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**BASIC DATA REPORT - DEFENSE WASTE PROCESSING
FACILITY SLUDGE PLANT - SAVANNAH RIVER PLANT
200-S AREA (U)**

by

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Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

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September 1982, Rev 9

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BASIC DATA REPORT
DEFENSE WASTE PROCESSING FACILITY
SLUDGE PLANT
SAVANNAH RIVER PLANT 200-S AREA

E. I. du Pont de Nemours & Company
Savannah River Plant

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DPSP 80-1033
Basic Data Report
Defense Waste Processing Facility
Sludge Plant, Savannah River Plant 200-S Area
Revision 10, 1206 pages
(Volume I, 510 pp, and Volume II, 696 pp)

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BASIC DATA REPORT STAGE 1

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SUMMARY

This Basic Data Report for the Defense Waste Processing Facility (DWPF) - Sludge Plant was prepared to supplement the Technical Data Summary. Jointly, the two reports were intended to form the basis for the design and construction of the DWPF. To the extent that conflicting information may appear, the Basic Data Report takes precedence over the Technical Data Summary. It describes project objectives and design requirements. Pertinent data on the geology, hydrology, and climate of the site are included. Functions and requirements of the major structures are described to provide guidance in the design of the facilities.

Revision 9 of the Basic Data Report was prepared to eliminate inconsistencies between the Technical Data Summary, Basic Data Report and Scopes of Work which were used to prepare the September, 1982 updated CAB. Concurrently, pertinent data (material balance, curie balance, etc.) have also been placed in the Basic Data Report. It is intended that these balances be used as a basis for the continuing design of the DWPF even though minor revisions may be made in these balances in future revisions to the Technical Data Summary.

PART TITLE: LIAISON GROUP

ITEM TITLE: Purpose

The design and construction of any project of the magnitude of the waste processing facility requires prompt, orderly, and accurate interaction between all individuals involved. These individuals share a common goal: to provide, on time, minimum essential facilities which will operate safely and economically to produce a specified quantity and quality of product.

The liaison group generally consists of representatives with process, mechanical, instrument and electrical backgrounds. They coordinate activities with plant personnel, Savannah River Laboratory, research and development, and the Design Division of the Engineering Department.

The requirement that the Defense Waste Processing Facility be designed and constructed to comply with DOE requirements necessitates that knowledgeable personnel specify the process and design and construct the facility.

The purpose of this section is to define the responsibilities of the liaison group, identify the personnel involved, establish methods of communication and documentation of decisions regarding the design and construction of the defense waste processing facility.

NEW ITEM

PART TITLE: LIAISON GROUP

ITEM TITLE: Responsibilities

Defense Waste Processing Facility (DWPF) Liaison

The primary responsibilities of the Waste Management Program DWPF Liaison Group are (1) to verify that any recommended process can be efficiently and safely operated and maintained and (2) to see that all required facilities are provided.

The liaison group reviews process recommendations and process changes by SRL from an operating and maintaining viewpoint. Functions, objectives, requirements, and equipment for all process and nonprocess buildings are specified by the liaison group. Prints, scopes of work, and design criteria are reviewed for conformance with project objectives. Replies of SRP-SRL reviewers are coordinated and prepared for the Design Division. Requests for additional or clarifying information are answered along with print comments and technical data in transmittals. Information affecting the scope of the project, funding or project schedules are transmitted by the group to the Projects Management Office of the Manufacturing Division for review.

A representative of the liaison group is expected to attend all pertinent plant design meetings between the Engineering Department Design Division specialists and SRL-SRP Engineers.

Departmental Engineer Office

The Departmental Engineer Office provides general guidance to SRL, SRP, and Engg Design Division in the definition of project objectives, evaluation of the acceptability of conceptual design, and financial planning. This office reviews SRL-SRP recommendations and attends meetings between the Engg Design Division and SRL-SRP.

SRL Defense Waste Processing Section (DWPS)

Various SRL groups perform the research and development work for new processes. The SRL-DWPS group coordinates this effort and serves as liaison between SRL and the plant in cooperation with other SRL-SRP groups, the DWPS group specifies the process, process requirements, control methods, environmental considerations, safety, etc. This information has been compiled and published in the Technical Data Summary which is revised and updated as significant developments are made. As required, programs for the development of additional experimental data will be developed. This group is also responsible for coordinating the SRL review of all Engg Department Design Division prints, scopes of work, etc., and communicating these reviews to the liaison group.

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Personnel

Listed below are personnel in the Departmental Engineer Office, DWPF Liaison and SRL with assignments related to the DWPF.

A. MANUFACTURING DIVISION - PROJECTS MANAGEMENT OFFICE

A. M. Lander AED Dept Engineer (ext 6246)
C. C. McBride Defense Waste Liaison Engineering Manager (ext 4312)

B. MANUFACTURING DIVISION - SAVANNAH RIVER PLANT OPERATIONSSRP Waste Management Programs

R. Maher Program Manager (725-3575)

C. DWPF LIAISON - SAN FRANCISCO OFFICE

J. B. Mellen Liaison Leader (882-3179)
J. A. Gentilucci (882-3178)
H. K. Bethmann (768-6899)
J. C. Eargle (882-2449)
R. M. Galloway (882-2674)
J. R. Glasscock (882-2643)
D. B. Jett (882-2592)
J. E. Koonce (882-2673)
T. T. Thompson (882-2448)
H. R. Huxford
M. C. Schroder (882-2447)
 Reporting Systems
H. H. Elder (882-2672)
D. R. Boyd (882-2450)
D. E. Wood (882-2668)

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Personnel

D. DWPF LIAISON - SRP OFFICE

B. G. Kitchen Superintendent (725-2527)

E. L. Graf (725-1185)

J. E. Callan (725-1241)

A. J. Lethco (725-1239)

R. M. Shulko (725-1003)

B. R. Moultrie (725-1364)

W. A. Murdaugh (725-1010)

A. A. Schmidt (725-3953)

J. J. Slovic (725-1106)

D. C. Nichols Superintendent (725-2136)

R. F. Rogers (725-1324)

R. G. Baxter (725-1187)

C. B. Goodlett (725-3901)

R. R. Herries (725-1238)

J. P. Moseley (Wilm - 366-2082)

R. N. Ransom (725-3950)

R. W. Zeyfang (725-2002)

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Personnel

E. TECHNICAL DIVISION - SAVANNAH RIVER LABORATORIES

S. Mirshak Director of Research (ext 3422)

1. Defense Waste Processing

J. A. Kelly	Section Director (ext 2410)
J. F. Ortaldo	Research Manager (ext 3578)
W. R. Stevens	Research Manager (ext 1120)
R. M. Wallace	Research Fellow (ext 2104)

2. Solid Processes

D. C. Witt	Supervisor (ext 9173)
T. L. Allen	Melter Process Development (ext 9195)
D. L. Pellarin	Solid Process Control, Glass Cracking (ext 9179)
C. L. Selby	Canister Decontamination (ext 9172)
H. L. Hull	PNL Liaison (ext 9181)
K. R. Routt	Vitrification Equipment Development (ext 9160)
J. W. Kelker, Jr.	Containerization (ext 9209)
C. R. Ward	Containerization (ext 9176)
G. T. Wright	Off-gas Scrubbing (ext 9193)

3. Liquid Processes

M. D. Boersma	Supervisor (ext 9139)
L. F. Landon	TDS (ext 9203)
E. J. Weber	Gravity Settling, Filtration, Aluminum Dissolving (ext 9162)
F. M. Heckendorn	Process Control (ext 9206)
P. L. Graf	Erosion Assessment (ext 9164)
D. S. Janes	SME, Filtration (ext 9230)

4. Full Scale Vitrification

F. H. Brown	Supervisor (ext 9146)
M. B. Cosper	Continuous Melter and Melter Physical Models (ext 9192)
H. C. Wolf	In-Can Melter, Off-gas Analytical Systems (ext 9180)
J. L. Kessler	Large Slurry-Fed Melter (ext 9191)
W. P. Colven	Mech. Systems for Off-gas (ext 9170)
C. T. Randall	CM Off-Gas (ext 9169)
G. A. Griffin	Instrumentation & Control Maintenance (ext 9100)
C. R. Pound	Slurry Feed Systems (ext 9153)
D. P. Lewis	Slurry Feed Systems (ext 9229)
D. M. Sabatino	Slurry Feed Systems (ext 9244)

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Personnel

5. Glass Technology

M. J. Plodinec	Supervisor (ext 2170)
N. E. Bibler	Radiation Chemistry, Glass Characterization (ext 2313)
W. N. Rankin	Canister Decon, Materials Testing (ext 2363)
G. G. Wicks	Glass Leaching (ext 3190)
T. J. Bird	Liaison for Analyses of SRP Samples (ext 2313)
D. C. Iverson	Small Scale Glass Melter (ext 1236)
P. D. Soper	Off-gas, Glass Chemistry (ext 2313)

6. Process Technology

W. V. Wright	Supervisor (ext 2947)
L. L. Kilpatrick	Full Height Ion Exchange Tracer Facilities (ext 2777)
L. M. Lee	High Level Caves Ion Exchange (ext 2777)
R. E. Eibling	Sludge Processing (ext 2369)
D. D. Walker	Ion Exchange Resins (ext 1237)
J. R. Fowler	Waste Composition (ext 2363)
B. A. Hamm	In-Tank Processing (ext 2369)

7. Waste Form Processing

R. B. Ferguson	Supervisor (ext 9183)
P. D. D'entremont	Supernate Precipitation Pump (ext 9180)
M. A. Shmitz	Supernate Precipitation Filter (ext 9207)
A. W. Wiggins	Supernate Precipitation Mixing (ext 9163)

8. Environmental Analysis and Planning

T. V. Crawford	Research Manager (ext 2767)
W. L. Marter	Environmental Radioactive (ext 2775)
J. S. Murdock	Preliminary Safety Analysis (ext 2457)
W. G. Holmes	Environmental Information Document Regulatory (ext 2434)
J. W. Morris	<u>Environmental Impact Statement</u> (ext 1226)

9. Analytical Development

W. E. Stewart	Analytical Development (ext 3438)
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10. Actinide Technology

W. S. Durant	Safety Analysis (ext 1358)
W. C. Perkins	Safety Analysis (ext 1361)
J. C. Huang	Safety Analysis (ext 1362)

PART TITLE: LIAISON GROUP

ITEM TITLE: WMP DWPf Liaison Group Design Area Responsibility List

VITRIFICATION BUILDING AND ASSOCIATED PROCESSING FACILITIES

Design Area	Title	AED Liaison	
		SF	SRP
S-100	Temporary Construction Facilities	Jett	Murdaugh
S-210	Canister Receiving and Storage Warehouse	Eargle	Callan
S-221	Vitrification Building	Bethmann	Zeyfang
S-291	Vitrification Building Ventilation Exhaust Stack	Jett	Zeyfang
S-292	Vitrification Fan House	Jett	Zeyfang
S-294	Vitrification Building Sand Filter	Jett	Zeyfang
S-320	Vitrification Equipment Exit Decontamination Facilities	Koonce	Zeyfang
S-324	Vitrification Building Hot Maintenance, Regulated and Special Shops	Wood	Slovic
S-325	Shield Windows, M-S Manipulators and Auxiliary Facilities - Vitrification Building	Wood	Lethco
S-326	Vitrification Building Cell Cranes and Auxiliaries	Wood	Slovic
S-329	Glass Frit, Misc. Feeds and Common Service Facilities - Vitrification Building	Galloway	Shulko
S-350	Glass Melt and Off-Gas Treatment Facility		
-1	Feed Receipt and Adjusting	Koonce	Zeyfang
-2	Melting	Glasscock	Baxter Moseley
-3	Off-Gas	Glasscock	Baxter Moseley
-4	Acid Hydrolysis	Bethmann	Goodlett

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: WMP DWPF Liaison Group Design Area Responsibility List

VITRIFICATION BUILDING AND ASSOCIATED PROCESSING FACILITIES

Design Area	Title	AED Liaison	
		SF	SRP
S-360	Canister Weld, Test and Decontamination Facility		
-1	Temporary Seal	Elder	Herries
-2	Canister Decon	Elder	Herries
-3	Canister Weld and Test	Boyd	Herries
S-375	Central Vitrification Control and Data Processing Facilities	--	Schmidt
S-376	Health Protection and Monitoring Facilities - Vitrification	Koonce	Zeyfang
S-378	Sample Collection and Analytical Test Facilities	Koonce	Lethco
S-380	Embedded Piping Facilities - Vitrification Bldg.	Bethmann	Zeyfang
S-381	In-Cell Interconnect & Service Jumper Facilities	Bethmann	Zeyfang
S-383	Process, Service, Gang Valve & Misc. Header Piping - Vitrification	Bethmann	Zeyfang
S-390	Vitrification Bldg. Air Supply System, H&V & Auxiliary Facility	Jett	Zeyfang
S-391	Vitrification Bldg. Exhaust Air System, Fans, & Auxiliary Facility	Jett	Zeyfang
S-395	Vitrification Bldg. Vessel Vent, Sump Collection & In-Cell Common Facility	Galloway	Zeyfang
S-422	Vitrification Facility - Bulk Frit & Mi. Feed Storage Facility	Eargle	Shulko
S-511	Pump Pit/Diversion Box Facilities	Eargle	Ransom
S-550	Interarea Transfer Lines - Vitrification (End-to-End)	Eargle	Ransom
S-704	Central Administration & Control Bldg. - Vitrification	Eargle	Lethco

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: WMP DWPF Liaison Group Design Area Responsibility List

VITRIFICATION BUILDING AND ASSOCIATED PROCESSING FACILITIES

Design Area	Title	AED Liaison	
		SF	SRP
S-956	Emergency Electrical Generation Facility - Vitrification	--	Schmidt
S-986	Compressed Air Facilities	Boyd	Slovic
S-999	Extra Machinery - Vitrification	Wood	Slovic

Glass Waste Storage Facilities

S-250	Glass Waste Lag Storage Bldg.	Galloway	Callan
S-450	Glass Waste Storage & Transfer Handling Facilities	Galloway	Callan

Power, General, and Service Facilities

S-600	Site, Roads, Walks, Fence, Parking, & Railroad Facilities - Vitrification	Boyd	Lethco
S-698	Landscaping & Erosion Control Facilities - Vitrification	Boyd	Lethco
S-701	Gatehouse & Patrol Headquarters Bldg.	Boyd	Lethco
S-802	Outside Overhead (OSOH) Process, Power & Service Piping Facilities - Vitrification	--	Ransom
S-803	Outside Underground (OSUG) Process, Power & Service Piping Facilities - Vitrification	--	Ransom
S-821	Storm Sewer Facilities - Vitrification	Boyd	Shulko
S-831	Sanitary Sewer Facilities - Vitrification	Boyd	Shulko
S-901	Fire Protection Facilities - Vitrification	--	Lethco
S-905	Water Wells 1 and 2 & Auxiliary Facilities	Boyd	Shulko

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: WMP DWPf Liaison Group Design Area Responsibility List

VITRIFICATION BUILDING AND ASSOCIATED PROCESSING FACILITIES

Design Area	Title	AED Liaison	
		SF	SRP
S-951	Primary and Secondary Substations & Auxiliary Facilities	--	Moultrie
S-953	Electrical Distribution Lines, OSOH/OSUG - Vitrification	--	Moultrie
S-958	Communications, Safety, Alert, & Fire Alarm System - Vitrification	--	Moultrie
S-980	Primary Water Treatment, Water Storage & Chemical Waste Treatment Facilities	Boyd	Shulko
S-981	Service Cooling Tower & Auxiliary Facilities	Boyd	Shulko
S-995	Central Refrigeration Facilities - Vitrification	Boyd	Slovic
	Saltcrete	--	Goodlett
	Technetium Removal	--	Goodlett
	Process Hazards Review	Thompson	Lethco
	Quality Assurance	Thompson	Lethco
	Permits	--	Shulko
	SAR	Thompson	Shulko
	Basic Data Report	Elder	Shulko
	Pump Task Force	--	Slovic
	CCTV Task Force	Wood	Schmidt
	Melter Task Force	Glasscock	Baxter Moseley
	Canister Decon Task Force	Elder	Herries
	Tolerances	Jett	Ransom Slovic

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Correspondence

a. General

- 1) Correspondence to SF DWPF Liaison group issued by the Engineering Department should be addressed as shown in Design Procedure DPE-3507 and mailed to:

J. B. Mellen

- 2) Correspondence to SRP DWPF Liaison group should be mailed to:

B. G. Kitchen
P. O. Box 757
Jackson, SC 29831

Copies of correspondence Items 1) and 2) will be made and distributed to DWPF Liaison group as required. One copy will be reserved for the DWPF Records Information Management System. Additional copies are to be made for other groups as appropriate.

- 3) Transmittal letters and prints are to be addressed to:

J. A. Gentilucci, SF, with a carbon copy to A. J. Lethco, P. O. Box 757, Jackson, SC 29831.

These transmittals and prints are to be distributed to the responsible engineers. A copy of each print and transmittal will be maintained in an area file office. Transmittals will be logged in and a print out of each weeks receipts will be issued weekly to DWPF Liaison and SRL.

- 4) Correspondence from the DWPF Liaison to Design Division should be assigned a document number and routed as shown in DPE-3507, Design Procedure DWPF Part 3, Item 101, Page 4. A file code is to be assigned to each letter.

COMPLETE REVISION

PART TITLE: LIAISON GROUP

ITEM TITLE: Communication

1. Telephone

Design specialists may contact any SRL-SRP engineer concerning additional or clarifying information on a specific subject. However, SRL-SRP engineers are not authorized to issue any verbal instructions that will alter the scope of the project. These instructions must be forwarded in writing through the DWPF Liaison group.

2. Electronic Mail

Electronic mail can be scheduled by Lynn Ferguson, 773-29A, ext. 725-2506. The data phone number is extension 725-1107. The data phone is located in 773-29A-2.

3. Telecommunications

Teleconferencing by phone or slow scan TV may be scheduled by contacting J. Arbogast, 773-28A, ext. 1028.

The phone numbers for teleconferencing are:

Ext. 725-1441 - Teleconferencing Phone

Ext. 725-1438 - Data Phone

Ext. 725-1442 - Trouble Shooting Phone

All phones are located in 773-29A-8.

4. Whisper Writer

Messages for the whisper writer are to be sent and received by J. Arbogast, 773-28A-8, ext. 1028. The Whisper Writer phone number is extension 2425. All messages that are received will be delivered to the addressee with carbon copies as directed. All messages with ID numbers will be filed in the area correspondence file.

COMPLETE REVISION

PART TITLE: OBJECTIVES

ITEM TITLE: General Project Objectives

Background

The Savannah River Plant (SRP) occupies an approximately circular area of 300 square miles (192,000 acres) in South Carolina, 25 miles southeast of Augusta, GA (Figure 2-1, Appendix B). The site borders the Savannah River for approximately 17 miles. The plantsite has an elevation between 90 and 400 ft above mean sea level. The plantsite is closed to the public except for guided tours, controlled deer hunts, controlled through traffic along South Carolina Highway 125 (SRP Road A) and along the Seaboard Coastline Railroad, traffic on U.S. Highway 278 along the north edge of the site (Figure 2-2, Appendix B), and authorized environmental studies.

SRP was constructed during the 1950's to produce the basic materials, primarily ^{239}Pu and tritium, used in the fabrication of nuclear weapons. **The plant facilities (Figure 2-2, Appendix B) consist of three operating nuclear production reactors (in P, K, and C Areas), two nuclear production reactors in standby condition (in R and L Areas), a small test reactor in standby condition (in U Area), two separations areas (F and H Areas) for processing irradiated materials, a heavy water recovery plant (in D Area), a fuel and target fabrication facility (in M Area) containing two test reactors, the Savannah River Laboratory (SRL; a process development laboratory to support production operations), administration facilities (in A Area), and the many non-nuclear facilities necessary for plant operations.**

The storage areas for high level liquid waste are adjacent to the separations areas and consist of two tank farms linked to the separations areas and to each other by pipelines with secondary containment. In addition, a 195-acre burial ground area located between F and H separations areas is used for controlled storage of solid radioactive wastes. The waste storage areas are at least 6 miles from the nearest plant boundary.

The wastes produced in the F- and H-Area canyons are neutralized to an alkaline pH and transferred to the waste tank farms. After aging for 2 to 3 years, during which the insoluble hydroxides settle, the supernatant liquid is evaporated in a bent tube evaporator. The evaporator bottoms are transferred to another waste tank and allowed to cool, thereby depositing a wet salt cake. Excess liquid above the salt cake is recycled back to the evaporator system. The F- and H-Area waste tank farms each have two bent tube evaporators.

PART TITLE: OBJECTIVES

ITEM TITLE: General Project Objectives

At present, SRP has 37 large subsurface tanks for the storage of aqueous radioactive wastes as sludge, supernatant liquid of various salt concentrations, and salt cake. (Tank 23, one of the 37, has been reserved as a hold tank for resin regeneration wastes from the fuel storage basin.) Nineteen of these tanks are adjacent to one separations plant (H Area) and 18 are adjacent to the other (F Area). Fourteen additional tanks are either under construction or planned. Figures 2-3 and 2-4, Appendix B show the two separations areas with adjacent waste tanks.

SRP waste storage tanks are of four basic designs. As a result of tank upgrading and retirement programs, 23 tanks will be retired and all waste tanks in use in 1987 (with the exception of type IV tank 23 for RBOF service) will be of type III or IIIA construction. Type III and IIIA tanks are 1.3 million-gal tanks with double-steel bottom and sidewall construction.

General Project Objectives

The general project objectives for the Defense Waste Processing Facility (DWPF) are to:

1. **Process the liquid high-level radioactive wastes from the separations areas into solid matrices to reduce the mobility of the radionuclides. Insoluble radioactive waste (sludge) and radionuclides removed from decontaminated soluble waste (salt) will be immobilized in glass. The function of facilities described in this document is to immobilize the highly radioactive sludge. The facility will receive sludge which has been treated with caustic to reduce the volume of insoluble aluminum and washed to remove soluble sodium salts. The washed sludge will be incorporated into leach-resistant glass in sealed containers which will be stored onsite until a federal repository is available.**
2. Design, construct, and operate the facilities for processing and storing the solidified waste in a manner that will keep the radiation exposure of plant personnel and the general public to as low a value as practical.
3. Provide facilities to ensure that any liquid or gaseous effluent from the plant meets applicable federal and state regulations.
4. Minimize the cost of the facilities insofar as is consistent with the objectives stated herein. The design of DWPF should include provisions to make the construction and operation of later possible additions more convenient or less costly only to the extent that these provisions do not significantly increase the cost of the present project.

PART TITLE: OBJECTIVES

ITEM TITLE: Production Capacity

In 1988, about 4 million gallons of sludge slurry will be available for processing. The capacity of DWPF should be sufficient to reduce stored waste to a current inventory within about 20 years after startup. A current inventory of waste sludge is that aged less than five years. An instantaneous glass production rate of about 225 lb/hr at an overall attainment of greater than 75% will meet the work off period objective.

****COMPLETE REVISION****

PART TITLE: OBJECTIVES

ITEM TITLE: Objective Start-Up -- Total Facility

****Sludge Plant Project Timing****

1. Turnover of the processing building should be based on anticipated project authorization and assuming a normal 40-hour construction work week. All other turnover dates are referenced to the turnover date for the processing building and assume a 12-month period for checkout of process equipment, tank calibration, cold chemical runs, etc.
2. The turnover date for the sand filter, fan house, and exhaust stack should lead the turnover date for the process building.
3. ****The turnover date for the receiving and service building and cold feed facilities should lead the turnover date for the process building. The facilities will be required during the water, acid, and caustic checkout runs of process building equipment. The office area of the service building should be completed as early as possible to provide office space for construction checking personnel****
4. The turnover date of the interim glass waste storage facility should not be later than 3 months after the turnover date of the process building. For functional checkout, the storage area will receive the first storage containers filled with glass from simulated waste during the first year of cold chemical operations.
5. Maintenance and Electrical & Instrument shops should be turned over to operations about 1 month before the process building turnover. If a separate area shop building is provided, offices, lunch rooms, etc. should be completed as soon as possible after project authorization. These facilities will be used by Works Engineering personnel during construction checking.
6. Facilities and some equipment for Patrolmen will be required as soon as the construction area is enclosed within a fence. The Patrol ****headquarters**** should be completed as soon as possible after project authorization. Until the building is completed, temporary buildings for Patrolmen plus some equipment will be required at all entrances into the construction area.
7. The turnover date for interarea transfer facilities should be at least 3 months before turnover of the processing building.
8. The turnover date for facilities required for comfort conditioning of various area buildings should be based on the earliest anticipated facility turnover.

PART TITLE: OBJECTIVES

ITEM TITLE: Objective Start-Up -- Total Facility

9. Generally, the vehicles or mobile equipment to be purchased by AED will not be required until turnover of the facility. However, the vehicles assigned to Safety and Security Department for patrol purposes should be procured at the time the construction area is enclosed by a fence.
10. It is desirable that the turnover date for the Administration Building should be as soon as possible after project authorization to house operations personnel assigned to construction checking. If the Administration Building is not available, AED will provide temporary housing (possibly trailers) to be located as conveniently as possible to the construction site.

Assuming that the patrol headquarters and administration buildings are combined, it may be desirable that the sections of the building be turned over to operation separately to achieve an early occupancy.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: General Site Requirements

The following factors are to be considered in choosing a site location. The factors are listed in decreasing order of importance and are to be used only insofar as the soil conditions, terrain, etc. of the chosen site are consistent with good economics and engineering standards of construction.

1. The waste processing facility should be in close proximity to F and H separations areas and the tank farm areas to minimize the distance of transfer of radioactive liquids through pipelines.
2. The facility should be as far as possible from plant boundaries to minimize the potential impact of any routine or accidental stack releases to offplant population.
3. The facility should be as far as possible from rivers, creeks, and flowing streams to reduce the risk of any radioactive liquids being accidentally released to the stream.
4. In choosing a site, the economic advantages and disadvantages of utilizing existing plant facilities such as paved roads, railroads, laundry, fire protection, employee travel, etc., shall be considered.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Specific Siting Requirements -- S-Area Facilities

The following factors shall be considered in determining the location of specific buildings in the area.

1. Consideration shall be given to potential accidental releases of gaseous effluents that might involve the main area entrance, employee parking lot, and building air intakes.
2. Railroad entrances to the area and buildings should be at a location that will minimize interference with vehicular traffic patterns.
3. Where possible, pipelines carrying radioactive liquids should avoid railroads and frequently used roadways to reduce the potential for damage to the pipelines and subsequent exposure of personnel to radiation or release of contamination to the environment.
4. Parking lots and buildings, especially those with the most workers, should be located to minimize walking times and avoid crossing of vehicle and pedestrian traffic as much as practical.
5. Whenever it is consistent with safety, security, and process operations, energy conservation shall be considered in all designs. The buildings should be designed using the latest energy conservation techniques.
6. Provide space for expansion of the vitrification process building, the glass storage building, the sand filter and other facilities as stated in Part 4, Item 220.
7. Locate buildings to the extent practical to minimize the length of seismic resistant exhaust air tunnels. See Part 11, Item 490 for restrictions on siting the main air exhaust stacks.
8. **The Service and Interim Storage Buildings should be located to minimize handling of full and empty canisters within and between buildings.**

INFORMATION ONLY

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Specific Siting Requirements -- Inter-Area Facilities

The following factors shall be considered in determining the location of pump pits, diversion boxes, and transfer lines.

1. Consideration shall be given to potential accidental release of radioactive liquid, especially from diversion boxes and pump pits. There is also potential for release of airborne radioactive dust from these facilities.
2. Where possible, pipelines carrying radioactive liquids should avoid railroads and frequently used roadways to reduce the potential for damage to the pipelines and subsequent exposure of personnel to radiation or release of contamination to the environment.
3. A pump pit shall be sited so that all transfer lines are free draining.
4. Pump pits should be located as near as practical to existing or new sources of utilities such as steam, plant and instrument air, electrical service, and cooling water.
5. Transfer lines for radioactive materials must be adequately shielded and above the water table.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Roads, Railroads, Parking, Fencing, etc.

1. Railroad access will be required to receive cold chemicals and empty glass canisters.
2. Combined rail-truck access to the main process building is required with direct access to the process cell to permit loading the largest piece of building equipment from the process cell directly into a covered burial container on a railroad car or truck bed within the shielded and confined area of the process building.
3. **Truck loading docks will be required at the main process building, the service building and at other areas and buildings for occasional unloading of supplies.**
4. An employee private vehicle parking lot should be provided for 105 cars based on an average of 1.9 employees per car and an estimated work force of 122 day employees and 29 employees on each rotating shift plus an allowance of 10% excess. Use du Pont Civil Engineering Standard C7R for detailed design criteria for parking lots. Provide a three-sided metal shelter at the employee parking lot for employees waiting for carpools.
5. Access to S-Area should be from both Roads 4 and F via a continuous road between Roads 4 and F.
6. Fencing around the perimeter of the area should prevent unauthorized personnel from wandering into hazardous work areas. For permanent fences use No 11 AWG or heavier wire fabric topped by three strands of barbed wire to make a minimum overall height of eight (8) feet. Equip unattended openings of more than 96 sq. in. or over 6 in. in the smallest dimension with wire mesh (maximum 2-in. mesh with No 11 AWG wire or expanded metal) or 1/2-in. metal bars on not more than 6 in. centers and with cross bars to prevent spreading. Use heavy duty hardware; peen, braze or spot weld any hardware accessible from the outside.
7. Perimeter fencing should be at least 50 ft and not more than 500 ft from buildings as specified in Reference C-4, Appendix C. There should be a cleared area of at least 20 ft outside the perimeter fence.
8. General area lighting should be provided for the gate house and gate area, parking lots, perimeter fences and other locations requiring outdoor lighting for general safety and security. See Table 3-1, Appendix A for lighting requirements. Whenever possible, consider using energy-saving, low-maintenance lighting systems and fixtures (such as high pressure sodium lamps) to minimize energy requirements.

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PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: History

Information on the Savannah River Plant site and Waste Management Operations at the Savannah River Plant has been compiled and previously published (References C-1, C-2, and C-2). Pertinent information from these references has been excerpted and is reproduced here in subsequent Items 205 through 500 of Part 3. This information is intended only as general background information until a Preliminary Safety Analysis is published. The Preliminary Safety Analysis will provide more specific and detailed information on site characteristics.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Geology -- Topography

The plant is located in the Coastal Plain geologic province as shown in figure 3-1. This province is characterized by flat, mostly unconsolidated sediment of Cretaceous age or younger. About 20 miles northwest of the plantsite is the lower edge of the Piedmont Plateau; (the other main geologic province in South Carolina).

On the site, two distinct physiographic subregions are represented (figure 3-2): the Pleistocene Coastal Terraces (below 270 ft in elevation) and the Aiken Plateau (above 270 ft and rising to 400 ft on the northwest boundary).

At least three terraces are recognizable within the coastal terraces subregion (figure 3-2). The lowest terrace (Wicomico, 100 ft) is the very broad floodplain of the Savannah River; it is largely covered with a dense swamp forest. The higher terraces (Sunderland, 170 ft, and Brandywine, 270 ft) have a level-to-gently-rolling topography. Before the establishment of SRP, the areas where soils and drainage were favorable were extensively cultivated.

The Aiken Plateau was once a relatively smooth, gently sloping area with a regional slope to the southeast. However, the plateau has been deeply eroded by numerous drainage tributaries. Those interstream areas underlain exclusively by Cretaceous sediments are characterized by gently rolling hills and few, if any, undrained areas. Those interstream areas with a thin cover of Tertiary sediments are characterized by plateaus with steep ravines and numerous undrained "sinks" or "Carolina bays."

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Geologic Formations Beneath The Savannah River Plant

SRP is underlain by a sequence of unconsolidated and semiconsolidated upper Cretaceous, Tertiary, and Quaternary sediments^a deposited on an eroded basement of Precambrian and/or Paleozoic igneous and metamorphic rocks (figure 3-3). These basement rocks consist of gneiss and schist, and are at a depth of about 900 ft at SRP. They are part of the crystalline rock formations, which outcrop at the Fall Line, and separate the Piedmont Plateau and the Coastal Plain, and dip 36 ft/mile to the southeast underneath the Coastal Plain sediments.

The sediments form a wedge ranging in thickness from a few feet at the Fall Line to more than 1,200 ft on the southeastern or downdip side of the plantsite. They strike in an average direction of N60°E and dip from 6 to 36 ft/mile to the southeast. The sediments are unbroken by large displacement faults or severe unconformities.

A large Triassic deposit in a basin of the crystalline rock underlies one-third of the plant area and is located in the southeastern section of the site. This deposit consists of sedimentary material formed into sandstones, siltstones, and mudstones.

The geologic formation that immediately overlies the basement rock is called the Tuscaloosa formation and is 500 to 600 ft thick. This formation consists of sand and clay and contains several prolific water-bearing beds, which supply over 1,000 gal of water per minute to each of several plant wells.

Overlying the Tuscaloosa formation are several formations of the Tertiary Period that range in age from about 10 million to about 50 million years. These formations have a combined thickness of about 350 ft in the central part of the plant. They consist predominantly of compact clayey sand and sandy clay with a few beds of sand and few beds of hard clay. At depths ranging from about 100 to 180 ft, there is a zone in which the sandy deposits include calcareous cement, small lenses of limestone, and some shells. At scattered discontinuous localities, slowly circulating ground water has removed this calcareous material and left these lenses less consolidated than the sedimentary rock surrounding them.

^a Tertiary sediments include the Paleocene, Eocene, Oligocene, Miocene, and Pliocene epochs. Quaternary sediments include the recent Pleistocene epoch.

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PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Geologic Formations Beneath the Savannah River Plant

At some places on the plant, the rocks of the Tertiary Period are overlain by more recent terrace deposits of alluvium. These deposits are usually thin in the upland areas, but are of significant thickness in the valleys of the Savannah River and some of its larger tributaries.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Hydrology and Surface Water

Almost all of the plantsite is drained by tributaries of the Savannah River. Only one small stream in the northeastern sector of the site drains to the Salkehatchie River to the east. Each of the tributaries is fed by small streams; therefore, no location on the site is very far from a continuously flowing stream.

In addition to the flowing streams surface water is held in over 50 artificial impoundments covering a total of over 3,000 acres. The largest of these impoundments, Par Pond, has an area of 2,640 acres. Water is held intermittently in marshes and over 200 natural basins or Carolina Bays. The large swamp bordering the Savannah River is crossed by several of the streams.

The five main streams on the plantsite are Savannah River tributaries. They arise on the Aiken Plateau and descend 100 to 200 ft before discharging to the river. On the plateau, the streams are clear except during periods of high water. Rainfall soaks into the ground, and seepage from the sandy soil furnishes the streams with a rather constant supply of water throughout the year.

The five tributaries are Upper Three Runs, Four Mile Creek, Pen Branch, Steel Creek, and Lower Three Runs (figure 2-2). Two of these streams, Upper Three Runs and Four Mile Creek, are close to the F and H separations areas.

Surface water on the plant is very low in dissolved solids (less than 50 ppm) and iron and is very soft. All streams have pH values between 6 and 7.

Upper Three Runs, the longest of the plant streams, differs from the other four streams in two respects: it is the only one with headwaters arising outside the plantsite, and it is the only one that has never received heated discharges of cooling water from the production reactors.

Upper Three Runs drains an area of about 190 square miles. Its significant tributaries are Tinker Creek and Tims Branch. Tinker Creek is a rather lengthy headwaters branch. Tims Branch receives industrial wastes from the fuel fabrication facilities in M Area and from SRL; it flows through an impoundment, Steeds Pond. The M-Area effluent flow averages about 1 cfs. In July 1972, Tims Branch flowed at 1.6 cfs below Steeds Pond and 4 cfs just before discharge into Upper Three Runs.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Hydrology and Surface Water

The flow and temperature of Upper Three Runs have been monitored at the highway 125 crossing. Fourteen flow measurements between 1960 and 1966 ranged from 193 to 529 cfs and averaged 265 cfs. Flows measured in June and July 1972 were 345 and 195 cfs, respectively.

The average temperature for 1959 to 1966 was 16.9°C, with a maximum monthly average of 23.0°C in July.

Upper Three Runs is designated as a national hydrologic benchmark stream by the United States Geological Survey (USGS). In benchmark streams, the water quality, temperature, and flow are measured monthly to provide hydrologic data for a river basin in which the hydrologic regimen will likely be governed solely by natural conditions. The thermal effects laboratory has been established on Upper Three Runs Creek just downstream from F Area; the creek water flow is used in the research done there.

Four Mile Creek follows a generally southwesterly path to the Savannah River for a distance of about 15 miles. In the swamp along the river, the creek flow partially empties into Beaver Dam Creek which is a much shorter stream that discharges into the river. The remainder of the Four Mile Creek flow discharges through an opening in the levee between the swamp and the river, seeps through the levee into the river, or flows down the swamp and mixes with Steel Creek and Pen Branch.

Four Mile Creek and Beaver Dam Creek together drain about 35 square miles and receive discharges from four plant areas. Four Mile Creek receives effluents from F and H separations areas and the reactor cooling water discharge from the C-Area reactor. The average flow upstream of any plant discharge is less than 0.5 cfs and is increased by F and H Area effluents and drainage to about 20 cfs just above the confluence with the reactor discharge. After the junction with the reactor cooling water, the creek flows about 7 miles before entering the river swamp. Beaver Dam Creek receives 65 to 130 cfs of effluent from the heavy water production process and the associated power plant in D Area.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Hydrology and Ground Water

Water for domestic and process use will be obtained from deep wells in the vicinity of the processing facility because of the distance from the river.

The normal water table has not been well defined north of Upper Three Runs Creek. The highest recorded elevation south of Upper Three Runs is 286 ft above mean sea level recorded near H Area on March 30, 1965. Along the Savannah River at the southeast corner of the plant, the elevation is about 80 ft above mean sea level.^a Local levels in the water table are modified by elevations of the drainage courses and variation in the permeability of the subsoil. In some areas, the water table and creek flow are sustained both by artesian water rising from the Tuscaloosa formation and by rainfall.

The ground water from all aquifers in the area has a chemical composition within limits for potable water defined by the U.S. Public Health Service. However, some samples have very high concentrations of iron. The temperature of ground water from all aquifers is between 65.5 and 71°F. Table 3-2 compares the chemical compositions of characteristic ground water samples from different aquifers.

^a At SRP, the nominal level of the river varies from about 84 ft above mean sea level near the upper plant boundary to about 80 ft at the lower boundary.

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PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Water From the Tuscaloosa Formation

The Tuscaloosa formation is the principal aquifer in the SRP area and is under artesian pressure over much of the area. The aquifer is recharged predominantly through the Tertiary cover in the high areas around Aiken. Water movement in the aquifer at the plantsite is toward the piezometric low along the Savannah River downstream from Augusta.

Water from the Tuscaloosa formation is generally soft, acidic, and low in dissolved solids. The concentration of alkali ions (sodium and potassium) is about equal to that of the alkaline earths (calcium and magnesium), and the number of sulfate, chloride, and nitrate ions exceeds the number of bicarbonate ions. Although little fluoride ion is found, it does occur in some locations in concentrations up to 0.1 ppm. Water from the Tuscaloosa formation is corrosive to most metal surfaces because of the very low concentration of dissolved solids and low pH. This is especially true where the water contains appreciable amounts of dissolved oxygen and carbon dioxide. Such water causes iron pipe to deteriorate rapidly and to discolor the water flowing through it.

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PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Water From The Ellenton Formation

Wells screened in the Ellenton formation generally do not have the capacity to yield as much water as the permeable materials in the underlying Tuscaloosa formation. Because there is no continuous bed of clay separating the two formations, they act as one aquifer.

Water from the Ellenton formation generally has a low concentration of dissolved solids, a low hardness, a high content of iron, and a comparatively high proportion of sulfate among the ions. The ratio of sulfate ion concentration to total anion concentration ranges from 35 to 65%. The dissolved silica is a relatively constant 22 to 28% of total dissolved solids. The concentration of calcium ions is in excess of the concentration of bicarbonate ions; this may be caused by scattered crystals of gypsum (calcium sulfate) in the Ellenton formation.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Water From The McBean and Congaree Formations

The McBean and Congaree formations consist of (1) fine-to-medium sand, (2) green glauconitic marl and clayey sand, (3) laminated beds of red-brown or yellow semiplastic to nonplastic clay, (4) impure beds of soft fossiliferous limestone or marl, and (5) lenses of silicified limestone.

The fine-to-medium sand sections and the limestone section are water bearing and yield moderate-to-sizeable quantities of water to industrial and municipal wells in the area near SRP. Next to the Tuscaloosa formation, the McBean and Congaree formations are the most prolific aquifers in the area.

These formations are recharged in the topographically higher regions of SRP and discharge into the major drainageways on the plantsite such as Upper Three Runs, Four Mile Creek, and Steel Creek. Some water also discharges to the Savannah River and some migrates down dip to discharge by upward vertical leakage to overlying formations. Artesian conditions prevail over the greater part of the extent of the aquifer, and wells in the southern and southeastern part of the plantsite flow quite freely from the calcareous beds of the formation.

Water from the sandy parts of the McBean and Congaree aquifers is similar in chemical composition to that from the Tuscaloosa formation. In general, the water is acidic and low in dissolved solids. Water circulating through limestone beds in the McBean formation contains alkaline earth metals in excess of the alkali metals, and the bicarbonate ion is in excess of the total concentration of other anionic constituents. This composition is commonly found in waters circulating through deposits made up predominantly of calcium carbonate. This water also contains higher concentrations of silica than water from any other formation at SRP.

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PART TITLE: SITE CONCENTRATIONS

ITEM TITLE: Water From The Barnwell Formation

The Barnwell formation of Eocene age is a deep-red fine-to-coarse clayey sand and compact sandy clay. Parts of the formation contain mottled-gray or greenish-gray sandy clay and ledges of ferruginous sandstone. Small quantities of water are obtained from the Barnwell formation at some locations, but ordinarily, large supplies of water are not to be expected.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Hydrology of the Chemical Separations Areas

F and H-Areas are both located on relatively high ground between Upper Three Runs and Four Mile Creek. The locations of the F- and H-Area tank farms and the interarea waste transfer lines are indicated in Figure 3-4, Appendix B. The surface drainage from both F and H Area flows toward both Four Mile Creek and Upper Three Runs. Because of the water table contours, drainage from the F-Area tank farm into the ground divides with some flowing toward Upper Three Runs and some flowing toward Four Mile Creek (Figure 3-5, Appendix B). Drainage from H Area into the ground flows toward Upper Three Runs. Figure 3-6, Appendix B shows the depth below the surface of the maximum water table that occurred in March 1965. The location of the proposed waste processing facility is shown in Figure 3-7, Appendix B.

The tank arrangements in each area are shown in Figures 2-3 and 2-4, Appendix B. For each group of completed tanks, Table 3-3, Appendix A lists the tank type; elevations of the ground surface, tank top, and tank bottom; and high and low recorded water table.

The results of detailed studies on the plantsite reveal how the geology and hydrology of the site affects ground water movement. Differences in the piezometric head (water pressure) measurements show the direction that ground water flow will take. Figure 3-8, Appendix B shows the vertical distribution of hydrostatic head in ground water near H Area, measured with six piezometers near the H-Area waste tank farm and four other piezometers outside H Area. Downward percolation of water from the water table is indicated by decline to minimum head in the Congaree formation. In the two piezometers (1D and 1E of Figure 3-8, Appendix B) above the tan clay, the decline is probably fairly uniform with depth. Across the tan clay (1D to 1C), the decline is relatively abrupt (about 12 ft of head decline in 18 ft of depth). The tan clay, maximum 12 ft thick, is sufficiently impermeable to divert some of the water laterally to creeks, the nearest being several thousand feet away.

Within the fairly permeable sands of the McBean formation, the head declines only 2 ft in approximately 50 ft of geologic material (1C to 1B). The green clay shown on Figure 3-8, Appendix B is one of the more significant hydrologic units in the region; it is only 6 to 10 ft thick in H Area (although somewhat thicker elsewhere), and its importance is easily missed if only drilling information is available. The 80-ft decline in piezometric head (1B to 3B, 1A) across the green clay indicates that the clay is continuous over a large area and has low permeability. Thus the green clay also diverts water laterally to creeks that have eroded down into the McBean formation. These points of discharge are farther from H Area than the discharges from the Barnwell formation.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Hydrology Of The Chemical Separations Areas

Ground water in the Congaree zone below the green clay also discharges into Upper Three Runs. This formation has the lowest hydrostatic head. The Ellenton formation has a head approximately 7 ft higher than the Congaree, thus indicating that the Ellenton is not receiving water from the Congaree formation.

Head is uniform in the three Tuscaloosa piezometers (P3C, P3B, P3A), lower than that in the Ellenton formation (DRB7WW), but higher than that in the Congaree. Both the recharge and discharge regions of the Tuscaloosa formation are principally off the plantsite, and they control its water level within the plantsite.

Piezometric contours for the Tuscaloosa formation (Figure 3-9, Appendix B) indicate that the Tuscaloosa water flows from the Aiken Plateau in a curved path to the Savannah River valley. This lateral flow through the very permeable formation supports the Tuscaloosa water level on the plantsite. Recharge by vertical percolation from above probably does not occur at SRP. The Tuscaloosa aquifer underneath a portion of southeastern Georgia also flows toward and outcrops in the Savannah River valley as shown in Figure 3-9, Appendix B.

