitigating the potential safety hazard from the

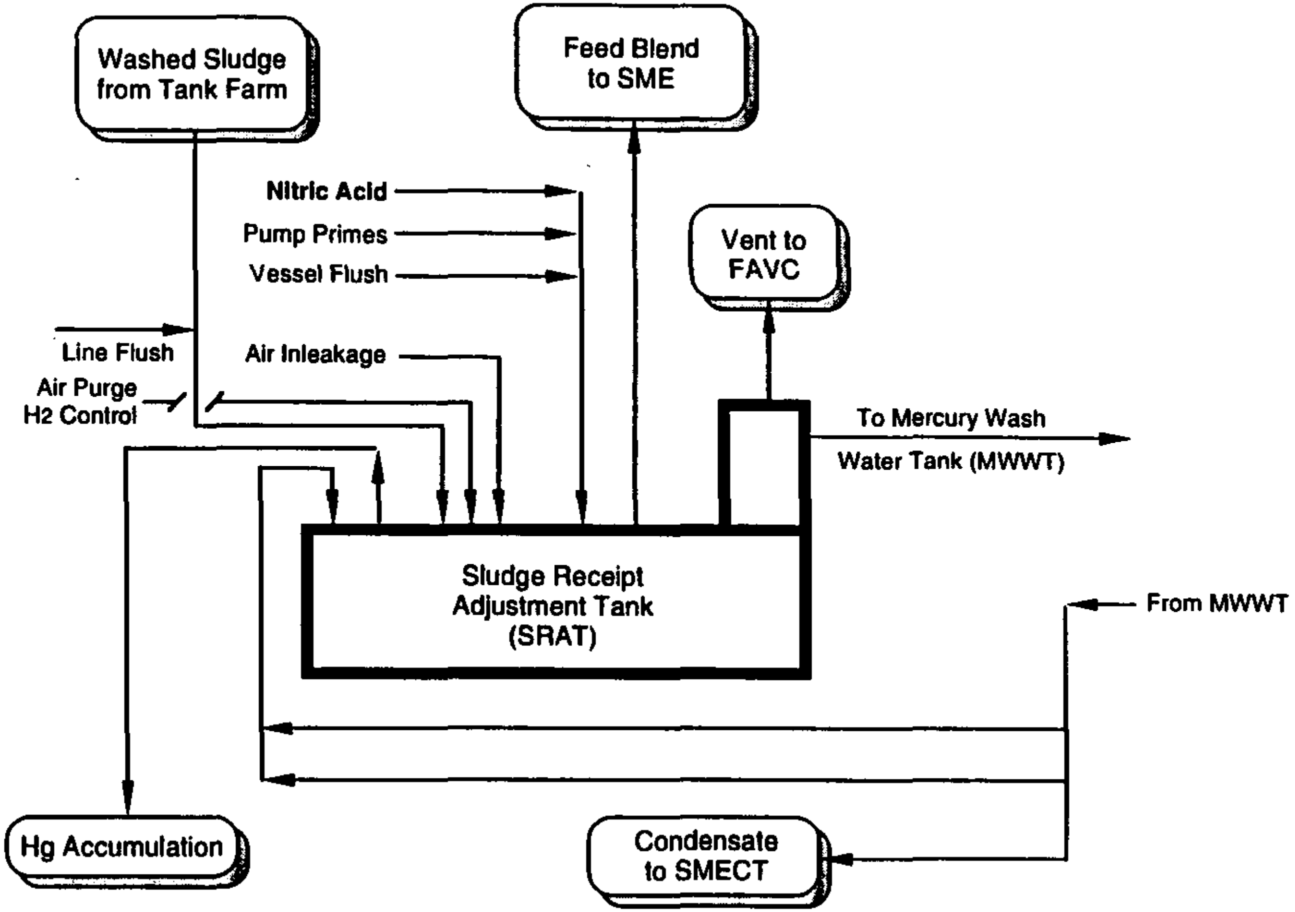
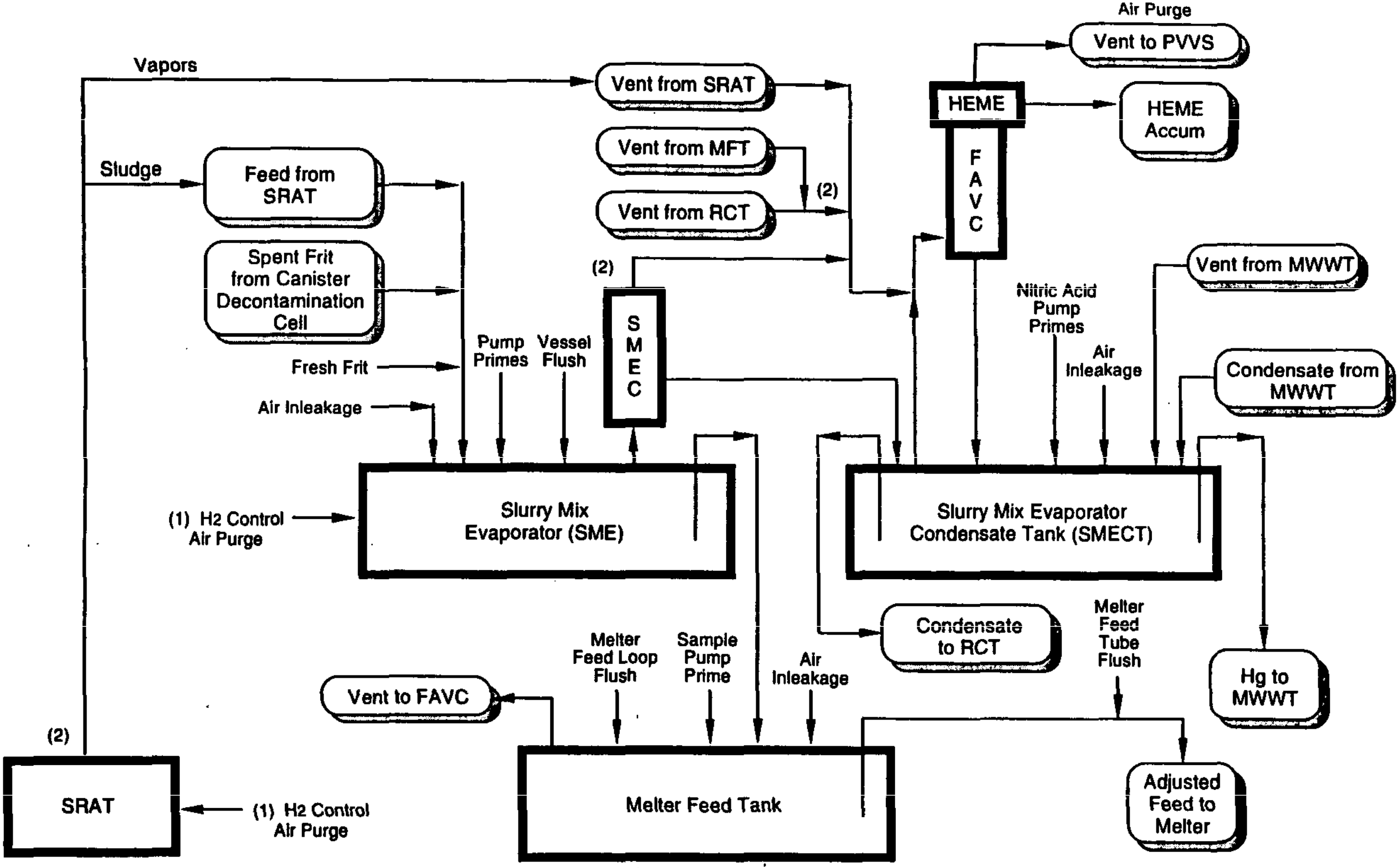