The water table elevations of H-Area wells range from 107 to 120 feet below grade with drawdown ranging from 26 to 39 feet after pumping at 1000 gpm for 24 hours. See Table 3-12, Appendix A for detailed information.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Temperature, Humidity, and Precipitation^a

The average Augusta winter temperature is 48°F, the average summer temperature is 80°F, and the annual average is 65°F. The average daily temperature variation is about 20°F. Additional temperature data covering a 77-year period are given in table 3-4 along with relative humidity data. The average relative humidity for Augusta is 70%.

The highest, lowest, average high, average low, and average temperature at SRP for the years 1961 through 1972 are given in figure 3-10. Observed temperature extremes measured at Augusta and SRP are listed in table 3-5.

The average minimum temperature and the total time that the temperature is less than 32°F in Augusta are listed in table 3-6 for the years 1966 through 1972.

The average annual rainfall at SRP was 47 in. for the years 1952 through 1972. Total annual rainfall measured at SRP for 1952 to 1972 is given in table 3-7. The recorded maximum annual precipitation in Augusta occurred in 1929 (73.82 in.); the recorded minimum, 1933 (28.05 in.).

The observed rainfall for 1971 and 1972 at different locations on the plant and in Augusta is given in figure 3-11. Precipitation is higher at all locations onplant than in Augusta with considerable variability among the sites at SRP.

On the average, rainfall is greatest in March and least in November (table 3-7). Hourly observations in Augusta indicate that the intensity of rainfall is usually less than 0.5 in. per hour, although the rate may reach 2.0 in. per hour in the summer.

Snowfall and freezing rain, which are infrequent during the winter months in the SRP area, does not cover the ground for more than a few days.

^a Meteorological data for Augusta cited in this report were obtained from a series of annual reports entitled "Local Climatological Data Annual Summary with Comparative Data, Augusta, Georgia," published by the U. S. Department of Commerce.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Wind

Wind data are obtained from two locations in the vicinity of SRP: the National Weather Service in Augusta and an instrument television tower within 15 miles of the center of SRP. Differences in the data are expected due to differences in height above ground level from which the data were obtained and topographical differences. The National Weather Service instruments are located at the Bush Field Airport which is in the Savannah River valley at an altitude of about 130 ft above mean sea level. Wind channeling effects in the valley could cause some bias from the northeast direction. The television tower at Beech Island is at a higher altitude (380 ft) and, therefore, should be relatively free of directional bias due to local topography.

There are also surface effects with respect to measured wind velocity. The velocity generally increases as a logarithmic function of height near the ground surface. Departures from the logarithmic function occur due to variations in atmospheric stability.

The average hourly wind velocity for Augusta was 6.4 mph (measured at a height of 20 ft) for the years 1950 to 1955.

The frequency of wind speed as a function of height on the television transmission tower near SRP is given in table 3-8. These data show that at 120 ft above the ground, speeds of less than 2 m per second (approximately 4 mph) occur 15% of the time with frequency decreasing with elevation. That this is so much less than indicated for Augusta is due to two reasons: more sensitive instruments on the television tower and greater height above the ground. The most frequent wind speed at 120 ft above the ground is 2 to 5 m per second.

The occurrence of a hurricane along the coastal region does not generally mean that SRP will be subjected to winds of hurricane force. SRP is 100 miles inland, and the high winds associated with hurricanes tend to diminish as the storms move over land. Winds of 75 mph were measured by anemometers mounted at 200 ft only once during the history of SRP -- during the passage of hurricane Gracie to the north of the plantside on September 29, 1959.

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PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Wind

The prevailing wind direction, by month, is given in table 3-9 based on a 9-year record at Augusta. Wind direction frequency near SRP is shown in figure 3-12 as the percent of time the wind was blowing from different directions. This figure represents data obtained at an elevation of 300 ft (supplemented with data from elevations of 120 and 450 ft) from the instrumented television tower near SRP over a 2-year period (1966-1968). For the period measured, there was a preference for winds from the southwestern quadrant with a secondary maximum for winds from the northeastern quadrant.

The daily shift of prevailing wind at Augusta, as shown in table 3-10 is as much as 180° from day to day throughout the year. The 1957 monthly average of day-to-day shifts in prevailing wind direction ranged from 42 to 80 per day. In addition, hourly observations at Augusta show that the wind direction was not often constant for 24 hours during the year 1957. In most cases, the wind shifted from one hour to the next.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Tornadoes

SRP is in an area where occasional tornadoes are to be expected. National Weather Service records from 1916 to 1975 show that at least 300 tornadoes have occurred in South Carolina. In 1975, 12 tornadoes struck South Carolina and 22 struck Georgia. More accurate records of wind speeds and damage area have been kept since 1959. The Fugita-Pearson scale for assessing tornado wind speed and damage has been in use by the National Weather Service since 1971. Most tornadoes occur in South Carolina and Georgia during the period February through June and August to September and travel in a southwest to north east direction. The combined area of Georgia and South Carolina is struck by an average of 24.6 tornadoes per year.

Tornado data from 1969 to 1975 show that Georgia and South Carolina may have extreme tornadoes with a maximum wind speed up to 260 mph. Tornadoes with winds up to 318 mph have been observed in the midwest but not in the southeast. The probability of a tornado with winds in excess of 250 mph striking a point within the SRP is estimated to be less than 10^{-5} per year. During the 24-year history of SRP, there has been no tornado damage to any production facility. On two occasions, light damage has occurred (displacement of light sheet metal roofing, window breakage, tree breakage, etc.). Several other tornado funnels have been sighted in unpopulated areas on the plantsite but investigations showed no damage; thus, the sighted funnels did not touch the ground. Investigation of tornadoes occurring near SRP in 1975-1976 showed damage from tornadic wind speeds varying from 100 to 175 mph.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Seismicity

SRP is located in an area where moderate damage may occur from earthquakes, based on earthquake risk predictions by the U.S. Coast and Geodetic Survey. The spatial distribution of South Carolina earthquakes, with respect to southern Appalachian seismicity, is shown in figure 3-13. On the basis of three centuries of recorded history of earthquakes, an earthquake above an intensity of VII on the modified Mercalli (MM) scale would not be expected at the Savannah River Plant. Average acceleration for intensity VII corresponds to 0.13 g. During the past 100 years, the area within a 100-mile radius of SRP has experienced one shock of intensity X, one shock of intensity VIII, two shocks of intensity VII, and 12 shocks of intensity V, MM. Seismic monitors, which were installed in SRP reactor buildings between 1952 and 1955, are set to alarm at 0.002 g (intensity II) and have never indicated an earthquake shock of this intensity since their installation.

The shock of intensity X MM was the Charleston earthquake of August 31, 1886. This earthquake was felt 800 to 1,000 miles away. An area of about 2,000,000 square miles was affected.

The Charleston earthquake caused only minor superficial changes to the ground surface. The epicentral region was broken by many fissures through which water issued, but the fissures seldom attained a width of more than 1 in. The earthquake was probably caused by a fault movement in basement rock beneath a half-mile thickness of unconsolidated sediments. There is evidence that the intensity at and near the Fall Line was slightly greater than that nearer to the epicenter of the 1886 Charleston earthquake. This presumably is due to the fact that the sands and clays of the coastal plain sediments provide greater attenuation to seismic waves than do the underlying basement rock. The effect may also be due to resonance of the soil column near the Fall Line.

Damage was greater at Augusta, GA, and Columbia, SC, on the Fall Line, than at intermediate locations. Reports on the effects of the 1886 Charleston earthquake from towns in the vicinity of SRP were used to estimate earthquake intensities.

Since the 1886 earthquake, Charleston has been the focus of continued seismic activity indicating that the earthquakes are associated with a tectonic structure even though it is obscured by the overlying Coastal Plain sediments.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Seismicity

Earthquakes associated with the Piedmont Province do not seem to be associated with tectonic structures and could thus be assumed to occur anywhere within the province. The maximum earthquake occurred in Union County on January 1, 1913. It occurred about 95 miles from SRP, and its intensity at SRP was about III MM. Since these earthquakes are not associated with a known tectonic structure, they can reasonably be assumed to occur anywhere in their tectonic province, which could be as close as 20 miles from waste management facilities at SRP. If an intensity VI-VII MM earthquake were to occur at this distance, the intensity at SRP would be V-VI MM. At the VI MM level the acceleration would be approximately 0.07 g. Using a similar logic, the maximum earthquake in the Blue Ridge province and Valley and Ridge provinces would result in an intensity of I-II MM and the acceleration would be less than 0.02 g.

Intensified geologic studies have revealed a fault (Belair) northwest of Augusta along the Fall Line, in which crystalline metamorphic rocks are faulted up against sediments of the Tuscaloosa formation and in one area, against sediments that were reworked from the Tuscaloosa formation. Based on a study of the Belair fault by the U.S. Geological Survey, the Nuclear Regulatory Commission states:

The Belair fault zone is located about 16 km west of Augusta, GA. It is actually a number of faults, each 1.1 to 4.7 km in length, which when taken together comprise a zone at least 21 km long trending approximately north-northeast.

The conclusion of the latest report by the U. S. Geological Survey indicates that the age of the oldest unfaulted stratigraphic unit is thought to be between 2,000 and approximately 23,000 years old. The age of the youngest faulted unit is approximately 65 million years old. To date, no intermediate age strata have been found which would provide a more definitive date of last movement on the fault. Thus, although the study does not absolutely demonstrate lack of movement in the last 35,000 years, it does provide a high level of confidence that the last movement is not as recent as previously believed. With the absence of any correlation of macroseismicity with this fault zone, we have concluded that this fault is not capable within the meaning of Appendix A to 10 CFR Part 100, "Seismic and Geologic Siting Criteria for Nuclear Power Plants". We will continue to monitor research activities which could lead us to modify this finding.

PART TITLE: SITE CONSIDERATIONS

ITEM TITLE: Radioactivity Contamination History

Two locations within S-Area were contaminated in 1958. This contamination was removed in June, 1982.

In the first incident, which occurred in April 1958, uranium solution and contaminated solvent leaked from a tank car loading apron in Building 211-H to a storm sewer. An estimated 1 curie of activity was leaked. The storm sewer drained east of Building 294-H. The drainage ditch was backfilled to fix the contamination. **The contaminated area at HP #10 is defined by coordinates (a) N72124, E64672; (b) N72132, E64790; (c) N71967, E64684; (d) N71961, E64810; (e) N71859, E64692; and (f) N71865, E64860.**

In the second incident, which occurred in November 1958, a recycle sump in Building 211-H overflowed carrying contaminated water and solvent via a storm sewer to an area northeast of Building 211-H to HP Outfall #59. Less than 1 curie of activity was leaked. A dam was built to retain the contaminated water. Subsequently, the retention pond and ditch were backfilled. The contaminated area at HP #59 is defined by coordinates (a) N73916, E63647; (b) N73916, E63950; (c) N73690, E63600; (d) N73690, E63903; (e) N73451, E63550; and (f) N73451, E63855.

Health Protection Department has core drilled in these two areas to determine the level of radioactivity remaining in the soil and the extent of any migration that may have occurred. Data from the core sampling program were evaluated and the soil removed based on these data.

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS

ITEM TITLE: Site -- Dismantling and Relocation

The site chosen for the waste processing facility is a gently rolling wooded area. There are no existing facilities in the area.

The DWPF project should fully fund any cost associated with site clearance, crossing existing roads, and new tank farm facilities such as **waste transfer lines,** pump pits, etc. that are specifically for S Area use.

Existing diversion boxes, tank farm area evaporators, etc. may require modifications to accomodate the DWPF waste streams. These modifications will be provided by the Interim Waste Operations program.

See Part 5, Item 170 for coordinates of the tie-in point for DWPF pipelines to existing tank farm area facilities.

All construction work will be under non-regulated conditions.

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS ITEM

TITLE: Site Preparation by Plant

**The radioactivity contamination history at S-Area site was discussed in Part 3, Item 900. The contaminated soil has been removed.

Usable timber is being cut under the supervision of the U. S. Forestry Service.**

Some H&V cooling water discharged through the northeast H-Area storm water outfall causes a small swamp which would be included within S-Area. The water or the outfall run off will be diverted away from that area prior to the start of project construction.

The costs of completing the above items will not be part of the project.

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS ITEM

TITLE: Anticipated Funding Schedule

Project schedule should be based on the following assumptions:

Design only project authorized - FY 82
Construction project authorized - FY 83
Construction period - 1983 - 1988

INFORMATION ONLY

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS ITEM

TITLE: Summary Description of Production Processes

Prior waste handling operations in the F and H Area waste tank farms will have separated the process waste into a clear supernate or salt solution and a washed settled sludge from which most of the salt solution and aluminum have been removed.

Project objective are to be met by two stages of construction and operation. The first, Sludge Processing, will provide a vitrification facility to incorporate the insoluble sludge portion of the waste together with the long lived radionuclides contained in the sludge into a borosilicate glass sealed in canisters and stored onsite until shipped to a Federal repository. The second stage will provide a facility to decontaminate waste salt solution and transferring the recovered radionuclides to the vitrification facility.

When Salt Processing begins, the recovered radionuclides (primarily isotopes of Cs, Sr, and Pu) will be incorporated into the sludge feed of the vitrification facility for immobilization in the borosilicate glass. Facilities to make the recovered radionuclide feed compatible with sludge processing are part of the Salt Plant Project.

COMPLETE REVISION

PART TITLE: GENERAL REQUIREMENTS & SCOPING BASIS

ITEM TITLE: Future Expansion Requirements

1. Sufficient contiguous area should be reserved for future incremental expansions of the interim glass storage building to a storage capacity up to the total number of canisters specified in Part 11, Item 405. Assume that the interim storage building will be expanded in continuous increments identical in size with the first unit.
2. Sufficient area should be reserved to build a replacement sand filter adjacent to and to tie into the air tunnels of the original sand filter.
3. **Sufficient area should be reserved for supporting facilities (cold feed, administration building, etc.) to accommodate any expansion requirements that are necessitated by the Salt Plant construction.**
4. Sufficient area should be reserved adjacent to the vitrification processing building to accommodate up to a 100% expansion of that building if necessitated by the selection of a waste form other than borosilicate glass. Assume the expansion to take place toward the north (assuming a north-south major axis for the main processing building). Allow a service alley (about 30 ft) for piping and electrical services between the building and the expansion area.
5. **Allow space to the extent feasible to increase the size or capacity of the following facilities to accommodate Salt Plant at some future date without increasing capital investment in the Sludge Plant:
 - a. **Gatehouse and Administration Building**
 - b. Parking Lot
 - c. Electrical Substation
 - d. Cooling Towers
 - e. Water Treatment Facilities
 - f. Railroad Lines and Spurs
6. **Plan excavations required so that future expansions as described above can be made while all existing facilities are operating.
7. Allow space, accessible by rail and truck for shipping facilities. This space should be as close to the north end of 221-S and 250-S as practical.**

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS ITEM

ITEM TITLE: Security Requirements -- Considerations

The security requirements for S-Area are discussed below:

- a. Patrol personnel will be assigned to the area for the protection of government property by controlling vehicular and pedestrian traffic entering and leaving the area. The entire area should be enclosed by a chain-link security fence with controlled entry.
- b. The patrol gatehouse facility or area in which patrolmen are housed is to be hardened against possible terrorist attack in accordance with DOE requirements for all new facilities (Reference C-4, Part 4, Section D.) See Part 11, Item 275 for specific areas to be hardened. There will be no requirements for safeguards (i.e. doorway and gate monitors, closed circuit television monitors, etc.). The guard area should have good visibility of approaching roads and the employee parking lot.
- c. Safeguarding of special nuclear materials is not a consideration in the design of S-Area buildings. Protection of expensive, highly vulnerable government property from sabotage is the main consideration.
- d. The physical facilities for a patrol gatehouse headquarters may be either a separate facility located at the area gate or it may be combined with the administration building based on economics and site layout. If a separate patrol gatehouse building is provided, it should be complete with offices, lunchroom, change room, gun room, etc., as described in **Part 11, Item 275.**

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS ITEM

ITEM TITLE: Earthquake and Tornado Design Criteria

DOE Order 6430 (Reference C-11, Appendix C) provides general design criteria for DOE facilities and specific design criteria for certain facilities (i.e. plutonium, etc.) but does not provide specific criteria for waste processing plants.

In the absence of specific design criteria for a waste processing plant, DWPF design requirements are based on an interpretation of the above document and are detailed in Reference C-17. SRP requirements and the bases for these requirements are discussed below:

A. Design Basis Earthquake (DBE)

1. Background

The term Safe Shutdown Earthquake (SSE) is used in various regulations and Design Basis Earthquake (DBE) in Reference C-11. The two terms are synonymous. Since the DWPF is a DOE facility, the term DBE will be used to describe the DWPF requirements.

Site investigations as presented in Section 4.2.5 of Reference C-17 defines the peak horizontal ground acceleration for the design basis earthquake at SRP as 0.20g.

Reference C-11, Chapter XXI, 3.e and Chapter XXI, 7.a specifies the seismic requirements for plutonium facilities. It specifies that critical structures and systems important to safety shall be designed to withstand the DBE. These structures and systems are those necessary to assure the capability to:

- a) As necessary to safely shutdown operations, maintain the plant in a safe shutdown condition, and maintain integrity of the final confinement barrier of plutonium.
- b) To prevent or mitigate the consequences of accidents which could result in potential offsite exposures determined in accordance with 10 CFR 100.

It should be recognized that the DWPF Sludge Plant is not a plutonium processing facility and, therefore, the above criteria do not apply as such, but rather are used to formulate a conservative bases for DWPF design.

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS

ITEM TITLE: Earthquake and Tornado Design Criteria

2. SRP Requirements and Bases for DWPF Design

Seismic design requirements for the DWPF should be based on Reference C-17.

If a DBE should occur, it is assumed that the DWPF would no longer be useable as a production facility. However, the DWPF should:

- a) contain the radioactive materials to the maximum extent practical and not to exceed limits specified in 10CFR100.
- b) achieve a safe shutdown for all process operations.
- c) cope with the consequences of any accident resulting from the earthquake.
- d) confine any spilled radioactive materials while the necessary resources are obtained to cope with the problem.

To accomplish the above objectives, recommended construction criteria for the principal DWPF structures and systems are shown in Table 4-1, Appendix A.

B. Investment Protection Earthquake (IPE)

1. Background

The specific criteria for plutonium facilities contained in Reference C-11, (Chapter XXI, 3.1) defines an operating basis earthquake (OBE) as equivalent to one-half of the DBE and as the earthquake for which the facility is designed to remain operable or readily restorable to operating condition. Chapter XXI, 7.a of Reference C-11 states that critical areas shall be capable of full operability and critical items (ventilation, electrical, fire protection, etc.) should be capable of continued operation after an OBE. It is also stated that an analysis shall be made on a case-by-case basis of other than critical items to determine if operability should be retained for an OBE.

It is assumed that the requirements for the OBE were developed by the nuclear power industry so that electrical generation could be restored relatively quickly, whereas the rationale for the DOE position is that providing some protection to be able to maintain a high cost production facility in a productive state is justified while willing to risk the loss of less expensive supporting facilities. It is also presumed that if DOE prepared criteria for a waste processing facility, a similar criteria would be invoked. These assumptions are used as a bases for the SRP requirements below for an investment protection earthquake (IPE).

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS

ITEM TITLE: Earthquake and Tornado Design Criteria

2. SRP Requirements and Bases for DWPF Design

SRP requirements for an IPE are as follows:

- a) **IPE design criteria for horizontal ground motion for the DWPF should be based on Reference C-17.**
- b) Structures and facilities designed according to the IPE design criteria must be capable of resuming operations after repair and/or replacement of damaged equipment. The repair and/or replacement of equipment must be limited to that equipment which is normally designed for this purpose.

Examples of this philosophy are:

- Crane should be retrievable to crane maintenance for repair
 - Embedded piping should be useable
 - Trunnion guides, sleepers, etc. should not be misaligned
 - Critical elements of ventilation systems, fire protection systems, and emergency electrical systems should be operable as necessary to protect critical structures and items
 - In-cell process vessels, jumpers, etc. should be replaceable as necessary
 - Operating area equipment should be repairable or replaceable as necessary
 - Supporting facilities (administration building, cold feed, etc.) should be repairable or replaceable as necessary.
- c) Table 4-1, Appendix A presents an analysis on a case-by-case basis of the items for which full operability is to be maintained. The rationale for this classification is that structures and equipment essential to safety must remain operable and all equipment which is not normally repairable must remain useable.

PART TITLE: GENERAL REQUIREMENTS AND SCOPING BASIS

ITEM TITLE: Earthquake and Tornado Design Criteria

C. Tornado

1. Background

Section 4.2.2 of Reference C-17 presents historical data on tornadoes in South Carolina. The Design Basis Tornado (DBT) is defined as having a rotational speed of 230 mph at a radius of 230 ft and a maximum translational speed of 50 mph, also having a total pressure drop of 1.5 psig at a maximum rate of 0.5 psi/sec.

2. SRP Requirements and Basis for DWPF Design

Recommended tornado construction criteria for DWPF structures and systems are defined in Table 4-1, Appendix A and should meet the DBT requirements set forth in Reference C-17.

D. Standard Construction

1. Background

Reference C-11, Chapter IV, 9.b states that except where otherwise designated in these criteria, earthquake loads shall be accordance with the applicable section of the Uniform Building Code.

Reference C-17 specifies standard construction criteria for the DWPF.

2. SRP Requirements and Basis for DWPF Design

Standard construction facilities are to be designed in accordance with Reference C-17.

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Summary Block Diagram

A simplified process flow diagram for DWPf Sludge Plant is given in Figure 5-1, Appendix B. All vessels required to operate the process are located within one main process cell in the vitrification building. The main process cell may be divided into sub-cells to segregate some portions of the process such as the glass melting and mechanical handling operations for better ventilation and contamination control. All vessels estimated to be required to operate the process are listed in Table 5-5, Appendix A; included are some of the required vessel design features.

The facilities are to be designed for processing 5-year cooled sludge from the waste farm. Waste from the vitrification plant returning to the waste farm is to be segregated from the 15-year cooled salt solution that will be processed in the salt processing facilities.

All radioactive waste solution generated in the vitrification building is neutralized if necessary and transferred to the waste farm through the Recycle Collection Tank.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Interarea Transfer Piping

Underground interarea transfer lines will be required to transport sludge feed and recycle waste between S and H Areas. A third line is required as a common spare. All lines must drain by gravity to a low point pump tank. To accomplish transfers, maximum use should be made of existing lines and diversion boxes. **The transfer piping provided for the Sludge Plant should be planned with consideration for the future requirements for salt processing. Provide four process lines between outside 221-S and the chemical process cell.** Additional design requirements follow:

Piping Origination -- For this design effort, the sludge feed, recycle waste, and spare line should all originate at coordinates N71200, E61830. Tie-ins will be made under clean (non-regulated) work conditions. The elevation of the lines at this point is to be adjusted to provide free drainage.

Construction -- The three interarea lines require jacketing. A double core-single jacket and a single core with jacket are required. The sludge feed (slurry) and spare lines are to be paired in one jacket. Leak detection and hydrostatic test provisions for the jacket are to be included. These lines must undergo a flexibility analysis. All transfer lines are to have an unidirectional minimum slope of 0.5%. Refer to Part 3, Item 130 for line siting information.

Shielding -- Provide sufficient shielding for all lines to reduce the radiation level at the shielding surface to 1.0 mr/hr. This is the shielding requirement in areas outside inhabited working facilities and where personnel movements are not controlled. Shielding may be provided by burying the lines, earth mounding, or use of high density materials. **Radionuclide concentrations for the shielding calculations are found in Appendix H, Tables 21-19 and 21-20.**

Shielding boxes may be required above grade at the processing building entry point for the interarea lines.

Operating Conditions -- Although most transfers through the interarea lines will be at ambient conditions, occasionally warm fluid may be transferred through these lines. The following operating conditions apply:

<u>Transfer Line</u>	<u>Temperature Cycle</u>	<u>Cycles per yr</u>	<u>Lifetime Cycles</u>
Sludge	Ambient to 50°C	100	3,000
	Ambient to 75°C	Varies	1,000
Recycle Waste	Ambient to 50°C	350	10,000
	Ambient to 75°C	Varies	1,000

See Part 6, Item 300 for instrumentation and control.

Rheological data for sludge slurries are presented in Table 21-3, Appendix H.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Decontamination

Canister decontamination is accomplished by wet blasting using glass frit as an abrasive. The process steps are shown in Figures 5-3, 5-6, and 5-9, Appendix B. Prior to decontamination, it must be confirmed that the surface temperature of the canister is less than 100°C, to prevent formation of steam in the decontamination chamber. The glass frit is conveyed from the cold feed area to the Process Building where it is mixed with water and formic acid to form a slurry. In the decontamination cell, canisters are cleaned on all surfaces using a low pressure slurry blast, rinsed with high pressure water, dried, and removed to the smear station. **Those canisters requiring additional cleaning (2nd cycle) are indexed to permit cleaning only the indicated areas, then are cleaned with a high pressure water and slurry blast*, rinsed, dried, and removed.** The spent frit and water (used only once) are collected for transfer to glass melting process.

Conditions to be used for decontamination are as follows:

	1st Cycle		2nd Cycle	
	Low Pressure Slurry **40-100**	Water Rinse 2000	High Pressure Water + Slurry **5000 (water)**	Water Rinse 2000
Pressure (psig)				
<u>**Frit (lb to clean one complete canister*)**</u>	600	-	500	-
<u>**Water (gal to clean one complete canister*)**</u>	100	100	1000	100
<u>**Formic Acid (lb to clean one complete canister*)**</u>	6	-	5	-

It is assumed that only 20% of the canisters require 2nd cycle cleaning and on only 50% of their surface areas. Rinsing of the entire surface is assumed. Thus usage for average flow sheet conditions is assumed to be 650 lb of frit, 6.5 lb of formic acid and 320 gal of water per canister processed through the cell. Of these totals 200 gal of water is as part of the frit/water slurry and 120 gal is rinse water.

Overpacked canisters are decontaminated in the same equipment as the canisters but might require only the water rinse.

The decontamination equipment requirements are given in Part 20, Item 260.

Frit used for decontamination, the same as that fed to the glass melter, is described in Part 5, Item 255 and Table 21-6, Appendix H.

*For high pressure blast, the water enters the blast nozzle at 5000 psi and the slurry is a separate feed to the nozzle where it is educted and propelled by the water blast.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Smear Test (Decontamination Cell)

Decontaminated canisters or overpacked canisters are to be smear tested after leaving the Decontamination Cell but before entering the Weld Test Cell. Those with contamination levels below the limits set forth in Part 8, Item 350 are transferred to the Weld Test Cell. Those exceeding the acceptance limit are to be recycled for further decontamination. Canisters and overpacks are also visually examined for residual oxide, glass on the surface, and to read the identifying numbers. The sequence of operations is shown in Figure 5-3, Appendix B.

Requirements for the smear test station equipment are set forth in Part 20, Item 265.

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Canister Welding - Outer Closure (Weld Test Cell)

Final closure of the canister is to be accomplished by welding the outer plug into the throat of the canister using an upset-resistance welder.

Requirements developed to date are based on tests at SRP and SRL.

Filled canisters are received from the canister decontamination cell or from in-process storage within the Weld Test Cell. **The surface to be welded is visually examined and an oversize plug, with a beveled leading edge, is placed over the nozzle bore. The canister is positioned vertically in the welder, supported by its upper flange which rests squarely upon horizontal grounding plates. A vertical ram is lowered onto the plug and a force is exerted to achieve the desired resistance for the electrical circuit through the ram, the plug, the canister flange, and the grounding plates.**

Resistance of the circuit is measured to assure adequate continuity before the actual weld. With the ram force maintained, the weld current is then applied. As the metal at the plug-canister interface heats, plastic deformation occurs and the plug is forced about 1/2 inch into the nozzle and a solid state weld is formed. The ram is retracted and the canister is removed from the welder and transferred to the inspection/smear operations.

A block flow diagram of the welding process is shown in Figure 5-7, Appendix B.

The weld area is visually examined, before and after the plug is inserted, to ensure that there is no interference with insertion of the plug or achievement of a satisfactory weld. Examination^a covers:

- o Presence of foreign material on nozzle
- o Gross deformation of nozzle (hole) or flange bottom surface
- o Discoloration of nozzle (hole) or flange bottom
- o Fit of plug in hole
- o Reading canister number

^a **There are no acceptance/rejection criteria for these examinations. The information will be used to rectify indicated problems.**

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Canister Welding - Outer Closure (Weld Test Cell)

Adequate welds can be made with different combinations of weld current, weld duration, and ram force. Welding development is continuing at TNX to determine optimum conditions. Shown below, as a guide, are those conditions now used for a 5 inch diameter weld and those of which the welder must be capable. Requirements for the welder are given in Part 20, Item 270.

	<u>**TNX WELDER</u>	<u>DWPF Design Basis (max)</u>
Weld current (amps)	<u>250,000</u>	<u>300,000</u>
Weld duration (sec.)	<u>1.3</u>	<u>3.3</u>
Ram force (pounds)	<u>100,000</u>	<u>150,000</u>

Provisions are required for delivery of plugs from the service building to the welder.** In-process storage requirements for canisters are given in Part 5, Item 295.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Weld Repair (Weld Test Cell)

Canister assemblies with defective upset resistance welds must be reworked to provide complete containment. **A design goal shall be to perform the weld repair in work stations that are used for normal canister processing (for example, in the canister inspection station or the overpack weld station).** The preferred method involves welding a cap to the canister flange to cover the defective plug weld. The sequence of operations that take place in the weld test cell is shown in Figure 5-8, Appendix B.

Requirements for the repair cap are set forth in Table 20-1, Appendix A.

The closure must be designed for TIG or MIG welding of the repair cap to the canister flange. **The goal is to provide a 3/8 inch minimum corrosion barrier around the glass.**

Weld quality is to be inspected visually.

The closure design must not interfere with grappling or handling of the canister.

The repair cap must incorporate a helium capsule meeting the same requirements as the capsule on the canister plug (set forth in Part 20, Item 50) unless the capsule on the canister plug can be used to leak test.

The welding operation is to be remote. Welding equipment set up, adjustment, disassembly, and maintenance should be hands-on.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Inspection (Weld Test Cell)

Canisters are to be inspected and characterized prior to interim storage. The process steps, also shown in Figure 5-3, 5-8, and 5-9, Appendix B, are:

- Measure gamma radiation level*
- Measure canister surface temperature
- Visually examine weld and canister surfaces
- Measure surface defects
- Smear canister surfaces for contamination measurement
- Read canister number

These operations are to be performed in the Weld Test Cell, except as noted below.

Equipment requirements for inspection/smear operations are given in Part 20, Item 275.

The processing sequence may be varied; however, the smear test must be the last operation before the canister leaves the weld test cell. **Processing of canisters with overpacks is the same as for canisters.**

After glass fill and closure have been effected, the canister dimensions and shape may not conform with original shape and dimensions.

There are no acceptance or rejection criteria for radiation levels, temperature, or surface defects. This information will be used to monitor process performance, adjust process conditions, and to characterize product to be shipped off-site at some future date. Limits for contamination are given in Part 8, Item 350. If canisters fail these limits they are spot decontaminated in the Canister Decontamination Cell.

Completed welds are to be visually examined to verify their integrity. A videotape record is required. Examination is to include:

- o Symmetry of weld extrusion (full circumference)
- o Height of plug above flange
- o Presence of spots (from arcing) on bottom of grounding flange

*The gamma radiation level may be measured in the transfer tunnel between the WTC and loadout port.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Overpacking

A small number of filled canister assemblies that are unsuitable for transfer to the Interim Storage Building must be sealed in overpacks.

Examples are canisters that were overfilled, have glass on the exterior surfaces that cannot be removed, or have been severely damaged and the wall thinned or penetrated.

The sequence and location of each operation for overpacking is shown in Figure 5-9, Appendix B. The requirements for overpack component design are set forth in Part 20, Item 60.

A design goal shall be to perform overpacking operations in work stations that are used for normal canister processing. Provisions for placing canisters into overpacks are required in the melt cell. Similar provisions are also desired in the weld test cell provided it can be accomplished with minimal modifications to an existing work station. Welding of all overpacks will be done in the weld test cell.

Overpack components will be transported to the assembly station, preferably as an assembly and handled similarly to canisters. The overpack is to be opened, the canister inserted, and the overpack closed. Closure is to be verified (visual verification is acceptable) to ensure water tightness. Overpack assemblies are to be decontaminated and smear tested in the decontamination cell as set forth in Part 5, Items 275 and 276. **Assemblies are to be transported to the weld test cell and welded. Requirements for the welding equipment are set forth in Part 20, Item 271. Welded assemblies are inspected the same as canisters (Part 5, Item 290).

Overpack welds will be visually inspected, and non-destructively tested. Ultrasonic testing is preferred. The goal for overpacking is to provide a 3/8 inch minimum corrosion barrier around the canister.

Inspected canisters are transported to the Interim Storage Building. Welds failing the inspection will be repaired.**

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: In-Cell Canister Storage

Facilities must be provided to store canisters and overpacked canisters when not in a process station in the Melt Cell, Canister Decontamination Cell and Weld Test Cell. In-process storage sequence is shown in Figures 5-3, 5-6, 5-7, and 5-9, Appendix B. Following is the minimum number of canister storage positions considered necessary for operability. Additional positions are desirable to provide operating flexibility assuming they require no additional increase in building size or are required as a result of the attainment studies.

<u>Cell</u>	<u>Number of Positions</u>	<u>Expected Use</u>
Melt	4	Empty canisters
	3	Filled canisters, cooling
	1	Spare
Canister Decontamination	1	Cleaned canister
Weld Test Cell	2	Awaiting welding
	1	Awaiting SCT
	1	Spare

In determining the number of positions, it is assumed that inspected canisters are available in the service building and that transfer into the Melt Cell and out of the Weld Test Cell can be carried out on a 24-hour basis, if required.

Requirements for storage facilities are:

- o At least one position in each cell should be capable of receiving an overpack.
- o Remove decay heat, if necessary, so glass centerline temperature does not exceed 500°C.
- o In order that personnel can enter the Weld Test Cell for maintenance, shielded storage positions are preferred, or the ability to shield these locations should be provided. Guidelines for attenuation of dose rates are set forth in Part 11, Item 115. Intermittent occupancy is assumed.
- o Dimensions of canisters and overpacks are given in Part 20, Items 50 and 60, respectively.

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: In-Cell Canister Storage

- o The designs should incorporate features to minimize damage to canisters. Examples of such features are:
 - Avoid sharp corners or edges
 - Adequate viewing
- o The designs should minimize contamination of canisters by the storage facilities (e.g. minimum contact area, proximity to high activity sources, provision for decontamination, etc.)
- o Materials of construction should be compatible with decontamination solutions. (See Part 14, Item 200.)

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Process Cooling Water

Cooling water must be provided to various tanks and other equipment containing radioactive process solutions to remove radioactive decay heat, cool thermally heated solutions, and to maintain temperatures of various processing solutions in required ranges. The cooling load should be based on removing heat from radioactive decay of 5 year old sludge or 15 year old salt or both combined and from heated solutions to cool the solutions down to a maximum of 50°C or a lower temperature if required by the process. Cooling coils will not be required where vessels or equipment are not expected to self heat or be heated above 50°C or specified process maximums.

The cooling water for vessel cooling coils should be supplied from a closed-loop circulating process cooling water system to ensure confinement of radioactivity in the event of a cooling coil leak. A positive pressure must be maintained on the cooling water coils at all times so that if any leaks occur, cooling water will leak into the tank rather than the tank contents into the cooling coils. For vessels requiring both cooling and heating, use two sets of coils - one set for water cooling and one set for steam heating (see Part 5, Item 405 for steam coils).

Water for the closed loop may be treated with corrosion inhibitors or biocides to prevent algae growth provided that they do not contain or degrade to form free chloride ion. Chloride must be excluded to prevent chloride stress corrosion of stainless steel components.

The capacity and number of heat exchangers, pumps and other hardware for the circulating system should be adequate to allow normal maintenance without shutting down the circulating system. The reliability of utility systems should be high enough to avoid influencing process attainment studies; these studies assume utility systems are almost always available. Cooling water for the heat exchangers should be provided from the cooling tower circulating system (Part 13, Item 320). Water pressure in the cooling tower side of the heat exchangers should be maintained higher than that in the circulating process cooling water side. The heat exchangers should be protected during a DBE to prevent damage which might allow leakage of potentially contaminated cooling water from the circulating processing cooling water side into the circulating cooling tower water side.

The water from process vessel coils should be routed through a process cooling water return header where it must be continuously monitored and periodically sampled before returning to the circulating pumps and heat exchangers for cooling and reuse. The water return line from each process vessel coil should be equipped with a valved sample tap (but no sampling device). If contamination or extensive loss of water is detected in the process cooling water system, circulation will be stopped by closing the water control valves; however, pressure must be maintained in all coils while the liquid level in each vessel containing coils is observed to see which vessel shows an increase in level. The level increase will confirm which coil is leaking. The sample taps will be used primarily to verify the absence of radioactivity inside a coil prior to returning a vessel to service after a loss of coil pressure while the coil was covered with solution containing radioactivity.

INFORMATION ONLY

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Process Cooling Water

Radioactive contamination will be purged from the process cooling water system by displacing the contaminated water with fresh makeup water and discarding the contaminated water to a delay tank or tanks. Either an intermittent or a continuous purge system is acceptable. If purges of the water system are intermittent, one 10,000 gallon tank will be sufficient. If purges are continuous, at least two tanks will be required. When a tank is full, a sample will be taken and analyzed offline to verify that tank contents are within standards for discharge. About 12 full volume flushes of the system are anticipated to be required to dilute and remove any contamination from the loop by a factor of 10^4 . Assuming a flush rate of 50 to 100 gpm and an analytical turn-around time of 5 hours, continuous flushing would appear to require tanks that are too large (over 10,000 gallons each); intermittent flushing should be selected if it appears more economical.

The delay tank(s) may be located inside or outside of the process building. **Equip the delay tank(s) with seal-less pumps to prevent leakage, agitators, cold feed type samplers and vent to the cold feed vent system (Part 5, Item 425) through a HEPA filter.** Piping and equipment should be provided for transferring the potentially contaminated delay tank effluent to the H-Area drainage system and for manually diverting any contaminated water from the H-Area drainage system to the existing Building 281-8H elastomer-lined retention basin, or to the recycle collection tank in the vitrification building. Purges to eliminate spent biocides or corrosion inhibitors if used may be discarded via the chemical waste treatment facility (Part 5, Item 460) after analysis has verified no radioactive contamination.

Provide in-line monitoring for radioactivity with a local alarm and recorder plus alarms in the Health Protection area and appropriate central control room.

All operations and maintenance will be conducted in a direct hands-on mode.

Components of this system requiring emergency power are listed in Part 13, Item 560.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Melter Cooling Water

Cooling water is required for the melter and the melter off-gas system to minimize corrosion of melter refractory, reduce the temperature of the outside surface of the melter to a maximum of 50°C, condense water from the off gas and cool non-condensable off gas.

The cooling water should be supplied by a circulating water system having the same features regarding coil pressurization, heat exchangers, pumps, samplers, radioactivity monitoring, earthquake protection, purge facilities, biocides, corrosion inhibitors, etc., as described for the Process Cooling Water, Part 5, Item 400. This cooling system must also meet the following requirements:

1. Remain operable during **purchased power failure.**
2. Have an alternative source of cooling water independent of the circulating cooling tower water
3. Be sufficiently clean and pure to have low electrical conductivity if the water must be used to cool energized electrical bus bars or other electrical jumpers

The process cooling water may be used for the melter cooling system if the additional emergency power, alternative water supply and applicable water quality criteria can be met.

Components of this system requiring emergency power are listed in Part 13, Item 560.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Process Steam System

The process steam system serves in cell equipment and therefore is subject to contamination. It should be a once through system because the low steam requirements do not justify a closed-loop steam system. Steam condensate from the process vessels should be directed to process steam condensate delay (or purge) tanks. The tanks may be located outside the process building seismic structure. When a tank is full, a sample will be taken and analyzed offline to verify that tank contents are within standards for use as process water or for discharge as described below. Allow 6 hours for obtaining, delivering to the laboratory, and analyzing the sample in addition to the time required for emptying the tank in determining the tank capacity. **Equip condensate collection delay tank(s) with seal-less pumps to prevent leakage, agitators, cold feed type samplers and vent to cold feed vent system (Part 5, Item 425) through a HEPA filter.**

Provide in-line monitoring for radioactivity in the steam condensate with a local alarm and recorder plus alarms in the Health Protection area and appropriate central control room.

A positive pressure must be maintained automatically in the steam coils of process vessels at all times so that if any leaks occur, leakage will be into the tank from the coils. Compressed air or steam condensate may be used as the backup method of pressurization.

The steam pressure should be limited to a maximum of 195 psig.

Condensate from process equipment should be collected and analyzed and, based on the analyses, disposed of as follows:

- o No radioactive contamination - use as process water. (See Part 13, Item 130)
- o Contaminated with radioactivity - discard to Recycle Collection Tank or, alternatively in emergencies only, to the H-Area retention basin for disposal or cleanup.

See Part 6, Item 400 and Tables 6-1 and 6-2, Appendix A for instrumentation and control.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Regulated Chilled Water Refrigeration System

A refrigeration system may be required in the processing building to provide chilled water to the glass melter off-gas **and mercury recovery vent** systems. The chilled water should be a circulating system having the same features regarding coil pressurization, pumps, sampling points, radioactivity monitoring, purge facilities, biocides and corrosion inhibitors as described for the Process Cooling Water, Part 5, Item 400. **Additional makeup and purge disposal facilities may be required if an antifreeze is required in the circulating coolant.

Components of this system requiring emergency power are listed in Part 13, Item 560.

The basis for sizing this system is set forth in Part 5, Item 260.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Process Vessel Vent System

The purpose of the process vessel vent system is to limit leakage of vapors into the cell. Technical studies indicate that it is also necessary to cool vapors exiting tanks containing mercury and formic acid solutions to limit emissions to the atmosphere. For segregation of fumes, two vent headers are required; one for vapors from nitric acid and alkaline containing vessels, the second for formic-mercury containing vessels. The vent header for the formic-mercury system should have a condenser to remove the mercury and formic acid vapors; the condenser is to vent to the vessel vent header for the nitric-alkaline system. For flexibility for future connections and the ability to segregate formic acid and nitric acid fumes/liquids, each vessel position (excluding Weld Test Cell and Equipment Decon Cells) should have the capability of connecting to either header.

Design criteria for the vessel vent system are as follows:

SRP experience shows that vapor leakage can be controlled by a nominal 50 scfm air flow through unsparged tanks. Although some air inleakage may occur at vessel shaft openings, for design purposes assume that all vent air enters through the overflow pipe. The vessel vent system design is also to assure an air sweep through vessels with air sparging; the sparge rate is expected to be 0.6 scfm per ft² of liquid surface on loss of agitation. The vessel vent design is to provide for exhausting two vessels at the maximum sparge rate with all other spargers at the minimum rate. Sealed vessels (evaporators) are to operate at negative pressure with minimal air inleakage.

The preferred vessel vent system design should establish the desired flow by properly sizing the headers, vent jumpers, and overflow lines and not include orifices or valves at individual vessel positions. If it becomes necessary to accommodate a range of static pressure conditions, consideration may be given to locating orifices in the connectors on certain vent line jumpers.

During process vessel repair and replacement work, it should not be necessary to provide for adjustment of air flow from that vessel into the vent header. If it does become necessary to reduce header inflow because of an extended vessel outage, a blank connector can be used for isolation of the header.

When the vessel vent system is not functioning, process operations will be controlled to limit vapor flow out of the vessels or the process will be shut down.

Vessel vent positions are required in the canister decontamination cell for equipment venting. Two vent positions are to be provided in the melter cell for future connections. Vessels in the mercury purification cell are to be vented to the vessel vent system. The glass melter and its off-gas system are to be separate from the vessel vent system except for provision of emergency ventilation of the melter pour spout.

****COMPLETE REVISION****

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Process Vessel Vent System

Individual vessel vent lines and the vent header^s should be sloped to permit total drainage. Make provision to collect drainage from the headers in vessels in matching service. If necessary, the headers may drain to a floor sump rather than directly to a vessel. Provide liquid level detection in the vent headers. Access to the headers is not required, but access to each header drain line is required as SRP experience has shown that header drains can be expected to plug with deposits from the vent system. ✓

The combined air from the two vent headers must be routed through an in-line heater and a dry, removable filter system. Exhaust must be provided by removable, redundant exhaust fans located in the cell. Automatically functioning valves are required on the suction side of the vessel vent fans to provide operations continuity in the event of a fan failure. The filtered air is discharged to the cell exhaust air tunnel. The in-line air heater must be insulated as necessary to limit thermal drafts associated with hot equipment.

Since little liquid will collect in the vessel vent filter, include capability to drain liquid to the floor. The filter design, air heater, and exhaust fans are discussed in Part 20, Item 320.

Air sampling requirements are discussed in Part 12, Item 120. See Tables 6-1 and 6-2, Appendix A for instrumentation and controls. Recycle of fan discharge for control or whatever purpose is not desirable; the fans should function satisfactorily over a nominal flow and static pressure range that may be expected to be established by system instrumentation and flow control.

COMPLETE REVISION

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Cold Feed Tank Vent Systems

Three cold feed tank ventilation systems are required to limit discharges of chemical vapors from cold feed make-up and head tanks, one in the main processing building and two in the miscellaneous cold feed storage facility. Vessels receiving pneumatically conveyed frit are not to be connected to these vent systems.

1. Processing Building System

The cold feed vent system is also to provide venting of liquid waste collection tanks located in the operating area of the main processing building. **Cold feed and drain catch tanks in formic acid service are vented through a condenser to condense formic acid fumes. This condenser vents to the cold feed vent system and drains to the formic acid catch tank.**

Air flow through this vent system is established as follows:

- o A nominal 50 cfm is to be pulled through any open overflow line on vessels connected to the cold feed tank vent header. It is noted that the overflow line on some vessels is connected to an enclosed drain system (Part 5, Item 215) and will not be an air source.
- o Where make-up tanks are provided with dry chemical charging chutes, the vent system should provide for greater than 100 fpm air flow through an open chute to limit dusting from the operation. Assume two chutes are open at any time.
- o Air inleakage at other vessel openings is to be ignored in designing the system.

Filter requirements for this vent system are:

- o Any tank possibly receiving contaminated liquid must have the tank vent line equipped with a replaceable HEPA filter.
- o Tanks equipped with chutes for solid chemical additions are to be provided with a dust collection filter in the tank vent line.
- o **Air from the cold feed vent header is to be routed through a filter to remove particulates. This filter should have a Group III ASHRAE/52-68 rating (see Chapter 3 of Reference C-13, Appendix C).** This filter installation will not require shielding. Although radioactivity is not expected to be present, sampling capability should be provided per Part 12, Item 120.

Exhaust fans for this system are to be commercial units provided for acid/caustic fume service. An installed spare is required. All parts of the vent systems will be repaired by hands-on maintenance.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Cold Feed Tank Vent Systems

Air from this system is to be continuously monitored for radioactivity before discharging to the atmosphere because it possibly may contain radioactive particles. If this system discharges through the building zone 2 exhaust system, the stack effluent monitor will satisfy this requirement.

Tables 6-1 and 6-2, Appendix A, note instrumentation for the system.

2. **Miscellaneous Cold Feed Systems

Two systems are required for miscellaneous cold feed storage. Tanks in formic or oxalic acid service are vented through the organic acid vent system. Other tanks are vented through a separate system.

Air flow through these vent systems are established as follows:**

- o A nominal 50 cfm is to be pulled through any open overflow line on vessels connected to the cold feed tank vent header.
- o Where make-up tanks are provided with dry chemical charging chutes, the vent system should provide greater than 100 fpm air flow through an open chute to limit dusting from the operation. Assume two chutes are open at any time.
- o **Air inleakage at other vessel openings is to be ignored in designing the systems.

A dust collection filter is to be provided only for the organic acid vent system.

Single exhaust fans are required for each system. Commercial units will be satisfactory. The fans should discharge through a stack to avoid contact with people.**

Tables 6-1 and 6-2, Appendix A, note instrumentation for these systems.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Sump Collection Systems

Sumps are to be provided throughout the area to collect process leaks and spills and floor flushes. The number, location, type, etc. of sumps will depend on facility designs.

Sump liquids are to be collected in systems for contaminated liquid or in a system for slightly contaminated/clean liquid. Sumps expected to be wet or active should have liquid level detectors and pumpout facilities. Those expected to be dry should have a conductivity type detector and access to permit liquid removal. The systems are described further below.

1. Contaminated Liquid Collection

Contaminated liquid in the remotely operated processing area is to be collected in two completely segregated systems to separate nitric acid and formic acid streams with separate headers for each. Liquid collected in sumps in the vitrification building exhaust system should be returned to the header for formic acid streams. Liquid waste with high levels of radioactivity which is generated during decontamination of equipment is to be returned to the header for nitric acid wastes. Formic acid waste streams are routed to the recycle collection tank; nitric acid waste to the decon waste treatment tank.

A third collection header, discharging to the decon waste treatment tank, should be provided for liquid originating in vitrification building regulated operating areas not designed for or not expected to have high levels of contamination. This liquid is expected to contain considerably less radioactivity than liquid originating in the remote processing cells; the third header is to assure that grossly contaminated liquid does not back-up into inhabited work areas.

Collection branches may be utilized and tied into the cell headers, with the design to preclude air flow and liquid flow from the header into sumps tied into the header. The cell header need not be part of the process cell pipe rack. Flushing capability is to be provided for headers expected to handle solids.

Pumps used to empty sumps are to be in remotable piping in the remote cell areas. Pumps serving sumps in inhabited areas are to be designed for hands-on maintenance. The branch connections to the collection header should be such that dummy connectors are not required to prevent discharge from adjacent connection points.

The process cell floor is expected to be flushed twice a year with 10 gallons of water per 15 ft² of floor. The sump collection system must be capable of handling a variety of materials ranging from water to sludge and sludg rit slurries.

****COMPLETE REVISION****

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Sump Collection Systems

The only sump solution expected to be sampled are those in the exhaust ventilation facilities, including any in the fan house plenums. Liquid level dip tubes in these sumps will be utilized for sampling when necessary; permanently installed sampling facilities are not required. See Part 11, Items 450, 470, and 490 for the piping requirements for the transfer of sump liquids from the exhaust ventilation facilities to the vitrification building.

2. Slightly Contaminated/Clean Liquid Collection

A. Vitrification Building

Operating corridors within the vitrification building, both regulated and clean, will require either floor drains or a sump system to handle slightly contaminated/clean liquid from these corridors. The sump collection system in this part of the vitrification building is to discharge to the floor drain header catch tank. See Part 5, Item 215 and Part 11, Item 105 for additional information on floor drains.

Sampling facilities for these sumps are not required.

B. Glass Waste Storage Building

A sump should be provided in each vault compartment of the glass waste storage building. Each sump should be equipped with a conductivity probe for detection of liquids. Access to permit sampling and to empty the sumps to a portable container should be provided; permanently installed equipment is not required.

C. Service Building

Floor drains and/or a sump system are required to handle liquids in the chemical storage and make-up areas of this building. Liquids from this system are to be discharged to the chemical and industrial waste treatment facilities (part 5, Item 460). Sampling equipment is not required in this system.

Floor drains with a collection system will be required for collecting potentially contaminated fire water from the regulated areas of the service building (i.e. Health Protection, change rooms, etc.).

PART TITLE: PROCESS DESCRIPTION

ITEM TITLE: **Radioactive** Contaminated Liquid Wastes

Radioactive contaminated process wastes and solutions from sumps and drains in the process cells should be accumulated in the Recycle Collection Tank for return to the tank farm (see Part 5, Item 430).

Wastes collected through floor drains from regulated areas of the processing building should **be directed to the floor drain catch tank and then to either** the Recycle Collection Tank for return to the tank farm or to the chemical waste treatment facility (Part 5, Item 460) depending on analyses. See Part 5, Item 215 for regulated floor drain requirements.

Sanitary sewage from any toilets located in the regulated areas should be combined with sewage from clean areas for treatment.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Radioactive Contaminated Solid Wastes

General

Radioactive contaminated solid waste generated in S-Area will consist of waste generated in the regulated operating areas of the buildings in the area and failed process equipment. This solid waste will be both combustible and noncombustible. For control purposes it will be divided into two types; (1) job control waste and (2) process cell or radiation danger zone waste.

Job control waste will be composed of material generated in the regulated operating areas of the building, such as paper materials, plastics, gloves, scrap materials, and used cleaning materials.

Process cell waste will consist of failed or obsolete equipment (i.e. process vessels, jumpers, pumps, etc.). If necessary, large items will be decontaminated in the decon cells prior to packaging for disposal.

Waste will be separated into two categories for disposal.

Job Control

or

Low level - less than 300 mrad or 50 mrem at 18"

High level - greater than 300 mrad or 50 mrem at 18"

All wastes will be identified, packaged, and transported under properly authorized procedures to prevent spread of contamination or undue exposure to personnel. Facility design should give consideration to routes for waste removal from buildings in relation to minimum distance of travel and through lesser populated areas. Waste removal routes are to be through regulated areas.

Facilities Required

1. A covered box storage area, approximately 15 ft x 10 ft, for low level waste with truck access at each waste location. One load lugger is to be spotted at pad near the regulated loading dock entrance. The other load lugger is to be located near exit point of the shielded transport carrier. This one is to be used for scheduled filter changes at other area sites as required.
2. A 15 ft x 15 ft concrete loading pad for waste dumpster with truck access at each waste disposal location listed in No. 1 above.
3. Enclosed beta gamma waste dumpsters, per SRP Standard Design. Regulated load lugger, Heil Mfg. Co., Series 4096, Model DSB-12, 12 cu yds, painted yellow. Load luggers are listed in Table 16.1, Appendix A.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Radioactive Contaminated Solid Wastes

4. Carts for transporting high level radiation waste to dumpster at loading pad. A shielded waste buggy is to be used for high level waste. Carts and buggy are listed in Table 16-1, Appendix A. Design of this buggy will be provided later by SRP.
5. Access to and method of removal (truck or rail) for the largest process vessel to be installed in the process building with provision for adding local shielding.
6. Air locks (Part 11, Item 110) are required at shipping points to control air flow direction.

Volumes of Waste

Low level or job control waste is estimated to be approximately **40,000** cu ft/yr. Weight will depend on type of material, job control will be lighter than process cell waste and mostly combustible.

Process cell waste is estimated to be approximately 2,000 cu ft/yr. This will be heavier than job control waste and primarily uncombustible except for plastic packaging. Examples are jumpers, process vessels, process scrap, and even the largest process vessel. Shielding requirements for vessels including a failed melter are stated in Part 20, Item 380.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Chemical and Industrial Wastes

Facilities will be required to provide for disposal of non-radioactive solid waste and for treatment capabilities to clarify and/or purify non-radioactive chemically contaminated waste waters from chemical spills in cold feed and process areas, truck unloading pad effluents, cooling tower blowdown, etc. Limits for release of treated wastes are given in Part 8, Item 220.

Liquid Wastes

Separate collection facilities and hold up tanks should be provided for caustic and acid waste systems with a two week capacity. Facilities should permit controlled blending for self-neutralization of wastes or separate treatment with other agents to render waste streams disposable to the environment. Administrative, procedural controls will be required to avoid or control mixing of normally incompatible chemicals. Treatment tanks should be equipped with agitators and samplers and should be designed to allow periodic removal of sediments for disposal to a landfill. The tanks and working area should be protected from rain and be ventilated to remove any gases that may evolve from the liquids or from treatment reactions.

Chemicals and mixtures thereof which will require disposal include the following:

Nitric Acid	Biocides (if required by design)
Sodium Hydroxide	Corrosion inhibitors (if required by design)
Potassium permanganate	Oxalic acid
Sodium hypochlorite	Formic acid
<u>**Sodium bisulfite**</u>	Detergents
Glass Frit	Acid-stable surfactant

Treated solutions should be filtered if necessary, analyzed and discharged to Four Mile Creek by pump and pipe line interconnecting with existing H-Area facilities. This may be a multipurpose line from other waste water sources in the DWPF, such as process cooling water purges. If so, the line should have a separate diversion permitting discharge either to the retention basin or to Four Mile Creek. The sludge from treatment operations should be dried and removed to a landfill area.

The volumes and amounts of chemicals to be processed through the waste treatment facility may be based on the following criteria:

- A volume equivalent to one-half the volume of a make-up batch will be dumped once every 100 makeups. Assume acid and caustic makeups equally subject to error.
- Overflow of a volume equivalent to the volume of one tank full of each make-up and receipt tank once every 500 fillings or makeups

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Chemical and Industrial Wastes

- A flush of 0.15 gal/ft² of diked, curbed or otherwise allocated floor area:
 - a) each time a tank is made up for makeup tanks
 - b) once each week for tanks used only for receipt and transfer (no makeup)
 - c) once each month for other operating areas but not including control rooms, electrical equipment rooms and clean areas generally
- Spillage of 1% of the contents of a makeup tank during each makeup
- Assume all floor flushes are discarded via the waste chemical treatment facility even though occasional contaminated flushes may be discarded via the Recycle Collection Tank.
- Assume the maximum amount of floor flushing which may occur at one time to be equal to 1/5 of the total possible flushes.
- The capacities of drain header and floor drain catch tanks are specified in Part 5, Item 215, page 1. Other tank sizes should be optimized based on process needs.

Solid Wastes

Clean, combustible and non-combustible solid wastes will be handled according to present plant practices. Three clean, front load compactor dumpsters will be required under this project and are listed in Table 16-1, Appendix A. Existing plant equipment will be used to service the dumpsters.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: General Control Requirements

The Technical Data Summary specifies process parameters requiring monitoring and/or control for the various process equipment. The process control system must be designed to provide safe and efficient operation of all building facilities. In addition, a safe shutdown and standby condition must be achievable under emergency conditions. To accomplish these objectives, the following items should be considered in system design.

- o A central control room (CCR) and field operating stations (FOS) are required for normal operations.
- o **The central control room area houses the following 3 consoles: supervisor's console; process console; and power console. All process operations are carried out from the process console by the operator. The power console allows the operator to monitor the operation of all electrical, heating, ventilating and air-conditioning, other utilities and services for S-Area.** Limited controls are available at the location for the power operator to control some emergency equipment. Normal operation of most utility and major electrical equipment is done locally at the equipment.
- o **The supervisor's console acts as a back-up to the process operator's console.** During normal operations, control of the equipment is inhibited at the supervisor's console.
- o Control facilities must allow operator or automatic control of individual pieces of equipment and/or closely coupled groups (CCG). CCG's are groups of equipment in which it is desirable to interlock or sequence operations through a common or integrated process control loop.
- o The operator must be able to start and stop equipment, adjust process control points, and perform other operations required for safe, efficient process control.
- o The operator must be able, at any time, to take over control of a loop unless the loop is designed to prevent takeover for safety reasons.
- o Continued normal operation of each process control loop should not be affected by failure of other control loops.
- o Facilities to integrate control of two or more loops should be provided if feasible and desirable.
- o In the automatic mode, all operations should be performed according to programmed operating parameters without operator assistance.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: General Control Requirements

- o A variety of visual displays must be obtainable in the CCR. Displays may be sequential and should include process variables, setpoints, alarm points, and other required operating information. Audible alarms should also be provided where needed.
- o Failure of the automatic mode must still allow operator control from either the CCR or from local facilities.
- o Design should ensure the automatic transfer to a controlled safe standby condition at particular setpoints and the capability to accomplish a controlled safe shutdown in the event of equipment or component failure.
- o The receiving tank level information and/or interlocks must be provided at all locations where the transfer can be initiated.
- o The system should perform automatic diagnostic tests on all loops, provide malfunction alarms, and identify location and type of malfunction.
- o Provide restricted access (key-operated or similar) for certain functions such as alarm setting changes and setpoint changes where required.
- o Provide redundant sensors, processors, controllers, electrical equipment, transmission lines, computers, and other operating facilities as required for safety and/or operating efficiency.
- o Hard wire all system interlocks required for safety of personnel, equipment, or the environment, with the exception of the process cell crane if a wireless control and/or viewing transmission system is used.
- o Facilities should be provided to perform data acquisition and storage of all measured process variables including sample data from the 772-F laboratory and calculated variables. Current values of all variables and sample data will be stored for recall for at least 24 hours. Some current values, averages, sample data or calculated variables will be stored for recall for at least 30 days. All alarms will be logged and stored for recall for at least 24 hours. Some alarms will be stored for recall for at least 30 days.
- o Facilities should be provided to print large volumes of reports, statistics and other operator requests, as well as routine reports.
- o Facilities to provide records of selected data for at least 50 years should be furnished. Selection of the record keeping system should be based on small volume and reliable retention. No record storage facilities will be required in S-Area.

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PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: General Control Requirements

- o Process control devices should not be located in damp or corrosive areas or in other environments that can adversely affect their accuracy or create excessive maintenance problems.
- o Modular design permitting rapid replacement should be incorporated as much as possible.
- o Maximum practical standardization should be used in equipment choice.
- o Provide redundant instrumentation and emergency or uninterruptable power where continuous service and control are essential.
- o Install equipment in other buildings as required to have needed information and control functions available in the CCR and at the FOS's.
- o Electrical or electronic sensing and transmission should be used whenever possible to be compatible with computer systems.
- o Data Highways will be required from all S-Area Process and Service Facilities, 772-F Laboratory, H-Area Tank Farm Control Room, and FOS's to the CCR.
- o Safety system requirements should be assessed by the criteria as specified in Part 9, Item 120. Some examples of items that should be considered as part of the safety system are fire detectors, HP monitors, ventilation controls, seismic monitors, multitemperature monitors, etc. All safety-related measurements should be sensed by two separate devices, preferably using different sensing principles. Identical redundant sensors, separately mounted and connected, can be used where only one sensing principle is available.
- o For specific instrument requirements see Tables 6-1 and 6-2, Appendix A. These tables list the conceptual variables to be measured and control locations.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: **Main Process Cell General Instrument Requirements**

- o To the extent possible, sensors, electronic components, and similar devices must be located out of the main process cell where they can be readily maintained.
- o When sensors or other such components must be located in the main process cell, provisions should be made for checking their response and calibration from convenient out-of-cell locations.
- o All sensors or other such components located in the main process cell must be removable. When possible, they should be slide-in type for ease of replacement and maintenance.
- o Electrical or electronic lines used to transfer signal energy from the main process cell will terminate in a Regulated Area. Beyond this point, equipment will be located in nonregulated areas when practical.

NEW ITEM

INFORMATION ONLY

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: S-Area Process Control

Specific design requirements for S Area facilities are listed below:

Chemical Process Cell

- o Provide facilities to allow emergency operation of equipment required for safety of personnel, equipment, or the environment, from local control units.
- o **Field operating stations (FOS) for equipment required to be located in a tornado and seismic resistant structure (See Part 4, Item 700.) are also to be housed in that structure.**
- o Normal operation of the process should be from a central control room.

Melter Cell

- o **Two independent canister glass level detection systems are required with capability to establish the final glass level to $\pm 1/2$ inch. One of these systems must have the capability to detect stalagmite formation. Neutron transmission and detection of waste glass radioactivity are recommended as glass level detection systems.
- o A glass weight measurement system with an accuracy of ± 15 lbs is required to monitor the pour rate.**

Canister Decontamination Cell

Because of the nature of the operations in the canister decontamination cell, control of the operations will differ from that in the chemical process cell. Most operations will be controlled locally from FOS in the operating area and near the viewing windows.

- o For instrumentation and control requirements of specific equipment in the canister decontamination cell, refer to Part 20, Items 260 and 265.

Weld Test Cell

Because of the nature of the operations in the weld test cell, control of the operations will differ from that in the chemical process cell. Most operations will be controlled locally from FOS in the operating area and near the viewing windows.

Data from in-cell instrumentation should be displayed and/or recorded at local FOS. Some data may also be entered directly into the CCR computer; other data may be entered by operators from local terminals. The central process monitor may also be used to query local operators status, action to be taken, etc. The welder will be controlled locally and key QA data will be sent back to the central computer.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: S-Area Process Control

- o For instrumentation and control requirements of specific items in the weld test cell, refer to Part 20, Items 270 and 275.

Cold Feed Prep

- o Basic composition of mixing or blending will be verified by analysis.
- o All pumps delivering solutions to Process Building should have both remote switches in the CCR and field switches. Flow measurements on these streams should be available both in the field and the CCR.
- o To prevent line drainage from the main process building back to cold feed prep, provide valves at the pump discharge in the cold feed transfer lines to shut off when the cold feed transfer pumps shut down.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: Interarea Transfer Instrumentation and Control

Specific design requirements for control of transfers between H and S Areas are listed below:

- o Control of transfers of sludge slurry from the H-Area tank farm to S-Area **and of transfers of recycle waste solution from S-Area to the H-Area tank farm will be required.
- o Normally the point of control of these transfers should be at the point of origin after permission has been given by the receiver to initiate the transfer.
- o The receiving station is to have voice communication with the transferring station to report any malfunction at the receiving station.**
- o The existing H-Area waste farm control building will require enlargement to house the instrumentation required for the interarea system as instrumentation planned for current projects will fill the existing building.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: Utilities Control

Since a powerhouse will not be required, instruments and controls as listed in Tables 6-1 and 6-2, Appendix A should be installed to have needed information and controls in the CCR for all utilities and services.

- o **Provide facilities to allow emergency operation of equipment required for safety of personnel, equipment, or the environment, from field operating stations (FOS).
- o FOS for equipment required to be located in a tornado and seismic resistant structure (See Part 4, Item 700.) are also to be housed in that structure.**
- o See Part 13, Item 560 for emergency power requirements.

PART TITLE: INSTRUMENTATION AND PROCESS CONTROL

ITEM TITLE: Ventilation Systems Control

Process Building

The ventilation supply and exhaust fan rooms will normally not be occupied except for walkthrough inspections. Design considerations for ventilation system control are:

- o Failure of ventilation equipment should immediately activate backup equipment and alarms in the central control room on the power operators panel and at the location of the failed equipment (locally).
- o Failure of a single fan in any exhaust system should not shut down production operations. Provide emergency power sufficient to maintain minimum air flow **upon failure of normal power** (see Part 13, Item 560).
- o Process building air supply fans should be interlocked to the exhaust fan as appropriate to automatically reduce the air supply in the event of exhaust failure.

**Glass Waste Interim Storage Building

- o Instrumentation for pressure differential (vault vs. outdoors and above-vault operating area) and air flow through stack is required.
- o Alarms for pressure differential, diversion to filtration, and failure of diversion system are required in the operating areas, the storage building office and the processing building control room.
- o Changeover from normal convection cooling to fan-powered cooling and filtration of the ventilation air will be manually controlled.
- o See Part 13, Item 560 for emergency power requirements.**

PART TITLE: SAMPLING AND ANALYTICAL CONTROL

ITEM TITLE: General

General

An analytical laboratory for process control in the vitrification facility will not be provided. Samples will be taken in sample cells or at sampling locations and transferred to an existing laboratory for analysis. **The amount of time necessary to sample and transport the samples is to be included in the sample turn around time and will not exceed times that are now listed in Part 5, Item 230.**

It is assumed that during the tank retirement program, the Interim Waste Operations program will prepare the sludge (aluminum dissolution and sludge washing) to meet the specifications of the feed requirements for the vitrification facility. **Savannah River Laboratory will provide analytical service for this interim program.**

Requirements for characterization of the glass product are not well defined at the time. Current control philosophy envisions that the quality of the glass product will be controlled by stringent parameters in glass melter operations and that routine characterization of the glass product by destructive analyses will not be required. However, it can be assumed that some limited sampling of the glass product will be required to verify that the process control parameters are being met. It is assumed that any required analysis of the glass samples can be obtained by use of existing facilities at SRL. **A description of these sample requirements is listed in Part 7, Item 400.

A description of requirements for the** non-destructive examination of the filled glass canister **is included in Part 5, Item 290 and Part 20, Item 275.**

During the construction of the supernate processing facility, additional vessels may be required in the vitrification facility. Design of the sampling cells should consider the potential requirements for the addition of additional samplers.

An AED allowance for purchase of laboratory equipment is listed in Table 16-1, Appendix A. Installation of equipment is to be by AED or a construction cross order funded by AED.

PART TITLE: SAMPLING AND ANALYTICAL CONTROL

ITEM TITLE: Sampling -- Raw Materials Receiving

Raw Materials used in the vitrification facility will be analyzed on receipt. These materials will be received in bulk quantities, both solid and liquid, by truck and railway shipment. (See Table 5-2, Appendix A.)

Chemical solutions prepared from the raw materials will be analyzed before being used in the process.

Provision must be made for sampling shipments of raw materials and prepared chemical solutions in small containers and transfer of these containers to the Analytical Laboratory for the required analyses.

Raw materials used in the process are not to be used until the essential materials analyses are complete. If the material has been unloaded prior to acceptance and the material does not meet specifications, provision for reloading and shipment back to the vendor must be included.

Exposure to and inhalation of hazardous chemicals to personnel during sampling must be considered.

Current SRP policy for sampling, analyzing and unloading raw materials are outlined below for guidance in designing required facilities.

- Bulk chemicals including glass frit received by rail car are sampled from the rail car. After laboratory verification that the material meets specifications, the contents of the rail car are transferred to the receiving vessel.
- Bulk chemicals received by truck are sampled from the truck **before** the truck is unloaded into a receiving tank. If laboratory analyses indicate that the material is unacceptable, **the material will be returned to the vendor.**
- Chemicals received in drums, carboys, bags, etc. are unloaded into a holding area. A statistically representative number of the containers in the shipment are sampled for analyses. Following completion of the laboratory analyses, the material is released for process use.
- Chemical cold feed solutions are prepared from the bulk chemicals in makeup tanks. Prior to process use, each makeup is sampled and analyzed prior to process use to verify proper makeup.
- Sample size is dictated by analytical requirements but is normally about 200-500 mL.
- Sampler used for sampling bulk chemical vessels and process chemical vessels (cold feed solutions) is shown on W148193 and D116567.

PART TITLE: SAMPLING AND ANALYTICAL CONTROL

ITEM TITLE: Sampling-Glass Melt Operations

Small samples of the glass product will be occasionally required for analyses to determine product quality. The required analyses will be performed in the high level caves at SRL. **Sampling of the melt stream will provide information of vitrification, chemical composition, radionuclide distribution and physical properties. These results may influence operating parameters, but are not intended for daily process control.**

Design should provide for obtaining a representative 1 liter sample of the molten glass as it is poured into the canister. Equipment for removing the sample from the glass melt cell and transporting to SRL will be required. This includes a shielded shipping container which must meet canister smear requirements and be compatible to handling facilities at both sites. Facilities at SRL are now being scoped and drawing numbers will be made available as soon as they are complete.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Licensing

DOE waste processing facilities are exempt from licensing by the Nuclear Regulatory Commission (NRC).

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: DWPF Status -- Regulatory Guides

The design and construction of the facility should be in accordance with the requirements of DOE as set forth in applicable portions of the DOE Manual. Reference C-11, Appendix C provides design requirements for DOE facilities.

The DWPF should be designed and constructed in such a manner as to provide a degree of protection to the work force and to the general public that is no less than that provided for facilities constructed in conformance with accepted industrial standards and requirements. Regulatory guides have been issued by NRC for various nuclear facilities. These guides, which are applicable to power plants and to elements of the commercial fuel cycle, may be used to supplement the DOE guides.

****COMPLETE REVISION****

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Construction and Operating Permits

General

A permit to construct and operate the DWPF per se is not required. However, permits will be required for various portions of the DWPF. DOE will obtain these permits from the appropriate agency. Prior to granting the permit, the agency requires a review of the design of the facility for which the permit is requested. In general, the request for a permit should be accompanied by sufficient drawings, flow rates, estimated releases and any other information that may be necessary for the agency to independently verify the estimated releases to the environment.

Requests for permits should be prepared and submitted to SRP for transmittal to DOE and thence to the appropriate agency. Generally, 30 days will be required for review of the permit application by DOE and 180 days for the agency review. Thus, the design should be complete at least 210 days prior to the date that construction is expected to begin.

The following discusses the permits, plans, actions, etc. that will be required.

Erosion Control Plan During Construction

A plan to prevent or mitigate erosion during construction will be required. A permit from the State will not be required for the erosion and control plan; however, the plan will be submitted to the State for informational purposes. The plan should be submitted at least 60 days prior to construction activity to allow for DOE and State review.

The erosion control plan should show the method of controlling erosion (sedimentation basins, ripracking, etc.), number and location of discharge points. Monitoring of the discharge should not be required. Consideration should be given to the potential for making the sedimentation basins permanent structures for potential mitigation of the disturbance of the existing wetland in S-Area.

Site Dewatering Wells

Wells may be required for dewatering the construction site prior to deep excavation for construction of the building. Number, location and discharge points for these wells should be shown on the Erosion Control Plan.

It should be assumed that the South Carolina Department of Health and Environmental Control (SC-DHEC) will not require that ground water discharged to streams during site dewatering be treated to meet NPDES requirements (Part 8, Item 220), but will require notification of the quantity and source of the water.

INFORMATION ONLY

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Construction and Operating Permits

Ground Water Wells

DOE will obtain a "Permit to Construct Ground Water Wells" from the South Carolina Department of Health and Environmental Control (SC-DHEC) Water Supply Division (WSD). This requirement will apply to ground wells constructed for supplying water for industrial and domestic usage. The request for a permit should contain the number and location of the wells plus drawings and specifications for the wells.

Surface Runoff

A permit to construct storm sewers will not be required. However, storm water discharge to the streams will require revision of the existing NPDES permit. This revision will require showing the number, location, area served, etc. for each discharge point. Design of the storm sewer system must assure that no discharges other than rainfall reach the storm sewers. The revision should be submitted 210 days prior to completion of the storm sewer system.

Concrete Batch Plant

The concrete batch plant used during construction will require a "Permit to Construct" and a "Permit to Operate" from the Bureau of Air Quality Control (BAQC) of SC-DHEC.

This requirement can be assumed to apply to any batch plant constructed on-site by either Du Pont Construction or a sub contractor, but would not apply to an existing off-site batch plant. The State will inspect the batch plant after construction completion and issue an operating permit.

Domestic Water System

A "Permit to Construct" the domestic water treatment and distribution system will be required from WSD of SC-DHEC. The request for a permit should contain the drawings and specifications for the domestic water system.

Chemical and Industrial Waste Treatment Facility

A "Permit to Construct" the chemical and industrial waste treatment facility will be required from Industrial and Agricultural Waste Water Division (IAWD) of SC-DHEC.

The request for a permit should contain the method of treatment, sources and expected concentrations of feed to the waste treatment facility, flow rates, quality of effluent from the treatment facility, location of discharge points, provisions for sampling and monitoring, etc. The facility should be designed to meet the effluent limits specified in Part 8, Item 220.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Construction and Operating Permits

Prior to placing the facility into operation, the NPDES permit will be modified to include this facility as a discharge point. This permit modification will be submitted about 180 days prior to placing the facility into operation.

Sanitary Waste Water Treatment

A "Permit to Construct" the sanitary treatment facilities will be required from the IAWD of SC-DHEC.

For planning purposes, assume that the request for a permit must be submitted 210 days prior to construction of the treatment facilities. However, SC-DHEC has granted conditional approval within 60 days for some SRP treatment facilities when assured that the planned treatment facility was essentially identical to purchased package units already in existence at SRP. This conditional approval was granted on the basis of report showing vendor's information. Full approval normally requires the 180 days. After construction completion, the State will inspect the facility and grant a permit to operate.

It is planned to discharge the effluent to the streams; therefore, the NPDES permit will require modification. Limits for discharge to streams are shown in Part 8, Item 220. Revision to the NPDES Permit will be submitted about 180 days prior to placing the facility into operation.

Diesel Generators

A "Permit to Construct" the diesel generators must be obtained from BAQC of SC-DHEC for any diesel generator with a 150 kw or greater capacity. This requirement will apply to emergency diesel generators and to direct drive diesels used with the well water system. The request for a permit should show the expected emissions to the atmosphere from the diesel operation.

A "Permit to Operate" the diesel generators will be required from the same agency.

Exhaust Stack

A permit to construct and a permit to operate the exhaust stack for the vitrification building will be required. The permit is required because the stack is a source of NO_x emissions to the atmosphere.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Construction and Operating Permits

The permit request should contain location, height, drawings, specifications, etc. of the stack plus flow rate and concentrations of non-radioactive emissions.

If the exhaust stack exceeds 200 ft in height, the FAA must be notified.

Storage of Materials

A Spill Prevention Control and Countermeasures plan (SPCC) must be submitted to IAWD of SC-DHEC for oil storage facility of greater than 660 gallon capacity. Construction will be responsible for preparing the plan for construction and operations will prepare the plan for operations.

Process Cell Crane and CCTV Viewing

If a wireless system is used, permits must be obtained from the Federal Communications Commission.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Releases -- Gaseous/Aqueous/Solids

General goals for waste management, operating criteria, and design criteria have been published in SRO-TWM-77-1, Integrated Radioactive Defense Waste Management Plan, July, 1977. Excerpts from this reference that are applicable to the DWPF are reproduced here. These criteria must be incorporated into the design of the DWPF.

1. General Goals for Waste Management

The primary objective of Savannah River's radioactive waste management program is to manage the waste in such a manner as to minimize the radiation exposure and associated risk to man and his environment over the lifetime of the radionuclides. To realize this objective, the Savannah River Plant applies a defense-in-depth approach to the design, construction, operation, and maintenance of waste management facilities. Defense-in-depth approach provides for multiple barriers, both physical and procedural, to minimize the incidence of abnormal events and to limit the adverse consequences of events that may occur. This policy has been implemented by the formulation and observance of the following goals:

- All waste management operations must be consistent with the policies set forth by DOE Manual, Chapter 0511.
- Releases of radionuclides to the biosphere must be within standards set forth in Reference C-10, Appendix C; in addition, releases should be limited to as low as reasonably achievable.
- All waste materials in storage should be retrievable.
- High level liquid wastes will be converted into a relatively stable solid form suitable for packaging and storage in a retrievable mode.

2. Specific Requirements- Operating CriteriaAqueous Wastes

- Liquid radioactive wastes should be subdivided into two fractions: one (high level waste) containing concentrations of radionuclides that require confinement and one (low level waste) that may be discharged to the environment pursuant to Reference C-10, Appendix C.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Releases -- Gaseous/Aqueous/Solids

- High level liquid wastes should be converted into suitable physical and chemical forms and confined in a manner that will provide high assurance of isolation from the environment.
- Liquid wastes will be stored in carefully engineered systems equipped with provisions for leak detection and control.
- Adequate diversion systems must be provided to ensure that normally releasable streams from the SRP operations are promptly or automatically diverted to controlled holding areas if they become contaminated to levels that exceed established standards for release cited in Reference C-10, Appendix C.
- A system of monitoring wells within and about the radioactive waste storage sites is required to monitor possible migration of radionuclides from their storage location.

Airborne Radioactive Effluents

- Gaseous and other airborne radioactive effluents must be controlled at the lowest levels reasonably achievable and below limits specified in Reference C-10, Appendix C.
- Monitoring and surveillance systems are required to assess the integrity of containment systems and to inventory the quantity of radioactivity discharged to the atmosphere.

b. Design Criteria

These criteria apply to all new facilities:

- Storage sites for solid and liquid wastes must be selected to take advantage of natural barriers that could minimize the release of radioactivity to the environment even if the man made containment barriers fail.
- Storage facilities should be as far as practical from plant boundaries and water sources.
- Containment systems must be designed to withstand or cope with specified natural forces and design basis accidents without releasing excessive radioactivity or other pollutants offsite.
- Liquid waste storage facilities should be as near as practical to the point where the waste is discharged.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Releases -- Gaseous/Aqueous/Solids

- Primary barriers or transfer systems that are, or may be expected to be, in direct contact with radioactive waste must be designed and tested to be leak-free under expected normal operating conditions.
- Secondary barriers must be provided that enclose each primary barrier to ensure the concept of double confinement. For radioactive liquid wastes, this container will be designed to contain the entire contents of the primary container without leakage.
- Aqueous waste transfer systems should be installed in each of the primary and secondary containers and be ready for emptying the liquid contents immediately if required.
- Ventilation systems must be provided to prevent accumulation of flammable gases above liquid wastes in storage and process vessels.
- Ventilation systems must be designed to limit radioactivity releases to the atmosphere during normal operation to concentrations that are as low as is reasonably achievable.
- Design of confinement facilities and equipment must be such that radiation exposure to operating personnel meets the criteria specified in Reference C-10, Appendix C.
- An independent backup source of electrical power should be installed to maintain the integrity of barriers. Redundant electrical supply lines from the backup source are not required.
- Monitoring and surveillance systems must be provided to assess the integrity of primary barriers so that the condition of the barriers can be determined at any time and the extent of any leakage can be evaluated.
- The capability should be provided to assess the integrity of secondary containers so that double confinement of liquid and solid waste can be assured and the extent of any leakage can be evaluated.
- Monitoring systems, instrumentation, and procedural controls must be included to ensure that waste facilities operate within operating guidelines and technical standards.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Releases -- Gaseous/Aqueous/Solids

- Waste management facilities should be designed such that the facilities can be operated with as little reliance as possible on people and instruments. Loss of power, cooling water, or possible facility evacuation should not result in conditions that immediately threaten the integrity of physical barriers.
- Monitoring systems must be provided to detect and evaluate the quantity and distribution of any radioactivity released to the atmosphere or ground water.

3. Other Design Considerations

- All facilities should be designed for the safe confinement under all credible conditions of all radioactive waste handled, processed, and stored.
- Any equipment in any system which governs the protection of personnel onsite or offsite should be designed so that in case of failure alternate equipment will automatically come online.
- Liquid and gaseous effluents shall be decontaminated to meet SRP standards before release to the environment. SRP currently operates on the basis of Technical Standard DPST-RH-W-0.1 for release of radioactivity from the plantsite. This standard does not specify the amount of individual radionuclide that may be released but limits the total maximum exposure of an offsite individual from all SRP releases to that shown in Table 8-1, Appendix A. These limits are lower than those imposed by DOE Manual, Chapter 0511 and Reference C-10, Appendix C, but are considered those reasonably achievable. Since the technical standards limits apply to the summation of all releases from the plantsite, guides for individual production facilities have been developed based on operating experience. These guides are summarized in Table 8-2, Appendix A. Any release from the DWPF will have to be low enough that the plant does not exceed the technical standard.
- Storm water drainage from areas of high contamination potential outside of buildings (i.e., pump pits, or comparable regulated areas) is potentially contaminated. These facilities must be protected from rain or the storm run-off water collected and monitored for radioactivity with the capability of diverting the runoff to the existing Building 281-H retention basin. This is not to be interpreted as applying to outdoor cold feed areas or to areas outside of airlock doors to regulated areas such as the railway tunnel to Building 221-S, the fan house and glass waste storage building, HEPA servicing entrances or the sand filter airlock entrance.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Non-radioactive Plant Effluents

A. General

Currently, nonradioactive liquid releases from SRP are controlled in accordance with NPDES permits SC0023710 (sanitary sewerage) and SC0000175 (industrial waste). The permits expire in 1980 and 1981, respectively. The requirements of these permits are discussed below in divisions B and C. The Environmental Protection Agency is currently transferring administrative and enforcement responsibilities for the permits to the State of South Carolina. Future revisions of the permits, in 1980 and 1981, are expected to impose more restrictive limits on metals (i.e., chromium, nickel, and cadmium) and on accidental spills of chemicals.

Federal facilities must comply with all federal, state, and local regulations. Any facilities provided on this project must comply with applicable federal regulations on water pollution and air pollution. In addition, South Carolina regulations must be met. For example, South Carolina Air Pollution Control Regulations and Standards require both construction and operating permits for facilities with liquid and/or gaseous effluents. The permit applications are normally prepared by Du Pont for DOE-SR to submit to state authorities.

B. NPDES Permit SC0023710

This permit requires secondary treatment, monitoring, and reporting of sanitary waste water discharges to tributaries of the Savannah River.

The permit requires flow measurement and specifies monitoring and limits for the following parameters:

Concentration

Suspended solids, ppm	Monthly average less than 30	Monthly maximum less than 45
BOD, ppm	Monthly average less than 30	Monthly maximum less than 45
Fecal coliform, colonies/100 ml	Monthly geometric average less than 200	Monthly maximum less than 400
pH	Between 6 and 9	

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Non-radioactive Plant Effluents

In addition, a loading limit which is obtained by multiplying the concentration by the flow is specified.

SRP policy for sanitary waste water discharges from the secondary treatment plants **has been** to eliminate discharges to streams by use of spray irrigation on the land surface in a manner that avoids runoff. Spray irrigation equipment is now installed in A, D, and H Areas. However, recent plant experience has shown that spray irrigation has not been entirely satisfactory. The current policy **is discharge the effluent to plant streams and dispose of accumulated sludge to existing SRP land fill area.**

C. NPDES Permit SC0000175

This permit specifies limits for discarding nonradioactive industrial effluents to streams on the plantsite.

The permit specifies limits for various types of discharges. The limits are summarized in Table 8-3, Appendix A and are applicable to each waste stream of a particular type. In addition to the limits, flow measurement is required for each of the discharges. Sampling and flow measurement must be at the source and prior to mixing with any other waste stream.

The permit also specifies limits for effluents from the following facilities: (a) vehicle and equipment cleaning facilities, (b) painting and corrosion control facilities, (c) vehicle and equipment maintenance areas, (d) petroleum, oil, and lubricant storage and handling areas, and (e) photographic laboratories.

200-S Area will have nonradioactive effluent streams of one or more of these types and those shown in Table 8-3, Appendix A. If the waste stream is discharged directly to the environment, it must meet the water quality limits specified and provisions for sampling and flow measurement of each stream must be provided. If several waste streams are combined for treatment to improve the water quality, then only the effluent from the treatment facility will require monitoring for compliance with the discharge permit. Limits for this treated effluent will be specified by federal and state authorities. However, it can be assumed that this treated effluent will require monitoring for all of the parameters specified in Table 8-3, Appendix A and that the most restrictive limits will apply.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Exposure Limits

Reference C-10, Appendix C prescribes limits for worker radiation exposure. It also stipulates that the exposure should be as low as technically and economically feasible and that worker exposures of less than 1000 mrem/year should be a design objective.

To meet the above objective, SRP policy (Technical Standard DPSTS-RH-0.02, proposed revision 4/74) states that shielding shall be provided to limit the exposure to less than 0.5 mrem/hr in continuously occupied areas and less than 5 mrem/hr in intermittently occupied areas.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Radiation Contamination Limits for Storage or Shipment

The limit for transferable contamination on the canister is 220 d/min/dm² alpha and 2200 d/min/dm² beta-gamma.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: NOISE LEVEL LIMITS

The maximum permissible noise level for personnel for an 8-hour working day is 90 DBA. All practical engineering and design efforts should be made to reduce noise to personnel to a level below this requirement. Areas exceeding 90 DBA are to be posted and ear protection supplied for personnel working in the area.

Design must be in accordance with Du Pont Engineering Stancards J2B and J2C.

NEW ITEM

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Plant Decommissioning

General

The decommissioning of the Sludge Plant can be facilitated by incorporating in the design features which will assist in this effort. DOE facilities general design criteria requires that design features be considered which will facilitate decommissioning Reference C-11, Appendix C. These features may be utilized in any one of the four general modes of decommissioning as described in published literature.

- (1) Layaway
- (2) Protective storage
- (3) Entombment
- (4) Dismantlement

The decommissioning plan for the Sludge Plant is based on the following assumptions:

- Dismantlement is the ultimate objective of any decommissioning effort
- Techniques and methods of decontamination and decommission will probably change during the lifetime of the facility.
- The intent of the regulations is to anticipate the most likely method to accomplish decommissioning
- **Due to the purpose of the Sludge Plant, it will be one of the last facilities at SRP to be decommissioned.**
- The criteria selected to assist in decommissioning will not represent a significant increase in cost

Plan

A general plan for a method of decommissioning sludge processing facilities will involve:

- (1) Flushing of lines and vessels
- (2) Evaporation of liquid waste in the tank farm evaporator or providing an evaporator for this task

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATION

ITEM TITLE: Plant Decommissioning

- (3) Solidification of liquid waste
- (4) Conversion of certain areas to a facility suitable for volume reduction and packaging of process equipment
- (5) Decontamination of process cell interior surfaces
- (6) Isolation of decontaminated areas to prevent recontamination
- (7) Demolition

It is assumed that the weld test cell portion of the process cell will be modified and used for a volume reduction and packaging facility because of the remote handling, viewing and transportation handling capabilities. This area of the process building will probably be the last one to be decontaminated. Design of the process cell should facilitate this approach.

Decommissioning is planned in four phases.

a. Chemical Decontamination

This phase will involve rinsing and chemically cleaning the internal surfaces of process lines, vessels, and equipment. The contamination will be removed by a series of flushes designed to reduce the level to as low a value as practical. The external surfaces of process equipment will be sprayed remotely with a series of decontamination solutions or steam. Spent cleaning solutions will be evaporated and solidified.

b. Removal of Contaminated Equipment

This phase will involve disconnecting and removing all process equipment to the decontamination cells for further decontamination and preparation for burial. The process equipment will be reduced in volume by cutting, sawing, etc., and packaging for transportation to a waste disposal facility.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Plant Decommissioning

c. Decontamination of Structures

This phase will include decontamination of all contaminated surfaces of the process cells. These surfaces will be remotely sprayed with a series of decontamination solutions and steam to reduce the radiation levels. Spent cleaning solutions will be evaporated. Residual contamination of structural surfaces will be removed using state-of-the-art methods at the time of decommissioning. This might include such techniques as chipping, grinding, etc. All contaminated material will be packaged for transportation to a waste disposal facility.

d. Demolition and Restoration

This phase will include demolition of all above grade portions of the Sludge Plant facilities using conventional methods such as explosives and impact balls. The site will then be graded and planted with vegetation to near prefacility conditions. The DWPF site will be released for unrestricted use.