Figure 5. Nitric Acid Injection



(1) Dilution Air (Hydrogen Control Points)
(2) Ammonia Reducing Scrubbers

Figure 6. Location of Additional Dilution Air and Ammonia Scrubbers

accumulation of significant amounts of solid ammonium nitrate, a known explosive, and reducing the frequency of cleaning to remove accumulated ammonium nitrate.

Pilot scale operations identified the accumulation of ammonium nitrate and organics that sensitize its decomposition in the Integrated DWPF Melter System (IDMS) PVVS. Most of the ammonium nitrate was subsequently found to be the result of sodium nitrite corrosion inhibitor added during ITP and the HAN used to destroy the nitrite. The LWF (described above) would eliminate the need for HAN and reduce the nonpolar organic production during hydrolysis. The Ammonia Mitigation Modification will consist of the addition of ammonia-reducing scrubbers at three locations in the PVVS of the CPC: one at the exit of the SRAT condenser, one at the exit of the SME, and one at the combined vent lines of the Recycle Collection Tank (RCT) and MFT. The ammonia scrubbers have not been installed. Figure 6 also shows the general locations of the ammonia scrubbers.

Sludge-Only Startup

DOE is considering an optional sludge-only feed process. The process would use a reference (nonradioactive) salt to generate a precipitate slurry that is chemically similar to the radioactive washed precipitate slurry or a simulated PHA stream. Thus, it would be possible to vitrify in-tank processed sludge without the use of a radioactive precipitate slurry. The simulated precipitate slurry would be injected at the existing, operational low point pump pit.

COMPARISON OF ENVIRONMENTAL IMPACTS OF DWPF PROCESS MODIFICATIONS

The following sections compare the resource requirements, atmospheric releases and liquid waste flows for normal operations predicted in the DWPF EIS (DOE, 1982a) to those currently expected for radioactive operation (WSRC, 1993a). Meaningful comparisons of the volumes and compositions of solid waste streams could not be made since comparable data do not exist across the various documents. In addition, this section provides a comparison of the consequences and risks associated with accidents described in the 1982 EIS and those included in relevant Safety Analysis Reports (SARs). Comparisons do not include sludge-only startup because it is an optional temporary operational mode that would have fewer resource requirements and lower releases. Comparisons do include the individual and collective effects of the other modifications.

Resource Requirements

Table 1 compares the original and modified resource requirements. It is based on the expected annual operation, which, for the modified case, is 75% of time-averaged design flow rates (i.e., 75% attainment). There is some degree of agreement between the DWPF EIS and current expectations for glass frit and cement. Other resources are substantially different (factors greater than 2).