Design Criteria

Although major investment in decommissioning requirements should be avoided it is desirable to include design features wherever possible to facilitate any decommissioning method that may be selected. **Based on the general procedure just given, the following design criteria for decommissioning the DWPF facilities were developed.** Several of these criteria are required for process operation. Others are criteria to be included to the extent that no significant additional cost is incurred.

Items 1 through 6 are included in general design criteria for the main processing building Part 11, Item 105. These are considered necessary for process operations and will assist in decommissioning. Items 8 through 17 are included to provide design criteria specifically for decommissioning if they can be included in the design without increasing construction costs.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Plant Decommissioning

1. Maintenance

Provide the capability to introduce, loosen, take apart, disconnect, locate, relocate, and remove all equipment. The process cell will require remote maintenance. In selected locations, hands-on maintenance will be acceptable provided that the capability for removing or placing in shielded storage in-process materials is available.

2. Compartmentalization of Process Functions

Where practical, process functions should be divided into different compartments. Division of the glass melt cell and the weld test cells is an example of this concept.

3. Access to Process Equipment

Provide ready remote access to all contaminated process equipment. Provide process cells with removable covers and do not stack process vessels except where absolutely necessary. Keep the number of jumpers on top of jumpers and piping services that cause obstructions to a minimum.

4. Cell Sumps and Jets

Provide a sump and a jet for each decon cell, process cell, and for removal of liquid. In any cell where liquids are not routinely handled during normal operation, include only the sump with provision for later addition of the jet.

5. Protective Coatings

Protective coating should be applied to concrete surfaces subject to chemical or radioactive spill. The protective coatings will reduce the amount of radioactive contamination absorbed into the concrete. If stainless steel linings are not used, a protective coating recommended to resist deterioration caused by radiation and process and decontamination chemicals should be tested, approved, and applied according to standards. See Reference F-2, Appendix F on selection and application of protective coatings.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Plant Decommissioning

6. Openings, Wall Penetrations, and Service Piping

Keep the number of wall penetrations in other design areas to an absolute minimum. Consider providing wall penetrations with a flange or lip which will give a surface to weld covers over each opening if required.

7. Provision for Chemical Decontamination

Provide capability of modifying piping and services to allow effective chemical decontamination of canyon surfaces. Provide for addition of spray rings or decontamination lances to any process cell section. Provide spray rings or decontamination features in the decontamination cells.

8. **Liquid Waste Disposal

Provide a means to transfer liquid waste from sump collection tanks and cell washdown to the Waste Tank Farm.**

9. Isolation of Sections of Ventilation System

Consider providing a method of ventilation control which will permit air flow from selected process cell sections to be selectively reduced or eliminated at the exhaust entrance to the air tunnel. This capability is not required during normal operations, but provision for installation during decommissioning is desirable.

10. Control Room Location

If feasible, the control room should be located so that controls for the continued operation of the weld test cell will be available during dismantlement.

11. Electrical Substations

If practical, the location of substations should be chosen to facilitate the continued operation of the weld test cell.

PART TITLE: REGULATORY AND ENVIRONMENTAL CONSIDERATIONS

ITEM TITLE: Plant Decommissioning

12. Capability for Mechanical Decontamination

Following chemical decontamination of canyon surfaces, it may be necessary to remove residual contamination by grinding or other methods. Design should facilitate the spalling of the concrete surface.

13. Coating of Exhaust Tunnels

The exhaust air tunnels from the Sludge Plant process cells should be coated in the same manner as exposed canyon walls.

14. Access to Sand Filter

Provide air lock access to the top of the filter to permit entry for sand removal and decontamination.

15. Secondary Filtration at Sand Filter

Consider provisions for passing air from the sand filter through HEPA filters before discharge to the stack during decommissioning. **This can be accomplished by providing any knockout plugs, etc., that might be required to divert the sand filter exhaust to the air tunnel from the operating area of the Sludge Plant building to the HEPA filtration system for that air.** As an alternative, reserve sufficient space between the sand filter and the stack to install a HEPA system during decommissioning.

16. Air Flow Patterns

Air flow patterns should be from clean areas to regulated areas to process cells. Flow should be directed from weld test cell to process cell to sand filter.

17. Volume Reduction of Waste

Volume reduction, treating, and packaging of solid waste is a desirable feature. This capability is not required during normal operations, but provisions for installation during decommissioning should be considered, at least in a limited scope, during final design.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: QA Assessment Basis

General

Quality assurance requirements for Savannah River activities are outlined in DOE Order SR-5700.6A. Du Pont interprets and satisfies these requirements through the Savannah River Quality Assurance Policy, DPW-76-111-1, Revision 1 and a series of six Savannah River Quality Assurance Manuals, DPW-78-111-2, plus detailed instructions for each organization. For the DWPF project, the program is slightly modified to accommodate the change in Du Pont work activities because an outside company is employed as the engineering contractor.

Quality Assurance Assessment Process

An assessment process is employed to determine whether all or part of the QA program is to be applied to a project, facility, or portion thereof.

In implementing the QA Program for DWPF, a QA assessment process will be employed to classify all items and services into one of two categories, Q or S, as defined under definitions. The reasons for these classifications are based on group judgment of knowledgeable people and are documented. The formal QA Program is implemented for those items and services that are classified as Q.

Quality Assurance Assessment Criteria

The Quality Assurance Assessment criteria for DWPF are given below:

1. Radioactive Material Releases

Release of radioactive materials to the environment, from normal operations or credible accidents, must not exceed the following annual doses at the site boundary.

<u>Type of Exposure</u>	<u>Exposure, mrems</u>	
	<u>Maximum^a</u>	<u>Average^b</u>
Whole body, gonads, or bone marrow	500	170
Other organs	1500	500

^aBased on dose to individuals at points of maximum probable exposure.

^bBased on average dose to suitable sample of exposed population.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: QA Assessment Basis

2. Nonradioactive Hazardous Gas Releases

Release of nonradioactive hazardous gases to the environment, from normal operations or credible accidents must not exceed the following concentration levels at the site boundary.

<u>Gas</u>	<u>Hazard Level, ppm</u>
Chlorine	Over 15
Hydrogen sulfide	Over 100, or between 50 & 100 for over 2 hours
Sulfur dioxide	Over 40

3. Unexpected Costs

Unexpected costs, such as damage and/or cleanup expenses, to facilities or processes must not exceed 10 million dollars per event.

4. Loss of Production

Loss of production of an acceptable product in a single production process must not exceed a 6-month period.

5. Unplanned Nuclear Criticality

Unplanned nuclear criticality must not occur in any facility or process.

6. Process Hazards

Unplanned reactions in, or upsets to, manufacturing processes that could cause explosion, fire, release of toxic material, eruption from overpressurization, or radiation exceeding 300 rems, resulting in fatality or total and permanent disability, must be prevented or mitigated.

Supporting services (electricity, steam, air, water, material handling, modes of transportation, etc.) and failure of hardware (rupture disks, pressure relief valves, gaskets, valve packing, seals, breathing-air equipment, etc.) are typically not considered under this QA assessment criterion.

7. Others

Department Superintendents with the concurrence of the site QA coordinator, may elect to assess projects or facilities for application of the QA program beyond the scope of the preceding criteria in order to achieve other important project objectives.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: QA Assessment Basis

Applicability of Criteria

For the DWPF, QA Assessment Criteria No.'s 1, 3, 4 and 6 (radioactive material releases, unexpected costs, loss of production and process hazards) are considered applicable. Criticality is not considered feasible in the DWPF and therefore criterion No. 5 is not applicable. Hazardous gases are not expected to be utilized in the DWPF in sufficient quantities that would exceed the release limits specified in Criterion No. 2; therefore this criterion is not considered applicable. The four applicable criteria, No.'s 1, 3, 4 and 6, are designated the "DWPF QA Assessment Criteria."

Qualifications

The following qualifications apply to the four DWPF QA Assessment Criteria:

1. The following clarifications apply to the process hazards criterion:

- o It is concerned with high consequence (death or total disability) accidents only. It does not apply to those hazards which would normally be covered by standard industrial design practices and safety programs.
- o It applies only to accidents that result from a manufacturing process operation. As a result, it will only be applied to the following design areas. However, the results of the assessment process may have an impact on other design areas.

221	378
250	383
329	395
350	450
360	511
376	550

The basis for selection of these design areas is given below:

- o The process hazards criterion will be applied to design areas in which there is a manufacturing process operation and/or potential hazard for a radiation dose to an individual employee exceeding 300 rems.
- o The manufacturing process is considered to begin with the origin of the waste transfer line, as defined in Part 5, Item 170, and end with the storage of the filled canister in the glass storage building.
- o The boundaries of the process are given below.
 - Includes the off-gas treatment, mercury recovery-recycle collection and mercury purification-containerization systems.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: QA Assessment Basis

- Includes chemical feed systems that directly feed the process, but does not include bulk storage of dry or liquid chemicals or the preparation of chemical solutions.
 - Includes sample collection and handling.
 - Does not include the 221-S exhaust system.
 - o By its definition, this criterion seeks to identify potential process accidents that are not obvious and are more difficult to identify. Therefore, appropriate expertise must be applied to the identification process.
2. The radioactive material release criterion is applicable to all incidents, including natural phenomena such as earthquake, tornado, flood, etc. This holds true up to the design basis of each phenomenon (e.g. DBE, DBT).
 3. The following clarifications apply to the radioactive material release criterion:
 - o The word exposure, as used in the introductory sentence and in the heading above the limits, means dose.
 - o Subscript b. means a sample of exposed population within a radial distance of 50 miles from the center of the release.
 4. The unexpected costs and loss of production criteria are not applicable when they result from any natural phenomena, such as earthquake, tornado, flood, etc.
 5. In estimating the unexpected costs, the estimate will be based on the cost at the time the assessment is performed and will not be escalated.
 6. Decommissioning will not be considered in the QA assessment.
 7. Reasons for classifying an item or service as Q or S are to be documented.
 8. For any item or service classified as Q, an action plan (QAAP) is to be developed and implemented. The action plan is to be commensurate with the importance of the item or system. The QA action plan is to cover the design, procurement, construction, inspection, and operation of the DWPF. In addition, other groups (AES, LDL, Construction, etc.) may have their own action plans, but none of these are to supercede or diminish the requirements established by the formally approved QAAP.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: QA Assessment Basis

9. A set of rules for selecting and evaluating credible accident scenarios and for the effect of redundancy in classifying segments or components Q or S is given below.
- o Generally, assume single failures as initiating events with no credit taken for items which can mitigate the consequences of events, unless these mitigators are Q.
 - o A credible exception is multiple failures with operator error as the second failure.
 - o If consequences are severe or probabilities are high, use multiple barriers and/or whatever else might be needed, based on judgment.
 - o Redundancy of actions or constraints to prevent or mitigate the consequences of a Q event are not used as the basis for voiding the Q classification of the major segments. However, redundancy or other design actions can reduce the need for Q classification of the components.

DEFINITIONS

For the QA Program on DWPF, the following definitions are employed:

- Q - Designator for any item or service that is assessed to have characteristics whose quality requirements must be validated by a formal QA program to reduce the consequences of a postulated event to less than the limits established by the DWPF QA Assessment Criteria.
- S - Designator for any item or service that is not Q as determined through the QA assessment process. Standard Du Pont practices apply. S items need no QAAPS and the formal QA program is not applied.

QAAP - Quality assurance action plan.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

The objective of this item is to assure that the same consequences for a given accident will be calculated at Savannah River and by the organization performing the QA assessment. This objective is to be accomplished by using the same methodology for consequence calculations that has been used at SRL for the Preliminary Safety Analysis. The following describes the bases used by SRL for performing the calculations for the Preliminary Safety Analysis.

Form of Material Releases

- o Spills are assumed to be low energy events - liquid on the cell floor with potential of liquid being released to the ground surface.
- o Subsurface releases have been shown to have negligible consequences.
- o Evaporation results in radioactivity in the vapor phase condensing to a liquid aerosol.
- o Violent reactions within a liquid-containing vessel are assumed to disperse liquid directly into cell atmosphere as an aerosol. The residual liquid is subject to surface run off.
- o Explosion of melter or canister rupture will disperse activity into cell atmosphere as a particulate aerosol. Re-entrainment contributes only a small fraction to the initial amount released and is not to be considered. Surface run off is not to be considered.

Volume or Mass of Material Released

Maximum vessel contents were assumed to be applicable for calculations for the safety analysis for liquid systems. Vessel sizes should be obtained from the current, approved flow sheet.

Isotopic Distribution

Isotopic distributions for the contents of each of the vessels have been determined from information contained in Tables 6, 7, 8, and 9 of DPST 81-379.

Partition Factors for Specific Isotopes

Partition factors for the evaporation of liquids are as follows:

- o 1.0 for tritium and iodine
- o 0.01 for selenium, technitium, and ruthenium

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

- o 0.0001 for non-volatile radionuclides

In cases where the liquid is dispersed directly into the cell air as a result of a violent reaction, a partition factor of 1.0 is applied to all radionuclides.

Duration of Release

Operating experience indicates that liquid releases are flushed and returned to a process vessel within 8 hours. Therefore, all accidents (except natural phenomena) are assumed to have a duration of 8 hours for the release and transport of radioactive materials.

Method for Calculating Amount of Liquid Vaporized During a Spill

If a spill of process liquid were to occur in the DWPF, the amount of radioactive materials that would be transferred from the spill pool to the exhaust filter is a function of the parameters shown in the following table:

<u>Parameter</u>	<u>Increase in Parameter Increases or Decreases Amount Vaporized?</u>	<u>Parameter to be Considered in Consequence Calculations?</u>
Decay heat generation in process liquid	Increases	Yes
Time before cleanup	Increases	Yes
Gamma radiation loss from liquid	Decreases	No
Liquid temperature	Increases	Yes
Heat of vaporization	Decreases	Yes
Heat capacity	Decreases	Yes
Air flow over liquid	Increases	No
Relative humidity of air	Decreases	No
Conduction into the concrete	Decreases	No

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

<u>Parameter</u>	<u>Increase in Parameter Increases or Decreases Amount Vaporized?</u>	<u>Parameter to be Considered in Consequence Calculations?</u>
Pool surface area	Increases	No
Partition factor between liquid and vapor for specific isotope	Increases	Yes
Condensation between liquid pool and exhaust filter	Decreases	No

A precise determination of material transport would involve a complex transient mass - heat transfer calculation. Such a calculation is not deemed cost effective because of the time required to develop the calculational procedure, because the consequences of evaporation from a pool are several orders of magnitude less than the medium-to-high energy events postulated, and because the factors omitted in the simpler determination are generally self-compensating.

For the purposes of this sample calculation, the decay heat generation rates for the specific compositions under consideration were taken from the Preliminary Technical Data Summary for the DWPF, DPSTD-80-38. The time before cleanup was based on consultation with plant personnel and assigned a value of eight hours. Because most of the material that is vaporized would be water, 540 pcu/pound was used as the heat of vaporization. Partition factors for the specific isotopes are listed and justified in the Preliminary Safety Analysis, DWPF, DPST-81-421. For future calculations, the latest (most current) references should be used. The current heat generation notes are in Appendix H, Tables 21-17 through 21-25.

For an example, assume a spill from the melter feed tank of 5375 gallons. This corresponds to the conditions of the stream from the Slurry Mix Evaporator to the Melter Feed Tank and has the following values:

Temperature	38°C
Heat capacity	0.683 pcu/lb-°C
Specific gravity	1.28
Heat generation rate	0.485 watts/gallon
Cleanup time	8 hrs.
Flush water*	2000 lb.

*The effect of flush water on the calculation of the amount of liquid vaporized during a spill is negligible and may be neglected.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

Mass of material spilled:

$$5375 \text{ gal} \times \frac{8.33 \text{ lbs}}{\text{gal water}} \times 1.28 \text{ (sp. g.)} = 57310 \text{ lbs sludge}$$

Average heat capacity:

$$\frac{57310 \text{ lbs sludge} \times 0.683 \text{ pcu/lb-}^\circ\text{C} + 2000 \text{ lbs water} \times 1.0 \text{ pcu/lb-}^\circ\text{C}}{57310 \text{ lbs sludge} + 2000 \text{ lbs water}}$$

$$= 0.694 \text{ pcu/lb-}^\circ\text{C}$$

Heat required to vaporize one pound of water:

$$540 \text{ pcu/lb} + (100^\circ\text{C} - 38^\circ\text{C})(0.694 \text{ pcu/lb-}^\circ\text{C}) = 583 \text{ pcu/lb}$$

Heat generation rate in pcu:

$$(0.485 \text{ watts/gal})(0.05692 \text{ Btu/min-watt})(1 \text{ pcu}/1.8 \text{ Btu}) \\ (60 \text{ min/hr})(8 \text{ hr})(5375 \text{ gal}) = 39570 \text{ pcu}$$

Mass vaporized:

$$39570 \text{ pcu}/583 \text{ pcu/lb} = 67.9 \text{ lbs}$$

Fraction vaporized:

$$67.9 \text{ lbs}/57312 \text{ lbs} = 1.18 \times 10^{-3}$$

Curies of Ru 106 vaporized given an initial concentration of 2.083 curies/gallon and a partition factor of 1×10^{-2} :

$$(5375 \text{ gallons})(2.083 \text{ curies/gallon})(1.18 \times 10^{-3})(1 \times 10^{-2})$$

$$= 0.132 \text{ curies}$$

These calculations are consistent with Subsection 9.4.2 of the DWPF preliminary safety analysis.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

Mechanism for Transport of Radioactive
Materials to the Filtration System

Airborne material escaping the canyon cell in which the accident occurred will be transported in the exhaust air stream to a deep bed sand filter. Tritium (as tritiated water), iodine, and ruthenium will condense to some extent on cold surfaces; however, they will resuspend in time. It is, therefore, conservative to assume that 100% of the airborne material reaches the sand filter.

Filtration System Efficiency

The efficiency of sand filters used at the Savannah River Plant has been measured on numerous occasions. A correlation of these data shows that 97% of the time the penetration factor ($1 - \text{efficiency}$) is 4.9×10^{-3} or less and 50% of the time the penetration factor is 3×10^{-4} or less. The 97% value is used for safety analysis calculations and the 50% value for environmental effects calculations. The efficiencies are greater where burst-type releases occur, but the more conservative values are used.

Elevation of Release Point to the Environment

Accidents in which normal ventilation is maintained result in a release from the 140-ft ventilation stack. Where the ventilation system is inoperable, a release height of 10 meters is assumed to be equivalent to a ground level release.

Dilution Factors During Transport (X/Q Values)

Dilution factors were calculated by the NRC 145 computer code according to NRC Regulatory Guide 1.145 and can be found in Tables, 3, 4 and 5 of DPST 81-379, Memorandum Durant, W. S. and J. C. Huang to H. D. Harmon, DWPF QA Assessments - Items Requiring Coordination, Bechtel, May 11, 1981.

Population Distribution

Population distributions are based on the 1970 census records and can be found in Tables 1 and 2 of DPST 81-379.

Radial Distance for Population Dose

Dose calculations are made out to a radial distance of 50 miles from Building 221-S.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

Dose Conversion Factors for Specific Isotopes

Dose conversion factors are available for each of the applicable radionuclides in NUREG-0172, Age-Specific Radiation Dose Commitment Factors for a One-Year Chronic Intake, G. R. Hoenes and J. K. Soldat, Batelle Pacific Northwest Laboratories, Richland, Washington, November, 1977. The dose conversion factors for tritium should be increased by a factor of 2.6 over the value specified in NUREG-0172.

Evacuation Time and Distance

Evacuation is not considered in consequence calculations for SRP separations and waste processing facilities primarily because of the low consequences of accidents associated with these facilities. However, if evacuation is to be considered, it is suggested that three days to evacuate out to a distance of 25 miles would be appropriate for an offsite population.

Inhalation Rates

Dose calculations for the DWPF are made using the GASPAR computer code. This code considers four distinct age groups: infant, child, teenager, and adult. Respiration rates in units of m^3/yr for these groups are as follows for population dose calculations:

Infant:	1400
Child:	3700
Teenager:	8000
Adult:	8000

Maximum individual inhalation rates are 1.5 times the above values.

PART TITLE: QUALITY ASSURANCE

ITEM TITLE: Bases for Consequence Calculations

Liquid Release Outside of Processing Building

Part of the waterborne release will stay in the ground water and part will flow to the surface water. The ground water migrates slowly, and takes tens of years to reach Four Mile Creek or Upper Three Runs Creek. Contamination of the ground water by an accident is limited to onsite and makes little or no contribution to the offsite dose. It is conservatively assumed, however, that all waterborne radionuclide releases reach the river; this assumption yields an upper limit for the dose. The maximum individual doses included only the potable water pathway. Daily water consumption by an individual was taken as 2 liters. The minimum Savannah River flow (6000 ft³/sec) was assumed for calculation of waterborne radionuclide concentrations.

The computer code LADTAP was used to calculate doses. This code, developed by USNRC, is based on USNRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I."

PART TITLE: PLANT POPULATION

ITEM TITLE: Total Plant Population

General

**The Sludge Plant population is estimated to be a total of 238 persons.
This plant population is divided into the following categories:**

- Wilmington Salary 74
- Local roll hourly 125
- Local roll weekly 39

The total of the above assigned to days will be 122.

The total of the above assigned to shifts will be 116.

The total estimated to be present in the area at one time is 151.

Personnel

A summary of the personnel to be assigned to S Area is listed in Table 10-1, Appendix A. A list of office locations, number of lockers and location, and a summary of sanitary facilities for both male and female are included in Table 10-2, Appendix A.

INFORMATION ONLY

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Processing Building

The main processing building is to house a glass melter and all associated equipment required to vitrify washed sludge from the waste farm. All process operations should be performed in a cell which includes segregated melter, canister decontamination, and **weld test cells** to control thermal currents and cross-contamination. Sludge from the waste farm will be processed to a retrievable, relatively nonleachable, radioactive glass form product which will be stored in an interim onplant storage facility. The processing building should house process cooling water systems, process equipment decontamination facilities, local control units for emergency operations, Health Protection facilities, and supporting E & I and maintenance shops and a few offices for essential personnel.

Processing areas must be located in a building of earthquake and tornado resistant construction in accord with Part 4, Item 700. Process equipment must be located in remotely operated cells. Process equipment will be **remotely installed and removed for maintenance** except in certain locations where contact maintenance will be permitted. All cell equipment and piping must be located relative to fixed reference points. Containment of radioactivity is essential. Decontamination capability for cell equipment is also essential and design of equipment should facilitate decontamination. **Remotely removable equipment is to** exit through a decontamination area in the cell before it is transferred to the repair shops or is removed from the building.

If space is not available in the seismic portion of the building, clean area facilities such as control rooms, locker rooms, cold feeds, H & V equipment rooms, electrical substations, etc., should be located in a contiguous or nearby building. There are no laboratory facilities required in S-Area, but process sampling capability will be required.

Ventilation supply fans may be housed on the roof of the process structure.

Air compressor equipment required for emergency instrument air service is to be located within the seismic resistant structure.

Emergency diesel-generator sets, if provided to serve Processing Building facilities exclusively, should be housed within the seismic structure of the process building. The critical electrical switch gear should also be housed within this structure.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

Design considerations for the processing building are as follows:

1. Process Cell Criteria

- o The following definitions will be used in discussing the design criteria and should be applied to the design of the facilities.
 - Remote Process Cell (RPC) -- A concrete-shielded, remotely operated area for processing radioactive waste. Generally rectangular in shape, the RPC includes areas which are open or closed as specified below.
 - Chemical Process Cell (CPC) -- The open area within the RPC which contains tanks and equipment related to melter feed preparation, waste handling, vessel vent and melter off-gas facilities.
 - Remote Equipment Decontamination Cell -- The enclosed area within the RPC, separated by cell covers, for remote decontamination of equipment in preparation for repair or removal from the RPC.
 - Contact Equipment Decontamination Cell -- The enclosed area within the RPC, separated by cell covers and air locks, for direct decontamination and limited repair of equipment by operating personnel.
 - Melter Cell -- A covered area within the RPC, isolated by cell covers and transfer tunnels, housing the glass melter and a cool down station for filled canisters.
 - Canister Decontamination Cell -- A covered area within the RPC isolated by cell covers and transfer tunnels, housing canister decontamination equipment.
 - Weld Test Cell -- An area within the processing building possibly within the confines of the process cell, isolated by air locks and transfer tunnels, housing facilities to seal and monitor the canisters.
 - Railroad Well and Air Lock -- The enclosed area within the RPC, separated by cell covers and ventilation control door, which serves as the air lock for transfer of equipment between the remote process cell and the outside of the vitrification building.
- o These cells are to be designed to service a specific equipment arrangement. A modular cell configuration is not required, but is desirable if available at no additional cost.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Provide about 10% spare penetrations through the cell shielding wall at each equipment location (including spare equipment modules), with a minimum of one spare penetration for each type of service where inclusion of spare penetration does not increase the building length.
- o At spare equipment modules, provide penetrations per Appendix A, Table 5-5.
- o To control the spread of contamination by thermal currents, insulate or water cool thermally hot major equipment pieces to the extent practical. Although some flanges, bails, connectors, and other protrusions cannot be readily covered, it is desirable to reduce heat loss to the cells by insulating essentially all thermally hot piping and vessel surfaces. Steam jumpers and associated piping are excluded from insulation considerations.
- o A protective coating resistant to deterioration by radiation, process chemicals, and moisture is to be applied to areas inside the remote process cell to reduce the amount of radioactive contamination absorbed into the concrete. This coating is also to be applied to interior surfaces of the concrete exhaust air plenums from the process cells.
- o Cell datum grid sleepers or equipment positioning floor pads, and positioning trunnion guides must permit precise positioning and remote installation of all equipment.
- o Cell covers over spaces requiring occasional personnel access must provide shielding against radiation. Covers over unoccupied areas are for ventilation control. All of these covers may be constructed of concrete or carbon steel. All covers should be designed to fit without the aid of dowel pins. Shielding covers must be stepped to provide protection against radiation streaming (leakage).
- o Cell covers are to be designed for temporary jumper or yoke storage but not for cell equipment storage. Provide an equipment storage or laydown space for storing heavy equipment.
- o Provision must be made for stacking or storing all of the cell covers that are involved in movement of a piece of equipment.
- o All permanent process cell piping, trunnions and guides, structural parts, kick plates, identification plates, etc., should be 304L stainless steel per spec 4498. Special materials are to be substituted as required when service exposure conditions render 304L stainless steel unacceptable.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Jumpers may be designed to allow transfers from one vessel to other vessels or equipment without entering the wall piping system. Such transfers may be necessary in some cases because of the need to transfer slurries at low flow rates through small-size pipe.
- o Provide clear overhead access to all process equipment, avoiding stacking of process vessels.
- o Process cell jumpers should be designed to minimize crossing over other jumpers so that one can be removed without removing other jumpers.
- o Piping may be located in replaceable horizontal stacks or vertical arrays. Piping for which replacement is most probable should be located at the top of the stacks or vertical arrays.
- o Permanently installed piping should be protected against mechanical damage by embedding in concrete or mounting in a steel structure ("cage"). The piping should have smooth large radius bends to maintain the integrity of the shield wall.
- o The flat faces of embedded nozzles must all be established in a series of parallel vertical (or horizontal) planes.
- o Embedded piping should be designed for structural flexibility and protected against chloride attack. Embedded piping through which frit or slurry-frit mixtures are transferred should be replaceable or have remotely renewable liners.
- o Embedded electrical pipe and connectors should have replaceable wiring and connectors. Embedded electrical pipe should penetrate the shield wall by the shortest route possible and should have smooth large radius bends to maintain the integrity of the shield wall.
- o Permanent and embedded piping should be limited to a few standard sizes. Recommended hole size in standard connectors are 3-inch, 2-inch, four 1/2-inch, and sample connectors. For a limited and specific use, a nonstandard connector would be considered.
- o Nondraining low points or expansion loops should be avoided because of the solids expected to be present in most of the process solutions. Piping for transfer of slurries should be designed as far as practical to be free draining and without traps. The existing in-line connector design for pipe jumpers is considered to satisfy this criterion.
- o Slope process cell floors and floors in all transfer tunnels to drain to sumps. Refer to Part 5, Item 430 for additional sump system information.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Provide floor sprays for general flushing of the cell floor.
- o Provide in-cell storage space for lifting yokes. Refer to Part 20, Item 187 for yoke information. Consider a portable (movable by crane) yoke storage rack, large enough to hold needed yokes but small enough not to interfere with equipment moves in the cell.
- o Provide remote and contact decontamination cells within the process cell. See Part 14, Item 200 for detail on the decontamination cells.

2. Melter Cell Criteria

This space is required within the process cell to house the glass melter operation and control spread of contamination from this operation.

- o Canisters are to enter and leave this cell through air locks.
- o Covers are provided over this cell for ventilation control only; see Part 11, Item 110.
- o The cell is to be sized for operations described in Part 5, Items 255, 270, 273, 293, and 295.
- o All process operations are accomplished with the cell covers in place. The covers are to be removed primarily for equipment or jumper replacement.
- o Slope cell floor to drain to a sump. This sump is to be connected with the process cell sump system, Part 5, Item 430.
- o Provide floor sprays for general flushing of the cell floor.
- o Walls separating the melter cell from other cells are for ventilation control and structural purposes only and not for radiation shielding.
- o The cell should be provided with viewing windows for critical operations; see Part 20, Item 150.

3. Canister Decontamination Cell

A cell space adjacent to the Melter Cell is required to house canister decontamination operation. This isolation is intended to limit spread of radioactive particles from the operation.

- o Canisters are to enter and leave this cell through air locks.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o The cell is to be sized for operations described in Part 5, Items 275, 276, and 295.
- o Walls separating the canister decontamination cell from other cells are for structural and ventilation control purposes only and not for radiation shielding.
- o Covers are provided over this cell for ventilation control only; see Part 11, Item 110.
- o All process operations are accomplished with the cell covers in place. These covers are to be removed primarily for equipment or jumper replacement.
- o Slope cell floor to drain to a sump. This sump is to be connected with the process cell sump system, Part 5, Item 430. The design is not to preclude making it possible to connect this sump transfer system to the frit collection tank in this cell.
- o Provide floor sprays for general floor flushing.
- o The cell should be provided with windows for viewing the critical operations described in Part 5, Items 275 and 276.

4. Weld Test Cell Criteria

An isolated space is required within or outside of the process cell to house operations with filled glass canisters. The isolation is provided to maintain canister surface and equipment cleanliness following canister decontamination. Cell design must provide for remotely controlled process operations with equipment that is expected to be designed for hands on maintenance.

- o Canisters are to enter and leave this cell through air locks.
- o The cell is to be sized for operations described in Part 5, Items 280, 285, 290, 293, and 295.
- o Walls and roof separating the weld test cell from other cells must be sized for personnel shielding, providing for intermittent occupancy (5 mR/hr at the shield surface).
- o Slope cell floor to drain to a sump. This sump is to be connected with the process cell sump system, Part 5, Item 430.
- o Provide floor sprays for general floor flushing.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o The cell should be provided with windows for viewing the critical operations described in Part 5, Items 280 and 290.
- o A shielded doorway with air lock is required for cell entrance.
- o Radiation level outside this shielded doorway is to be less than 0.5 mR/hr.
- o Shielding for canisters as specified in Part 5, Item 295.

5. Other Process Building Criteria

- o Provide office space as noted in Table 10-1, Appendix A.
- o If required gang valves should be located at an elevation sufficient to avoid suckback of solutions from the process cell. Shield or embed in concrete all lines between the process vessel and the gang valves for at least 34 ft above the maximum liquid level in the vessels.
- o Gang valve venting system must prevent vapor flow from the process cell.
- o Air supply to or exhaust from operating areas must not contaminate large sections of personnel inhabited areas if one part becomes contaminated. Provide partitions in areas of high contamination potential to minimize spread of contamination.
- o Use 304L stainless steel per spec. 4498 for any lines that are inaccessible in areas where hands-on maintenance will result in high radiation exposure to personnel. Special materials are to be substituted as required when service exposure conditions render 304L stainless steel unacceptable.
- o Locate sample cells to minimize sample lift requirements. Sample piping configurations must prevent syphoning.
- o Master-slave manipulator-operated sampling cells for obtaining samples from multiple locations are preferred, if feasible. See Part 7, Item 300 for additional detail on sampling requirements and Part 11, Item 110 for ventilation control in the sampling cells.
- o Where applicable, design sample systems to accommodate in-line analytical instruments.
- o Do not locate passageways, pipes, conduit, etc. under any portion of the remote process cell, except the weld test cell.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Provide a floor drain system to dispose of leakage or wash down liquids. Collection systems for overflow and drainage from chemical makeup and head tanks is required. See Part 5, Item 215 and 430 for additional information.
- o All lines for radioactive solutions which are routed through personnel occupied areas should be jacketed, equipped for leak detection, shielded or shieldable, easily replaced (unless embedded in building structure), and equipped for flushing, draining, and rodding, if necessary, to a suitable tank for containment and controlled disposal. The formic acid, acid, and floor drain headers are excluded. Embedded piping for transfer of radioactive process solutions into and out of the building through shielding walls is also excluded. However, all Zone 2 exhaust plenums (Part 11, Item 110) are to be protected against in-leakage from embedded piping.
- o Locate freight elevators on outside walls to facilitate material flow to and from the building. Make passageways to elevators wide enough to transport largest equipment on a given level. Freight elevators should be equipped with an emergency telephone (Type I telephone). See Part 17, Item 100.
- o Personnel movement between clean and regulated areas of the building must be controlled to eliminate potential contamination of clean areas. There should be one main entrance into the clean areas of the building and one main entrance into the regulated areas. Air locks are to be provided for personnel movement between different confinement zones.
- o Avoid locating personnel areas under process piping containing radioactive solutions.
- o Locate noncritical services (locker rooms, clothing storage, offices, shops, etc.) outside of the earthquake and tornado resistant building structure in standard construction facilities wherever possible to minimize building cost.
- o Locate a process equipment repair shop so that it is accessible from an air lock for equipment transfer between the shop and process cell. The shop must have a crane to handle decontaminated and new equipment. This shop should be of standard construction. See Part 14, Item 250 for additional detail on the Process Equipment repair shop and Part 20, Item 185 for detail on the shop crane.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Provide a room of about 150 ft² for decontamination of tools and small equipment. The following services and facilities are necessary:
 - Process water supply.
 - Liquid discharge to the Recycle Waste Collection Tank through the highly contaminated sump system. (See Part 5, Item 430.)
 - Sink and hood facilities.
- o At nominal 100-foot intervals, provide sealed access ports from the operating corridor into the process cell (Zone 1) exhaust air plenum. The access ports are to be sized for entry by personnel wearing protective suits. These ports are expected to be used very infrequently and all necessary support facilities (air locks, breathing air, steps) will be provided by operating personnel. Equipment locations in the operating corridors are to have priority, with the port locations adjusted as necessary.
- o The remotely operated process cell crane (Part 20, Item 180) will be primarily for installation and removal of piping and equipment and will normally remain in a crane maintenance area. With the open cell operating concept, crane decontamination may be required prior to hands-on maintenance. The crane maintenance area (Part 14, Item 550) is to be separated from the process cell by a shielding door.
- o Experience at SRP indicates a minimum 3/8 inch stainless steel floor covering is required for the crane maintenance area to prevent severe contamination of the building concrete and for impact resistance. The recommended material for the liner is 304L stainless steel per Spec. 4498.
- o Rails provided for the process cell crane are to be the heaviest duty available as these rails are expected to be inaccessible for maintenance.
- o Bus bars providing power to the process cell crane must be accessible for inspection and repair while process operations continue. This maintenance work will require a breathing air supply and the maximum air hose length permitted (150 feet) establishes the number of access points to the bus bar installation. Provide air locks where necessary at the access points.
- o Crane rails must accommodate the shielding door at the crane maintenance area.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- General Design Criteria

- o Building clearance for operation of the remote crane must provide access to all cell equipment. The crane maintenance shielding door may be opened to provide crane access to the section of the process cell adjacent to the decontamination room.
- o Floor elevation in the crane maintenance area is to accommodate the in-cell canister handling devices (Part 5, Item 266) when suspended on the process cell crane.
- o Provide capability to remove WTC in-cell crane trolley in event of double crane failure in the WTC.
- o Provide truck and rail access to the process cell for direct load-out of failed equipment; see Part 3, Item 140. This direct rail access is through the Process Equipment Repair Shop which also provides for equipment movement between this repair shop and the process cell. Equipment movements will be made using existing SRP transportation equipment and the special equipment in Part 20, Item 380.
- o Maintenance and decontamination of the Shielded Canister Transporter (SCT) should be performed in 221-S building in an area with adequate air filtration and contaminated liquid disposal facilities.
- o Transfer tunnels and equipment should have the following features:

<u>Tunnel</u>	<u>Personnel Access</u>	<u>Trolley Hatches Both Ends</u>	<u>Remote Canister Removal</u>	<u>Remote Trolley Removal</u>	<u>Full Remote Maintenance</u>	<u>Drag Trolley To</u>
Warehouse-MC	X	X				(Not Needed)
MC-CDC	X	X	X	X	X	MC End
CDC-WTC	X	X	X	X		CDC End
WTC-SCT	X	X	X			WTC End

The transfer tunnel between the MC and the CDC must be designed with remote maintenance capability for use should the tunnel become excessively contaminated (e.g. replacement of drag bar, motors, etc.)

6. Safety Systems

- o See Part 13, Item 560 for emergency power requirements for the Process Building.
- o Automatic sprinkler and/or Halon 1301 fire protection systems should be provided where applicable in personnel area; see Part 18, Item 620.
- o Permanently installed radiation and air monitoring equipment should be provided in the main process building; see Part 12, Items 110 and 120.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

A. General

Ventilation requirements for the process building are based on these general concepts.

- The building should be divided into zones for ventilation and contamination control.
- A combination of parallel and series ventilation systems should be used to provide protection for personnel and control of contamination at minimum investment and operating cost.
- In a ventilation system, air flow is to be from zones of low contamination potential toward zones of greater contamination potential.
- Air recirculation from a zone of higher contamination back to a zone of lesser contamination is prohibited.
- Motive force for the exhaust air system should be provided by multiple fans downstream of the filters. Operation of standby fans is to be initiated by abnormal pressures in the ventilation system.

B. Ventilation System Zoning

The building must have a layout that physically separates the processing zones with high contamination potential from personnel zones with lesser contamination potential. The ventilation zones described here are based on the definitions provided in Reference C-13, Appendix C.

Zone 1: **The process cell area and immediately adjacent crane service areas with high contamination and/or high radiation level are to have a separate ventilation system with air supply and exhaust independent from surrounding zones.** A single deep-bed sand filter (99.95% efficient) provides a reliable fire-proof filtration system of the exhaust as demonstrated by SRP operating experience. However, some specific Zone 1 areas are to be exhausted through the Zone 2 exhaust system as detailed later.

When radiation levels permit, entry into some sections of zone 1 is permitted with full-body protective clothing and respirators or full-face gas masks.

Zone 2: Normally occupied regulated operating areas with potential for contamination are in this ventilation zone. Air supply to zone 2 is from zone 3 (clean areas) or outside air if the series air flow from zone 3 is insufficient for zone 2 needs. All zone 2 air should exhaust through single-stage HEPA filters. Zone 2 air is not to be routed to zone 1 except for infiltration through air locks separating these zones and for flows established from subdivisions 2a and 2b.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

Zone 2a describes a major subdivision of zone 2, a space contiguous to zone 1 through a large air lock required for entry into and removal of equipment from the process cell. Zone 2a must be maintained at positive pressure relative to zone 1. A portion of the zone 2a exhaust exits through the equipment air lock and the remainder combines with normal zone 2 exhaust.

Zone 2b, a subdivision of zone 2, describes operating space between zone 2 and small, isolated zone 1 areas (sample and mercury recovery cells) established within zone 2 space. Air flow is to be from zone 2 to zone 2b to zone 1; zone 2b must be maintained at positive pressure relative to zone 1.

Zone 3: Offices, control rooms, and all other clean areas in the process building comprise this zone. Fresh air is supplied to zone 3, which then exhausts to zone 2. However, recirculation may be established within zone 3 to reduce air conditioning cost.

Recirculation of air in zone 3 is not necessary for isolation of essential personnel from toxic fumes. In the event of an air reversal or loss of air, personnel can don respiratory equipment and implement a safe and orderly shutdown and evacuation of the facility.

C. Zone 1 Criteria

The basic design criteria for process cell ventilation are: 1) removal of process heat and 2) contamination control

Process heat removal is necessary to:

- limit the cell operating temperature to 40°C, the maximum permitted for electrical motors and other temperature sensitive electrical and instrument components.
- minimize thermal currents which carry particulate contamination up to the cell crane.

Contamination control is attained by:

- **providing covers over the cells.
- establishing air flow from the top to the bottom of the cell space, thus reducing the effect of thermal currents.
- establishing air flow from areas of low contamination to areas of greater contamination.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

The following are to be used in implementing the basic criteria:

- **When removing covers from cells housing process operations, a minimum air velocity of 50 fpm is required for up to 400 square feet openings. Cover openings this size are expected to be sufficient for most remote crane operations.
- Equipment decontamination cells do not require air velocities of 50 fpm through cover openings.
- Cover openings resulting in air velocities of less than 50 fpm will require process shut down and reduction of equipment temperature.**
- A minimum velocity of 400 feet per minute is required through spaces between cell covers to ensure unidirectional flow of air through the covers during operations.
- **Air is to flow down through covers over the cells housing operations resulting in the presence of large quantities of loose radioactivity, and up through covers over cells which are to be maintained as clean as possible. For example, flow should be down into the melter and chemical processing cells and into the remote equipment decon cell where spraying operations are expected; flow should be up from the canister decon and the contact decon and maintenance cells.**
- Cell covers over the air lock separating the process equipment repair shop and the process cell are to be sealed to limit outflow in the event of a tornado.
- **Air supply for the contact decon and maintenance cell shall be separate from the process cell supply for safety of personnel working in the cell.**
- Air supply for the weld test cell shall be separate from the process cell supply to preclude backflow of airborne contamination from the process cell. As the weld test cell is a direct maintenance area within Zone 1 that is to be maintained as clean as possible, this cell is to exhaust through the Zone 2 exhaust system. The cell will be inhabited for maintenance work and the ventilation system should provide about six air changes per hour. As there is potential for severe contamination of the weld test cell, the exhaust from the cell is to pass through a HEPA filter prior to entering the Zone 2 exhaust system. The preferred location of the weld test cell HEPA filters is in a shielded room outside of rather than in the weld test cell; **this location will permit changing the filters without personnel exposure to background radiation which may exist in the weld test cell. Twelve inches of concrete will provide sufficient shielding for the filters (which may be contaminated to 150 mrem/hr in the event of a severe incident) as the radioactive source will be removed upon filter replacement.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

- Air flow pattern in the canister decontamination cell should be from the inspection area toward the canister inlet end.
- The Zone 1 exhaust system is to be constructed according to the requirements outlined in Part 4, Item 700 and Table 4-1, Appendix A.

D. Zone 2 and Zone 3 Criteria

A primary objective for zone 2 and 3 ventilation is contamination control. The following design criteria apply:

- Air flow direction should be from clean areas (Zone 3) to contaminated areas (Zone 2). Thus, air pressure in offices in clean areas should be positive in relation to that of the regulated operating areas and shops which in turn are to be positive in relation to the equipment decontamination cells and the process cell.
- Zone 2 air is not to be cascaded from one zone 2 space to another with the exception that Zone 2 will supply air to the zone 2b space.
- Zone 2 areas with higher potential for becoming contaminated are to be isolated from adjacent Zone 2 areas.
- To control concentrations of airborne contamination, the following minimum hourly turnover rates are to be applied:

Zone 3, all clean, non-regulated areas	- 6 room air changes
Zone 2, areas of high contamination potential, such as regulated shops, etc.	- 8 room air changes
Zone 2a, equipment repair shop	- 8 room air changes
Zone 2b, area surrounding sample and mercury recovery cells	- 8 room air changes
Zone 2, all other areas	- 6 room air changes

Exhaust from Zone 2 areas may be routed through standard construction facilities. This air is exhausting primarily from operating areas where personnel will not usually be required to wear respiratory protection and the amount of radioactive material expected in the exhaust system should be minor. Occasional radioactive releases can be expected in Zone 2 areas (contaminated samples, contaminated equipment repair, etc.) resulting in some contamination on the HEPA filters in the exhaust system. The amount of radioactivity expected to be deposited on the filters is much less than the annual release guide for an SRP separations plant. Therefore, the radiological risk for release from the DWPF HEPA filters for an earthquake-caused incident is very small. The HEPA filter housing and exhaust fans are to be located to provide optimum operating efficiency and maximum cost savings. **A separate stack may be used for this exhaust system and if so, this stream is to be monitored for radioactivity (see Part 12, Item 120).**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

The Shielded Canister Transporter (SCT) maintenance and decontamination facility is to be exhausted to the zone 2 system to control possible contamination and exhaust fumes from this facility. The air supply is to be cooled to minimize the air volume flowing through this facility to the zone 2 HEPA filters.