Table 1. Comparison of Original and Modified DWPF Resource Requirements[1]

RESOURCE	IN-TANK PRECIPITATION[2]	SALTSTONE MANUFACTURING AND DISPOSAL	LATE WASH FACILITY	HYDROGEN CONTROL	NITRIC ACID INTRODUCTION	AMMONIA SCRUBBERS	OTHER RESOURCE REQUIREMENTS	(Total) MODIFIED DWPF DESIGN	DOE/EIS-0082
Chemical Consumption (metric tons per year)[3]									
Sodium tetraphenyl borate	176.2		39.4					216	0
Sodium titanate	3.2							3.2	0
Sodium nitrite	141						62	203	NR[4]
Copper formate	5.4							5.4	0
Nitric acid					31	20	0.048	51	212
Formic acid[5]	52							52	NR[4]
Oxalic acid			1.2					1.2	0
Hydroxylamine sulfate								0[6]	233
Potassium permanganate								0[6]	13
Silver mordenite								0[6]	1.1
Nitrogen gas	10,718		4,581				0.89	15,300	NR[4]
Sodium hydroxide	181		259				299	739	1824
Cement		57,089[7]						57,089	38,400
Carbon dioxide	78							78	180
Water and steam	6,302	310	4,889				21,997	33,498	2,760,000
Glass frit							427	427	708
Air	3,190.1	4,198.7	627.0	6,632.2			11,973.8	26,622	NR[4]

Table 1. Comparison of Original and Modified DWPF Resource Requirements (continued)[1]

RESOURCE	IN-TANK PRECIPITATION[2]	SALTSTONE MANUFACTURING AND DISPOSAL	LATE WASH FACILITY	HYDROGEN CONTROL	NITRIC ACID INTRODUCTION	AMMONIA SCRUBBERS	OTHER RESOURCE REQUIREMENTS	(Total) MODIFIED DWPF DESIGN	DOE/EIS-0082
Chemical Consumption (cubic meters per year)									
Duolite ARC-359 resin								0[6]	11
Amberlite IRC-718 resin								0[6]	2.8
Zeolite								0[6]	31
Coal								0[6]	1.3
Sand								0[6]	5.0

1. Based on nominal capacity (75% attainment).
2. Includes requirements for the Salt Processing Cell (SPC).
3. Source: WSRC, 1993 unless otherwise noted.
4. Not reported in DWPF EIS.
5. Total formic acid requirement was 120 metric tons per year (DOE, 1991). Nitric acid introduction eliminates the need for 68 (120-52) metric tons per year of formic acid in the CPC.
6. In-tank precipitation eliminates the need for ion-exchange chemicals and filter material.
7. Cement premix includes flyash, slag, and saltstone additives.

Routine Atmospheric Releases

Tables 2 and 3 compare the original, intermediate (DOE, 1991) and most recent estimates of atmospheric releases for normal (i.e., routine) operation. Table 2 compares radiological releases and Table 3 non-radiological releases. Although the releases are expressed in annual quantities, they are based on time-averaged design flow rates (100% attainment). With the exception of carbon monoxide, the EIS predictions of atmospheric releases vary from those based on current information. They indicate that the operation of the modified DWPF would be different than the operation envisioned in the DWPF EIS. Tritium releases have increased by almost three times, while releases of uranium and transuranics have decreased from those predicted in the EIS. It is also important to note that the process modifications have resulted in new releases of benzene and other organic materials.

The offsite doses from atmospheric releases presented in the 1982 EIS were calculated using dose assessment methodology which has since been superseded. To provide a valid basis for comparison, the offsite dose and risk from atmospheric releases for each of the three documents (1982 EIS, 1991 SAR, and 1994 SAR) were recalculated using a consistent methodology. With the atmospheric release values (Ci/yr) as input, doses to the maximally exposed offsite individual (MEI) and to the 50-mile population surrounding SRS were calculated using the MAXIGASP and POPGASP codes. These codes are SRS-combined versions of the U. S. Nuclear Regulatory codes XOQDOQ and GASPAR. The hypothetical MEI is located in the north sector at a distance of 11,180 meters from S-Area. The estimated risk values were calculated by multiplying the calculated population dose by the ICRP Publication 60 dose-to-risk conversion factor of 7.1×10^{-4} fatal cancers per person rem. Table 2 shows increased risk to both the MEI and the surrounding population from radiological releases associated with normal operations. Most of the increase in calculated dose can be attributed to changes in calculational methodology, including using specific data for Sr-90 and Cs-137 (as contrasted to the "fission products" used in the 1982 EIS), rather than from changes in facility design.

For nonradioactive airborne emissions, the site boundary risk was calculated based solely on benzene releases, as benzene is the only carcinogen among the listed pollutants. Risk from 1994 calculated releases was calculated by assuming the same dilution ratio ($\mu g/m^3$ at site boundary per metric ton/yr released) as the 1991 analysis (DOE, 1991), and multiplying the resulting boundary concentration by the EPA risk factor of 8.28×10^{-6} $m^3/\mu g$.

Liquid Waste Streams

Table 4 summarizes data available to compare liquid waste streams. Due to design changes, availability of data, and the data reported, parameters vary to the extent that direct one-on-one comparisons are not possible or meaningful.