E. Sample Cells, Mercury Recovery Cell

Several small cells (zone 1 areas) containing radioactive materials are expected to be located within regulated operating areas (zone 2). These criteria shall apply to ventilation of these cells. **Note that these zone 1 areas may be supplied from a zone 2 space and exhausted through the sand filter.** See Part 7, Item 300 for additional sample cell information.

- Areas immediately surrounding the cells shall be considered zone 2b with high contamination potential. **This envelope around the cell is to be partitioned from the zone 2 space. An air lock is not required for entry into the envelope from the zone 2 area.**
- Air flow entering the cells from zone 2b shall pass through a HEPA filter to provide protection in the event of backflow from the cells.
- Provide a minimum air flow of 150 fpm through ports or access openings in glove boxes or hoods servicing these cells.
- **Cell exhaust shall pass through a concrete plenum directly to the zone 1 exhaust tunnel to limit exposure of personnel to radioactive contamination.
- Cell exhaust shall be at least 10% of cell volume per minute as recommended in Section 2.2.1 of Reference C-13, Appendix C. However, cell exhaust should be a minimum of 500 cfm.
- Hoods servicing these cells shall exhaust through HEPA filters and then be combined with zone 2 exhaust air, thus passing through a second stage of HEPA filtering.**

F. Air Locks

Air locks are required at all entrance/exit portals to the main processing building and normal passage points between ventilation zones. The following criteria shall apply.

- An air lock maintains confinement of contamination by maintaining air flow through the air lock to zones of high contamination at all times. **This flow is attained by differential pressure between the zones.**
- Exclusively emergency exits from zone 2 and zone 3 areas may be established without air locks.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

- **The stairwells are to be considered as air locks.**
- Air locks at entrance/exit portals between zone 3 and the environment do not require a separate air supply.
- Equipment entry and removal from the process cell (zone 1) shall be through a large air lock contiguous to the process equipment repair shop (zone 2a). This air lock is not to have a separate air supply, but is to be supplied from zone 2a. A large volume flow shall be directed through this air lock to provide a minimum air velocity of 50 fpm when the air lock opening to the process cell is 400 square feet.
- Air locks are required at all entry points between zone 2a and zones 1, 2, or 3.
- An air lock is required for rail car/truck access to the process equipment repair shop (Zone 2a) from the outside. **SRP experience with this type of air lock indicates that flow should be established by differential pressure between the shop and the environment.**

G. Canister Transfer Tunnels

Air flow through open ports into all canister transfer tunnels is to comply with the general concept of flow from zones of low contamination potential toward zones of greater contamination potential. The two openings into the transfer tunnels of greatest interest are 1) at the entry point for unfilled canisters and 2) at the entry of filled canisters into the weld test cell. Air flow into the transfer tunnel with the port open is to be a minimum of 150 fpm at these two points. This flow is to provide protection for personnel handling the unfilled canisters at the entry point and to limit contamination movement from the transfer tunnel into the cleaner weld test cell. **If it is not practical to establish this rate at these two points, consider use of an air lock to provide the necessary control of air movement.**

H. Dampers

Dampers are to be provided as required to control and balance air flows in the building. Dampers must be accessible for operation and repair. Backflow dampers are required in supply ducts where contamination from process cell backflows would increase personnel exposures.

Tornado dampers are to be provided in air ducts at the tornado resistant building envelope to prevent airborne releases to the environment. Ventilation system design should minimize the number of air duct entrances requiring tornado dampers and ducts are not to penetrate the roof directly into the process cell.

Also, a tornado damper should be provided in the air exhaust from the process equipment repair shop and/or the equipment air lock tunnel where these enter the tornado resistant building envelope.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

I. Filters

Provide filters on air supply systems (50 to 65% ASHRAE efficiency) in accordance with Section 2.3.3 of Reference C-13, Appendix C.

The HEPA filtration system for zone 2, 2a, and 2b exhaust should meet the intent of NRC Reg. Guide 3.32, c., 4, a. for only criteria of (a) leakage, (b) replacement, (c) DOP testing, (d) instrumentation, and (e) isolation valves. No heat removal or other fire protection system is required for these filters which are expected to retain only minimal activity from zone 2 releases. The only roughing filters required in the exhaust system are to be located in the HEPA filter installation, at least 36 inches up stream of the HEPA filters per Section 9.5.2 of Reference 13, Appendix C.

J. Construction and Testing

Design and construction is to provide for convenient inspection, maintenance, decontamination, or replacement of critical components such as filters, fans, sensors, and controls with minimum exposure to personnel and minimum release of contaminants.

All air supply systems are to be equipped with installed spare fans to provide for normal ventilation during routine fan maintenance. All fans are to be of standard materials of construction; ventilation supply ducts are to be galvanized steel or concrete. **All air supply fans may be located in unhooded groupings, with proper weather protection for the motors and air handling units. Provision should be made for determining the presence of and removing liquid from the supply ducts.**

Failure of a single fan in any exhaust system should not shut down production operations. Provide multiple fans for each type of service. Provide emergency power to maintain minimum air flow requirements during normal power failures (see Part 13, Item 560). **All exhausters are to be of standard materials of construction except those servicing the sample and mercury cell hoods which are to be stainless steel. Exhausters for the zone 1 area are to be located in a fan house described in Part 11, Item 470. The zone 2 exhausters may be located in an unhooded facility.

Metal exhaust ducts from normally occupied areas (zone 2) are standard materials of construction. However, duct work from potentially contaminated areas (sample and mercury purification cell hoods, etc.) are to be fabricated with 304L stainless steel per Spec. 4498 or be concrete plenums.**

Concrete plenums and ducts are discussed in the building general design criteria, Part 11, Item 105. Exhaust port openings near the process cell and melter cell floors must be designed and positioned to prevent any liquid which may be draining down the cell walls, or liquid on the cell floor, from entering the exhaust air plenum.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Ventilation Requirements

Reliability of the ventilation confinement system depends on a program of initial and periodic testing and inspection. Design should provide for periodic testing without incurring excessive personnel exposure or release of contaminants. Surveillance capability is to include:

- measurement of air flow in exhaust ducts
- testing performance of filters
- testing, under conditions as near to design as practicable, the operating sequence that would start up ventilation systems, including the transfer to alternative power sources

Additional detail concerning acceptance and periodic testing is specified in Chapter 8 of Reference C-13, Appendix C.

K. Climate Control

Criteria for climate control are presented in Reference C-12, Appendix C.

Office areas, change rooms, shops, and other occupied working areas are to be comfort conditioned.

Computer rooms are to be temperature and humidity controlled.

The Process Equipment Repair Shop is to be temperature controlled to the degree necessary for photogrammetry work. However, it is acceptable to limit the controlled temperature zone to the actual work space near floor level.

L. Controls and Instrumentation

The appropriate devices are required to indicate pressure differentials between zones, thus providing indication of proper ventilation within the process building. Additional instrumentation requirements are discussed in Part 6, Item 500.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Radiation Shielding Requirements

Radiation shielding for personnel is to be provided by the process cell walls and roof and the melter, canister decon, and weld test cell walls. The shield thickness required should limit the maximum total exposure of facility personnel to a value of less than 1 rem/yr/person. This requirement can be met if the average whole body dose rate in normally occupied areas is 0.5 mrem/hr or less (assuming about 2000 hours of occupancy per year per person). Design dose rates greater than 0.5 mrem/hr in intermittently occupied areas are acceptable if it can be shown that the total exposure for an employee is not likely to exceed 1 rem/yr/person. In all cases except emergency escape routes, design exposure rates should not exceed 5.0 mrem/hr.

The bases for the shielding calculations are:

- **Radionuclide concentrations given in Appendix H, Tables 21-17 and 21-18.**
- All process vessels filled to maximum operating levels, about 90% full in most cases.
- Shielding calculations are to be based on processing 5-year-old sludge and 15-year-old supernate or 5-year-old sludge, whichever is limiting.
- The personnel runway provided for access to the crane bus bars should be shielded to limit personnel exposure to 5 mrem/hr, the maximum for intermittent occupancy.
- Normally occupied areas are those in which personnel are continuously exposed to radiation for the 8 hour work shift.
- Intermittent occupancy defines areas inhabited less than an average 10% of the time.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Elevators-Stairs

At least one freight passenger/elevator will be required in the vitrification building. This elevator should be in the regulated area on an outside wall, and service all levels, including the roof. Building design should provide for equipment installation and removal via this elevator. Access to the building roof is required to service the ventilation equipment. Elevator capacity should be sized for the largest integral load expected. **An equipment lift/elevator lift is required for moving samples from the sample cells to the loading dock, and moving manipulators to the repair shop.** Emergency power requirements are listed in Part 13, Item 560.

Stairways are to be located so that personnel are never more than 100 feet from a stairwell [(National Fire Protection Association Code 101 - Life Safety Code) Pressurized stairwells will not be necessary in 221-S building because of the low personnel density, the number of stairwells and the resultant low residence time in the stairwells.] Any emergency exits from stairwells at grade level are not to open into adjoining buildings, but are to be direct to the outside (through isolated passageways, if necessary).

If ventilation equipment is located on the building roof, a stairwell and freight/passenger elevator access will be required. Access to the clean ventilation equipment on the roof is not to be provided through the regulated building -- except as an emergency escape route.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Clean and Regulated Change Room Requirements

A central change room and locker facility should be provided. The total change room and locker facility should be in the standard construction facility to minimize, where feasible, space requirements within the seismic structure. The specific number of lockers and change facilities required for the predicted plant population are shown in Appendix A, table 10-2.

Space for laundry bags for used clothing and overshoes will be required in the regulated change room. Additional space for storage of several bags of both clean and used clothing (received from laundry and being returned to laundry) will be required. **Used clothing is not to pass through clean areas of the building, and is to leave the area from the truck loading dock.**

The **normal** movement of personnel between regulated and clean areas (ventilation zones 2 and 3) is through the regulated locker room and the major clothing handling requirements are in this location. In addition, space is required for contaminated clothing hampers and personnel monitoring instruments at transfer points between ventilation zones 1 and 2, such as the crane maintenance entrance and the contact decontamination cell entrance, **and at the normal transition between zones 2 and 2a or 2b.** Monitoring and clothing stations are not required at emergency exits.

INFORMATION ONLY

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Lighting

Normal Requirements

Provide standard fluorescent lighting in all work and operating areas, control rooms, hallways, and offices. Lighting fixtures in regulated work areas should be designed for ease of relamping and be recessed to facilitate decontamination. Include provisions for reducing lighting in intermittently occupied areas.

Provide the capability of reducing lighting in operating areas containing shielded viewing windows.

Whenever possible, especially in remote locations or high bay areas, consider using energy-saving, low-maintenance lighting systems and fixtures (such as high pressure sodium lamps) to minimize energy requirements.

Special Requirements

a. Process Cell

Lighting for crane work should be provided by lights mounted on the crane bridge. The illumination level is to be compatible with the remote television viewing requirements. No other lighting is required in the process cell area.

b. Melter and Canister Decon Cells

In-cell lighting is required to view handling of the glass canisters and other operations. The lighting is to be remotely maintained, preferably by a technique not requiring removal of the cell covers for routine bulb/fixture replacement nor removal of the fixtures through the shielding wall into the operating corridor. The lighting intensity is to be adjustable and compatible with television viewing as well as direct viewing through cell wall windows.

c. **Weld Test Cell**

In-cell lighting is required to view handling of the glass canisters and other operations. If possible, design should provide for remote replacement of light bulbs; all other lighting system repairs will be by direct maintenance. The lighting intensity is to be adjustable and compatible with television viewing as well as direct viewing through cell wall windows.

d. Equipment Decontamination Cells

See Part 14, Item 200

e. Sample Cells and Mercury Recovery Cell

Provide remotely replaceable lights in these cells.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Lighting

f. Crane and CCTV Control Room

Ceiling lighting shall have switching and dimming provisions for control of the console illumination level.

Emergency Requirements

A minimum amount of lighting for personnel safety must be provided in all personnel areas of the building upon failure of the normal electrical distribution system.

Melter and **weld test cell** lighting required for safe process operation must be provided with emergency power to be able to continue these functions; see Part 13, Item 560.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Floor, Wall, Ceiling Finishes

Clean Areas - Ventilation Zone 3

- o Control room, office, and hallway floors are to be tile-covered and walls are to be fire-resistant construction. Standard painting is to be used throughout this area.
- o Equipment area floors within this zone are to be smooth, unpainted concrete.

Operating Areas - Ventilation Zones 2, 2a, and 2b.

- o Any offices or change rooms in this area are to have smooth, easily decontaminated floors and walls with painted finishes using standard paints for the surfaces.
- o The walls, floors, and ceilings of operating areas with risk of contamination are to be finished with epoxy coating.
- o Equipment areas with low risk of contamination are to have smooth floors and walls with painted finishes using standard paints.

Cell Areas - Ventilation Zone 1

- o The following surfaces are to be covered with a coating resistant to deterioration by radiation, process chemicals, and moisture.
 - The floor in the process cell and the walls up to five feet above the cell covers (Part 11, Item 105).
 - The floors and walls in the melter, canister decontamination, and weld test cells.
 - The floors and walls of the canister transfer tunnels.
 - All cell covers.
 - **The crane maintenance area walls and ceiling and any portion of the floor area not covered with stainless steel.
- o The decontamination portion of the crane maintenance area floor is to have a stainless steel lining (see Part 11, Item 105 and Part 14, Item 550).**
- o The floors and walls of the remote and contact decontamination cells are to be stainless steel lined (see Part 14, Item 200).

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Process Building -- Interior, Exterior, and Shielding Doors

Interior Doors

All doors are to be nonflammable construction. View windows for safety are required on personnel passage doors.

Exterior Doors

All exterior doorways must be of tornado resistant construction. A labyrinth type entrance affording missile protection and an easily opened and easily maintained door providing pressure protection is preferred for all building entrances.

Equipment entrances and normal personnel access/egress passages must be through an airlock or equivalent to control spread of contaminated material.

Shielding Doors

A shielding door will be required to separate the process cell and the crane maintenance area. This shielding should limit personnel exposure to 5mrem/hr based on intermittent occupancy of the crane maintenance area.

A shielding door will be required at the entrance to the process cell equipment access tunnel. As the radiation level within the tunnel is to be reduced to the intermittent occupancy rate (5mrem/hr) by shielding at the process cell, the metal door at the tunnel entrance need only to be thick enough to reduce the radiation level to 0.5 mrem/hr. An alternative is to provide sufficient process cell shielding to reduce the radiation level to 0.5 mrem/hr within this access tunnel, thus eliminating the need for a shielding door at the tunnel entrance. Radioactive equipment will not be stored or parked in this access tunnel; the tunnel door need not provide shielding for the transition period when radioactive equipment is moving through the tunnel.

The entrance to the weld test cell must provide shielding to reduce the radiation level on the outside to the normal occupancy requirement, 0.5 mrem/hr.

Shielding for all canister transfer tunnels is to reduce radiation levels to the intermittent occupancy level, 5 mrem/hr.

Refer to Part 11, Item 115 for additional details for shielding calculations.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- General

A facility to house the administrative and support personnel for the vitrification facility will be required.

The administration and patrol building should consist of:

- Office space, See Part 11, Item 225
- Receptionist area, See Part 11, Item 210
- Cafeteria, See Part 11, Item 220
- Records management center/file room, See Part 11, Item 235
- Conference room, See Part 11, Item 225
- Reproduction room, See Part 11, Item 235
- Mail room, See Part 11, Item 235
- Parking area for pool cars, See Part 11, Item 235
- Sanitary facilities, See Part 11, Item 235
- Janitors closet, See Part 11, Item 235
- Supply storage, See Part 11, Item 235
- Heating and ventilation room, See Part 11, Item 235
- Clean waste pad with dumpster, See Part 11, Item 235

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- General

The Administration Building should be standard construction.

Provisions for the physically handicapped should be provided in the building.

The building should be located to accomplish the following objectives:

- o The cafeteria should be conveniently accessible to personnel from all buildings without passing through the administration area.
- o Clerks in the area file room are to serve as Credit Union representatives. The file room should be located where it is accessible to all area personnel.

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PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- **Misc. Space Requirements**

Reception Area

Provide a combined office for a receptionist and employee counselor with the counselor's office separated for privacy. This office should be easily accessible to personnel.

The receptionist office should include an alcove (4- x 6 ft) for luggage storage. The receptionist should have access to area page facilities. Suitable furniture should be provided for visitors to wait for escorts or appointments. A phone should be provided for visitors.

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PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Medical Facility

Medical facilities will not be required in the administration building during the construction of the DWPF. Medical services will be provided in H-Area for the S-Area personnel.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Cafeteria Requirements

- a. Provide space and equipment for serving and seating 40 people. Except for some short orders, food service will be primarily catered from the main cafeteria. The food line will normally consist of salads, desserts, prepared sandwiches, one soup, two entrees, three vegetables, hot and cold drinks, and frozen desserts. Figure 11-1 is a suggested serving line plan.
- b. Provide space for storage of prepared cold and hot foods.
- c. **Provide a dishwashing area.**
- d. Provide an area for unloading a small truck with catered food supplies **at a loading dock.**
- e. Provide a **60 ft²** area for snacks, drink machine and empty bottles in or near the cafeteria.

All cafeteria serving line equipment is to be stainless steel. Cafeteria equipment requirements are tabulated **below. A suggested installation for these items is shown in Figure 11-1.

Cafeteria Area

Item numbers correspond to those shown in Figure 11-1.

<u>Item</u>	<u>Identification</u>
<u>1</u>	<u>1 Reach-in storage cabinet</u>
<u>2</u>	<u>1 Holden electric heat unit, 220-V</u>
<u>3</u>	<u>1 Microwave oven</u>
<u>4</u>	<u>1 SS worktable</u>
<u>5</u>	<u>1 Countertop deep fat fryer, 110-V</u>
<u>6</u>	<u>1 Countertop electric grill, 220-V</u>
<u>7</u>	<u>1 SS holding table with three undershelf drawers</u>
<u>8</u>	<u>1 SS deep sink with undershelf storage</u>
<u>9</u>	<u>1 SS worktable with storage underneath</u>
<u>10</u>	<u>1 Three-door, reach-in refrigerator, 110-V</u>
<u>11</u>	<u>1 Delta 300 Cash register</u>
<u>12</u>	<u>1 Undercounter storage drawer</u>
<u>13</u>	<u>1 Sneeze-guard glass with 12-in top, SS</u>
<u>14</u>	<u>1 Standrad SS electric four-hole cafe line, 220-V</u>
<u>15</u>	<u>1 Two-door, slide-under storage area</u>
<u>16</u>	<u>1 SS coffee pot, 5-gal</u>
<u>17</u>	<u>1 SS tea decanter, 5-gal</u>
<u>18</u>	<u>1 Self-serve ice dispenser, 80-lb, 220-V</u>
<u>19</u>	<u>1 Four-unit fruit beverage dispenser, electric, 110-V</u>
<u>20</u>	<u>1 In-line, two hole deep freezer, 110-V</u>
<u>21</u>	<u>1 In-line, cold salad counter</u>

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Cafeteria Requirements

<u>Item</u>	<u>Identification</u>
<u>22</u>	<u>1 Dessert display, two-shelf</u>
<u>23</u>	<u>1 In-line serving ware cart holder</u>
<u>24</u>	<u>1 Shelf storage napkins</u>
<u>25</u>	<u>1 SS shelf tray storage, two-stack</u>
<u>26</u>	<u>1 SS undershelf with door, Stor-6</u>
<u>27</u>	<u>1 SS worktable</u>
<u>28</u>	<u>1 Three-rail tray slide</u>
<u>29</u>	<u>1 Beverage cup station</u>
<u>30</u>	<u>1 SS holding table with 4-in lip</u>
<u>31</u>	<u>1 Garbage disposal unit, 220-V/110-V</u>
<u>32</u>	<u>1 Dishwashing machine, 220-V</u>
<u>33</u>	<u>1 Exhaust hood, electric, 220-V (with filters and automatic fire protection as required by state law)</u>
<u>34</u>	<u>Two-shelf storage undercounter between items 15 and 25</u>
<u>35</u>	<u>Bin storage ice machine, 110-V</u>
<u>36</u>	<u>Two-door slide-under storage refrigerator</u>
<u>37</u>	<u>4 Cafeteria tables with swing-out seats**</u>

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Offices, Auditorium and Meeting Room
Requirements

a. Offices

Provide offices as specified in **Table 10-2, Appendix A,** for the personnel located in the administration building area.

b. Conference Rooms

One conference room is required. This conference room should be large enough to seat 30 people. It should be designed so that it can be divided for small groups. The divider is to be as sound proof as practical. **Furniture and audiovisual equipment for this conference room are listed in Table 16-1, Appendix A.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Heating, Ventilation and Air
Conditioning

**Heating, ventilation and air conditioning of the administration building will be according to energy conservation requirements listed in Reference C-12, Appendix C.

The offices, cafeteria and miscellaneous service rooms are to be full comfort air conditioned only on the day shift.

The lunch room, change room, control room and conference room are to be comfort conditioned 24 hrs a day, 7 days a week.

The men's and women's change rooms on the regulated side are to be an isolated system with HEPA filtration.

Controls and equipment should be located with easy access for repair or replacement.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Maintenance & Service Facilities

File Room (Record Center)

Provide a file room of approximately 400 ft² with desk space for one clerk.

Reproduction Room

Provide a central area for reproduction equipment such as Xerox copier, print reproduction, and duplicating machines, etc. This room should also have a storage area for supplies for the reproduction equipment. Locate this room adjacent to the file room. (If it is not adjacent to the file room, then provide space for print reproduction equipment in the file room.)

Mailroom

Provide approximately 130 ft² for a mailroom.

Janitor's Closet

Provide approximately 40 ft² for a storage area for janitorial supplies.

Restrooms

Provide men's and women's rest rooms as specified in Appendix A, Table 10-2. Locate as close to cafeteria entrance as possible.

Equipment Room

Provide space for heating and air-conditioning equipment, electrical distribution panels, hot water tanks, etc.

Miscellaneous

Provide a visitor parking area for four vehicles in front of the building. Provide a service entrance and parking area for a small truck carrying cafeteria supplies and building supplies.

Provide a bulletin board area on the wall at the entrance to the administration building.

Provide a parking area behind the building for eight pool vehicles.

**Provide a room 130 ft² with shelves for supply storage.

Provide a dumpster pad near a rear entrance for clean waste dumpster listed in Table 16-1, Appendix A.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Administration Building -- Floor, Wall, Ceiling Finishes

Floors in all areas should be covered with vinyl tile with the exception of restrooms (ceramic tile), conference rooms (carpet), and equipment rooms (smooth concrete).

Provide standard fluorescent lighting for all areas. Lighting in conference room should be on at least two circuits (front and back) and controlled by a variable dimmer switch.

Provide standard painting for all areas.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Gatehouse and Patrol Headquarters

The gatehouse and patrol headquarters should be designed to meet the following criteria:

- a. **The patrol office and guard area, lieutenants office and communications room portion of** the building should be hardened against terrorist attack as specified in Part 4, of Reference C-4, Appendix C. **This space should be isolated in one corner of the building and the outer perimeter of this space is to be hardened. It will not be necessary to provide hardening for the lunchroom, workshop, mechanical room or change rooms.**
- b. The building should be located to control pedestrian and vehicular traffic into and out of the area. The building should provide good visibility of approaching roads and the employee parking lot.
- c. The building shall have full comfort air conditioning according to Reference C-12, Appendix C.
- d. Provide space for a **patrol office and guard area** located between the pedestrian passageway and the vehicle gate. **Temporary badges and emergency alarms will be located in this area. All walls, doors and windows bounding the pedestrian passageway, patrol office and guard area shall be hardened. All doors are to be operated remotely from the guard station.** It should also provide good visibility of approaching roads and the employee parking lot. It should provide ready access to the vehicle gate for badge inspections. The vehicle gate should consist of a barricade automatically raised and lowered from the guard station with a manually closed rolling vehicular backup gate of the chain-link fence type.
- e. Provide a weather-enclosed pedestrian passageway located between the guard station and a patrol headquarters. The passageway should be unobstructed and large enough to accommodate two lines of traffic. The S-Area side of the passageway should have a minimum of 18 linear feet of wall space to accommodate Health Protection badge racks -- preferably on opposite walls of the passageway to facilitate personnel movement.
- f. Provide **an administrative** office area just inside the guard headquarters large enough for **one desk** and a safe. **This office area is an isolated office for the lieutenant.**
- g. Provide a lunchroom sized to seat six people. Provide space for sink, hotplate, microwave oven, refrigerator, icemaker, and vending machines.
- h. Provide men's change room sized to accommodate 15 male employees. Maximum utilization in any 8-hour shift should not exceed five employees. Lockers should be sized to accommodate clothes on hangers. Sanitary facilities including showers are required.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Gatehouse and Patrol Headquarters

- i. Provide women's change room sized to accommodate 5 employees. Maximum utilization in any 8-hour shift should not exceed two employees. Provide clothes lockers identical to men's. Sanitary facilities including showers are required.
- j. Provide an approximately 12 x 12 ft storage room for uniforms, dirty laundry, and cleaning and storage of weapons. This room should be equipped with a wooden workbench and gun cabinet.
- k. Provide janitor's closet with a mop sink.
- l. Provide telephone equipment room sized to house the S-Area telephone system.
- m. Provide an area sized for six footlockers for storage of Health Protection emergency equipment. These lockers may be stacked to conserve floor space.
- n. Provide parking space for two patrol vehicles in close proximity to the patrol area.
- o. Provide wall space for timecard boxes, store order bin, and bulletin boards in the pedestrian passageway.
- p. Provide space for a small three-sided metal shelter at the entrance road for employees waiting for carpools.
- q. Office space is to be provided for patrol personnel as set forth in Table 10-2, Appendix A.

Auxiliary Equipment

- Fixed radio station, channels 1 and 3
- Set, walkie-talkie, dual channel, with duress capability
- Mop sink in janitor's closet
- 20 clothing lockers
- Two fire alarm detection systems (one for pull boxes and one for building fire detection systems)
- Safety alarm systems (including area paging system and emergency alarm systems)
- Counter top storage area along entrance and exit gates.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Service Building -- General Requirements

The service building provides space for receipt, storage, and preparation of raw materials for the vitrification process and may also house other service facilities (e.g., compressors, maintenance shops, change rooms, offices, control room, computer room, etc.). General storage areas for raw materials are:**

<u>Area</u>	<u>Location</u>
Bulk storage (frit)	Outside
<u>**Liquid Cold feed storage**</u>	Outside
Cold feed make-up	<u>**Outside**</u>
Dry chemical storage	Inside
Component storage and preparation	Inside

General

- **The service building is to be of standard construction.**
- Provision must be made to prevent inadvertent chemical spills from reaching the environment.
- Isolation between acid, caustic, oxidizing, and reducing agents must be provided.
- Those make-up operations which use dry chemicals should be located within the warehouse. The unloading dock areas should have protection from inclement weather.
- The layout of bulk chemical storage, the receiving and storage warehouse, and the cold feed area should facilitate movement of supplies, chemicals, and canisters through the facilities and to the process cells.
- Because of safety considerations and the possible need for rapid evacuations, no provision for the physically handicapped is required.
- Materials of construction for tanks and lines is to be compatible with the material being handled.
- Pumps for critical streams to Building 221-S should have installed spares.
- Requirements for sumps in chemical solution areas are set forth in Part 5, Item 430.
- Requirements for vessel vent systems are set forth in Part 5, Item 425.
- Instrumentation and control requirements are set forth in Part 6, Item 200.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Service Building -- Space Requirements**

Space is required for the inventory items specified in Part 5, Item 200, and the preparation facilities outlined in Part 5, Items 210 and 265. In addition, space should be provided for:

- Railroad and truck unloading docks for chemicals and canister and overpack components.
- Laydown area for unpacking and receiving inspection of canisters and overpacks. ** (This may be on unloading dock area.) **
- Storage of miscellaneous chemicals equivalent to 10% of the specifically identified chemicals storage area.
- **Storage of small items in a 10 x 10-ft area.**
- Receipt of incoming materials before laboratory release equivalent to the largest incoming dry chemical shipments. (See Part 5, Item 200)
- An inspection area for canister and overpack components (see Part 5, Item 265) containing:
 - o **A canister inspection station (about 8 ft x 8 ft) with dimensional gages and helium leak test connection. The station should be suitable for either audit or in-process inspection. The station should be capable of handling one overpack and 2 or 3 canisters at a time.**
 - o Three canister storage positions and one overpack position. Canister and overpack sizes are given in Part 20, Item 50 and Item 60.
 - o A canister and overpack weld x-ray area about 8 ft x 8 ft with additional space for oil cooler and x-ray control room (about 4 ft x 4 ft). X-ray area requires about 2 ft of concrete shielding
 - o Two work benches (each 8-ft long x 2-1/2-ft wide) and two storage cabinets (each about 6-ft wide x 24-in. deep)
 - o Vacuum pump system to evacuate canisters, overpacks, and helium capsules, and backfill with helium.
 - o Helium leak tester
 - o Helium cylinder storage rack for 6 cylinders (or equivalent supply)
- A local control room for local panels related to cold feed area storage and make-up operations

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Service Building -- Space Requirements**

- Safety showers and eyewash stations in the chemical storage and cold feed preparation areas
- **Battery charging station for forklift trucks will be located on the loading dock**
- Storage of reject chemicals and containers
- Lunchroom, restrooms, and change rooms if not combined with other areas. Lunchroom should include space for sink, hotplate, microwave oven, refrigerator, icemaker, and vending machines. Occupancy requirements for these areas are dependent upon the facilities combined with the warehouse operations.
- Office requirements as set forth in Table 10-2, Appendix A
- Shops and maintenance space have been incorporated with requirements outlined in Part 14, Item 400
- Provide approximately 40 ft² for a storage area for janitorial supplies and mop sink
- Provide a dumpster pad near rear entrance for a clean waste dumpster.
- **Mechanical equipment room to house the Building S-221 compressors.
- Electrical equipment room needed for S-210 services and some services for S-221.
- Central control room for the S-221 building as given in Part 11, Items 600, 605, and 610.
- Computer room for the S-221 building as given in Part 11, Items 605 and 610.
- E&I Shops with requirements outlined in Part 14, Item 450 for Shops 4 and 5. Shop 4 should be close to the computer and control rooms.
- Conference room large enough for 25 people.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Service Building -- Heating, Ventilation and Air Conditioning

Control of radioactive contamination is a concern in the regulated change rooms. Airlocks and air flows must prevent spread of contamination to the clean areas. Offices, lunchroom, change rooms, restrooms, central control room, and component inspection area should be comfort conditioned.**

Some chemicals will degrade at extreme temperatures. Liquids should be protected from freezing. A minimum temperature of 55°F should be satisfactory for these areas.

The canister and overpack component storage and inspection area should be protected from any movement of dust and/or chemicals from the chemical storage area.

Outside installations will require freeze protection compatible with the solutions being handled.

The ventilation system shall meet the requirements set forth in Reference C-12, Appendix C.

The basis for occupancy and for operating schedule for HVAC equipment is set forth in Part 5, Item 200.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Service Building -- Floor, Wall, Ceiling Finishes, and
Lighting**

Floors in offices and the lunchroom should be vinyl tiled. Ceramic tile should be provided on floors in restrooms and the janitor's closet. All other floors are to be smooth concrete. Tank areas are to be curbed or diked and isolation provided between acidic, caustic, and oxidizing solutions.

Provide standard lighting in all offices, change rooms, and warehouse areas. Lighting in container inspection area should be equivalent of office lighting for visibility while reading gages. Lighting for operating areas should be controlled by switches at all entrances.

Provide standard painting for all areas and equipment.

Suspended acoustical ceilings are required in the local control room, lunchroom, change rooms, restrooms, and offices.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Interim Storage Building

The function of this building is to serve as a storage location for containers of vitrified waste on an interim basis. Facilities are required to:

- Receive and store canisters filled with the vitrified glass-form waste. The canisters have previously been sealed, decontaminated, and characterized.
- Remove the radioactive decay heat generated from the canisters.
- **Provide natural and forced air ventilation.
- Provide HEPA filtration of forced air ventilation.
- House electrical power supply components required for the building and its equipment.
- Provide one regulated HP office and one clean operating office, one regulated and one clean change room, and and one clean janitor closet.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Interim Storage Building -- General Design Requirements

General design considerations for the building are:

- Provide for storage of glass-form waste.
- **Storage capacity of the building shall be sufficient to accommodate two years production of canisters (about 1025).
- During normal operation, remove radioactive decay heat by natural convection of air. The heat generation rate for glass-form waste is in Figure 21-7 and 21-8, Appendix H.** The maximum allowable centerline temperature for the glass-form waste in storage is 500°C.
- Provide biological shielding for personnel assuming all vault storage spaces are filled with a canister of waste.
- **Contain air-borne contamination except in the event of a design basis tornado or an investment protection or design basis earthquake.**
- Canisters must be retrievable for future shipment to a federal repository.
- Provide space for future expansions up to a 10,000 canister capacity. Subsurface preparation shall be sufficient to prevent future excavations for expansion from jeopardizing the seismic and tornado resistance of the initial building.
- Each addition (or expansion) of the building should provide for separate entrance of the vehicle used for transporting the canister. Ideally, the first and future buildings would have a duplicate design and layout for reasons of economy.
- As a basis for design, it is assumed that each building expansion increment will operate independently. Building-to-building access for personnel or for the SCT vehicle (Ref. Part 20, Item 290) is not required, and ventilation systems for each building added will operate completely independent of the systems provided on the original project.
- The design of the vault enclosure and/or contiguous steel portions of Building 250-S must be such that vault is not breached by missiles or collapsing steel structural members over or adjacent to the vault structure during a design basis tornado or earthquake.
- At least 12 spaces in the building should be capable of storing canisters in overpacks. Overpack sizes are given in Part 20, Item 60.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Storage Building -- General Design Requirements

- Since neither general or remote maintenance capabilities are practical, materials of construction for the vault section should be based on a 50-year useful life.

Part of the storage building must resist the design basis earthquake and tornado; part is of standard construction as set forth in Part 4, Item 700.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Interim Storage Building -- Ventilation Requirements

****Vault Area****

Design of the vault ventilation system is to be based on natural convection circulation for the removal of the decay heat load. Under normal operating conditions filtration of exhaust air is not required.

Provision is to be made to divert the exhaust air from the vault area to HEPA filters in the event airborne contamination exceeds acceptable levels. Provide for DOP testing of the HEPA filters. Above grade portions of the air inlet to the vault, air exhaust from the vault and HEPA filtration system should be standard construction. Tornado dampers are not required on the air inlet or exhaust.

To minimize the spread of contamination and the volume of air diverted to filtration should a canister be damaged during handling, the vault is to be divided into compartments (partitions required for ventilation only) with the ability to filter air from individual compartments.

Provide ducts to permit multi-compartment use of HEPA system for vault chambers where feasible. The system for air diversion and filtering should be provided with emergency power.

At no time shall air be permitted to flow from the vault to the adjacent operating areas. When plugs are removed (as for insertion of canister) a minimum air flow into the vault of 150 linear feet per minute is required through the opening. Consider using the emergency HEPA filter exhaust system to create this if the natural draft of the chimney fails to do so.

The vault ventilation air should be discharged a minimum of twelve feet above the roof line of the building in order to meet minimum recommendations set forth in Reference C-13, Appendix C, and in order to meet acceptable concentrations for air-borne radioactivity at ground level.

Requirements for radiation and air monitoring are shown in Part 12, Items 110 and 120. Requirements for instrumentation and control are set forth in Part 6, Item 500. **As shown in Table 4-1, the air monitoring instrumentation should be of standard construction.

Office Area

The office area is to be air conditioned per Reference C-11, Appendix C.

The regulated change room and HP office and counting room are potentially contaminated. Exhaust air from this area is not to be recirculated, but does not require HEPA filtration prior to discharge. Exhaust air from the clean operations office can be recirculated depending on economics.

Above Vault Area

Provide for heat removal and fume removal from the above vault operating area. Although this area is potentially contaminated, the exhaust air does not require HEPA filtration.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Storage Bldg. -- Maintenance and Access Requirements

The design is to preclude the need for maintenance inside the vault. Maintenance in any operating area outside the vault will be hands-on, with air suits or controlled access procedures as necessary to limit radiation exposure.

Access is required for changing HEPA filters, for maintenance of ventilation system, and for maintenance of the air flow and radiation monitoring instrumentation.

****COMPLETE REVISION****

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Storage Building -- Furniture, Fixtures, and
Auxiliary EquipmentSpace

Personnel will normally not occupy the above vault deck space or the personnel and maintenance spaces of the storage building. Operating and Health Protection personnel, assigned to the process building, will periodically enter the building to place canisters in the vault and to perform maintenance on building equipment. Doors providing access to the operating area above the vault should be equipped with intrusion alarms to notify the CCR when entry is made.

A clean change room with six lockers and clean protective clothing storage (no showers, etc.) is required. A regulated change room with space for bag storage of used clothing is required. Location of the change room should consider access from those areas of potential contamination (HEPA filter maintenance and vault deck).

Room Finishing and Lighting

Floors in the office should be covered with vinyl tile. All other floors are to be smooth concrete. Paint walls, floors, and ceilings of the office, toilet, change room and shop area for ease of decontamination.

Provide for standard lighting in office and change room/restroom. Lighting in the storage building operating area should be adequate for an operator to operate the SCT and to remove and replace shield plugs. Include provisions for reducing lighting in unoccupied areas of the building.

Furniture required for the office area is included in Table 16-1, Appendix A.

Miscellaneous requirements are:

- **2 Mop sinks**
- A desk top data input station (for the central computer) is required in the storage building office for record and inventory purposes.
- A public address system is required in the office and in other occupied areas.
- **Hand and foot counters
- HP counting equipment**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Glass Waste Interim Storage Building -- Radiation Shielding
Thickness Requirements

**Radionuclide concentrations are in Tables 21-17 and 21-18,
Appendix H.** Guidelines for attenuation of dose rates are set forth in Part 11, Item 115. For purposes of determining the required shielding thickness, assume the office and personnel areas, the operating areas above and around the vault are intermittently occupied. However, use of earth (as with a below grade vault) is desirable to further limit the radiation rate around the vault.

The design is to provide for expansion of the storage capacity of the building in an incremental fashion without construction personnel being exposed to radiation levels exceeding those for continuous occupancy and without jeopardizing the structural integrity of the storage building vault or foundation.

INFORMATION ONLY

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Sand Filter

The function of this building is to serve as the medium for removal of radioactive particulates from the process cell exhaust air, and final filtration of vessel vent system and melter off-gas air. Included in this section is a discussion of the air tunnel system. The sand filter and tunnels are to be constructed according to the requirements outlined in Part 4, Item 700 and Table 4-1, Appendix A.

The sand filter will consist of an air inlet and distribution system, a bypass system, the filter bed and an air exit system. The air inlet and distribution system must be corrosion resistant. The bypass is to route processing building exhaust air around the sand filter until hot startup of the processing building. **The bypass will be temporary construction.** Design of the bypass must ensure that unfiltered air cannot bypass the filter after hot startup. The filter bed must consist of graded layers of rock and sand designed to remove a minimum of 99.95% of the radioactive particulates at an air velocity of 5 ft/minute. The filtered air must meet the limits specified in Reference C-10, Appendix C. The air exit system should discharge the filtered air to the exhaust stack.

The sand bed is to be supported with grating of 304L stainless steel per Spec. 4498 and the corners of the distribution trenches are to be covered with stainless steel to provide resistance to corrosion. Specifications for the content, sampling, testing, transporting, and placement, along with size tolerances and depth tolerances, of the filter material are presented in Du Pont Spec. 6795. Generally:

1. A layer of supporting tile or material satisfactory for earthquake requirements
2. A 12-in. layer of 1-1/4 to 3 in. rock (A layer)
3. A 12-in. layer of 5/8 to 1-1/2 in. rock (B layer)
4. A 12-in. layer of 1/4 to 5/8 in. gravel (C layer)
5. A 6-in. layer of No. 8 U. S. mesh to No. 4 U. S. mesh sand (E layer)
6. A 12-in. layer of No. 20 U. S. mesh to No. 8 U. S. mesh sand (F layer)
7. A 36-in. layer of No. 50 U. S. mesh to No. 20 U. S. mesh sand (G layer)
8. An 8-in. layer of No. 50 U. S. mesh to No. 40 U. S. mesh/No. 30 U.S. mesh sand (H layer)

The size of the sand filter will depend on the size of the Zone 1 areas in the processing building and the quantity of ventilation air from those zones. Space should be reserved for expansion of the sand filter.

Sumps should be provided for collection of condensate and any water entering the sand filter or the air tunnel system. **Provide facilities for transferring the liquid to the main processing building through underground, stainless steel lines that are protected against galvanic corrosion.** A containment jacket is not required on these lines.

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Sand Filter

Provide an air lock for access to the sand filter for periodic inspection. Provide permanent lighting, with switches at the air lock entrance, with sufficient intensity for safe movement of personnel within the sand filter.

The interior surfaces of the sand filter and the air tunnels are treated as follows:

- a. Protective coating resistant to deterioration by radiation, process chemicals, vapors, and moisture
 - Tunnel from the processing building to the sand filter
 - Floor and troughs of the sand filter
 - Interior walls up to sand surface
- b. Dust-proofing surface sealer
 - Tunnel from the sand filter to the fan house
 - Sand filter bypass tunnel
 - Filter interior above the sand surface
- c. No treatment
 - Tunnel from the fan house to the stack

All air tunnels are to be the minimum length necessitated by area layout and seismic requirements. The tunnel between the sand filter and fan house may be eliminated if seismic design permits the exhaust fan installation to be adjacent to the sand filter.

An emergency blowout port, which is to be seismic and tornado resistant, is required in the tunnel between the fan house and the stack. This tunnel, the length of which is established by air sampling needs, is to be seismic and tornado resistant up to and including the blowout port but not beyond. This port must be located to preclude the stack structure falling on it and it is to open automatically if the stack becomes blocked.

Monitor tubes for occasional radiation profile measurements through the filter beds are required. A set of 6-inch tubes spaced 30 feet apart along the filter is required about 1/3 of the way across the filter bed and a second set of 6-inch tubes also spaced 30 feet apart is required about 2/3 of the way across the filter bed. The two sets of monitoring tubes should be offset about 15 feet.

Provisions should also be made for injecting DOP into the incoming air supply and sampling upstream and downstream of the filter to permit determination of filter efficiency.

See Table 6-1, Appendix A, for instrument requirements.

Part 12, Item 120 and Table 12-1, Appendix A specify Health Protection requirements associated with the sand filter.

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PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Fan House for Zone 1 Exhausters

This building is to contain exhaust fans and associated electrical equipment to exhaust the operating cells within the processing building. The fan house is to be constructed according to the requirements outlined in Part 4, Item 700 and Table 4-1, Appendix A.

Design considerations for the fan house are:

- Provide a condensate collection system and sump in the plenums beneath the fan house if these do not drain to the connecting air tunnels (Part 11, Item 450). **Condensate is to be returned to the processing building; any underground piping is to be stainless steel line with galvanic corrosion protection.**
- The surfaces of air plenums beneath the fans are to be treated as follows:
 - o Fan inlet plenums are to have a dust-proofing surface sealer
 - o Fan discharge plenums require no treatment.
- **Provide for building ventilation to remove motor heat loads. Climate control is not required.**
- Provide space for electrical motor centers associated with normal fan operation.
- Provide space for diesel generator(s) to supply emergency electrical power to the exhaust fans and monitoring system.
- Provide adequate space for manually operated monorails and hoists for removal and installation of heavy equipment. Permanently installed monorails and hoists are preferred over portable equipment.
- All maintenance work will be performed in a direct hands-on mode. However, adequate provisions should be provided in space layout for construction of plastic huts around potentially contaminated equipment during repair work.
- Personnel will not be permanently assigned to this building.
- Floors should have a smooth concrete finish.
- Painting is not required.

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PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Fan House for Zone 1 Exhausters

- Lighting should be standard for work locations. Lighting should be controlled by switches at building entrances.
- **Provide a portable eye wash facility in the vicinity of the battery charge station.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Exhaust Stacks

The function of the exhaust stacks is to disperse filtered air from the processing building to the atmosphere. Design of the stack (height, location, etc.) should consider the variables discussed in References C-13, Appendix C, and D-1 and D-2, Appendix D.

Design considerations for the stacks are:

- The stacks should be standard construction; earthquake and tornado resistant stacks are not required.
- Provide a stack sized for the quantity of air to be exhausted from the process cell (Zone 1) and a stack for the quantity of air to be exhausted from the operating areas (Zone 2) of the processing building.
- The primary design criterion is to provide a stack that assures dispersion of exhaust air such that concentration of airborne radioactivity from the design basis accident does not exceed allowable limits at the air intake for any area buildings or at SRP boundaries. At area building air intakes, the maximum concentration for unidentified alpha is 2×10^{-12} uci/cc and for unidentified beta-gamma is 1×10^{-9} uci/cc. For allowable limits on airborne radioactivity at the SRP boundaries, see Reference C-10, Appendix C. See Part 9, Item 140 and Reference C-18, Appendix C for further information on design calculations.
- The stacks should be at least 2-1/2 times the height of buildings within 500 feet to obtain the maximum dispersion of any released radioactivity or chemicals.
- Locate the stack to permit or facilitate expansion of the sand filter and at least one stack-length from the blowout port or any other safety related structures.
- Provide aircraft warning lights if required by height of the stack.
- **Provide condensate collection systems with facilities for transferring the condensate back to the processing building. Any underground piping is to be stainless steel line with galvanic corrosion protection.**
- Paint the stacks inside and outside with a chemical fume resistant paint.
- **The zone 2 exhaust air should be discharged a minimum of 12 feet above the highest point of the 221-S building in order to meet minimum recommendations set forth in Reference C-13, Appendix C.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Pump Pits and Diversion Boxes

Pits are to be provided for pump tanks and auxiliary equipment for transfers between the H-Area waste farm and S-Area. Diversion boxes will be required for flow direction control at the pump pits. Valve installations are acceptable in diversion boxes where necessary but not in pump pits.

A pump pit will be required at the low point between S and H Areas to provide drainage for the interarea recycle waste line and sludge line. **The diversion box associated with this pump pit should include piping for the recycle waste line, the sludge feed line, and the common spare line for the Sludge Plant plus four spare embedded lines for future connections.**

Multiple pump tanks, probably two, will be required to deliver sludge from H-Area to the vitrification plant in S-Area. One of these pump tanks should be located at the low point pump pit (above), thus sharing a ventilation system and diversion box with the recycle waste pump tank. The auxiliary pump pit(s) in the sludge transfer system will require only a single tank. The diversion box at the auxiliary pump pit(s) must include piping for the common spare line; the recycle waste line may by-pass this diversion box. The diversion box at the auxiliary pump pit(s) must provide for continual sloping piping for the spare interarea line to preclude holdup in a low point in this spare line. Diversion boxes associated with auxiliary pump pits should have at least one spare pair of nozzles for future lines. **A pump pit and interarea transfer concept for DWPF-Sludge Plant is shown in Figure 5-2, Appendix B.**

Capability for transfer in either direction through the sludge feed line and recycle waste transfer line is required; however, as reverse flow is expected only occasionally, piping changes within the diversion boxes will be acceptable to make this feasible. Sludge properties are presented in Table 21-3, Appendix H.

Covers should be provided to direct rainwater from the pump pits, diversion boxes, and working pads. Crane access is needed for these facilities. Facility design must include sloping floors with a sump, sump level detection, cell liners, underliner leak detection, and water sprays for pit decontamination. Underliner leak detection systems at multiple pump pit-diversion box installations must be segregated to identify the leaking liner. **Sump solutions will be transferred with pumps; if possible, these pumps should be replaceable by remote operation.** At the low point pump pit, the diversion box sump is to drain to the recycle waste tank pit sump; at the auxiliary pump pit(s), the diversion box sump is to drain into the pump pit sump.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Pump Pits and Diversion Boxes

SRP experience with equipment handling in pump pits and diversion boxes indicates a minimum thickness 3/8" stainless steel lining is required on floors for impact resistance and a lighter 11 gauge sheet on the walls. The heavier liner should extend 18" up the walls. All inside stainless steel liner plates are to be 304L corrosion evaluated per specification 4498; this liner will ensure against leakage to the environment.

A shielded cab crane is being purchased (Project 9S-1747, purchase order No AXC 2103-W) for use at SRP to make connections and handle jumpers within pump pits and diversion boxes. The DWPF pump pit and diversion box designs must allow use of the new shielded cab crane when servicing these facilities.

Each pump tank must be sized and instrumented to preclude overflow when receiving a transfer and subsequent pipe drainage from the preceeding tank. The pump tanks shall include an installed spare pump to make it possible to empty the tank if the in-service pump fails. A spray nozzle fixed to the end of a tank jumper should be provided for tank internal decontamination. Removal of highly radioactive material from a pump tank, and flushing of the system prior to work in a pump pit reduces personnel exposure significantly. The pump design should exclude use of water as a bearing coolant/lubricant to avoid extra water in the process. Agitation is required in all pump tanks to preclude solids buildup in the tanks and to facilitate equipment decontamination. The sludge slurry pump tank should include redundant liquid level instrumentation. Each pump tank should include two spare nozzles and corresponding spare nozzles should be incorporated in the pit wall with lines leading to the diversion box. In addition, a spare electrical nozzle is to be provided in each pump pit.

Tank positioning trunnion guides are required to provide precise positioning for remote replacement of equipment. The wall nozzle arrangement should be standardized for all pump pits to provide modularity. Pump tank fabrication is to make it possible to replace any of the pump pit tanks with a common spare tank without providing new jumpers to service the tank. However, it is unnecessary to provide for interchangeability of jumpers between pump pits or between diversion boxes.

Ambient temperature slurries/solutions will be transferred through the interarea system. The sludge feed system will operate on a batch basis providing a feed batch as required by the process which is expected to be on a four day cycle. The recycle waste system will operate on a batch basis as required, probably once daily. **Fission product decay heat must not be permitted to increase solution temperature in the pump tanks to (1) create a vapor or humidity problem in the tank vent system, (2) overconcentrate the sludge slurry feed to greater than 19 wt % sludge, or (3) raise the solution temperature to the point where these pumps will not function. If cooling is not required in the pump tanks, coils will not be required in the tanks. Appendix H, Tables 21-22 and 21-23 provide decay heat information.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Pump Pits and Diversion Boxes

A safety shower is to be located at the low point pump pit and at the auxiliary pump pit for personnel use if contacted by caustic process solution or decontamination chemicals.

Instrument requirements for the pump pit/diversion box complexes are discussed further in Part 6, Item 300 and Tables 6-1 and 6-2, Appendix A. Radiation monitoring requirements are presented in Part 12, Item 110. Electrical and instrument services are to be field mounted with weather protection.

TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Pump Pit and Diversion Box Ventilation

Pump pit diversion box ventilation systems very similar to existing installations are described here along with the design bases.

Pump Pits -- Ventilation is required to limit escape of radioactive dust, control the atmosphere within process vessels, and limit radioactive particulate escape in event of pit overpressuring. The latter is attained by use of gaskets beneath the pump pit covers and a HEPA filter on the air inlet duct to the pump pit.

Diversion Boxes -- Ventilation is required primarily to limit escape of radioactive dust to the environment. This control is established by exhausting 150 cfm through a high efficiency particulate filter, allowing for air leakage around the diversion box covers.

Diversion Box-Pump Pit Combinations -- Diversion boxes associated with pump pits may be ventilated through the pump pits to eliminate a separate filter and fan system. When ventilating a diversion box through a pump pit, diversion box covers are to be sealed similarly to the pump pit covers and the diversion box air inlet, which in this case supplies the pump pits, is to be provided with a HEPA filter.

Generally, air flow in the pump pit complex housing the sludge slurry feed tank and the recycle waste tank should be as follows: (a) from the diversion box through a wall opening to the recycle waste tank pit, (b) from the recycle waste tank pit through a wall opening to the sludge tank pit, (c) up through the overflow pipes on both tanks, and (d) out through the vent jumpers on the tanks.

Plant experience has demonstrated that an air flow of 75 cfm from each tank in a pump pit, with a single stage HEPA filter on the system, provides satisfactory pit ventilation. Satisfactory control of radioactivity within these vent systems at SRP has been demonstrated only when a **demister-condenser reheater** system has been included upstream of the HEPA filter. The DWPF pump pit ventilation system is to be designed to preclude condensation or moisture fall-out in the filter, exhaust fan and duct work. **Demister and reheater are required, plus space for future installation of a condenser.**

Parallel HEPA filters with isolation valves are required in the exhaust systems to permit filter changes without system shutdown. These filters require shielding, eight inches of concrete based on SRP experience with similar installations, and should be remotely changeable to reduce personnel radiation exposure.

A single exhaust fan is satisfactory in this service. The fan should discharge through a nominal stack (minimum height 12') to avoid direct contact with personnel.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Pump Pit and Diversion Box Ventilation

Solution temperature in the sludge feed and recycle waste pump tanks will normally range from ambient to that attained by the sludge during the nominal residence cycle for the batch transfer. However, the basis for humidity and condensation control in the tank ventilation system is to be saturated air at 75°C which is the maximum temperature of solution permitted by the design basis for transfers through the interarea lines.

Instrument requirements are shown in the Tables 6-1 and 6-2, Appendix A; radiation monitoring requirements are shown in Table 12-1, Appendix A, and discussed in Part 12, Item 120.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Raw Materials Receipt and Storage Requirements

General

The function of this facility is to:

- Receive, inspect, store, and dispense glass product storage container components (canisters, overpacks, plugs, etc.).
- Receive, sample, store, and dispense bags and drums of dry and liquid cold feed chemicals.
- Receive, sample, unload, store, and transfer chemicals purchased in bulk quantities.
- Prepare, sample, and feed chemical solutions to the consuming points.

Process

The following operations will be performed on day shift, Monday through Friday:

- Receipt and sampling of bulk, bag, and drum chemicals.
- Receipt, and inspection of canister and overpack components.
- Preparation and sampling of cold feed solutions.

Transfer of chemicals (such as glass frit and cold feed solutions) and canister components to the process building will be performed continuously on A, B, C, and D shifts. The office, lunchroom, and change room area will be used 24 hours per day. **All movements between the service building and the process building will be made by operating personnel.**

Receipt of glass frit, bulk chemicals, canister components etc. and preparation and/or dispensing of these materials will be performed by the same work group. These facilities should be located in close proximity to each other for maximum operating efficiency and to minimize transportation facilities.

Capacity of vessels feeding into the process cells must be at least equal to a 3-day consumption requirement. **Where cold feed solutions are made up in large quantities, make-up is to be accomplished outside. Where quantities are small, the operations will take place at the vitrification building cold feed facilities.**

The inventory standard bases for these facilities are shown in Table 5-1, Appendix A. Storage requirements are shown in Table 5-2, Appendix A.

Cold feed materials preparation and handling requirements are set forth in Part 5, Item 210. Canister and overpack component requirements are set forth in Part 5, Item 265 and in Table 5-4, Appendix A

Canister and overpack procurement is covered in Part 16, Item 300.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Cryogenic and Compressed Gas Requirements

Maintenance and Power compressed gas requirements will be provided by distribution from 700 area central receiving. Dedicated plant locations at the use points will be required for storage of full, empty and active cylinders. Expected requirements include cylinders of:

	<u>Cyl/Yr</u>	<u>SCF/Cyl</u>
Oxygen	120	244
Acetylene	50	250
Argon	25	24
Freon	a	a
Instrument calibration gases	b	b
Nitrogen	75	81
Breathing air	200	300
<u>**Helium</u>	<u>35</u>	<u>236**</u>

^a1400 lbs. per year, all types^bAssume four different types of gases at one cylinder per month each.

INFORMATION ONLY

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Bulk Cold Feed Materials -- Preparation and Handling

Bulk chemicals will be received and stored in the cold feed area.
These chemicals will be used directly or used in the preparation of chemical solutions for use in the process and/or equipment decontamination. Facilities will be required for make-up of the cold chemical process solutions as follows:

Formic Acid System

Design considerations are:

- A tank truck unloading station is required.
- Two 90% formic acid storage tanks are required. These tanks are vented to the atmosphere through conservation breathers.
- A formic acid dilution tank and a dilute formic acid feed tank are required. Vent from these tanks should be treated to minimize the corrosive effects of formic acid vapors on the remaining portion of the cold feed vent system.
- Connect drains and overflows from all formic acid tanks to the organic acid drain system.
- Provide samplers similar to those described in Part 7, Item 100, except replace air jet with a self-priming pump.
- See Part 6, Item 100 and Tables 6-1 and 6-2, Appendix A for instrumentation and controls.
- The formic acid system should be located in a separate diked area that drains to a sump. The sump should discharge to the Chemical and Industrial Waste Treatment Facilities.
- Freeze protection required for outside storage.

Frit (See Figure 5-10, Appendix B)

Design considerations are:

- **Air supply for the frit unloading and transfer system is to be from a dedicated compressor for this purpose only. Air will be dried to a maximum dew point of 2°F (18°F below SRP minimum design temperature - see Engineering Standard H6P.**
- Facilities are required for sampling frit (Part 7, Item 100).
- Provide facilities for removing out-of-specification material from the storage silos and returning it to the hopper car.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Bulk Cold Feed Materials -- Preparation and Handling

Nitric Acid System (See Figure 5-12, Appendix B)

Design considerations are:

- Storage tanks for 50% nitric acid are not required. A portable tank will be used for storage. (See drawing S5-6-594. Material of construction to be 304L stainless steel. Heater is not required.) Provide space for one portable tank.
- Provide mixing, cooling, and sampling for the HNO_3 - KMnO_4 makeup tank.
- Connect drain and overflow lines to an acid drain system. The acid drain system should discharge to Chemical and Industrial Waste Treatment Facilities.
- Use cold feed sampler similar to that described in Part 7, Item 100.
- Vent tank to cold feed vent system. (See Part 5, Item 425.)
- Refer to Part 6, Item 200 and Tables 6-1 and 6-2, Appendix A for instrumentation and controls.

Oxalic Acid System

Design considerations are:

- Oxalic acid will be received in 50 lb. bags, 32 bags per pallet.
- **Provide an oxalic acid makeup tank. Vent the tank to the cold feed vent system. Provide mixing and heating for this tank.**
- Drain and overflow lines should discharge to the Chemical and Industrial Waste Treatment Facilities.
- Use cold feed sampler similar to that described in Part 7, Item 100.
- Refer to Tables 6-1 and 6-2, Appendix A for instrumentation and controls.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Bulk Cold Feed Materials -- Preparation and Handling

Caustic System (See Figure 5-11, Appendix B)

Design considerations are:

- Storage tanks for 50% caustic are not required. A portable tank will be used for storage. (See drawing S5-6-594.) Provide space for one portable tank.
- Connect drain and overflow lines to an alkaline drain system. Alkaline drain system should discharge to chemical and industrial waste treatment facilities.
- Vent tank to atmosphere.
- Refer to Part 6, Item 200 and Tables 6-1 and 6-2, Appendix A for instrumentation and controls.
- Freeze protection must be provided for outside storage.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Vitrification Building Cold Feed Facilities

Bulk chemicals and prepared solutions from the cold feed makeup facilities will be transferred into the vitrification process building where the chemicals will be either used directly in the process or will supply other tanks which in turn transfer to the process.

Special decontamination solutions and small volume solutions for mercury recovery will be prepared in tanks inside the building. Larger volume cold feeds and decontamination solutions for crane and equipment decontamination will be prepared outside the building and transferred by pipeline into tanks in the building (see Part 5, Item 210).

Cold feed tanks inside the building and their design requirements are summarized in Table 5-3, Appendix A. **These tanks should be equipped with seal-less pumps to prevent leakage and to avoid exposure of personnel to chemical or radioactive hazards.** For any tank requiring access for addition of chemicals, provide appropriate mechanical means of adding the chemicals and room for any forklift trucks required. Based on SRP operating experience the working capacity of the decontamination solution feed and makeup tanks inside the building should be 250 gallons each, and the acid, formic acid and floor drain catch tanks should have a capacity of 1000 gallons each. The sizes of other cold feed tanks should be optimized based on process needs.

Some cold feed tanks located inside the building will handle formic acid. Vents from these tanks should be treated to minimize the corrosive effects of formic acid vapors on concrete exhaust plenums. All other cold feed tanks inside the building should be vented to the cold feed vent system (Part 5, Item 425) and be equipped with overflow and drain lines connected to the appropriate drain headers as described below. The vent line from the floor drain catch tank (see next paragraph) must be equipped with a HEPA filter to protect the rest of the cold feed vent system (Part 5, Item 425) from contamination when and if the tank must handle radioactive material. Overflow and drain line on frit handling tanks and floor areas adjacent to frit handling facilities should be designed to avoid or minimize the introduction of frit into drain headers and floor drains.

Provide an acid drain header, a formic acid drain header and a combined alkaline drain and floor drain header terminating in acid, formic acid and floor drain header catch tanks, respectively. **These tanks should be equipped with seal-less pumps to prevent leakage and to avoid exposure of personnel to chemical or radioactive hazards.** The acid and formic acid drain header catch tanks should discharge to chemical and industrial waste treatment facilities (Part 5, Item 460). Solutions in the floor drain catch tank are to be sampled and analyzed for radioactivity. If the solution is radioactive, it should be discharged to the sump collection system and thence to the Recycle Collection Tank (Part 5, Item 430). If the solution is not radioactive, it should be discharged to the chemical and industrial waste

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Vitrification Building Cold Feed Facilities

treatment facilities (Part 5, Item 460). Tanks which alternately handle both alkaline and acidic solutions must be equipped with agitators and suitable valving to permit drainage and overflow to the proper drain header depending on the tank contents. Occasionally, other chemicals may be used for special purposes; administrative procedural controls will be required to avoid or control mixing of normally incompatible chemicals.

Agitators and cold feed samplers, similar to those described on W148193 and D116567, should be provided on all tanks used for makeup of chemical solutions or for collection of material which must be analyzed for disposal. The referenced drawings describe typical equipment that has been used extensively at SRP and has given excellent service.

All tanks should be connected to a process water supply for flushing.

The following cold chemicals and solutions are normally prepared or stored in the cold chemical area and are transferred to cold feed tanks inside the building for subsequent addition to the process or decontamination cells:

- o Decontamination Solutions
 - 0.75 wt% potassium permanganate in 12 wt% nitric acid
 - 10 wt% oxalic acid
- o **Potassium Permanganate, 5%**
- o Nitric Acid, 50 wt%
- o Sodium hydroxide, 50% wt%
- o Glass Frit, solid
- o Formic acid, 90 wt%
- o **Dilute Formic Acid, 1.5%**

Formic acid is pumped from outside storage tanks to the frit slurry makeup tanks inside the building prior to adding the frit slurry to the process cells for melter feed makeup or canister decontamination.

A nitric acid solution is made up from 50 wt% nitric acid solution inside the building in small quantities for use as column wash solution in the mercury purification cell inside the building.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Sludge Slurry Receipt, Adjustment, and Evaporation

Process Description

Washed sludge slurry from the H-Area waste tank farm will be pumped through interarea piping and pump pits (Part 5, Items 170 and 180) to the Sludge Receipt and Adjustment Tank (SRAT) in the main process cell, cooled if necessary, and sampled after sufficient agitation to ensure adequate mixing. Occasionally, small quantities of liquid mercury may be received from the mercury collection sump in the Slurry Mix Evaporator (SME). Based on sample results (wt % solids), the batch will be adjusted by adding formic acid solution and boiling under total reflux to reduce mercury to the elemental, liquid state. Formic acid also provides the reductant in the glass melter feed. The liquid mercury will settle and collect in a sump in the bottom of the tank. Periodically, the mercury will be transferred to the Mercury Water Wash Tank (MWWT). After cooling, the adjusted sludge slurry will be transferred to the Slurry Mix Evaporator where fresh frit and spent frit (from canister decontamination; Part 5, Item 280) in water slurries will be added. Water will be evaporated from the composite slurry to a calculated endpoint based on the analyses and otherwise known compositions of the added components. The evaporated batch will be sampled, analyzed and then transferred to the Melter Feed Tank. **Condensate from the Slurry Mix Evaporator will flow by gravity into the Slurry Mix Evaporator Condensate Tank and then will be transferred to the Recycle Collection Tank.** Additional mercury which may accumulate in the SME condensate tank will be transferred to the Mercury Water Wash Tank.

Design Datao General

- The composition of the washed sludge slurry from the tank farm is given in Table 21-1, Appendix H.
- Physical properties of all sludge and sludge frit slurries are given in Table 21-3, Appendix H.
- Vessels should be sized to provide lowest capital investment and permit operation of the process to meet objective operating rates (Part 2, Item 105). In addition, consider the following:
 - a) minimum number of tank farm to S-Area transfers
 - b) **Inclusion of concentrated cesium waste from salt processing in the Slurry Receipt and Adjustment Tank.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Sludge Slurry Receipt, Adjustment, and Evaporation

o Sludge Slurry Receipt and Adjustment

- **The maximum concentration of washed sludge from the tank farm is 19 wt % solids and ranging from 13% to 19%. Concentration may be increased up to 25% in the SRAT.**
- The formic acid should be added as 90% by weight and 10% in excess of the stoichiometric amount required by the equations given in Table 21-4, Appendix H. **Assume six hours at boiling under total reflux and at a boil-up rate of 500 lbs per hour.**
- Assume 99% of the mercury is reduced and pumped out of the SRAT along with 0.1 gallon of feed slurry per gallon of mercury to the Mercury Water Wash Tank.
- The deentrainment section of the SRAT should provide a DF of at least 10^4 for entrained bottoms where

$$DF = \frac{\text{Concentration in SRAT Concentrate}}{\text{Concentration in SRAT Condensate}}$$

o Slurry Mix Evaporation

- Assume fresh and spent frit additions to the SME give 65 $\pm$ 7 lbs of dry frit per 35 lbs of other solids in the SRAT batches. Assume the control and delivery system can add fresh frit as a slurry containing 60 $\pm$ 2.5 wt% of frit.
- All frit slurry additions should be adjusted with 0.01 lb formic acid per lb of frit.
- The mercury from the SME condensate is transferred periodically to the Mercury Water Wash Tank. **Condensate is transferred to the Recycle Collection Tank.**
- The evaporated batch is nominally 40 wt % solids with a maximum of 47 wt%.
- The contents of the Slurry Mix Evaporator Condensate Tank must be maintained or capable of being cooled to below 50°C.
- The deentrainment section of the SME should provide a DF of at least 10^4 for entrained bottoms where

$$DF = \frac{\text{Concentration in SME Concentrate}}{\text{Concentration in SME Condensate}}$$

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Sludge Slurry Receipt, Adjustment, and Evaporation

o **Formic Acid Vent Condenser SystemThe formic acid vent condenser should operate at 150C.**o Operating Cycles

The following cycles assume three tanks, the Sludge Receipt and Adjustment Tank (SRAT), the Slurry Mix Evaporator (SME) and the SME Condensate Tank (SMECT).

o Sludge Receipt and Adjustment Tank (SRAT):^a

- Receive batch of washed sludge slurry.
- Cool
- Agitate
- Sample and analyze (6 hours)
- **Concentrated cesium waste additions**
- Add formic acid solution
- Heat
- **Boil six hours under total reflux**
- Cool
- Sample and analyze (4 hours)
- Transfer adjusted sludge slurry
- Periodically transfer mercury to the Mercury Water Wash Tank.

o Slurry Mix Evaporator (SME):

- Receive sludge slurry batch
- Receive spent frit slurry batch
- Receive fresh frit slurry batch
- Heat
- Evaporate excess water
- Cool
- Sample and analyze (6 hrs)
- Transfer batch
- Periodically transfer mercury to SRAT ** (Provide pump flange, sump and services; pump will be installed as necessary) **

o SME Condensate Tank (SMECT):

- Receive condensate continuously (during evaporation)
- Sample periodically
- Transfer batches as tank fills
- Periodically transfer mercury to the Mercury Water Wash Tank.
** (Provide pump flange, sump and services; pump will be installed as necessary.) **

The operating cycles may be revised as necessary to allow for preliminary evaporation of sludge slurry to 19 wt % in the SRAT before formic acid adjustment if the sludge slurry from the tank farm is dilute. The SRAT condenser therefore must be capable of diverting the condensate for removal or reflux. Removed condensate is routed to the SMECT.

^a All vessels must be agitated continuously when they contain frit or frit and sludge slurry.

PART TITLE: PROCESS FACILITIES

ITEM TITLE: Mercury Purification and Storage

Process Description

Periodically, liquid mercury will be transferred from the Sludge Receipt and Adjustment Tank to a Mercury Water Wash Tank in the process cell. Recovered mercury will be washed with water to remove entrained sludge slurry, formic acid and other contaminants accompanying the mercury. Mercury is transferred to the Mercury Purification Cell and washed with nitric acid to dissolve amalgamated metals. A final scrub is provided by passing mercury countercurrently through packed columns with nitric acid and water scrub streams. Washed mercury is vacuum distilled, loaded into containers and stored before shipment to 200-H Area. Wash solutions are neutralized and disposed of to the waste slurry process.

Design Datao General

Vessels should be sized to provide lowest capital cost and permit operation of the process to meet objective operating rates in Part 2, Item 105.

o Mercury Transfer

Assume that for each transfer of mercury 0.1 gallon of solution environment accompanies each gallon of mercury. Assume that each contaminant component accompanying mercury retains its chemical identity throughout the mercury purification process with the exception of formic acid and those contaminants that amalgamate with mercury.

The frequency of mercury transfers must be compatible with the capacity of the mercury collection sections in the Slurry Receipt and Adjustment Tank and the Slurry Mix Evaporator Condensate Tank.

o Operating Cycles1. **Mercury Water Wash Tank**

- Receive mercury from the Slurry Receipt and Adjustment Tank and/or from the Slurry Mix Evaporator Condensate Tank.
- Add 3 gallons of water per gallon of mercury.
- **Mix for 2 hours with an air sparge of 1.3 scfm per ft² of liquid surface.**
- Settle for 30 minutes to separate phases.

PART TITLE: PROCESS FACILITIES

ITEM TITLE: Mercury Purification and Storage

- Decant water wash and transfer to the Slurry Receipt and Adjustment Tank.
- Transfer mercury to Mercury Acid Wash Tank in Mercury Purification Cell.

2. Mercury Acid Wash

- Receive water washed mercury from Mercury Water Wash Tank (MWWT).
- Wash mercury in the Mercury Acid Wash Tank by adding one part 12% nitric acid from the Mercury Acid Scrub Column to one part mercury by volume.
- Mix for 60 minutes.
- Settle for 30 minutes to separate phases.
- Decant acid wash and transfer to the Spent Wash Tank.
- Transfer mercury to the Mercury Feed Tank No. 1.

3. Mercury Acid Scrub

- Start 12% nitric acid flow from Acid Feed Tank to Mercury Acid Scrub Column. Spent acid discharges to the Mercury Acid Wash Tank.
- Start mercury feed from Mercury Feed Tank No. 1 to Mercury Acid Scrub Column. Use volume flow ratio of one part mercury to one part acid. Mercury discharges from the column to the Mercury Feed Tank No. 2.
- When mercury feed is complete, stop acid flow to Mercury Acid Scrub Column.

4. Mercury Water Wash

- Sample mercury in Mercury Feed Tank No. 2 to assure low contamination level for transfer from cell to hood area for the distillation and packaging operations.
- Start water flow from the Water Wash Feed Tank to the Mercury Water Wash Column. Spent water discharges to the Spent Wash Tank.

PART TITLE: PROCESS FACILITIES

ITEM TITLE: Mercury Purification and Storage

- Start mercury flow from Mercury Feed Tank No. 2 to the Mercury Water Wash Column. Use a volume flow ratio of one part mercury to one part water. Mercury discharges to the Mercury Hold Tank.
- When mercury feed is complete, stop water flow to the Mercury Water Wash Column.

5. Vacuum Distillation

- Start vacuum still and feed mercury from the Mercury Hold Tank to the still.
- Condensed mercury will flow into mercury storage bottles. Periodically sample and analyze distillate to assure purity.
- When mercury feed has been completed, shutdown still. A portion of mercury feed will remain in the Mercury Feed Tank with contaminants.

6. Flushing Vacuum Still Bottoms

- Wash mercury remaining in the Mercury Feed Tank by adding one part 12% nitric acid to one part mercury by volume.
- Mix for 60 minutes.
- Settle for 30 minutes.
- Decant acid wash and transfer to the Spent Wash Tank.
- Rinse mercury by adding three parts water to one part mercury by volume.
- Mix 60 minutes.
- Settle for 30 minutes to separate phases.
- Decant water rinse and transfer to the Spent Wash Tank.
- Transfer mercury from the Mercury Feed Tank to the Mercury Feed Tank No. 1 for reprocessing.

7. Spent Wash Treatment

- Collect spent washes from the various wash and rinsing operations.

PART TITLE: PROCESS FACILITIES

ITEM TITLE: Mercury Purification and Storage

- Neutralize collected washes by adding 50% sodium hydroxide.
- Agitate for 30 minutes.
- Sample and analyze for pH to assure neutralization.
- Transfer neutralized solution to the Slurry Mix Evaporator for processing with waste slurry.

8. Recovered Mercury Storage

- As mercury containers are filled, remove to storage area in process building. Provide storage area for 100 bottles.
- Periodically transfer filled containers to mercury storage building in 200-H Area.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Melter Feed

**Sections of DPSP 80-1033, Appendix H which apply to Melter Feed are listed below:

<u>DWPF Sludge Feed Composition</u>	<u>Table 21-1, Appendix H</u>
<u>Salt Plant Product Composition</u>	<u>Table 21-2, Appendix H</u>
<u>Slurry Properties</u>	<u>Table 21-3, Appendix H</u>
<u>Frit Characteristics</u>	<u>Table 21-6, Appendix H</u>
<u>Sludge Only Glass Canister Decay Heat</u>	<u>Figure 21-7, Appendix H</u>
<u>Sludge Supernate Glass Canister Decay Heat</u>	<u>Figure 21-8, Appendix H**</u>

Process Description

The Melter Feed Tank (MFT) will receive the composite slurry from the Slurry Mix Evaporator. Agitation is required to keep the solids in suspension. Instrumentation for sampling, specific gravity, temperature, liquid level and high and low level alarms are also required. **Sampling is required in the MFT to provide an accurate description of the chemical and radionuclide content of material going into the glass waste form.** This analysis will become a permanent part of each canister record. (See Part 6, Item 200.)

Provide two independent continuous feed ports located at opposite sides of the melter to simultaneously introduce the feed slurry close to the melt surface at low velocity. **The intent is to introduce feed as symmetrically as possible to avoid irregular cold cap buildup as demonstrated during PNL and SRL tests.** The feed loops will require continuous circulation to keep the solids in suspension with a take off to the feed ports. Flow through each line should be adjustable to prevent assymetrical cold cap buildup. (See Part 20, Item 230.)

Each feed loop should be able to provide the full flow rate in the event one loop is down.

A minimum velocity of 3 fps is required to avoid solids settling.

**The feed lines should be flushable with pressurized water. During idling, water will be pumped through the feed lines to remove line deposits. Mechanical means for unplugging the feed lines may be required. Tests are planned to verify this.

For purposes of continuing design, provide for a water fog nozzle in the melter vapor space to cool the glass surface during idling. Flow rate is equal to normal water feed rate.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Melter Feed

Provide a transfer pump and piping to transfer out-of-specification material back to the slurry mix evaporator. Permanent piping, rather than a jumper change, is preferred as occasional adjustments will be required due to difficulties in obtaining consistent samples in the slurry mix evaporator and melter feed tank.

**Abrasion resistant materials of construction are required for recirculation and transfer piping. Design of the recirculating feed loop should be of the heaviest wall pipe that can be fitted to standard connector components.

Provide for direct addition of frit slurry to the melter to permit periodic flushing of the melt volume.**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Glass Melting

Sections of Appendix H which apply to Glass Melting are listed below.

Vitrification Stoichiometry
Frit Characteristics

Table 21-4, Appendix H
Table 21-6, Appendix H

The objective of the glass melting step is to use a liquid fed joule-heated melter to evaporate water from a slurry feed, melt borosilicate glass frit, and combine the melt with waste to form a homogeneous molten glass to be poured into canisters.

Design considerations for glass melting are:

- o An instantaneous melting rate of at least 8 lbs/(hr)(ft²) of melt surface. **Lid heating may be required to obtain this rate.
- o A nominal instantaneous melting rate of 228 lbs/hr.**
- o A slurry containing sludge and frit adjusted to a pH less than 7 is fed directly to the melter. The slurry contains approximately 40% total solids by weight.
- o Design basis is Frit 131. Composition of the frit is shown in Table 21-6, Appendix H. The recommended particle size range is greater than 325 to less than 80 mesh (44-177 microns).
- o Assume that 1.0 wt% of the feed components and frit are entrained in the melter off-gas.
- o The off-gas temperature is to be controlled to 375 $\pm$ 25°C at the off-gas outlet from the melter by use of a water, steam or air injection.
- o The melter bulk glass temperature is controlled to 1150°C $\pm$ 20°C with a minimum glass temperature within the melter of 1050°C.
- o Special equipment design basis criteria for the melter is discussed in Part 20, Item 230.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Glass Melting

Semi-Volatiles Production

<u>Component</u>	<u>% (Elemental)</u>	<u>Reaction</u>
o Ruthenium	10	<u>**Volatilizes as $\text{RuO}_4(\text{v})$ and decomposes to RuO_2 and O_2 prior to the quencher.**</u>
o Cesium	5	Volatilizes as $\text{Cs}_2\text{O}(\text{v})$ and reacts with NaCl to form CsCl prior to the quencher. $\text{Cs}_2\text{O} + 2\text{NaCl} = 2\text{CsCl} + \text{Na}_2\text{O}$
o Chloride/ Fluoride	100	Volatilize as sodium salts. 25% of the sodium fluoride hydrolyzes. $2\text{NaF} + \text{H}_2\text{O} = 2\text{HF} + \text{Na}_2\text{O}$
o Boron	0.5	Volatilizes as sodium metaborate $\text{B}_2\text{O}_3 + \text{Na}_2\text{O} = 2\text{NaBO}_2$ and polymerizes to $\text{Na}_2\text{B}_4\text{O}_7$. $4\text{NaBO}_2 = \text{Na}_2\text{B}_4\text{O}_7 + \text{Na}_2\text{O}$
o Mercury	100	Volatilizes as elemental mercury vapor. For material balance purposes, assume the Hg to oxidize completely to HgO prior to the quencher.
<u>o Iodine</u>	<u>100</u>	Volatilizes as NaI vapor. For material balance, assume 1% of NaI disassociates as I_2 and leaves the melter in the off-gas.
o Group A ^a	5	Volatilize as oxide vapors and scrubbed as particulates.

^aSee Table 21-1, Appendix H for definition.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Off-Gas Treatment

The purpose of off-gas treatment is to reduce the radionuclide content of the melter off-gas to a level which meets local, state and federal standards, and which is compatible with current cumulative releases from existing SRP facilities. The off-gas system consists of a series of equipment pieces designed to clean the melter off-gas. The principal unit operations consists of quenching the hot gas, removing entrained particles by filtration, condensing adsorbed water, heating, adsorbing ruthenium and iodine, cooling, and exhausting to a sand filter followed by stack discharge.

The formic acid treatment of the melter feed produces an oxygen deficient atmosphere. The off-gas consists of non-condensables, particulates, and condensibles. One percent (1.0%) of the feed components and frit are entrained in the melter off-gas, and are carried to the quencher.

Reactions assumed in the melter for the purpose of completing the material balances are outlined in Part 5, Item 255 and in Table 21-4, Appendix H. Volatilization characteristics of ruthenium, cesium, mercury, halides, sodium, and boron are summarized in Part 5, Item 255.

Off-Gas Treatment

- o The melter off-gas temperature is to be controlled between 400°C at the melter exit and not to drop below 290°C at the quencher.
- o The melter off-gas is cooled between 350-400°C at the exit point from the melter to minimize deposition in the off-gas pipe between the melter and quencher.
- o The vapor temperature is reduced below the dew point to condense water vapor and coalesce semi-volatiles. The condensate is sent to the Recycle Collection Tank.
- o The particulates are removed by two washed deep bed filters each consisting of two stages and are purged to the Recycle Collection Tank.
- o The scrubbed vapor stream is heated above its dew point and passed through a silica gel bed to adsorb ruthenium.
- o The vapor is heated further and passed through a silver mordenite bed to adsorb iodine.
- o The exiting vapor stream is cooled to the required temperature for the off-gas exhauster, passed through a HEPA filter, the exhausters, then discharged to the sand filter.

****COMPLETE REVISION****

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Off-Gas Treatment

General Criteria

Overall DF of Wet Scrubbing System (excluding adsorber beds & HEPA filter)

- o Particulates (from entrainment) - 10^6
- o Semi-volatile reaction/condensing products - 10^4

Cooling & Quenching

- o Melter off-gas water spray is to reduce melter vapor temperature to 350 to 400°C. For flow sheet purposes, it is assumed that the temperature of the off-gas leaving the melter is 520°C and that a water spray reduces the off-gas temperature to 375°C.
- o Provide for either air, water, steam, frit blasting or mechanically scraping to remove deposits in off-gas line. Quencher should be located as close as practical to the melter to minimize the length of line requiring cleanout. Off-gas line should exit the melter vertically to minimize entrainment.
- o Quencher -- reduce off-gas vapor temperature below the vapor dew point
- o Off-Gas Condenser -- The maximum allowable temperature of the vapor leaving the Off-Gas Condenser of the off-gas treatment system is 28°C.

Dilution Air

- o Minimum flow set to assure the carbon monoxide and hydrogen concentration in the melter off-gas beyond the quencher-scrubber is less than 70% of the lower explosive limit at 3X nominal melter off-gas generation rate. No credit taken for melter or canister air inleakage. The lower explosive limit for CO in air is 12.5 vol % @ atmospheric pressure. The normal point of operation will be less than 25% of the LEL. The lower explosive limit for H₂ in air is 4 vol %. Control air is added upstream of the off-gas quencher; dilution air is added at the discharge of the off-gas quencher.
- o The melter pressure control system should be capable of handling periodic melter off-gas excursions up to seven times the average melter off-gas flow rate lasting a maximum period of 8 minutes*. Relief system should handle a 12X surge in steam generation rate for 2.5 secs. without exceeding the seal pot setting of 1" W.C.

*7X off-gas flow excluding air inleakage and purges. Duration at greater than or equal to 35% of peak height (2.5X) is 1 minute. Total duration is 8 minutes. Data based on LSM-5 and Frit 131.

****COMPLETE REVISION****

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Off-Gas Treatment

- o Assume an air inleakage of 20 lbs/hr to the melter, 40 lbs/hr air inleakage at the canister vent, 40 lbs/hr air inleakage at the drain canister vent, a seal pot purge of 20 lbs/hr, and a TV camera lens purge of 20 lbs/hr for each camera. Additional control air is introduced upstream of the off-gas quencher. Air leakage plus control air will determine the amount of dilution air added to meet the 70% lower explosive limit requirement.

By-Pass System

Since the off-gas treatment equipment is in series, replacement of off-gas equipment would eliminate the ability to exhaust the melter off-gas. Additional equipment is required to continue exhausting gases from the idling melter while equipment replacement in the main off-gas line is in progress. The by-pass system should permit the following repairs or replacement while the melter is in the idling mode:

- o Quencher
- o Equipment associated with the off-gas condensate tank or primary washed deep bed filter.
- o The secondary washed deep bed filter, the filter pump tank, ruthenium adsorber preheater, ruthenium adsorber, iodine adsorber preheater, iodine adsorber and off-gas cooler.

COMPLETE REVISION

INFORMATION ONLY

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister and Overpack Components - Receipt And Preparation

The operations involved in receiving, storing, and inspecting canisters, inner and outer plugs, overpacks and overpack covers are shown in the Figures 5-3, 5-4, and 5-5, Appendix B.

Receiving

Components are delivered to the service building either by truck or rail. Flatbed trucks will carry up to 24 canisters and flatbed rail cars up to 72. Each canister will be fastened in a wooden shipping cradle about 3 ft x 3 ft x 10 ft. Plugs will be received in boxes on pallets. On the loading dock canisters will be removed from the cradles, and protective covers will be removed from the nozzles. Each canister receives a cursory visual inspection for damage incurred during shipment or handling. Overpacks will be handled similar to the canisters. Depending on final design, overpack covers might be handled similar to plugs.

Inspection and Storage

All quality examinations for canisters and plugs are shown in Table 5-4, Appendix A. Included are tests and inspections to be performed by S-Area **service building** personnel as well as, for information purposes, those performed by the vendor and by SRP laboratories. Received prior to each shipment will be a sample of metal from each melt and/or fabrication lot for laboratory analysis.

About 5% of the components from each shipment will be transferred directly to the inspection area for an audit of the vendor's certification. Following the audit inspections these components are transferred to storage. The remainder (95% of shipment) are transferred directly from the receiving inspection to storage. When a given lot has been released (based on the results of laboratory examinations and the audit inspection) components are removed from storage as needed. At the in-process inspection all components are inspected (see Table 5-4, Appendix A) for:

- cleanliness
- damage incurred in handling or storage and
- those specifications critical to operations in the process cells (alignment at the melter, welding, etc.).

At in-process inspection, soiled components are hand cleaned. Those with minor surface damage are dressed, using hand tools, to meet specifications. Each canister and each overpack will be hand stamped with an identifying number (in addition to the vendor's lot number) to provide a sequential number for SRP processing.

Outer plugs and overpack covers will have helium capsules attached for leak testing of the final canister or overpack closure just prior to shipping to a federal repository. No facilities for helium leak testing for final closures are to be provided on this project. The capsules are to be filled with helium, sealed, weighed, and leak tested to verify helium content just prior to use in the vitrification process.

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister and Overpack Components - Receipt And Preparation

Plugs and overpack covers have no receiving inspection. They are given an audit inspection and stored. All components are examined at the in-process inspection prior to use.

Requirements for canisters and plugs are set forth in Part 20, Item 50. Those for overpacks and covers are in Part 20, Item 60.

Acceptance/rejection criteria for leak testing as-received canisters and overpacks is a leak rate of 1×10^{-6} atm-cm³/sec helium.

Rejected canisters and overpacks will be returned to the vendor, packaged as they were received.

Rejected plugs or overpack covers might be returned to the vendor or might be discarded as scrap, depending on quantities and/or reject cause.

Space requirements for component testing and storage are set forth in Part 11, Item 305.

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Canister Handling

Facilities must be provided to transport canisters into and through the receiving, the filling and the containerization processes. These transfers are generally grouped as follows:

- A) **Service Building - From receiving to inspection, storage, and then to the melt cell in the Process Building**
- B) Melt Cell - To storage, melter (both pour spout and freeze valve), cooling station, plug (inner) insertion, in-cell storage, and then to the canister decontamination cell
- C) Canister Decontamination Cell - **To storage, temperature measurement, decontamination station #1 and #2, smear station, and then to the weld test cell.**
- D) Weld Test Cell - **To storage, welder, inspection/smear station, in-cell storage, radiation survey, and load-out area**

The sequence of operations is set forth in Figures 5-3 through 5-9, Appendix B.

Requirements for the transport systems are:

General

- Keep filled canisters in the vertical position until welded to avoid spilling contents.
- Normally, canisters will be processed, but provide capability for handling the larger size overpacks (needed on very infrequent occasions to enclose damaged or breeched canisters). Sizes of canisters and overpacks are set forth in Part 20, Items 50 and 60.
- Use of the canister transport systems for handling glass samples is acceptable. (Ref. Part 7, Item 400)
- Minimize contamination of canisters by the transport systems (e.g. minimum contact area, replaceable pads, decontamination of transporters, etc.)
- The design should incorporate features to minimize damage to the canisters. Examples of such features are:
 - o Minimizing the number of times a canister is grappled, handled, etc.
 - o Provide viewing for each operation where a canister is raised, lowered, or moved by remotely operated crane, except within the decontamination chamber.

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Canister Handling

- o Minimizing potential for dropping, toppling, impact with equipment or structures, etc.

Operation

- Transport systems are to be controlled from the operating area (not the CCR)
- Methods are required for retrieval of canisters and/or carriers located inside cells or transfer tunnels in case of transport system malfunction. ** (See Part 11, Item 105 for operation of transfer tunnels.) ** A back-up system is required in the weld test cell to remove canisters to shielded storage should the primary transport system fail.
- Each system should be capable of returning canisters from any station or cell to the preceding station or cell.

Maintenance

- **Methods must be provided for maintenance or replacement of transport system components located inside cells. (See Part 11, Item 105 for maintenance in transfer tunnels.)** Materials of construction must be compatible with decontamination solutions. (See Part 14, Item 200)
- Where practical, drives for transport systems should be located in areas with access to permit contact maintenance.

**Canister Grapple

A grapple for carrying canisters should meet the following goals:

- Be the same for each cell (MC, CDC, WTC).
- Have minimum moving parts.
- Have no motors.
- Have positive locking of the load.
- Have easy visual verification of locking.
- Be easily replaceable for other uses of the crane hook or other tools on the crane hook.
- Work through minimum size openings transfer tunnels or decon chamber.
- Minimize damage to canister grounding flange. (Consider soft grapple surface, e.g. Cu or bronze insert to prevent welding surface damage.)**

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Filling

After melting of the frit and homogenization of the sludge oxides with the melted frit, the molten glass flows through the riser and pour spout. The glass temperature is kept between 1050-1170°C by means of riser and pour spout heaters. Pouring into a metal canister is accomplished by lowering the pour spout pressure with respect to the melter vapor space pressure. Normal melter vapor space pressure is approximately 745 mm Hg. The canister filling step describes the design criteria for pouring glass into a metal canister followed by ambient air cooling.