Table 2. Comparison of Original and Modified DWPF Routine Radiological Atmospheric Releases

Parameter	1982 EIS Value	1991 SA Value	1991 SA % Difference	1994 SA Value	1994 SA % Difference
Routine Atmospheric Releases (Ci/yr)					
H-3	1.0×10^{1}	3.2×10^{1}	220.00	3.7×10^{1}	270.00
C-14	N/R	2.1×10^{-2}	N/A	1.3×10^{-2}	N/A
Sr-90	1.3×10^{-2}*	6.7×10^{-3}*	-48.46	4.2×10^{-4}	-96.77
Cs-137	N/R–	N/R–	N/A	5.3×10^{-2}	N/A
U-238	1.6×10^{-9}	3.8×10^{-11}	-97.63	$1.8 v 10^{-11}$	-98.88
Pu-239	1.1×10^{-4}¶	1.2×10^{-6}¶	-98.91	3.3×10^{-8}	-99.97
Offsite Dose (MEI) from atmospheric releases (mrem/yr) (recalculated using consistent methodology)	2.3×10^{-3}	8.6×10^{-4}	-62.61	9.2×10^{-3}	300.00
Estimated risk from atmospheric releases (LCFs to surrounding population/yr) (recalculated using consistent methodology)	3.2×10^{-5}	9.4×10^{-6}	-70.63	2.9×10^{-4}	806.25

*reported as "fission products"
–included in "fission products"
¶reported as "transuranics"

LCF = latent cancer fatality
N/A = not applicable
N/R = not reported

Table 3. Comparison of Original and Modified DWPF Routine Non-Radiological Atmospheric Releases

	1982 EIS	1991 SA		1994 SA	
Parameter	Value	Value	% Difference	Value	% Difference
Routine Atmospheric Releases (metric tons/yr)					
Carbon monoxide	2.2×10^{-1}	N/R	N/A	2.2×10^{-1}	0.00
Nitrous oxides	1.3×10^{0}	3.3×10^{1}	2.4×10^{3}	3.9×10^{1}	2.9×10^{3}
Ammonium	1.4×10^{-2}	N/R	N/A	7.6×10^{-1}	5.3×10^{3}
Benzene	0	5.9×10^{1}	incalculable	2.8×10^{1}	incalculable
Other organics	0	2.0×10^{1}	incalculable	5.6×10^{-1}	incalculable
Mercury	N/R	6.8×10^{-2}	N/A	6.6×10^{-2}	N/A
Particulates	7.6×10^{-2}	3.1×10^{0}	4.0×10^{3}	N/R	N/A
Site Boundary Risk from atmospheric benzene releases (LCFs to surrounding population/yr)	N/A	8.7×10^{-5}	N/A	3.9×10^{-5}	N/A

N/A = not applicable
N/R = not reported

Table 4. Summary Comparison of Defense Waste Processing Facility Waste Water and Benzene Flows

Waste Flow	1982 EIS Value[a]	1991 Value[a]	% Difference[b]	Current Value[a]	% Difference[b]
Waste Water					
Water to ETF[c]	N/A	N/A	N/A	38,448	N/A
ETF Outfall[d]	N/A	1,280,000	N/A	N/R	N/A
Cooling Tower Purge	172,800	187,000	8.72	N/R	N/A
Rainfall, Runoff, and Misc.	490	N/R	N/A	N/R	N/A
Benzene					
Benzene from DWPF to CIF	N/A	162,000	N/A	185,000	N/A

[a] Units are liters per day
[b] Differences are percent changes from 1982 EIS value
[c] Includes only water discharged from the DWPF
[d] ETF outfall is primarily from the F and H area separations and also includes discharges from the DWPF
N/R = not reported
N/A = not applicable

Accidents

The purpose of this section is to summarize differences in accident analyses (e.g., accident scenarios, consequences, and risk) described in the 1982 EIS for the DWPF and the current DOE approval draft of the SAR (WSRC, 1993b;c). Approval drafts contain the best data currently available, however they are subject to change prior to finalization. Additionally, since the 1982 EIS did not address supporting DWPF facilities such as the In-Tank Processing (ITP) and Extended Sludge Processing (ESP) Facilities, accident scenarios associated with these facilities and their resulting consequences are also summarized utilizing information from the current DOE approval draft of the ITP/ESP SAR (WSRC, 1994).

In the 1982 EIS, which addresses a proposed vitrification facility that was intended to encompass the activities that are currently designed into other SRS facilities (e.g., ITP, ESP, and the yet to be designed Late Wash Facility), approximately 9 types of accident scenarios were determined to be credible, with slight variances possible depending upon the different alternatives. Because the evolution of the overall vitrification process between 1982 and the present has resulted in several design modifications and additional facilities required to treat high-level radioactive waste instead of the single DWPF facility proposed in 1982, several of the accidents analyzed in the 1982 EIS and their resulting consequences are no longer meaningful. For example, two types of accidents discussed in the EIS include failure of a centrifuge suspension system and burning of strontium and cesium ion-exchange materials. The centrifuge suspension system thought to be required for vitrification in 1982 is not included in the current DWPF facility design. Also, the ion-exchange processes were not incorporated into the vitrification design that was eventually constructed. Instead, the ITP and ESP facilities were designed and constructed to perform separation activities through chemical batch processing in existing waste storage tanks.

Because the vitrification process described in the 1982 EIS is different than the processes and facilities that were eventually designed and constructed, the accident analyses presented in the 1982 EIS, including resulting consequences, are no longer applicable for characterizing risks to workers, the offsite population, or the environment. This is based on a direct comparison of accident analysis scenarios and results presented in the 1982 EIS and the current DOE review draft of the DWPF SAR (WSRC, 1993b;c). Because 5 of the 9 bounding accident scenarios identified in the 1982 EIS are no longer applicable for the existing vitrification-related facilities, the bounding radiological consequences described in the EIS have changed substantially and appear non-conservative. To illustrate the significance of these differences, Table 5 compares bounding radiological accidents (worst-consequence) described in the 1982 EIS and the Draft DWPF SAR. The differences in postulated accident risk can be attributed to changes in methodology between the 1982 EIS and the 1993 SAR as well as changes in facility design (i.e., addition of the ITP and ESP).