- The inside surface of the canister neck is to be protected from glass spills and condensation of volatile products from the molten glass stream. Protection is needed to facilitate insertion of the canister inner plug and to ensure a relatively clean surface for upset resistance welding of the final canister closure.
- For good glass flow within the canister, viscosity of the glass should be less than 500 poise. In order to achieve a smooth, uniform, relatively crack-free monolith, the glass is poured rapidly into the canister to ensure flow to the canister perimeter. The instantaneous glass production rate of greater than 228 lb/hr should ensure a perimeter viscosity of 490 poise which is equivalent to a temperature of 650°C for reference TDS composite sludge mixed with Frit 131.
- During the fill cycle and the first 1/2 hour of cooling, the canister is vented to the off-gas system. After filling, the canister is allowed to cool for 1/2 hour beneath the pour spout while still connected to the off-gas system. Venting is required to contain the release of volatile radionuclides such as ^{137}Cs . The canister is then rotated from beneath the melter pour spout or drain valve on a turntable and loose fitting cover is placed on the canister nozzle. The canister is cooled by normal cell ventilation until the top surface center glass temperature is below the softening point of 550°C. This time period is 13 hours from the end of pour. The temperature of 550°C is the softening point of waste glass; in the unlikely event that the filled canister were to fall on its side, no glass would flow out. During further cooling to 550°C, venting is to the cell atmosphere through the loose fitting cover. A tight fitting plug is inserted either while the canister is on the turntable or in the cooling rack.
- The partially cooled canister is then lifted from the turntable by the in-cell crane and placed in the cooling rack. The canister continues to slowly cool to cell temperature. The cooling process will require about 31 hours from the end of pour to cool the canister surface to 100°C.

****COMPLETE REVISION****

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Filling

Sampling

The melt stream will require periodic sampling. A sample volume of approximately 1 liter is required, filled at the instantaneous pour rate. (See Part 7, Item 400.) At a pour rate of 245 lbs/hr (See section below on Pour Rate.), the 1 liter sample will fill in 1.3 min and weigh 5.2 lbs. For design purposes, assume a sample frequency of 1%; i.e. 5 sample containers per year.

Heat Load - The calculated thermal heat load per canister is approximately 20,000 pcu/hr over the cool-down cycle. If this heat load upsets ventilation when all covers are removed, an insulated shroud should be provided for each thermally hot canister.

Inner Plug Insertion - An inner plug can be inserted into canister neck any time after completion of the pour.

Canister Weight

A glass weight measurement system with an accuracy of ± 15 lb is required to monitor the pour rate and provide an independent means of establishing the glass level. Continuous weight monitoring is required at both the pour spout and drain valve locations. Alarm indicators are required just prior to fill, at fill, and if an overfill develops due to a process upset.

Canister Glass Level

Two independent canister glass level detection systems are required with capability to establish the full canister glass level to $\pm 1/2$ in. One of these systems must have the capability to detect stalagmite formation. Fast neutron transmission and detection of waste glass radioactivity are recommended as candidate glass level detection systems. Specific requirements are as follows:

- o Fill level is $91 + 1/2$ in. or 3260 + 15 lbs. whichever occurs first.
- o Two level detection systems are required at both the pour spout and drain valve locations.
- o Both level detection systems should indicate start of fill, progression of fill, prefill, fill and overfill if it occurs. A suitable system for the pour spout and drain valve could be:

PART TITLE: PROCESSING FACILITIES BASIS

ITEM TITLE: Canister Filling

<u>Level, in</u>	<u>Neutron Transmission</u>	<u>Waste Gamma Detection</u>
3		X
15		X
30	X	
45		X
60	X	
75		X
90	X	X
91	X	X
Overfill		X

Pour Rate

The glass pour rate is dependent upon the canister change out time, as well as the glass production rate. For a canister filled with 3,260 lb of glass at a rate of 228 lb/hr, a total of 14.3 hours is required. However, assuming the canister change out time is 1.0 hours, a 13.3 hour fill cycle results in an average instantaneous glass pour rate of 245 lb/hr.

Canister Cooling

The general philosophy in canister cooling is to cool as rapidly as practical from the pouring temperature down to 500°C to minimize devitrification, then cool to equilibrium temperature as slowly as practical to minimize cracking. Cooling studies are in progress at SRL. Until requirements are determined, no special cooling equipment is required. SRL experimental data are shown in DPSTD-80-38-2, Part 10, Items 320 and 325 for filling and in Items 330 and 335 for cooldown.

COMPLETE REVISION

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Inner Canister Closure (Melter Cell)

Filled canisters are sealed with an inner closure to:

- o prevent slurry or water from entering the canister during subsequent decontamination.
- o contain activity within the canister to minimize contamination of the Canister Decontamination Cell and the Weld Test Cell.

Criteria for the inner closure design and components are given in Part 20, Item 50 and Table 20-1, Appendix A. The sequence of operations is shown in Figure 5-3, Appendix B.

After canisters are filled and before they are sealed, it is necessary to verify that they will accept the inner canister closure and outer plug (i.e. the canister has not been overfilled to a height that prevents the subsequent operations). Use of the two glass level detection systems will be acceptable provided their accuracy is adequate. An example of an alternative method would be a go-no-go gage handled by manipulator or in-cell crane.

Following glass level verification, the canister nozzle is sealed to contain volatiles. Sealing of the inner closure may be accomplished either on the turntable or at a separate station after the canister has cooled. Verification is required to ensure that the seal was properly accomplished. Examples of verification go-no-go gage, visual examination of plug position or configuration, etc.

As a basis for continuing design, a test (more positive than the verification method) is needed to determine that the seal is water tight before and after decontamination. A method is required to remove water from those canisters where the seal did leak.

****COMPLETE REVISION****

PART TITLE: PROCESS FACILITIES BASIS

ITEM TITLE: Canister Inspection/Glass Removal - Melt Cell

As a basis for continuing design, facilities are required to visually inspect canisters for adhering glass and to remove the glass before the canisters leave the Melt Cell.

NEW ITEM

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Fan House for Zone 2 Exhausters

Standard construction facilities are satisfactory for the exhausters for the Zone 2 operating areas within the process building. (See Part 11, Item 110.) The exhausters may be located outside if motors are properly weather protected, etc.

NEW ITEM

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Control **Room Space - General

The function of this building space is to house the control operating mechanisms for the process cell. This space may be located in a standard construction building or in a seismic-tornado resistant building in order of priority established in Table 4-1, Appendix A. Neither the control room space nor its contents need survive a seismic or high wind event. It is preferable that this space be in a non regulated area. If it is located outside, local control options are to be provided inside the process building. The process building is not to be enlarged to accomodate control room space.

The control room space will be utilized on a four-shift, seven day per week basis. Personnel assigned to the control room space are listed in Tables 10-1 and 10-2, Appendix A.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Control **Room Space --Design Criteria

The control room space is to be temperature and humidity controlled where computers and hardware are located. Rooms separate from the computers are to be comfort conditioned as specified in Reference C-12, Appendix C. Energy conservation should be considered.

Floors are to be vinyl sheet or tile except for the conference room. The conference room should be carpeted. The computer floor is to be raised for services.

Ceiling is to be suspended acoustical panels with fluorescent lighting with emergency lights for continuity of operation.

Fire detection and suppression is specified in Table 18-2, Appendix A.**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: **Control Room Space -- Space and Services Requirements**

Provide space for **the following:**

- Central computer and data processing hardware
- Central control console
- **Supervisory control console
- Power control console**
- Remote crane control console
- **Health Protection computer room
- 10' x 10' lockable fireproof storage room
- Office or segregated space for supervisory personnel and clerk as specified in Table 10-1, Appendix A
- Rest room requirements as shown in Table 10-2, Appendix A
- Conference room to seat 20 people - audiovisual aids and furniture are listed in Table 16-1, Appendix A
- Lunchroom sized to seat 30 people - equipment is listed in Table 16-1, Appendix A
- Janitors closet
- E&I shop as stated in Part 14, Item 450
- A combined reproduction room and supply room**

PART TITLE: BUILDING REQUIREMENTS

ITEM TITLE: Miscellaneous Weather Protection and Control Buildings

Provide **space at scattered locations for storing supplies and for occasional use as office space by roving operators. These facilities are not to be air conditioned.**

Depending on the site plot plan, the S-Area functions that may require weather protection include, but are not limited to, the following:

- **Local instrument control stations**
- Chemical treatment facilities for S-Area water supply
- **Industrial waste treatment facilities**
- Health Protection monitoring instrumentation installed in water lines
- Shelter at employee parking lot
- Rain water protection facilities as required at cold feed preparation areas
- **Electrical substation facilities**

In general, these buildings should be consistent with the intended purpose of the building. Some buildings may require freeze protection but comfort conditioning is not required. Lighting should be controlled locally.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Facilities Requirements

General

Monitoring of employee and public exposure to radiation, and radioactivity releases should be provided by an adequate system of monitoring (a) employees for personnel contamination, (b) monitoring radiation in employees work area and (c) monitoring of airborne and aqueous radioactivity releases, (d) additional personnel monitoring for hazards associated with industrial hygiene as determined by procedures.

This item defines the space requirements for the Health Protection employee monitoring program. Requirements for installed radiation and radioactivity monitoring are discussed in other items.

Facility Requirements Criteria

Provide a Health Protection Monitoring Area close to the regulated change rooms and the main building entrance to the vitrification facility. The Health Protection monitoring area should consist of the following:

- **A computerized data processing center is required with dual CRT's and printers, disk storage, a microfilm station for record documentation, selectable recorders (5% of total continuously monitored sites), dedicated exhaust stack activity recorders, and discard water activity recorders, and an audio/visual alarm panel. Should the main frame computer location be away from the HP facility, a CRT, recorder and disk storage should be provided at the main frame. The system should have uninterruptable power supply.**
- A personnel decontamination room, approximately 9- x 12 ft, equipped with a shower, and a sink. The shower and sink drains should go to the floor drain catch tank in the process building and not to sanitary sewage.
- An instrument decontamination and storage room, approximately 9 x 12 ft, equipped with a hood, sink with hot and cold domestic water. Sink and hood drains should go to the floor drain catch tank in the process building. The room should contain lab benches and shelves. The hood will require 150 lfm air flow face velocity at full face opening.
- A laboratory, approximately 9 x 12 ft, equipped with a hood; sink with hot and cold domestic water, distilled water and drain to floor drain catch tank. This laboratory will be used for the preparation of samples for analysis. The hood will require 150 lfm air flow face velocity at full face opening.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Facilities Requirements

- A counting room, approximately 20 x 20 ft, equipped with instrumentation for counting Health Protection samples. This room should be located so that the background radiation does not exceed 0.02 mr/hr and may require shielding walls to achieve this level of background radiation. Provide a source of stable electrical power without interference from equipment.
- Offices for Health Protection personnel as shown in Tables 10-1 and 10-2, Appendix A.
- All regulated Health Protection facilities are to have:
 - a. Recessed fluorescent lighting except in Health Protection counting room provide incandescent lighting
 - b. Sheet vinyl or equivalent floors with sanitary corners and joints sealed.
 - c. Smooth walls that are easily decontaminated
 - d. Sufficient electrical outlets for portable laboratory instruments and equipment with instrument power. Emergency power for each area will be required to maintain 25% of operating equipment.

In addition to the above space requirements, floor space will be required at the change room entrance exit for Health Protection hand and foot counters and at exits from selected work areas for location of Health Protection personnel survey instruments.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: **Installed Health Protection Radiation Monitoring Instruments**

Beta-gamma dose rate monitors should be installed at selected locations in the processing building to provide warning of radiation level. Specific locations and numbers will be defined by SRP after layout of the processing facility. Table 12-1, Appendix A provides general guidelines for purpose of estimating number of instruments required.

All of these installed instruments should be interfaced to the Health Protection Monitoring Console in addition to providing visible and audible local alarms.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Installed Air Monitoring Instruments

Air sampling and monitoring instrumentation must be installed in many work locations and gaseous release locations to (a) determine the quality of air that employees breathe, (b) quantity and type of radionuclides released to the environment and (c) the source of airborne radioactivity. Specific locations and numbers of installed monitoring instruments will be determined by SRP after layout of the processing facility. General guidelines for the purpose of estimating the required instrumentation are provided in Table 12-1, Appendix A. Additional guidelines are given below:

1. **For the processing building exhaust stacks, provide a redundant representative air sampling system.** Continuous monitoring systems for both alpha and beta-gamma activity are required to determine the type and quantity of radionuclide released. **In addition, sampling and monitoring systems for iodine-129 and tritium are required.** Redundancy in the sensing instrumentation is not required. Sampling equipment must be on emergency power, see Part 13, Item 560. Samples will be analyzed in 221-S Health Protection counting room described in Part 12, Item 100.
2. A method of sampling the air in certain process areas is desirable. Conceptually, this would consist of a sample tap, and a portable sampler on a cart. The air, after sampling, should be discharged to the original air space. These sampling locations would be used to locate specific sources of high air activity when installed monitors indicate a problem. Suggested locations for this type installation are as follows:
 - a. **Four samplers are required in the chemical process cell.**
 - b. In weld test cell.
 - c. **After each HEPA filter associated with samples and mercury cells.
 - d. Before and after filter in vessel vent system.**
 - e. In the remote and contact decon cells.
 - f. In melter cell.
 - g. Canister decontamination cell.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Installed Air Monitoring Instruments

3. **Sampling and monitoring is required for exhaust air from each of the two divisions of the vault storage area.** If radioactivity is detected, the air should be diverted to a HEPA filtration system. If filtered air from the HEPA system bypasses the regular exhaust stack from interim storage, then a representative sampling and monitoring stream must be provided downstream of the HEPA filters. Sampling of air around a canister prior to removal is required. The monitoring system must ensure that current RCG valves as set forth in Reference C-10, Appendix C are not exceeded.
4. For representative sampling of exhaust streams, see ANSI N. 13.1 American National Standard Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities.

The above monitoring instruments should be interfaced to the Health Protection monitoring console. Local alarms will be required in operating areas. The Health Protection wiring/cable from outlying locations is to meet wiring codes, but does not have to withstand earthquake and tornado design criteria.

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Installed Liquid Monitoring Instruments

Radioactivity monitoring instruments will be required in various aqueous streams that are normally free of radioactivity but potentially may become contaminated.

Aqueous monitoring instruments should be provided as required to provide early detection of releases.

Aqueous monitoring instruments will be required in the following locations:

1. Storm sewer effluent from the vicinity of potentially contaminated outside areas (i.e. pump pits) if the facility is not protected from rainwater.
2. Process cooling water system (circulating closed loop)(Part 5, Item 400).
3. Melter cooling water system (Part 5, Item 402).
4. Process steam system steam condensate from process vessels (Part 5, Item 405).
5. Regulated chilled water refrigeration system (Part 5, Item 410).
6. Effluent from the **sanitary** sewerage cleanup if release is on continuous basis.

The above instruments should be interfaced to the Health Protection monitoring console in addition to providing local alarms.

INFORMATION ONLY

PART TITLE: HEALTH PROTECTION AND RADIATION MONITORING

ITEM TITLE: Environmental Monitoring Wells

Wells must be provided for obtaining water samples for detecting and monitoring any inadvertent releases of radioactivity from the various confinement structures to the ground. Criteria for locating and constructing the wells are specified below:

1. Provide a pair of wells at each end of each construction joint in the vitrification building (4 wells per construction joint).
2. The wells should be located as close as practical to the walls of the building (about 10 feet). **Since outer perimeter buildings may be covering area at the process building construction joint, design these buildings to allow access to the wells for sampling.**
3. Each pair of wells should contain a shallow well and a deep well.
4. The shallow well should penetrate to the top of the foundation mat for the vitrification building. It should be screened for 10 feet above the foundation mat.
5. The deep well should penetrate to the water table and be screened for 20 feet. The midpoint of the screen should be located at the midpoint of the water table fluctuation.
6. A single deep well should be provided at each pump pit. The well should be as close as practical to the pump pit and should be similar to the deep well of the vitrification building.
7. Four-inch O.D. schedule 40 PVC is recommended for casing the well. Slotted schedule 40 PVC screen can be used for the well screen.
8. The annular space around the casing should be filled with gravel to a point just above the well screen. Annular space above the gravel should be filled with grout to prevent surface drainage into the well.
9. The well should be capped. No installed instrumentation or sampling equipment is required.

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PART TITLE: UTILITIES

ITEM TITLE: Availability From Present Sources -- All Utilities

Steam will be available from the plant system via a new pipeline from H- to S-Areas. New facilities are required to provide electricity, water, compressed air, refrigeration and sewage treatment.

PART TITLE: UTILITIES

ITEM TITLE: Electrical Power

Provide electrical power to S-Area by construction at necessary lines, substations, etc. and connecting to the existing SRP electrical system.

PART TITLE: UTILITIES

ITEM TITLE: Steam -- Design Basis and Criteria

Steam is required for building and process heating and operation of auxiliary equipment.

Steam will be supplied by pipeline from H-Area. The demand is currently estimated to be 36,000 lbs/hr of 300 psig steam. The tie-in point for the S-Area steam supply line may be at coordinates N71835 and E62617.

Steam reducing valves will be required at various locations to reduce the steam pressure for the user location. At any location where a steam outage may significantly impact on the production throughput (attainment) consider providing parallel reducing stations. Reducing stations should be protected from the weather as necessary to minimize freezing problems.

Within the vitrification processing building, steam lines will be required to deliver steam to the various process operations. Where feasible and economical to do so, the steam supply lines should be "looped" to minimize outages from repair work.

Condensate from H & V systems will be used as process water (See Part 13, Item 130) for cold chemical makeup and other process uses. Excess condensate may be discarded to the storm sewer.

Condensate from process equipment should be collected, analyzed and disposed of as described in Part 5, Item 405.

PART TITLE: UTILITIES

ITEM TITLE: Water Systems

The following water systems (see Figure 13-1 and 13-2, Appendix B) will be needed:

Raw Well Water
Neutralized Well Water
Fire Water
Domestic Water
Process Water
Melter Cooling Water
Process Cooling Water
Regulated Chilled Water
Cooling Tower Water
Chilled Water

Raw Well Water

Raw well water will be from deep wells (see Part 13, Item 300) and will be the primary source of water for all the water systems except the process water system. It serves as emergency cooling water for the cooling tower side of the melter, process and regulated chilled cooling water systems, for air compressors and for the computer room air conditioner condenser. The well water pumps should be driven by combination of electric and diesel drives.

Neutralized Well Water

Neutralized well water will be degassed and pH adjusted raw well water and will supply water to all other water systems and it will serve as a backup supply for the process water system. Neutralized well water will serve as dilution water in chemical makeup for water treatment. Neutralized well water should be supplied from a portion of the neutralized well and fire water tank. One of the neutralized water pumps should be on emergency power.

Fire Water

Fire water will be neutralized well water and will share the same storage tank with neutralized water. Fire water storage should provide a two hour supply of water for the largest fire anticipated. The neutralized water pump should not be able to reach the fire water reserve. DOE requires that a second fire water source tank with sufficient capacity to supply water for an additional one-half hour be provided in addition to this primary tank (See Part 18, Item 620). This secondary fire water should be supplied from the most cost effective system (either from H-Area or from a shared domestic water tank). Fire water pumps should be driven by combination electric and diesel drives.

PART TITLE: UTILITIES

ITEM TITLE: Water Systems

Domestic Water

Domestic water will be chlorinated neutralized well water and should be limited to drinking and sanitary purposes. Do not connect domestic water to the process or any potential source of contamination. Domestic water should provide washdown water through hose connections in non-regulated areas of the main processing building and in all areas of other area buildings. One of the domestic water pumps should be on emergency power.

Process Water

Process water will be primarily steam condensate from heating and ventilating and nonradioactive process users. Steam condensate from process equipment handling radioactive materials may be used as process water after laboratory analysis has verified that the condensate is not contaminated with radioactivity (see Part 5, Item 405). Process water will be used for all cold chemical and cell chemical makeup for process uses, make up to the closed loop cooling system and as washdown water in regulated areas of the main processing building.

Melter, Process, & Regulated Water

Melter cooling water is used to cool the melter and part of its off-gas system (Part 5, Item 402).

Process cooling water is used to cool all process vessels containing radioactive materials (Part 5, Item 400),

Regulated chilled water is used to cool parts of the melter off-gas system (Part 5, Item 410).

Central refrigeration facilities for heating and ventilating systems (Part 13, Item 600).

The above closed loop water circulating systems will be made up from process water; disposal of purged water is described in Part 5, Item 400.

Cooling Tower Water

Cooling tower water is made up when necessary from neutralized water. It will be chlorinated after it is added to the circulating system. Purged water must be treated to destroy chlorine before discard to the environment.

PART TITLE: UTILITIES

ITEM TITLE: Water Systems

Chilled Water

Chilled water is used for cooling non-process equipment (mostly heating and ventilating) to temperatures lower than those attainable with cooling tower water.

Regulated Chilled Water

Regulated chilled water is used for cooling process equipment (mainly condensers) to temperature lower than those attainable with cooling tower water.

See Part 13, Item 560 for emergency electrical power requirements.

PART TITLE: UTILITIES

ITEM TITLE: Water Supply and Storage

Water should be supplied from at least two deep wells by well pumps with combination electric and diesel drives. The pumps should discharge to a common header to water treatment facilities and the various water systems or system storage tanks. See block diagram, figure 13-1 and Part 13, Item 130.

PART TITLE: UTILITIES

ITEM TITLE: Water Treatment

A water treatment building with facilities for water analyses and the necessary chemical treatment equipment should be located near the water storage tanks or basins.

**Raw well water will be degassified to reduce the CO₂ content to less than 5 ppm and then adjusted with sodium hydroxide to a pH of about 7 to yield neutralized well water. This water will be used as make up to the cooling towers and will be the primary fire water supply.

Neutralized well water used for domestic water should be chlorinated to a residual chlorine content of 0.5 to 1.5 ppm and then stored in a domestic water tank.**

If sufficient steam condensate is not available for process water needs, neutralized well water should be supplied as a backup supply of process water.

Sodium hypochlorite should be used as the source of chlorine for all water treatment systems.

Water treatment systems should be provided to feed:

1. sodium hydroxide solution to degassed well water.
2. sodium hypochlorite to neutralized well water and to the cooling tower basin water,
3. **sodium bisulfite to purged cooling tower basin water prior to disposal.

Sodium hypochlorite and sodium bisulfite will be supplied from drums with at least one dedicated metering pump for each treatment point and one installed spare pump.**

PART TITLE: UTILITIES

ITEM TITLE: Cooling Tower

Two cooling towers with circulating water systems will be required, one to provide cooling for the process, and another for air compressors, refrigeration equipment and other non-process equipment.

Process cooling will be via the heat exchangers in the closed-loop process cooling water system. Water circulating through the cooling tower will be isolated by the heat exchangers from water circulating through process equipment. See Part 5, Item 400.

Studies were undertaken recently at SRP to find ways to save energy in plant cooling tower systems. The following recommendations were made and are planned to be followed by the plant:

1. Cooling tower fans should be capable of operating at zero, half or full speed and be automatically controlled by water supply line temperature for minimum fan energy usage.
2. The tower water supply and return pumps should be automatically controlled, based on changes in supply line pressure to minimize the number of pumps running and the average line pressure pumped against.

Unless other more energy efficient and cost effective designs can be conceived, these recommendations should be applied to DWPF design.

PART TITLE: UTILITIES

ITEM TITLE: Electrical Power Supply

A primary substation should be supplied with dual feeders from the plant 115 kV transmission system on the primary side and dual 13.8 kV distribution on the secondary side. The substation should be capable of supplying all of the normal load and switching that allows either transformer or supply line to be taken out of service for maintenance without curtailing production.

The primary substation should be connected to the plant supervisory control system **and include remote controls/indications at the 751-A dispatcher office, 221-S CCR and local controls/indications at the primary substation as shown in Tables 6-1 and 6-2, Appendix A.**

Secondary substations should be supplied primary electrical power at 13.8 kV from the primary substation. Each substation should be dual feed from two 13.8 kV supply feeders, one for the normal and one for alternate supply. Each feeder must have the capacity to carry the complete substation load. Appropriate breakers, switches and protective devices should be supplied.

Three-pole structures should be used at turns in the 115 kV transmission system. Underground distribution lines are preferred if economically feasible.

PART TITLE: UTILITIES

ITEM TITLE: Electrical Distribution Facilities

A dual 13.8 kv distribution bus should be supplied with the main and alternate feeds for a substation, **feeders to be routed in separate raceways if installed overhead.**

Provide a minimum of 25% spare duct banks for each voltage level if installed underground.

PART TITLE: UTILITIES

ITEM TITLE: Emergency Electrical Power - Design Basis Criteria

The general philosophy is to provide emergency electrical power to systems which must operate during a power failure. The requirement may be for personnel protection, equipment protection, or protection of the environment.

The following is a list of critical loads which are to be connected to emergency power:

- Emergency lighting
- Elevators
- Instrumentation and control power, regulated voltage
- Central control computer system
- Process cooling water pump
- **Neutralized water pump
- Domestic water pump**
- All cell cranes
- Cell crane lighting
- TV monitoring system on the process cell crane
- **TV monitoring system in remote cell**
- Regulated chilled water pumps and associated refrigeration machine
- Cooling water pumps serving melter
- **Cooling water delay tank pumps**
- Off-gas system exhausters - melter
- Process vessel vent system exhausters
- Off-gas system quencher pump - melter
- Melter dump - canister handling system
- Melter spout vacuum jet pump
- Slurry receipt & adjustment tank agitator
- Process frit slurry feed tank agitator

PART TITLE: UTILITIES

ITEM TITLE: Emergency Electrical Power - Design Basis Criteria

- Slurry mix evaporator tank agitator
- Melter feed tank agitator
- Decon frit slurry feed tank agitator
- **Decon chamber agitation system**
- Spent frit hold tank agitator
- Main electrodes - melter
- Exhaust fans, sample and mercury recovery cells
- **Exhaust fans, weld test cell**
- HEPA filter exhaust fans, glass storage
- **Pour spout riser, and drain valve heater - melter**
- Battery chargers (total)
- Diesel generator auxiliaries
- Emergency condensing unit for HP computer
- Emergency air-handling unit for HP computer
- Electrical and instrument control area (vitrification building) supply fans
- Electrical and instrument control area (vitrification building) exhaust fans
- Sand filter exhaust fans, See Part 6, Item 500 for emergency power criteria
- HEPA filter exhaust fans, See Part 6, Item 500 for emergency power criteria
- Computer room equipment:
 - o Supply fans
 - o Return fans
 - o Chiller
 - o Pump
- 25% of the 120V AC outlets in the Health Protection lab and counting room

PART TITLE: UTILITIES

ITEM TITLE: Emergency Electrical Power - Design Basis Criteria

- **Instrumentation and Health Protection monitors at pump pits and diversion boxes.
- Health Protection computer and monitoring system
- Communications and alarm systems
- Patrol headquarters
- Perimeter fence lighting
- Lights at guard station
- Primary Filters Pump (Off-gas System)
- Secondary Filters Pump (Off-gas System)
- **Instrument/Plant air compressors.**

PART TITLE: UTILITIES

ITEM TITLE: Central Refrigeration Facilities

Central Refrigeration Facilities should provide refrigeration and chilled water to supply buildings that can be economically served by a central installation rather than individual systems. This item only deals with heating and ventilating refrigeration.

Provide the number and size of water chillers necessary to allow conservation of energy by minimizing the number of units on line and the volume of circulating chilled water during periods of low chilled water demand.

PART TITLE: UTILITIES

ITEM TITLE: **Compressed Air -- Instrument, Plant and Breathing

Compressed air will be required for instrument/plant uses and personnel breathing air.**

All compressors must be heavy duty, non-lubricated, electric motor driven units. **Emergency backup must be provided for breathing and instrument/plant air systems. Air compressors may be located in standard construction facilities except for the emergency backup instrument air system which must be located within the seismic structure.**

Specific design features of the air systems are as follows:

Breathing Air

Compressors used for breathing air must be non-lubricated with intakes located to avoid entry of air containing hazardous contaminants and with a discharge pressure to provide a supply pressure of 100 to 120 psig at the stations. The system must be separate from all other compressed air systems. The air must meet the requirements for Grade E breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966 as follows:

Oxygen	- 19 to 23%
Carbon dioxide	- 500 ppm maximum
Carbon monoxide	- 10 ppm maximum
Hydrocarbon vapors	- 5 mg/m ³ maximum
Odor	- none

Additional SRP requirements are:

Moisture	- 0.5% maximum
Other gases - inert	- 1% maximum
chemically active	- none
Particulate matter	- none

The system should be sized to accomodate 8 persons at one time with each person having 20 scfm available.

Each breathing air station consists of a distribution manifold equipped with a filter, pressure gage and individual valves at each outlet hose connection. Breathing air stations and the required number of outlets at each are to be in clean areas located adjacent to the following areas:

PART TITLE: UTILITIES

ITEM TITLE: **Compressed Air -- Instrument, Plant and Breathing**

<u>Station</u>	<u>Outlets</u>
- Contact decontamination cell	3
- Process equipment repair shop	5
- Regulated Machine Shop/Regulated E&I Shop #1	2
- Weld test cell entrance	3
- Crane maintenance area	4
- Both sides of process cell on second level	3 each
- Air locks at each in-cell canister transfer tunnel (4 locations)	2 each
- Entrances to crane bus bar runway (est 3 locations)	2 each

As required by design, provide a means to route breathing air hoses through doorways without crimping the hose (See Project S-1748).

Alarms indicating loss of breathing air supply should be visible or audible to the persons using the air, or some other means of warning must be provided.

Breathing air for other locations in the vitrification building and other area locations such as the fan house, sand filter, glass storage building, etc. may be serviced by portable cylinder carts or a portable compressor if necessary.

The breathing air compressor should be backed up by sufficient 300 ft³ compressed breathing air cylinders to provide a 10 minute supply of air for escape. These cylinders must be located within the seismic structure.

**Instrument/Plant Air

The instrument/plant air will be supplied by three identical water-cooled 750 scfm compressors. These compressors will be located in the seismic structure, cooled with emergency well water, and will be supplied with emergency power (see Part 13, Item 560). Other requirements are as below.**

PART TITLE: UTILITIES

ITEM TITLE: **Compressed Air -- Instrument, Plant and Breathing**Instrument Air

Instrument air should be provided at about 100 psig at the compressor. The air should be as oil free as possible, but not to exceed 1 ppm oil. The required maximum dew point is 20°F as specified by Standards R100N and H6P. A lower dew point is acceptable providing there is no cost penalty. A dessicant dryer will be required. The system capacity should be at least 10% greater than the anticipated total connected load.

**Plant Air

The plant air system will be supplied at 100 psig. The system capacity will accommodate sparging 30% of the vessels that have air spargers at 50 scfm/sparger at any one time.**

PART TITLE: UTILITIES

ITEM TITLE: Sanitary Waste Treatment/Sewers/Disposal

A. Sanitary SewersFunction

To provide for secondary treatment of sanitary waste.

Process

Secondary treatment for the biological and chemical treatment of sanitary waste should be provided by a packaged extended aeration waste treatment plant sized to serve the expected area population (See Part 10, Item 100). Assume a load of **50** gallons per person per day. **A Clow Treatment Plant should be specified because there are presently 8 units on plant with 5 more on order. The same personnel and spare parts will serve all units. Design for 25% expansion over the expected area population and round off to the next higher 1000 gpd unit.** An influent surge basin with an 8-hour capacity should be provided to allow for uniform loading of the treatment plant.

Accumulated sludge should be removed **by off-plant contractors and disposed of on the SRP site in existing land fill areas.** Liquid effluents must be chlorinated with sodium hypochlorite before disposal **to Four Mile Creek via the existing line from H-Area to Four Mile Creek.**

All discharges must be monitored and sampled as required by the NPDES permit. A small building should be provided for chemical treatment equipment, sample analyses, and instrumentation. See Part 8, Item 220 for discharge limits.

B. Storm SewersFunction

To provide a system for collection and disposal of runoff storm water.

Process

Systems will be required to handle storm water that is uncontaminated. **The uncontaminated water may be discharged directly to the environment.

Radioactively or chemically contaminated areas should be protected from rainfall with suitable walls and roofs so that runoff requires no treatment prior to disposal. Any rainwater which should happen to enter contaminated areas must be discarded in the same manner as other potentially contaminated solution from those areas. Disposal would be through the Recycle Collection Tank (Part 5, Item 445) or the Chemical and Industrial Waste Facility (Part 5, Item 460).**

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Equipment Receiving and Inspection

Equipment purchased for initial installation in the processing cell of the processing building should be purchased to specifications which will provide reasonable assurance of proper fit in the process cell. Temporary equipment must be provided to inspect and verify that equipment received at SRP from a vendor has been fabricated to the required tolerances, specifications, materials, etc., and to measure "as built" dimensions. These records are required for field fabrication of jumpers and subsequent replacement of failed process equipment. Final checkout of this remotely installed equipment and piping should be performed in the main process building during installation.

PART TITLE: MAINTENANCE REQUIREMENT - SHOPS

ITEM TITLE: **Process Equipment Decontamination and Maintenance Cells**

Failed process equipment must be decontaminated prior to removal to the process equipment repair shop. **Cells for remote and contact decontamination plus an air lock entry into the contact decontamination and maintenance cell will be required.

The function of the two cells is to provide a location for decontamination and repair of highly contaminated failed process equipment.** The interior of the equipment will be cleaned by circulating decontamination chemicals through the equipment. Exterior surfaces will be sprayed to remove contamination. The cells should be located in the tornado and earthquake resistant sections of the processing building and should be large enough to accommodate the largest piece of process equipment. Equipment to be decontaminated will be moved into and out of the cells using the process cell crane. Both cells should have easy access to the railroad air lock for removal of equipment.

Design requirements common to both the remote and contact decontamination and maintenance cells are as follows:

- Cell lighting which is waterproof and easily relamped
- **Cell junction boxes, receptacles, conduit, etc. are to be 304L SS corrosion release per Spec. 4498.**
- Embedded sleeves to accomodate removable radiation measuring instruments; the sleeves should terminate at steel plate spray shields on the inside of the cell walls near the location of the vessels when being decontaminated.
- Holding frames for pumps, agitators, and motors
- Impact resistant stainless steel liner, at least 3/8 inch thick on floors and 18 inches up the walls and a lighter gage liner from 18 inches above the floor to the bottom of the cell covers. Liners are to be corrosion released 304L stainless steel per Spec. 4498.
- Wall nozzles (one per service per cell unless stated otherwise) to provide utilities and services as follows:
 - o Steam inlet
 - o Electrical power, 460 V, 3 phase, 60 Hz for agitators or pumps (two nozzles)
 - o Plant air inlet
 - o Process water inlet
 - o Sump liquid level instrumentation
 - o Liquid level instrumentation for vessel being decontaminated
 - o Inlets for decontamination solution from Sellers and Clayton units outside the cell to lances inside the cell.

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: **Process Equipment Decontamination and Maintenance Cells**

- o Inlet for bulk decontamination solution to vessels
 - o **Outlet for sump pump discharge to sump collection system to the Decontamination Waste Treatment Tank
- Sloped floors to drain freely to sumps
 - No trunnion guides**
 - A freely rotating hook which can be held by the non-rotating overhead process cell crane hook to permit rotation of vessels inside the decontamination cells.

Design requirements specific to the remote decontamination and maintenance cell:

- Sufficient clearance around the vessel being decontaminated to permit easy access by manipulator held lances dispensing pressurized decontamination solutions.
- Electromechanical manipulators to handle lances for spraying decontamination solution and assisting orientation of vessels in the cell during placement by the process cell crane.
- Shielded viewing window(s) at the building second level operating area with decontamination solution controls and manipulator operating controls.

Design requirements specific to the contact decontamination cell:

- Shielded viewing window(s) at the building first level operating area with decontamination solution controls and manipulator operating controls.
- Shielding cell covers and shielding walls between the contact decontamination cell and the remote decontamination and process cells to give 0.5 mrem/hr in the cell. Assume a melter, full of glass, in position in the remote decontamination cell.
- Stand or rack to hold electromechanical manipulators for decontamination, repair and testing.
- Plugged spaces for possible installation of master/slave manipulators at the viewing window(s) or electromechanical manipulators if process equipment design features require or allow some remote disassembly for additional decontamination or repair.

PART TITLE: MAINTENANCE REQUIREMENT - SHOPS

ITEM TITLE: **Process Equipment Decontamination and Maintenance Cells**

- Personnel entry from an air lock. **Provide a safety shower with eyewash, safety light, and floor drain with water seal draining into the contact decontamination and maintenance cell.
- Stainless steel set of drawers with divided sections 4'w x 1'd x 6'h for storage of small power and hand tools.**
- Jib cranes or equivalent equipment with a capacity of 2 tons for handling small or disassembled equipment.
- Welding and burning equipment as follows:
 - o **Supply of oxygen, nitrogen, acetylene and argon with controls inside the cell and the compound gas cylinders outside the cell.
 - o Two 400 amp high frequency welder with the machine outside the cell and with the welder receptacles and all phase controls and polarity switches inside the cell.**
 - o See Project S-1748 for typical welder and gas facilities that have been used extensively at SRP with excellent results.

Design requirements for the air lock to the contact decon cell:

- **Breathing air manifold with hoses. The hoses should be routed through the air lock without crimping. (See design used for Project S-1748.)**
- Space for clothing hampers, waste containers and personnel monitoring equipment.
- Viewing window or other suitable means for maintaining visual contact between personnel in the air lock and the cell.
- Method of communicating with personnel wearing protective plastic suits in the cell.

Chemicals normally used for decontamination of equipment (Part 5, Items 210 and 215) will be supplied through Sellers and Clayton units on feed tanks outside the cells to lances inside the cells. **A Clayton cleaner dilutes solutions with steam by about 25% by volume. The decon solution routes through a Sellers jet can be varied between 0-10% of the total flow. Use 7% as an average. The remaining 3% is the steam and water supplied to the jet.**

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Process Equipment Repair Shop

A process equipment repair shop will be required for the repair of process equipment which has been decontaminated in the equipment decontamination cells. This shop may be located in a standard construction structure contiguous to the process building.

Design requirements for this shop are:

- Access to the equipment decontamination cells via a rail and truck access air lock to isolate the shop from the building process cell.
- A grade level rail and truck approach through a standard structure air lock to the shop and connecting with the rail and truck access air lock (described above). See Part 11, Items 105 and 110.
- Access to the Regulated Machine Shop (See Part 14, Item 300) for movement of equipment and parts to and from the machine shop for repair.
- An overhead crane; see Part 20, Item 185.
- Two approximately 20 ft x 30 ft spaces to allow simultaneous maintenance on two vessels from the process, melter or weld test cells; the floors in at least one of these spaces should serve as a datum plane for precise equipment measurements. Provide jib cranes or equivalent equipment with a capacity of 2 tons for handling small or disassembled equipment over these spaces.
- Equipment to verify (e.g. by photogrammetry) that vessels have been repaired to required dimensions and tolerances; this is part of required repair work and should be done in the same maintenance spaces described above.
- A tank or tanks and associated instrumentation to run-in repaired pumps, agitators, etc.
- Two 300 amp high frequency welders and a curtained area about 12 ft x 12 ft including a workbench for welding smaller parts.
- Compressed oxygen, acetylene and argon from cylinders mounted outside the shop to supply the work spaces and welding areas.
- Smooth walls and floors for easy decontamination. **See Part 11, Item 135 for details on wall and floor finishes.**
- Four workbenches, 60 x 34 inches, and about 144 sq ft of caged tool storage space including storage shelves and bins.
- **Sump and pump to the decontamination waste treatment tank.**

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Process Equipment Repair Shop

- Utilities and services as follows:
 - o Plant air
 - o Instrument air
 - o Process water
 - o Domestic water
 - o Breathing air
 - o Steam
- Electrical outlets for portable power tools and process pumps and agitators.
- Supplementary ventilation with HEPA filters to discharge to the building air (Zone 2) exhaust plenum at all locations where welding, cutting, grinding or metal removal operations take place; additional fans or blowers may be required. See Part 11, Item 110 for general ventilation requirements.

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Regulated Machine Shop

A regulated machine shop is required to provide space for repair of failed components of process equipment after decontamination. This shop may be located in a standard construction structure.

Design requirements for this shop are:

- Access to the process equipment repair shop (see Part 14, Item 250) for movement of equipment and parts between the two shops.
- A tool crib of approximately 300 ft² equipped with standard tool storage bins.
- Smooth walls and floors to facilitate decontamination.
- Supplementary ventilation with HEPA filters to discharge to the building air (Zone 2) exhaust plenum at all locations where welding, cutting, grinding or metal removal operations take place; additional fans or blowers may be required. See Part 11, Item 110 for general ventilation requirements.
- Utilities and services as follows:
 - o Plant air
 - o Instrument air
 - o Process water
 - o Domestic water
 - o Breathing air, See Part 13, Item 650.
- Electrical outlets for portable and fixed power tools.
- Monorail with 2-ton capacity to service the machine shop and process equipment repair shop.
- **Sump and pump to the decontamination waste treatment tank.**
- Compressed oxygen, acetylene and argon from cylinders mounted outside the shop to supply the work areas.
- Maintenance shop area equipped as follows:
 - o Lathe, 20 in. swing, 75 in. bed
 - o Hydraulic press, 50-ton air operated
 - o Radial drill, 3 ft. with adjustable table
 - o Welding booth, 10 x 10 ft.; 300-amp high frequency welder
 - o Drill press, 20 in. floor model, variable speed

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Regulated Machine Shop

- o Grinder, 15 in. pedestal with dust collector
 - o Arbor press, with stand similar to Do All Model 789-000619
 - o Saw, band, 20 in. variable speed
 - o Horizontal cut-off saw, 10 in. wet
 - o Pipe threading machine, portable, 2 in. pipe capacity
 - o Four workbenches, 72 x 34 inches, and three storage cabinets,
84 inches high, 18 inches deep and 48 inches wide with swing doors.
- E & I shop area as described in Part 14, Item 350, Shop 1.
- **A one-man office for the Maintenance foreman adjacent to
or near the shop (See Table 10-1, Appendix A).**

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Regulated Electrical and Instrument Shops

Shops and offices as described are for E & I groups for repair of regulated area electrical equipment and instrumentation. Where possible, offices should be adjacent to shops.

Shop 1-

Location: Adjacent to Process Equipment Repair Shop on 1st level of 221-S

Shop Size: approximately 600 sq ft

Office Size: approximately 100 sq ft

Shop Function: This shop will be used for the repair of electrical and instrument process equipment, which has been decontaminated in the equipment decontamination cells.

Utility Requirements: - 120 Volt 60 Hertz, single phase, AC Electrical Service
- 240 Volt 60 Hertz, single phase, AC Electrical Service
- 480 Volt 60 Hertz, 3 phase, AC Electrical Service
- Instrument Air
- Plant Air
- Breathing Air, See Part 13, Item 650
- See Part 11, Item 110 for ventilation requirements

Shop Equipment: A two ton monorail and hoist

See Table 16-1, Appendix A for additional equipment requirements.

' PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Regulated Electrical and Instrument Shops

Shop 2-

Location: East side 2nd level 221-S

Shop Size: approximately 600 sq ft

Office Size: approximately 100 sq ft

Shop Function: This shop will be used for the repair of electrical and instrument process, H. P. and Laboratory equipment which has been decontaminated.

- Utility Requirements:
- 120 Volt, 60 Hertz, single phase, AC Electrical Service
 - 240 Volt, 60 Hertz, single phase, AC Electrical Service
 - 480 Volt, 60 Hertz, 3 phase, AC Electrical Service
 - Instrument Air
 - Plant Air
 - See Part II, Item 110 for ventilation requirements

Shop Equipment:

See Table 16-1, Appendix A for equipment requirements.

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: Regulated Electrical and Instrument Shops

Shop 3-

Location: 3rd level 221-S, adjacent to crane maintenance area

Shop Size: approximately 1000 sq ft

Office Size: approximately 100 sq ft

Shop Function: **This shop will be used for the repair of all Process
Crane electrical and instrument equipment.**

- Utility Requirements:
- 120 Volt, 60 Hertz, single phase, AC Electrical Service
 - 240 Volt, 60 Hertz, single phase, AC Electrical Service
 - 480 Volt, 60 Hertz, 3 phase, AC Electrical Service
 - Instrument Air
 - Plant Air
 - See Part 11, Item 110 for ventilation requirements

Shop Equipment - In addition to the items listed in Table 16-1, Appendix A, this shop should include facilities designed for test and repair of individual components in the shop and to exercise the crane viewing and control system in place.

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Clean Maintenance Shop

A clean maintenance shop for the repair of clean equipment such as fans, refrigeration equipment, etc. should be provided. The shop should contain sufficient floor space to accomodate the following facilities, and equipment:

- Tool crib of approximately 700 ft² with tool storage cabinets.
- Three-fourth inch drill press
- Twelve-inch pedestal grinder
- Twenty-five-ton hydraulic press
- Portable pipe threading machine -- up to 2 in.
- Pipe bending machine -- up to 2 in.
- Reciprocating hacksaw, 10 in. wet
- Bandsaw, 20 in. variable speed
- Welding machine -- 300 amp. high frequency
- Welding machine, gasoline powered and trailer mounted, 300 amp., high frequency
- Welding gas manifold
- Four workbenches, 60 x 34 inches
- **Include one man 100 - 120 ft² office space in total area**
- Portable welding machine, electric, 300 amp
- Ventilation exhauster for welding booth
- Welding and burning table, 48 x 24 inches
- Monorail, one ton capacity
- Material storage rack about 7 ft high to accomodate 20 ft lengths of pipe and stock. The rack may be located outdoors but as close to the shop as practicable.
- Fabrication area of approximately 600 ft² (about 20 x 30 ft)

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Clean Electrical and Instrument Shops

Shops and offices as described are for E & I groups for repair of clean area electrical equipment and instrumentation. Where possible, offices should be adjacent to shops.