There are substantial non-radiological hazards associated with normal and/or accident scenarios for the DWPF and ITP/ESP facilities that are not addressed by the 1982 EIS. For non-radiological hazardous impacts to the environment and the offsite population, little information in terms of resulting health effects are presented in the 1982 EIS. However, Table 9.0-6 of the current draft DWPF SAR states that a benzene release from the DWPF Organic Waste Storage Tank being destroyed by a tornado (not analyzed in the EIS) would result in benzene concentrations in air of 1207 mg/m^3 at a distance of 640 meters from the point of release, 7.4 times higher than the Emergency Response Planning Guideline number 2 (EPRG-2) release limit of 163 mg/m^3 (as developed by the American Industrial Hygiene Association and adopted by DOE in Order 5500.3A). Table 9.0-7 of the current DWPF SAR states that the benzene concentrations in the air at the nearest site boundary would be 5.7 mg/m^3 and 15.4 mg/m^3 resulting from an explosion and tornado, respectively.

Table 6 summarizes postulated health effects to the MEI located at 640 meters as a result of being exposed to the resulting benzene releases. Table 7 summarizes postulated health effects to the MEI located at the nearest site boundary for the same releases. (Health effects to the Maximum Offsite Adult Individual and the Offsite Population are not presented because the current SAR does not analyze offsite consequences resulting from chemical accidents.) Other non-radiological accidents that could present offsite population or worker health effects include the release of formic and nitric acids, and mercury.

Based on the 9 original accident scenarios described in the 1982 EIS and a comparison against the current draft DWPF SAR, only 4 of the accidents analyzed in 1982 are applicable to the current design and construction of the DWPF. Because significant design changes have been made in the vitrification process since 1982, the accident analysis information in the 1982 EIS is (1) incomplete by current requirements since it does not sufficiently address non-radiological accident scenarios and resulting health effects, and (2) no longer valid since the single facility described by the EIS is not representative of the several facilities that were eventually designed and constructed

Table 5. Comparison of Bounding Consequence Accidents Analyzed in the 1982 DWPF EIS and Current Draft DWPF SAR

Accident Description	Dose to the Maximum Offsite Adult Individual (rem)[a]	Risk to the Maximum Offsite Adult Individual (rem per year)
1. Current Draft DWPF SAR - Earthquake resulting in release of radioactive material to the environment (1994 Draft DWPF SAR, not analyzed in the 1982 EIS) - frequency of 5.2E-05 events per year.[c]	6.7	3.5E-04[b]
2. 1982 DWPF EIS - Explosion in a calciner resulting in release of radioactive material to the environment (1982 EIS, no longer applicable under current design and construction) - frequency of 3.0E-05 events per year.[d]	9.3E-06	3.0E-10

a. This individual is assumed to be located at the nearest site boundary, approximately 6.5 miles (10.5 kilometers), as stated in WSRC, 1994, Table 9.1-6.

b. The "E" format (e.g., 3.5E-04) represents exponential notation (i.e., 3.5×10^{-4}). This format is used throughout the remainder of this Supplement Analysis.

c. The information presented for this accident was obtained from WSRC, 1994, Table 9.0-4.

d. The information presented for this accident was obtained from WSRC, 1993b, Table 5.42.

to vitrify high-level radioactive waste. Therefore, a direct comparison of the information in the 1982 EIS to the current existing DWPF Draft SAR (including the ITP and ESP Draft SAR) is not feasible and would not present comparable results. Table 8 summarizes examples of postulated DWPF (including ITP/ESP) radiological accidents that have high frequencies and/or high consequences to the Offsite Maximum Adult Individual and were not analyzed by the 1982 EIS.

OTHER RELATED ACTIONS

In addition to process modifications, a number of actions are closely related to the DWPF; these actions are either not covered in the original NEPA documentation, are substantially different than the coverage in that documentation, or have occurred since the issuance of the EIS, its ROD, and the EA.

Actions related to the DWPF include the following:

- Temporary storage of failed equipment for ultimate disposal in a Federal geologic repository

Table 6. Postulated Health Effects to the Maximum Adult Individual Located 640 Meters from the OWST Resulting from Bounding Benzene-Related Accidents at the DWPF

Accident Description	Estimated Frequency (events per year)	Benzene Air Concentration at 640 Meters[a] (mg/m^3)	Point Estimate of Risk at 640 Meters (cancers per year)[b]	Number of Expected Cancers[c] (640 Meters)
Explosion in the DWPF Organic Waste Storage Tank resulting in the burning and release of benzene to the environment.	2.7E-04	580	1.3E-06	4.8E-03
Tornado destroying the DWPF Organic Waste Storage Tank resulting in the release of benzene to the environment.	1.0E-04	1207	1.0E-06	1.0E-02

a. Information presented is based on data provided in WSRC, 1994, Table 9.0-6. No analysis results for benzene releases are provided in the 1982 EIS, WSRC, 1993b.

b. Calculated by multiplying the estimated frequencies, benzene air concentrations, and an Environmental Protection Agency multiplication factor 8.28E-06 cancers/mg/m^3.

c. Calculated by multiplying the benzene air concentrations and an Environmental Protection Agency multiplication factor 8.28E-06 cancers/mg/m^3.

Table 7. Postulated Health Effects to the Maximum Adult Individual Located at the Nearest Site Boundary Resulting from Bounding Benzene-Related Accidents at the DWPF[a]

Accident Description	Estimated Frequency (events per year)	Benzene Air Concentration at Nearest Site Boundary (6.5 miles) (mg/m^3)	Point Estimate of Risk (cancers per year) at Nearest Site Boundary[b]	Number of Expected Cancers (nearest Site boundary)c
Explosion in the DWPF Organic Waste Storage Tank resulting in the burning and release of benzene to the environment.	2.7E-04	5.7	1.3E-08	4.7E-05
Tornado destroying the DWPF Organic Waste Storage Tank resulting in the release of benzene to the environment.	1.0E-04	15.4	1.3E-08	1.3E-04

a. Information presented is based on data provided in WSRC, 1994, Table 9.0-7.

b. Calculated by multiplying the estimated frequencies, benzene air concentrations, and an Environmental Protection Agency multiplication factor 8.28E-06 cancers/mg/m^3.

c. Calculated by multiplying the benzene air concentrations and an Environmental Protection Agency multiplication factor 8.28E-06 cancers/mg/m^3.

Table 8. Examples of Potential DWPF (Including ITP/ESP) Accidents That Were Not Analyzed By The 1982 EIS[a]

Accident Descriptions	Frequency (events per year)	Radiological Consequence to the Maximum Offsite Individual (rem)
DWPF[b]		
Design Basis Earthquake (0.2g)	5.2E-05	6.7E+00
Explosion in the glass melter.	7.6E-06	2.2E-06
Explosion in the Sludge Receipt and Adjustment Tank.	2.2E-06	6.6E+00
Explosion in the Slurry Mix Evaporator.	9.6E-07	5.8E+00
Explosion in the Chemical Processing Cell Vent System	1.6E-06	5.5E-01
Rupture of waste canister.	1.3E-04	7.9E-06
Uncontrolled reaction in the Sludge Receipt and Adjustment Tank.	4.5E-02	1.7E-04
Uncontrolled reaction in the Slurry Mix Evaporator	4.5E-02	1.5E-04
Uncontrolled reaction in the Recycle Collection Tank	4.5E-02	3.5E-07
ITP/ESP[c]		
Deflagration in Hold Tank (radionuclides, sodium titanate, sodium tetraphynlborate, etc.)	6.3E-05	4.0E-08
Filter Cell Deflagration and Fire	2.2E-06	4.7E-02
Tank 50 Deflagration	2.8E-05	2.2E-07
Tank 22 Benzene Deflagration	1.4E-05	1.6E-07
Deflagration/Fire in Waste Tank Annulus	1.7E-04	6.2E-01
Large Liquid Waste Release and Fire	4.0E-04	1.4E-01
Solids Fire in Non-Inerted Tank	1.4E-05	1.8E-02

a. As shown in Table 5, the worst-consequence accident to the Maximum Offsite Individual (Adult) as described in the 1982 EIS results in a total exposure of 9.3E-06 rem.

b. Information presented for DWPF accidents obtained from WSRC, 1994, Table 9.0-2.

c. Information presented for the ITP/ESP facilities obtained from WSRC, 1994, Tables 3.5 and 3.7.

Since the publication of the DWPF EIS, DOE-SR has prepared a Conceptual Design Report (CDR) and constructed vaults for placement of failed melters and other highly contaminated equipment in interim storage for ultimate disposal in the Federal geologic repository. The CDR states that the equipment is too highly contaminated to allow disposal at the SRS Burial Grounds. This contradicts the following statement in the DWPF EIS:

"Provision will be made for shipping the largest process equipment (i.e., 3.7 m x 3.7 m x 6 m spray calciner) and the heaviest (27-t glass melter) process equipment to the burial

ground by railroad car. Smaller equipment will be transported in a shielded cask car." (DOE, 1982 page 3-24)

The referenced calciner is not used in the modified DWPF design. Temporary storage of failed melters and other highly contaminated equipment for ultimate disposal in the Federal geologic repository is at best implicitly linked to the DWPF EIS as a parallel action to interim storage of glass canisters, which is described in the EIS.

- Construction and operation of a high-level radioactive waste evaporator in the F- and H-Area Tank Farm

  To support DWPF operation, DOE-SR has initiated a project to provide a replacement high heat waste evaporator in the H-Area high-level radioactive waste tank farm. The replacement evaporator would include higher vapor production rates, use closed loop cooling rather than once-through, have better shielding and ventilation, provide easier equipment maintenance, achieve higher activity removal in the vapor, and use upgraded control systems. Retirement of two existing evaporators, one in F-Area and one in H-Area, by the end of 1994 could result from construction and operation of the replacement unit.

- Treatment of wastewater discharges in the F- and H-Area Effluent Treatment Facility (ETF)

  Construction and operation of this ETF were required to discontinue use of and close the F- and H-Area Seepage Basins in response to Public Law 98-181. The DOE NEPA determination for construction and operation of the ETF was a Memorandum-to-File (MTF) and supplement to the original MTF (DOE, 1986, 1987). Since publication of the NEPA reviews for these facilities (i.e., the DWPF EIS and the MTFs for the ETF), the point of wastewater discharge for the DWPF has been moved from Fourmile Branch to Upper Three Runs Creek, via the ETF. Therefore, the relationship between the DWPF and the ETF was not addressed in their respective NEPA reviews. There are environmental tradeoffs to the change of discharge points. It represents a treated effluent to a stream with higher discharge, but one which is considered to be of greater value and less affected by SRS operations. As stated above, the ETF also provides a waste concentrate stream to the saltstone feed tank for inclusion in the saltstone manufacturing and disposal facility.

- Incineration of organic byproducts in the Consolidated Incineration Facility (CIF)

  DOE prepared an environmental assessment (EA) for the construction and operation of the CIF (DOE/EA-0400). The EA was issued in June 1992, and reissued with minor revisions and an additional appendix in December 1992; on December 18, 1992, based on the information and the analysis in the EA, DOE issued a Finding of No Significant Impact. The concept of the CIF was originally based on the need at SRS to provide an onsite system to detoxify and reduce the volume of liquid and solid hazardous, low-level radioactive, and mixed waste from various sources at SRS. The CIF would also burn up to 200 metric tons per year (WSRC, 1993a, 100% attainment) of process waste (primarily by-product benzene) from the DWPF vitrification process. The expected destruction and removal efficiency of the CIF is 99.99 percent. The combustion of *benzene in the CIF will reduce the demand for auxiliary fuel oil for firing.*

- Construction and operation of the New Waste Transfer Facility (NWTF)

The NWTF will transfer radioactive waste from the DWPF and associated facilities, including ITP, Extended Sludge Processing, and the F- and H-Area Tank Farms. On September 18, 1991, the NWTF was categorically excluded from further NEPA review (CX 9101007) as a "General Plant Project" under the then current DOE NEPA Guidelines (52 FR 47662).

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ACRONYMS AND ABBREVIATIONS

APP	Auxiliary Pump Pits
CEQ	Council on Environmental Quality
CPC	Chemical Processing Cell
DOE	U.S. Department of Energy
DWPF	Defense Waste Processing Facility
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESP	Extended Sludge Processing
FAVC	Formic Acid Vent Condenser
H_2	hydrogen gas
HAN	hydroxylamine nitrate
HEME	High-Efficiency Mist Eliminator
HEPA	High-Efficiency Particulate Air (filter)
Hg	mercury
IDMS	Integrated DWPF Melter System
ITP	In-Tank Precipitation
LCF	Latent cancer fatality
LWF	Late Wash Facility
m	Meter
M	Molar (gram molecular weight per liter)
MEI	Maximally exposed offiste individual
MFT	Melter Feed Tank
MWWT	Mercury Wash Water Tank
N_2	nitrogen gas
NaOH	sodium hydroxide
NEPA	National Environmental Policy Act
NH_3	ammonium gas

NO_2^-	nitrite ion
NWTF	New Waste Transfer Facility
OWST	Organic Waste Storage Tank
PHA	Precipitate Hydrolysis Aqueous
PPT	Precipitate Pump Tank
PVVS	Process Vessel Vent System
RCT	Recycle Collection Tank
ROD	Record of Decision
RPT	Recycle Pump Tank
SAR	Safety Analysis Report
SME	Slurry Mix Evaporator
SMEC	Slurry Mix Evaporator Condensate
SMECT	Slurry Mix Evaporator Condensate Tank
SPC	Salt Processing Cell
SPT	Sludge Pump Tank
SRAT	Sludge Receipt and Adjustment Tank
SRS	Savannah River Site
ST	sodium titanate
STPB	sodium tetraphenylborate
WSRC	Westinghouse Savannah River Company

APPENDIX A

SUMMARY OF NEPA DOCUMENTATION FOR DWPF PROCESS MODIFICATIONS

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications.

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
General DWPF			- Final Environmental Impact Statement, Defense Waste Processing Facility, SRP (1982) - Environmental Assessment, Waste Form Selection for SRP High Level Waste (1982)
In-Tank Precipitation	- Salt Decontamination Demonstration, Tank 48-H, Project S-3437, SRP (12/23/83) - Compliance with the National Environmental Policy Act, In-Tank Precipitation, Tank 48-H, Savannah River Plant (6/15/84) - In-Tank Precipitation, Tank 48-H, (H-Area), SRP Compliance with the National Environmental Policy Act (Supplement to an approved MTF) (4/18/85) - Modifications to the DWPF EIS (DOE/EIS-0082) and the Waste Form Selections Environmental Assessment (EA) (No date)	- Conduct Geotechnical Investigation, H-Area (4/21/93) SR/CX9212006 - Notice of NEPA Approval, Provide Containment Boxes for Spent Filters, H-Area (7/21/93) SR/CX9212010	
Late Wash Facility		- Notification of DOE Office of NEPA Oversight (EH-25) No Written Response to DOE Savannah River Operations Office (SR) Transmittal of NEPA Categorical Exclusion (CX) (OK #17), SR/CX9208008	

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications. (con't.)

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
Effluent Treatment Facility	- F/H Effluent Treatment Facility (ETF), Compliance with National Environmental Policy Act (NEPA) DOE (8/12/86) - F/H Effluent Treatment Facility (ETF), Compliance with the National Environmental Policy Act (NEPA) (Supplement to an approved MTF) (8/26/87)	- Notice of NEPA Approval, ETF Improved Leak Detection (11/21/91) SR/CX9111002 - Notice of NEPA Approval, ETF Liquid Scintillation Counter Room (6/16/91) SR/CX9106012 - Notice of NEPA Approval, Dividing the Control Room (1/20/93) SR/CX9201012 - Notice of NEPA Approval, S-4512, F/H ETF Cleaning System for Mercury Removal (3/11/92) SR/CX9202014 - Notice of NEPA Approval, ETF Aluminum Nitrate/Ferric Nitrate Addition System, Project S-4895 (9/28/92) SR/CX9207004 - Notice of NEPA Approval, Project S-7318: SR/CX9209001, Expanded Distribution Control System, 241-84, H-Area (2/24/93) - Notice of NEPA Approval, Project S-4536: SR/CX9203011, Retention Basin Liner Upgrade, F-Area (7/12/93) - Notice of NEPA Approval, Project S-7453: SR/CX9201012, Modify Building 241-84H Control Room, H-Area (1/20/93) - SR/CX9201010, F and H ETF Pad and Paving (S-4537), Approved under SR/CX9006017 (3/11/92)	

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications. (con't.)

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
Replacement High-Level Waste Evaporator			- EA in progress
New Waste Transfer Facility		- Notice of NEPA Approval, Project T0052: SR/CX9101007, NWTF APP, and LPPP Modifications, H and S Areas (9/18/92)	
Waste Removal		- NEPA Environmental Evaluation, Extend Administrative Building, 241-18F - Change, Project S-3291 (with CX approval attached) (4/1/91) SR/CX9006027 - CX Approval, Provide New Waste Management Control Building and Related Facilities (12/10/91) SR/CX9011014 - NEPA Environmental Evaluation, Documentation of Completion of NEPA Determination, Project S-3025, Install Waste Removal Equipment and Storage Facility F/H Area (with CX approval attached) (2/25/92) SR/CX9005004 - Notification of Department of Energy (DOE) Office of NEPA Oversight (EH-25)Non-Response to DOE Savannah River Field Office Transmittal of NEPA Categorical Exclusions (CX's) (OK#8)Construct Waste Management Works Engineering Building, H-Area (8/5/92) SR/CX9112014	

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications. (con't.)

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
H-Area Tank Farm	- Waste Management Inspection Equipment Building on the Savannah River Plant, Project S-4259 (7/20/83)	- Notice of NEPA Approval, Project S-2821: SR/CX9301001, Install Containment Building, H-Area (7/12/93) - Notice of NEPA Approval, Project S-4932: SR/CX9211005, Replace Tanks 13-16 Condensate Headers, H-Area (7/12/93) - SR/CX9108003, Pump Tank Transfer Pumps (S-4518) and SR/CX9108004, Inner Area Line Transfer and Recirculating Pump (S-4517) (9/10/91) (Both approved under SR/CX9006015) - Notice of NEPA Approval, Slurry Pump Containment (S-1588) (2/25/92) SR/CX9011010 - Notice of NEPA Approval, Whole Body Friskers, 241-H (S-4509) (11/18/91) (Approved under SR/CX9006015) - Notice of NEPA Approval, Upgrade Storm Water Monitoring System (S-3333) (6/27/90) SR/CX9004003 - Notice of NEPA Approval, Replace Tank Farm Utility Lines (S-3335) (9/17/90) SR/CX9004017 - Notice of NEPA Approval, Upgrade Tank Farm Operations (T-0047) (9/18/91) SR/CX9101002	

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications. (con't.)

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
H-Area Tank Farm (continued)		- Notice of NEPA Approval, Reroute Evaporator Condensate Drain Lines (4/21/93) SR/CX9211008 - Notice of NEPA Approval, Test and Replace Evaporator Vent Line Sections (6/22/92) SR/CX9005003 - Documentation of Completion of NEPA Determination, Project S-7458, 242-H Evaporator South Wall Shielding, Approved under SR/CX9006015 (8/27/91) - NEPA Environmental Evaluation, Install Storm Water controls, Approval under SR/CX9108027	
F-Area Tank Farm		- Notification of Approved, Provide Shelter for Tank 27 Containment Facilities (S-4689) DOE CX's (OK #6) (6/9/92) SR/CX9110011 - Notice of NEPA Approval, Project S-4804, SR CX/9208002, Construct Equipment Storage Building, 241-104F, F-Area (1/20/93) - NEPA Environmental Evaluation, Upgrade Building Public Address System, 241-F (S-3337) (6/27/90) SR/CX9004004	- Final Environmental Impact Statement, Waste Management Operations, Savannah River Plant, Aiken, South Carolina (1977) - Final Environmental Impact Statement, Supplement to Waste Management Operations, Savannah River Plant, Aiken, South Carolina (1980)

Table A-1. Summary of the Level of NEPA Documentation for DWPF Process Modifications. (con't.)

FACILITY NAME	APPROVED MEMORANDA TO FILE	APPROVED CATEGORICAL EXCLUSIONS	EA's/EIS's
Waste Management Maintenance Facility		- Notice of NEPA Approval, Upgrade of Building 299-H (11/6/90) SR/CX9008005 - Notice of NEPA Approval, Provide Waste Management Works Engineering Storage Area, Project S-3012 (7/26/90) SR/CX9002003 - Notice of NEPA Approval, Install Building 299-H Surveillance Cameras (2/7/92) SR/CX9106027 - NEPA Documentation - CX Recommendation No. 32, Upgrade of Building 299-H, Approved under SR/CX9008005	

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