Shop 4-

Location: **Adjacent to Process and Health Protection Computers and/or Central Control Room**

Shop Size: approximately 800 sq ft

Office Size: approximately 100 sq ft

Shop Function: This shop will be used for repair of computers and peripheral devices and the clean process control electrical and instrument equipment.

Utility Requirements: 120 Volt, 60 Hertz, single phase, AC Electrical Service

240 Volt, 60 Hertz, single phase, AC Electrical Service

480 Volt, 60 Hertz, 3 phase, AC Electrical Service

Instrument Air

Plant Air

Ventilation requirements are to be the same as the 221-S Computer Room listed in Part 11, Item 110.

Shop Equipment:

See Table 16-1, Appendix A for equipment requirements.

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Clean Electrical and Instrument Shops

Shop 5-

Location: **This shop should located in a central part of S-Area.**

Shop Size: approximately 1600 sq ft

Office Size: approximately 100 sq ft

Shop Function: This shop will be used for the repair of all clean electrical and instrument equipment not located in 221-S.

Utility Requirements: 120 Volt, 60 Hertz, single phase, AC Electrical Service

240 Volt, 60 Hertz, single phase, AC Electrical Service

480 Volt, 60 Hertz, 3 phase, AC Electrical Service

Instrument Air

Plant Air

See Part 11, Item 110 for ventilation requirements.

Shop Equipment:

See Table 16-1, Appendix A for equipment requirements.

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Regulated Crane Maintenance Area

The process cell crane will require periodic decontamination, maintenance and repair. An area must be provided that will permit isolation of the crane from the process cell area and permit access by personnel. The area must be shielded from the process cells area by a shielding door.

Design requirements for the area are:

- Facilities for wet decontamination using hand held wands or lances.
- Portable or fixed facilities or both to permit access to crane with lances dispensing decontamination solutions.
- Services to hose or other connectors to provide:
 - o decontamination solution
 - o process water
 - o plant air
- Communication, between crane maintenance area and area outside viewing window for personnel wearing protective plastic suits.
- Waterproof high intensity lighting.
- The floor is lined with an impact resistant 304L stainless steel at least 3/8 inch thick on the floor and 18 inches up the walls.
- Adequately sloped and trenched floor to direct spent decontamination solution to a floor drain sump for drainage or discharge to the Decontamination Waste Treatment Tank.
- Clearances and rail supports to accomodate any in-cell crane carried into the area by the main process cell crane for decontamination, repair and run in after repair.
- Breathing air (see Part 13, Item 650).
- Sufficient space for access to all crane components using permanent or portable, or both, stainless steel scaffolding.
- Monorail system with a capacity of 2 tons to move crane parts to adjacent maintenance and E & I facilities (see below).

****COMPLETE REVISION****

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Regulated Crane Maintenance Area

- Means and sufficient head room above the crane for hoisting any piece of equipment (motors, gearboxes, wheel assemblies, etc.) from the crane and lowering it to the floor.
- One workbench, 60 x 34 inches, metal topped and one tool storage cabinet, 84 inches high, 18 inches deep and 48 inches wide with swing door.
- Access to freight elevator to move repair parts and waste to and from the maintenance area.
- Windows are required to observe and direct maintenance activities from adjacent areas.

A regulated maintenance work and shop area should be provided adjacent to the crane area and be equipped as follows:

- Welder, 300 amp, high frequency, portable for use in both the crane area and adjacent area.
- Oxygen, acetylene and argon from compressed gas cylinders located in a clean area (to avoid contamination of cylinders).
- Two workbenches 60 x 34 inches, metal topped and three tool storage cabinets, 84 inches high, 18 inches deep, and 48 inches wide with swing doors.

PART TITLE: MAINTENANCE REQUIREMENTS -- SHOPS

ITEM TITLE: Master-Slave Manipulator Repair Shop

A facility will be required for repair of master-slave manipulators.

Design requirements for this facility are:

- Glove box for slave end disassembly of one manipulator at a time.
- Glove box for decontamination of slave end components.
- Glove box construction per Spec. 7187.
- Workbench, 30 ft x 3 ft with access from both sides for reassembly, run-in, and checkout of repaired manipulators.
- Storage area with access from one side and including overhead racks for storage of up to eight failed or repaired manipulators.
- Storage wall about 20 ft long by 6 ft high with bins or drawers for new manipulator parts.
- Four, wall-mounted storage racks about 25 ft long for storage of new cables and tubes.
- Four, 5 x 3 ft workbenches in a 400 ft² area for disassembly and assembly of manipulator components.
- High intensity lighting.
- **One man office (see Appendix A, Table 10-1) (100-120 ft²).**

The shop should be located in a regulated area close to the locations where manipulators are used; however, it is not necessary that the shop be in the seismic-tornado resistant portion of the building.

INFORMATION ONLY

PART TITLE: MAINTENANCE REQUIREMENTS - SHOPS

ITEM TITLE: T & T Equipment/Vehicle Maintenance

Existing vehicle maintenance shops will be used for repair and servicing of T & T equipment and vehicles. No maintenance facilities are required on this project unless design of the equipment for transporting the canister to the interim storage building necessitates some type of vehicle maintenance facility.

PART TITLE: SPARE EQUIPMENT

ITEM TITLE: Installed Spare Equipment -- Policy

Installed spare equipment will be the minimum consistent with contamination control, personnel safety and major equipment protection.

PART TITLE: SPARE EQUIPMENT

ITEM TITLE: ****Extra Machinery Allowance****

These extra machinery items should be estimated as one complete spare melter including all components, frames and melter to frame connections plus ****0.75%**** of total project cost.

PART TITLE: AED PARTICIPATION IN PROJECT

ITEM TITLE: Portable Equipment Procurement

Miscellaneous portable tools, instruments, office furniture and special allowances are listed in table 16-1. This equipment is to have an AED allowance for SRP procurement by the Project Department. **The items estimated in Section A of this table have not been escalated from FY 81 costs.**

PART TITLE: AED PARTICIPATION IN PROJECT

ITEM TITLE: Responsibility and Costs for Computer Programming

The responsibility for developing the necessary computer programs for operation of the process control and Health Protection computer programs has not been defined. The following SRP-DOE policy should be use as a guide for estimating costs.

- Costs for computer programs purchased from a vendor as part of a computer procurement should be capitalized as part of the project cost.
- Costs for computer programs developed or modified by SRP Du Pont personnel will be funded from operating costs and will not be capitalized.
- Costs for computer programs developed by Design Division or Engineering Service Division personnel will probably not be capitalized as part of the project.
- Procurement of automatic data processing equipment requires submission to DOE of an implementation plan and again of a procurement plan.

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PART TITLE: AED PARTICIPATION IN PROJECT

ITEM TITLE: Canister ****& Overpack**** Procurement

There will be no canisters ****or overpacks**** purchased on this project.

PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Bell Telephone System -- Plant Telephone System

There will be four types of Bell Telephone systems required in S Area.

Type 1 - Intra-area only, four digit number, switching in local area switchboard.

Type 2 - Intra-area and 3/700 Area, four digit number, switching in local area switchboard, will use type 1 phone with switch on phone to select type 2. Only telephones that are essential to operation will have this capability.

Type 3 - Inter-area and offplant, four digit number, switching in local area and 3/700-Area switchboard.

Type 4 - Same as type 3 except it will be considered as nonessential and may be disconnected by local area control during plant emergencies.

In addition, the Bell Telephone System should provide the following:

1. A Patrol emergency telephone -- an additional telephone located in Patrol Headquarters to be used for emergencies -- type 3.
2. A fire emergency telephone -- an additional telephone located in Patrol Headquarters to be used only to report a fire -- type 3.
3. An SSI telephone providing direct communications with all other Area Patrol Headquarters central control room, and the EOC (Emergency Operating Center). All SSI telephones can be on line at the same time.

Communication systems should be provided with emergency power from a generator and a standby storage battery system.

****COMPLETE REVISION****

PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Bell Telephone System -- Plant Telephone System

Preliminary estimates of the telephone requirements are shown below:

<u>Location</u>	<u>Type 1</u>	<u>Type 2</u>	<u>Type 3</u>	<u>Type 4</u>	<u>SS1</u>
S-221, Freight elevator	1	-	-	-	-
S-221, Sample elevator	1	-	-	-	-
S-292, Fan house	3	-	-	-	-
S-951, Primary substation	-	1	-	-	-
S-704, Patrol headquarters and	-	-	4 ^a	1	1
S-704, Administration building	6	-	24	18	.
S-221, Vitrification building	24	5	16	4	.
S-210, Service building	6	-	24	14	-
S-511, Pump pits	1 ^b	-	-	-	-
S-250, Interim storage	3	-	1	-	-
S-981, Cooling tower	1	-	-	-	-
S-980, Water treatment	1	-	-	-	-
S-831, Sewage treatment	1	-	-	-	-
S-422, Bulk Frit & Cold Chem	1	-	-	-	-

^a Includes dedicated fire and patrol emergency telephones.^b Provide a telephone for each enclosure at each pump pit.****COMPLETE REVISION****

PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Area and Plantwide Alarm Systems

An Areawide fire alarm system should be provided to activate alarms in the CCR, Patrol Headquarters and the F-Area fire station. The system must be compatible with the American District Telegraph System presently being installed plantwide on Project S-1840 and be coded to identify the S-Area location of the alarm for quick response by F-Area fire station.

A tie-in to the H Area "Nuclear Incident Monitoring System" (NIMS) should be provided to ensure the alerting of S Area personnel of incidents that may affect them. No sensors associated with the NIM System are required, however, within S-Area. The alarms should be located in Patrol Headquarters and in the CCR Building.

Installed radiation monitoring, air monitoring, liquid effluent and monitoring essential ventilation equipment, etc., should be appropriately alarmed at the immediate site and in the CCR Building.

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PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Public Address System -- Areawide

An areawide public address system should be provided to assure that information vital for operation and safety reaches all personnel. Initiation of the public address system should be available from any of the four type telephones with a master override of the system being located in Patrol Headquarters.

PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Public Address and Intercom Systems in and Between Buildings

Building or sub-area public address and/or intercom systems should be provided at various locations as required.

In addition to the areawide public address system discussed in Part 17, Item 200, public address systems covering limited areas and/or buildings are required. These systems should also be accessible from the Bell telephones as discussed in Item 200. The subsystems and locations covered are as follows:

- process building (vitrification)
- interim storage building
- **service building-outside cold feed area**
- all remaining outside work areas (i.e. water treatment, sewage treatment, pump pits, etc.)

PART TITLE: COMMUNICATIONS-ALARM SYSTEMS

ITEM TITLE: Teletype, Data Transmission Capabilities, Requirements.

The teletype and automatic data processing links of the plant should be expanded to include S Area.

Data transmission capabilities should be provided between interim storage, CCR, 772-F Laboratory and all processing Buildings with the S-Area central computer. Provisions should be provided for tie-in of additional data transmission systems for future expansion.

Two, 100 watt base station radio-control centers are to be established in S-Area, one located in Patrol Headquarters and one in the 221-S Central Control Room. The base station systems must use Motorola Digital Voice Protection equipment to be consistent with the existing SRP system. Four transmitting channels are required at frequencies of 164.225 MHz, 164.750 MHz, 164.325 MHz and 165.2625 MHz. Two receiving channels are required at frequencies of 164.225 MHz and 164.325 MHz.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Criticality

Design considerations for buildings and equipment where nuclear criticality is a possibility must be in compliance with DOE requirements as addressed in **Reference C-10, Appendix C.** A detailed evaluation of the potential for criticality is being made by SRL. At present, there are no known criticality hazards in the process, however, the basic data will be revised as necessary when the evaluation by SRL is completed. The impact on design effort and cost to meet DOE requirements if criticality hazards are found is expected to be small being limited to detection, alarm and recording instrumentation.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Radiation Hazards -- All Areas

Protection from radiation hazards must be adequate to insure compliance with DOE standards in **Reference C-10, Appendix C.** Radiation hazards exist in waste process streams and equipment in the process, weld test, decontamination and repair cells of the main processing building, in solidified waste in the storage building and in air and liquid effluents from the main processing building. Exposure to direct radiation is to be controlled by shielding walls in the main processing building (Part 11, Item 115, Page 1) and in the glass storage building (Part 11, Item 430, Page 1). Radioactive contamination in ventilation air is to be controlled by the ventilation requirements in Part 11, Item 110, Pages 1-7.

Additional protection against exposure to radiation is to be provided by monitoring air and liquid streams to detect radiation from air reversals, process liquid leaks, process equipment failure, etc. (Part 12, Items 100, 110, 120, 130). Protective clothing, restricted access, regular monitoring of personnel and body fluids provide further protection from radiation exposure (Part 12, Item 140).

Examples of radiation hazards include:

- Entry into weld test cell, contact decontamination cell, crane maintenance, ventilation fan room, etc.
- Reversal of ventilation air flow
- Leaks of process liquids
- Accumulation of activity in replaceable filters
- Removal of contaminated equipment from process area
- Inadvertant spread of contamination by personnel from contaminated areas to clean areas.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Controlled Access -- Surveillance Monitoring

Facilities and equipment must be provided to permit movement of personnel between areas of differing contamination and radiation levels to perform operation and maintenance functions. Typical arrangements provided for movement between areas of different contamination levels generally include an airlock for control of air flow, clothing change facilities and personnel radiation monitoring instruments. Clothing change facilities required depend upon the difference in level of contamination between two areas and may vary from the use of a lab coat and shoe covers over street clothing to a complete change of clothing into protective clothing including use of respiratory or fresh air breathing equipment.

Personnel monitoring equipment must be provided for use when moving from a high radiation/contamination potential area to one with a lower radiation/contamination level. Monitoring equipment requirements may vary from complete monitoring by Health Protection personnel when leaving an area of high radiation/contamination, to a self administered hand and foot count before entering a "clean" area.

Some examples of controlled access requirements are:

- Between clean areas, eg., outside, offices, control room and process building operating areas (Part 11, Item 125)
- Between process building operating areas where radiation or contamination levels might be quite different. An example might be between a local process control area and a sampling area.
- Between process building operating area and the **weld test cell** or the contact decontamination cell.
- Between outside and sand filter, stack or building housing ventilation fans.
- Between outside and glass storage building.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Controlled Access -- Surveillance Monitoring

Surveillance monitoring of radiation in the process building and in the air and liquid streams is discussed in Part 12, Items 110, 120, and 130.

In addition to the general employee work area surveillance, monitoring of employees in the preceding discussion concerning controlled access, a detailed program for monitoring each employee's radiation exposure is maintained. SRP policy and requirements are summarized below:

- Each employee who enters a radiation area is required to wear a Health Protection TLD badge. Employees assigned to the processing building plus employees assigned to clean buildings but whose duties require periodic visits to the process facilities will be assigned permanent Health Protection badges. Badge racks must be provided at the area patrol headquarters where all employees will leave badges overnight. Space must also be provided for storage of visitors' badges. Periodically (once/month or once/quarter) the employee radiation exposure will be determined by reading the dosimeter in existing Health Protection facilities to provide a historical record of employee exposure.
- Employees entering high radiation areas such as crane maintenance, contact decon cell, etc. will be required to wear self-reading dosimeters. These dosimeters will provide a daily estimate of employee exposure and the estimate is recorded on the employee radiation exposure card. The dosimeters will be kept in the Health Protection complex and returned to Health Protection for recharging at the end of each shift.
- Employee's exposure to radiation by inhalation or ingestion is monitored by a Health Protection bioassay program. Periodically, employees assigned to regulated area work are required to leave bioassay samples. Change rooms should be equipped with a small rack for storage of bioassay sample bottles. These samples will be analyzed in existing facilities.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Chemical Hazards -- All Areas

A number of chemicals as liquids or gases are used in the process and include:

- Nitric acid
- Sodium hydroxide
- Potassium permanganate
- Hydroxylamine sulfate
- Oxygen
- Acetylene
- Sodium hypochlorite
- Caustic waste
- Sulfuric acid
- **Sodium bisulfite**
- Formic acid
- Oxalic Acid

Design Safety Considerations

In addition to proper unloading, storage and containment requirements, provision must be made for personnel protection in the event of contact with chemical agents. Although protective clothing and equipment is prescribed when handling chemicals, design should include eyewash stations and safety showers in all locations where chemicals are used. **These locations include the dry chemical storage, liquid cold chemical storage and makeup area, pump pits, fan house and all locations within the main process building when contact with chemicals is likely. These stations are to meet Du Pont Standard S1E, a design guide for new facilities. If permanent, plumbed facilities are not practical, use of portable eyewash containers is acceptable if the requirements of Standard S1E are met.**

The heavy (approximately 1,000 lb) canisters and lids represent potentially serious safety hazards during all transporting, inspecting, and storage operations. Equipment design should consider the following requirements:

- 1 All loads should be securely fastened during transport, inspection and storage.
- 2 Operations should not require employee to place extremities of body in potential pinch point areas.

Sodium hydroxide and nitric acid have a strong local corrosive action. Avoid contact with or exposure to these corrosive chemicals.

Potassium permanganate is a strong oxidizing agent. It should be kept away from combustible and organic materials.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Chemical Hazards -- All Areas

Hydroxylamine sulfate is a highly toxic compound. When heated to approximately 350°F, it begins to decompose forming free hydroxylamine and toxic oxides of sulfur. The hydroxylamine may decompose explosively.

Sodium hypochlorite is corrosive and an irritant via ingestion and inhalation. Anhydrous salt is highly explosive, and can cause violent reactions with amines, cellulose, ethylene imine and ammonium acetate, carbonate, nitrate, oxalate and phosphate.

Sodium sulfite is moderately toxic through ingestion. Aqueous solutions are toxic and corrosive.

Formic acid is moderately toxic through ingestion and is an irritant to skin, eyes and mucous membranes. It is a moderate fire hazard when exposed to heat or flame. It is an explosive hazard with furfural alcohol, hydrogen, peroxide, $\text{Ti}(\text{NO}_3)_3 \cdot 3\text{H}_2\text{O}$. Fire fight with carbon dioxide, dry chemical or alcohol foam.

Oxalic acid is highly toxic when ingested and can cause death rapidly. Inhalation of dust or vapor can cause chronic irritation of the upper respiratory tract, gastrointestinal disturbances, albuminuria, gradual loss of weight, increasing weakness and nervous system complaints. Oxalic acid has a caustic action on the skin and may cause dermatitis.

Storage, transfer, and makeup of corrosive chemicals represent potential hazards to operating and maintenance personnel. All lines should be sloped for drainage. Pumps should be located to minimize potential sprays from leaks at flanges, etc. All operating equipment, such as pumps, etc., must be capable of being locked out and lines must be capable of being drained before repair. Provide safety showers in close proximity to all locations where corrosive chemicals are handled.

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Fire Protection -- General

Fire protection systems must be in compliance with DOE policy and objectives defined in **Reference C-10, Appendix C** which are that fires will not result in injury to personnel, radioactive or other hazardous exposure of the public (including failures of critical safety systems and loss of primary confinement integrity), unacceptable impairment of DOE programs and excessive damage to or loss of Government property. Criteria covering the fire protection requirements applicable to buildings and facilities are included in **Reference C-11, Appendix C.**

In general, fire protection equivalent to an "improved risk" as accepted by the fire insurance industry is required. Exceptions are where large or unusual fire potential exists, or where radioactive contamination of plant or public environment could occur, a level of protection exceeding the "improved risk" level is required. Such improved protection generally consists of special precautions to prevent fires, multiple types of fire extinguishment, inerting, rapid detection of incipient fires, increased fire rating of construction materials, rapid response of fire departments, etc.

Particular attention should be given to the fire protection water supply and distribution system for compliance with the general design criteria for DOE facilities as specified in **Reference C-11, Appendix C.** Among other things, this section specifies recommendations for looped water systems, sprinkler flow of 15 gpm for each sprinkler head expected to operate in a fire with a reserve of 500 gpm for hydrant use, and a fire water flow for at least two hours and perhaps longer for certain fires.

INFORMATION ONLY

PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Fire Protection -- 200S Area

Provide a fire alarm system for the area which is activated from manual stations and by fire detectors located in unattended areas such as the process cell in the main processing building, service building, etc. Alarms connected to the area system should sound in the affected building, central control room, area guard headquarters and the 200F fire station. **This fire system should be compatible with the low voltage Gamewell Flex III* chassis and the ADT Autoterm* and Hoffman* enclosures in the existing SRP system. Prints of the existing system have been supplied.** Fire detection and local alarm systems using detectors such as heat and smoke types may be used for early detection of fires but should not be used in lieu of automatic suppression systems for general building protection except under certain conditions.

Automatic fire suppression systems should be installed for general building protection. Two types are considered adequate for most applications. Water sprinkler systems can be used for most occupied areas and warehouse facilities. **Halon systems should be used for areas where there are concentrations of electronic equipment, e.g., computer equipment, and for some restricted areas such as sample cells in the main processing building. Motor control centers and electrical load centers will be segregated from areas with automatic fire suppression system by fire walls with a minimum one (1) hour rating and will be equipped with fire detection and portable fire extinguishers.**

Fire hose stations and/or portable extinguishers should be provided in all facilities accessible to personnel including appropriate outside areas whether or not automatic extinguishment is provided. Additional extinguishers for special hazards should be provided as required.

An area wide fire water supply, storage, and distribution system must be provided and must be operable in the event of electrical power failure. Water supplies for fire protection shall be adequate in pressure and volume to provide not less than 15 gpm for each sprinkler head expected to operate in the largest probable fire, with at least 500 gpm reserved from hydrant use. Fire water flows shall be continuously available for a period of at least two hours, except that for very large buildings, buildings with special public or plant hazard potential, multiple building sites or groups of combustible buildings a minimum four-hour reserve is required.

The fire protection water supply must assure availability regardless of process and domestic usage and may be provided by a separate fire protection water supply system, multiple or combined supplies with reserve fire supply or by connection to an effectively inexhaustible supply (such as a small plant supplied from a large city distribution system). **The back-up fire water storage should be provided by a minimum cost system.**

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PART TITLE: SAFETY -- FIRE PROTECTION

ITEM TITLE: Fire Protection -- 200S Area

A looped or two-way flow system should be provided with sectional valving arranged to provide alternate flow paths in the event of breaks, shutdowns for future connections, or other impairments. Fire supply valves should be capable of being locked open to assure availability of supply.

An estimate of combustible materials that will be contained in the vitrification facilities is shown in Table 18-1, Appendix A. This should be used as a guide for determining fire potential and areas requiring automatic suppression system.

Based on the DOE criteria and the estimated quantities of combustible materials, recommended fire protection systems are listed in Table 18-2, Appendix A.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Components (As-Received)

A set of canister components consists of a canister, an inner plug, and an outer plug (with a helium capsule attached). Repair caps are used to cover defective welds.

Design requirements for components are shown in Table 20-1, Appendix A.

Component receiving, storage, and inspection requirements are set forth in Part 5, Item 265. Component processing is shown in Figures 5-3 through 5-8, Appendix B, and described in appropriate Items of Parts 5 and 20.

The design of canisters should incorporate features for fail safe lifting by cranes and grapplers. Ideally, the design and methods for both canisters and overpacks should be the same; however, this is not a requirement because of the very low frequency for handling overpacks.

Design of all components should incorporate features to facilitate decontamination of the appropriate portions (e.g., no crevices, radiuses should be greater than 0.06 in., etc.).

ASME boiler codes for pressure vessels apply to design of canisters, except that pressure proof tests are not required.

The design of the inner canister closure shall:

- o prevent exchange of air between cell and canister and entry of water or frit slurry into the canister during decontamination (see Part 5, Item 275 and Part 20, Item 260).
- o facilitate decontamination of all exposed external surfaces.
- o minimize accumulation of frit and water above the nozzle seal.
- o contain contamination inside the canister before and until after welding of the outer plug.
- o not interfere with welding of the outer plug.
- o accommodate a helium capsule, for later release and helium leak testing.
- o permit helium, when released, to fill the entire canister void space.
- o not create an electrical path that short circuits the outer plug weld.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Components (As-Received)

- o not contain materials or produce materials that will cause degradation of the canister (moisture, acids, chlorides, etc.).
- o provide a method to verify that the closure was properly installed (e.g. go-no-go gage, etc.).
- o withstand decontamination conditions.

Outer plugs shall have capsules attached that are pressurized with sufficient helium to provide a minimum of 50% helium concentration in the entire void space of glass filled canisters (both above and below the inner seal). The capsules shall be designed to be filled and sealed and to retain the helium for release and leak testing of the canister closure just prior to shipping to a federal repository. The design shall incorporate features to contain the helium, to permit its release and to confirm release at the desired time. An acceptable release mechanism would be a ruptured disc, with rupture triggered by heating the gas in the capsule.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Overpack Components (As-Received)

A set of overpack components consists of an overpack, a cover with a helium capsule attached, and possibly other miscellaneous parts as determined by design.

Design requirements for components are shown in Table 20-1, Appendix A.

Component receiving, storage, and inspection requirements are set forth in Part 5, Item 265. The overpack process is shown in Figure 5-9, Appendix B, and described in Part 5, Item 293.

The design of overpacks should incorporate features for fail safe lifting by cranes and grapples. Ideally, the design and methods for both canisters (see Part 20, Items 50) and overpacks should be the same; however, this is not a requirement because of the very low frequency for handling overpacks.

Design of all components should incorporate features to facilitate decontamination of the appropriate portions (e.g., no crevices, radiuses should be greater than 0.06 in., etc.).

To exclude water during decontamination, the overpack components should be designed with a water tight seal that is subsequently welded. If gaskets are used they must not contain chlorides, or produce chlorides under radiation, that cause stress corrosion cracking of stainless steel.

ASME boiler codes for pressure vessels apply to the design of overpack components, except that the pressure proof tests are not required.

The overpack covers shall have capsules attached that are pressurized with sufficient helium to provide a minimum of 50% helium concentration in the void space in the overpack. The capsules shall be designed to be filled and sealed and to retain the helium for release and leak testing of the overpack closure just prior to shipping to a federal repository. The design shall incorporate features to contain the helium, to permit its release and to confirm release at the desired time.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Radiation Shielded Windows

Radiation shielded windows will be required for viewing of equipment and operations in the following areas:

- Melter Cell
- Canister Decontamination Cell
- Weld Test Cell
- Remote Decontamination Cell
- Contact Decontamination Cell
- Crane Maintenance Area
- Sampling Cells
- Mercury Recovery Cells

These windows are to provide shielding equivalent to the cell walls. They are to be non-fogging, low browning, and have a separate protective glass covering on the hot side. Installation and removal equipment will be required. Removal for replacement or repair shall be from the cold side of the cell walls. A shielded barrier plug should be provided for placement inside the melter cell and canister decontamination cell when the windows are removed.

The type, size, mounting height, and specifications for each window location will be determined when layout plans are complete and location of in-cell equipment is known.

Shielded windows will be used to observe:

- o All functions of the process cell crane and the remote operation of the crane while it is in the crane maintenance area. If E & I Shop #3 and the Maintenance Shop are on opposite sides, viewing will be required from both sides.
- o Vessel and equipment decontamination in the remote decontamination cell.
- o Equipment and personnel in the contact decontamination cell.
- o Inner plug insertion and canister inspection in the melt cell.
- o Smearing of canister in the canister decontamination cell.
- o Weld inspection and smearing of canister in the weld test cell.
- o Sampling, sample flow, and in-cell equipment in the sampling cells.
- o Mercury purification equipment and in-cell equipment in the mercury purification cell.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Radiation Shielded Windows

- o Melter operation and maintenance including:
 - Observation of pour spout bellow replacement.
 - Observation of makeup of canister to melter bellows flange.
 - **Observation of glass sampling of melter.
 - In addition to the above specific requirements, it is desirable to generally view the cell to facilitate placement of the canister vent shroud, replace the turntable drive motor and observe the melter and the canister being filled.** If the viewing windows can be located to supplement TV observation of equipment replacement by crane in the melter lid, this aspect should also be considered. The lid equipment includes thermowells, TV camera, feed tubes, conductivity probe, bubbler, oxygen analyzer or light.

Additional viewing requirements such as identifying canister numbers, in-cell grappling and material transfer in the melt cell, canister decontamination cell, and weld test cell may be resolved with CCTV or windows depending on equipment placement and line of sight interferences.

Window shielding should be comparable to wall shielding. The window's cell side should be protected with a removable guard. For continuing design, some means of window cleaning should be provided.

PART TITLE: SPECIAL EQUIPMENT DESIGN BASIS/CRITERIA

ITEM TITLE: Manipulators

At least two master-slave (M-S) manipulators will be required in each sample cell and the mercury purification cell for the vitrification facility. The manipulator should be capable of 10 lb handling capacity with fingers and a 50 lb vertical lift capacity. All M-S manipulators will be thru wall mounted in penetrations above the cell window. These manipulators should be positioned so that complete coverage of the working area will be obtained. All manipulators are to have SRL stainless steel tongs, standard X, Y, and Z motion with booting and gauntlet for containment.

Additional manipulators may be required in the equipment decontamination cells, melter cell, canister decontamination cell and the weld test cell. These manipulators may be either M-S thru wall mounted or electromechanical (E-M) depending on the operation to be performed or the design of in-cell equipment. Type, size, function and specifications should be determined as equipment and cell design progresses. Remote operations which cannot be performed by the in cell crane are candidates for either M-S manipulators or E-M manipulators.

At each shielded window location, provide two master-slave manipulator port holes. At shielded window locations where M-S manipulators are not provided on the project, shielded plugs for the port holes are required.

Each E-M manipulator should be capable of being controlled from a shielded window. Each E-M manipulator should be capable of being remotely removed and installed in its cell via the process cell crane. Staggered height dowels should be provided for locating these manipulators in remote cells.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Cell Crane

A remotely operated crane will be required to install and remove equipment and piping in the process cell. Design considerations for this crane are noted here.

A. Crane Service

- The crane is to be capable of these operations:
 - o Lift the heaviest cell equipment, including cell covers.
 - o Lift 10 tons with an auxiliary hoist.
 - o Reach one wall with an electrically operated impact wrench that is carried routinely on a 1 ton hoist suspended from a trolley; include an auxiliary 1 ton hoist on this trolley.
 - o Reach the opposite wall with an electrically operated impact wrench that is carried routinely on a 1 ton hoist suspended from a second trolley; include an auxiliary 1 ton hoist on this trolley also.
- Electrical connections and parts and all mechanical parts must be able to withstand crane washdown without failure. **Warm water under pressure**, detergent solution, and steam will be used for crane decontamination. General crane decontamination is likely to be required once a quarter, and decontamination of localized areas to permit maintenance is likely to occur monthly.
- The crane is to be operated using a closed circuit TV viewing system, see Part 20, Item 182, with remote control. No on-board operating controls or cab is required.
- Although remotely operable, maintenance and repair will be a direct "hands on" operation.
- The crane will operate in a 13-40°C environment, without humidity control. The intermittent radiation levels are expected to vary between 100 to 300 rads/hr. However, the maximum short period rate may reach 1100 rads/hr as when the crane is operating directly over certain equipment. A period of 100 hrs per year at 1100 rads/hr in addition to a constant rate of 300 rads/hr shall be used for the design. The crane must be available 90% of the time to perform cell maintenance tasks based on a 25 year radiation exposure period.

B. Crane Structural Components

- The girders, end trucks, and trolley shall be structural steel materials; stainless steel is not required.
- A 304L stainless steel checkered plate footwalk running the length of the bridge shall be supplied on each side of the bridge.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Cell Crane

C. Mechanical Components

- Cable cutters are required on the main and auxiliary hoists to dispose of a suspended load in an extreme emergency requiring this step. Cable cutters are not required on auxiliary hoists that carry loads of less than 3 tons.
- Provide for retrieval of the crane from the process cell in the event of failure of the main drive system or any other system which would prevent return of the crane to the maintenance area under normal operating procedures. Retrieval must provide for removing hoist loads.
- The main bridge trolley must be remotely retrievable (movable) under single mode failure conditions.
- The main bridge drive must be equipped with auxiliary wheels which can be remotely jacked into place to completely take the load off of main drive wheels so as to allow retrieval of the crane under emergency conditions. The auxiliary wheels are to be actuated/operated separately.

Crane lubrication points are to be accessible from the crane mounted platforms or the crane maintenance area platforms.

- Crane hooks are not to swivel.

D. Seismic Considerations

- In an **Investment Protection Earthquake (IPE)** situation, the crane shall stay on the runway rails and be retrievable to the maintenance area for any necessary repair prior to its use. The bridge trolley must remain on the bridge structure.
- Structural components are to be designed so as to suffer no permanent structural distortion that would disrupt or prevent crane operation as a result of loads imposed by an **IPE**.
- The crane is not required to be operable or retrievable during or after a Design Basis Earthquake (DBE).

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Cell Crane

E. Electrical Design

- Supply voltage to the crane is to be 460 volt, 3 Phase, 3 wire 60 Hertz AC.
- A redundant bus bar power supply is preferred. The bus bars must be accessible for inspection and repair.
- Dual power pickup shoes or contacts are required on each set of bus bars.
- Electric motors shall be totally enclosed, non-ventilated, type NEMA design B temperature rise with Class H insulations Motors shall be rated for 60 minute crane duty service.
- Component cabinets requiring ventilation are to have HEPA filters on inlet and outlet air openings. Cabinet doors are to be sealed against water inleakage from decontamination spraying. Other openings are to be located and/or configured to exclude spray water from inside the cabinets. Cabinets are to be fabricated of 304L stainless steel.
- Crane is to have controllable acceleration and deceleration on the main crane drive and the main trolley drive.
- Crane is to have stepped speed control on all functions per the following table:

	<u>Min.</u>	<u>Max.</u>	<u>Steps</u>
Bridge	3FPM	100FPM	5
Trolley	3FPM	75FPM	5
Main Hoist	3FPM	14FPM	5
Auxiliary Hoist	3FPM	21FPM	5
Girder Monorail Trolley	2FPM	6FPM	2
Girder Monorail Hoist	12FPM	47FPM	2

- Brakes on main bridge trolley hoists are to be redundant.
- Operator controllable variable braking action is required on the main crane drive. The brake control lever or pedal is to be spring returned to the off position when the operator releases the lever or pedal.
- Brakes on all crane drive functions are to be set when power is interrupted.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Cell Crane

- Brakes on all crane drive functions except the main crane drive are to set when the motion control is returned to the neutral (off) position.
- Brakes on all crane drive functions must be remotely operable under single mode failure conditions.
- The main and auxiliary trolley hoist shall have separate, redundant gear train drive systems to prevent an uncontrolled load drop should a gear fail.
- For fire protection requirements, see Part 18, Items 600 and 620.

F. Crane Operating Criteria

- The remote operator's console should be designed so that all normal controls can be reached from one operating position.
- For additional maintenance control console, see Part 14, Item 350.
- The crane control system must be operable over the full length of the crane travel (rail length).
- Control system components requiring maintenance or subject to failure cannot be located in an inaccessible position in the process cell.
- Permits, where and as necessary must be obtained from the FCC for operation of a wireless control system. A festooned cable assembly may be an option for crane control wiring. The CCTV's control is described in Part 20, Item 182.

Crane Lighting

- The main process cell shall be equipped with lighting sufficient to accomodate operational viewing by means of closed circuit television viewing; see Part 20, Item 182. This is to be interpreted as lighting which provides a minimum illumination intensity of 200 foot candles over an area equal to the span and the width of the crane measured at a plane located a minimum of 60 feet below the crane rail elevation.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: In-Cell Cranes

Four remotely operated cranes will be required: one each in the Melt Cell (MC) and Canister Decontamination Cell (CDC), and two in the Weld Test Cell (WTC).

This item outlines general design criteria. Close coordination of shielded window, in-cell CCTV viewing, and in-cell lighting designs with this design is required to assure proper crane operation. Placement systems are to be located on all electrical connections and parts and all mechanical parts must be able to withstand crane washdown without failure. Warm water under pressure, detergent solution, and steam will be used for crane decontamination. Each crane will have a 5-ton hoist with a non-swivel hook.

The following are general requirements for the cranes:

- o No TV equipment on cranes
- o No lights on cranes
- o No manipulators mounted on cranes
- o Manual movement all directions "X", "Y", "Z"
- o Each crane equipped with two (2) motions
 1. Hook
 2. Impact Wrench

(An electro-magnet will not be installed)

- o All drives, X, Y, Z,Z in emergency mode to be driven by impact wrench
- o Standardize cranes if possible
- o Cable cutter on both Z,Z motions
- o Add maintenance functions to crane in addition to operating functions, extent to be determined without enlarging building size
- o CCTV's in all cells require removal by cranes

MC and CDC Cranes

These cranes will be remotely removed by the main process crane (MPC) for maintenance in the crane maintenance area. The electrical connections should be of the Hanford design.

NEW ITEM

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: In-Cell Cranes

WTC Cranes

"Hands-on" maintenance will be performed on WTC cranes after all canisters have been removed from the cell or placed in shielded storage. To assure this capability, a redundant crane system is required. One crane must be operable at all times. Crane controls inside and outside the cell are required.

- o After an Investment Protection Earthquake (IPE), the crane shall stay on the runway rails and remain operable. The bridge trolley must remain on the bridge structure.
- o Structural components are to be designed so as to suffer no permanent structural distortion that would disrupt or prevent crane operation as a result of loads imposed by an IPE.
- o These cranes are not required to be operable or retrievable during or after a Design Basis Earthquake (DBE).

These cranes will not normally be removed by the Main Process Crane (MPC) for maintenance in the crane maintenance area. However, in the very unlikely event that both WTC in-cell cranes fail simultaneously, the capability of removing the in-cell crane drive system must be capable of being removed to the crane maintenance area via the process cell crane and a plug in the floor of crane maintenance.

The electrical connections should be of the Hanford design.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: CCTV Systems - Crane and Cell Viewing

Remote operations in the processing cell will require a viewing system. The system should be a remotely operated TV viewing system mounted on the process cell crane (See Part 20, Item 180) and maintained in the crane maintenance area.

A. General

- Permits, where and as necessary must be obtained from the FCC for operations of a wireless system. A coaxial cable reel **or festooned cable** assembly may be options if size and reliability are not a problem.
- The viewing system should be designed so that an operator can work comfortably for long periods.
- The operator's console should be designed so that all normal controls can be reached from one operating position.
- **CCTV control or signal circuitry located on the crane should be hard wired.**

B. Viewing Range and Resolution

- **High resolution TV cameras should be used for maximum visual clarity and for possible use in conjunction with photogrammetry and/or in cell photography.**
- While the crane bridge is being moved, the width of the process cell, with some overscan, must be visible at cell cover height.
- In process cells, magnification and resolution must be adequate to perform a variety of jobs such as removal and installation of vessels and jumpers. Vision must be adequate to properly position tools and to detect small leaks.
- Placement of TV cameras must be separated on the crane bridge structure so as to improve apparent depth perception to the extent practical.
- **All CCTV cameras** should have zoom magnification **and camera pan/tilt capability.**

C. Design and Maintenance

- Commercially available components are to be used where practical.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: CCTV Systems - Crane and Cell Viewing

- The system enclosures must be able to withstand wet decontamination without failure. Cranes may become contaminated to levels where it is necessary to clean the **crane** using high pressure (300 psig) streams of laundry detergent solution, warm water and saturated steam.
- The system must permit removal and replacement of CCTV cameras, pan-tilt mechanisms or other operating components within a time span of four hours or less to limit personnel radiation exposure.
- A usable viewing system must be available following failure of any **single** component or module.
- The CCTV control system must be operable over the full length of the crane travel (rail length).
- Control system components requiring maintenance or subject to failure cannot be located in an inaccessible position in the process cell.
- Auxiliary video and audio recording equipment is required to record crane operations. Voice dubbing is required for the videotape system.
- A supervisory viewing station is to be provided with monitors and **monitor** switching capabilities duplicating those of the operator's console.
- The operator's console is to be located in a sound **treated room to meet PNC 40 curve.**
- The remote operator's console should be part of the crane operating console and be designed so that all controls can be reached from one operating position **with the operator in a seated position.**
- **CCTV and associated transmission components located on the crane shall meet the temperature and radiation conditions as stated in Part 20, Item 180.
- The CCTV system shall be considered as part of the crane to meet the availability and life expectancy requirements as stated in Part 20, Item 180.
- For additional maintenance control console, see Part 14, Item 350.**

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Equipment Repair Shop Crane

A crane will be required in the process equipment repair shop to provide services for process cell equipment repairs.

A. Crane Service

- **The crane may be a modified standard, commercial crane.**
- The crane is to be remotely operated by radio or cable from the shop floor with a portable control system. On-board operating controls and cab are not required.
- Crane maintenance and repair will be a "hands-on" operation as with any commercial crane.
- The crane is to be equipped as follows;
 - o Duplicate the **lifting capacity of the large hoist** and the 10 ton auxiliary hoist on the process cell crane.
 - o Provide a single monorail with a trolley from which is suspended two 1-ton hoists, one to carry an electrically operated impact wrench and one for miscellaneous service.
- The crane will operate in a 13-40°C environment without humidity control. The radiation level in this shop will not be a factor in crane design.

B. Crane Structural Components

- All parts of the crane are to be standard materials of construction.

C. Mechanical Components

- Crane lubrication points are to be accessible from the crane mounted platforms or the maintenance area platforms.
- Crane hooks are not to swivel.

D. Seismic Consideration

- This crane is not required to survive an operating basis earthquake.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Equipment Repair Shop Crane

E. Electrical Design

- Supply voltage to the crane is to be 460 volt, 3 phase, 3 wire 60 Hertz AC.
- Power supply bus bars will be accessible at all times and redundancy in the power supply is not required.
- **Electric motors shall be totally enclosed, non-ventilated, type NEMA design B temperature rise with Class H insulation. Motors shall be rated for 60 minute crane duty service.**
- For fire protection requirements, see Part 18, Items 600 and 620.
- Any cabinets provided for climate control for electrical components are to have HEPA filters on the inlets to avoid long term accumulation of radioactive particulates in the cabinets. These cabinets do not require waterproofing.
- Provide lighting on the crane to increase shop floor illumination during load manipulations.
- Crane is to have variable speed control on all functions identical to the process cell crane, Part 20, Item 180.
- Brakes on main bridge trolley hoists are to be redundant.
- Brakes on all crane drive functions are to be set when power is interrupted.
- Brakes on all crane drive functions are to be set when the motion control is returned to the neutral (off) position.
- The main and auxiliary trolley hoist shall have separate, redundant gear train drive systems to prevent an uncontrolled load drop should a gear fail.
- Permits, as necessary, must be obtained from the FCC for operation of a wireless system.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Equipment Lifting Yokes

Each piece of equipment installed in the process cell must be handled remotely using either a hook on the cell crane or a combination of the crane hook and a yoke matched to the equipment piece. To minimize the number of yokes required in the cell, lifting bails and trunnions on similar equipment (weight, size, function) are to be matched to mate with a single yoke. For example, single yokes could be provided each of the following equipment groups:

- o all cell covers, both sheilding and ventilation covers
- o all pumps and agitators
- o large diameter and wide equipment
- o small diameter and narrow equipment

Provision of additional bracing for bails or trunnions and oversized lifting trunnions is desirable to reduce the multiplicity of lifting yokes. All yokes in process cell service are to be carbon steel and painted. These yokes will not be removed for use elsewhere and storage must be provided in the cell. All equipment movements will be accomplished within the process cell with the one set of lifting yokes

A second set of lifting yokes is required in the process equipment repair shop to handle new and decontaminated equipment. These yokes are to be carbon steel and painted. Use of adjustable lifting yokes adaptable to lifting trunnions on various equipment pieces would significantly reduce the number of yokes required in the shop and result in significant cost and space savings. Adjustable yokes have been demonstrated satisfactorily at SRP.

A set of lifting yokes is required to handle the tanks and equipment in the interarea line pump tank pits.

**All carbon steel lifting yokes are to be inspected and stress relieved by:

- o Ultrasonically inspecting plate material to be used for hooks and eyes prior to cutting so that defects (laminations, cracks, etc.) will not be present in the final assembly.
- o Inspecting all welds (visual and dye-penetrant) before and after stress relieving. No defects permitted.
- o Stress relieving completed yoke in accordance with Section VIII, Division I, Paragraph UCC 56 of the ASME Boiler and Pressure Vessel Code.
- o Not permitting heating of stress relieved assembly.

Specifications for the fabrication of stainless steel yokes should include the above items, except they should not be stress relieved.**

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

Equipment in the process, melter, canister decontamination, and remote and contact decontamination cells must be remotely removable by the overhead maintenance crane. This includes the in-cell cranes, if any, and canister transporter in the melter and canister decontamination cells. Equipment pieces or major components from these cells will be removed to the remote decontamination cell or crane maintenance area for decontamination and then to shops for repair.

All in-cell vessels should be designed in accordance with the following criteria.

Load and Service Conditions

- o Internal or external pressure as defined by ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Part UG 21.
- o Weight of the vessel and normal contents under operating or test conditions.
- o Superimposed loads, such as counterweights, agitators, pumps, piping, other vessels, and heating and cooling coils.
- o Localized stresses resulting from attachment or mounting of trunnions, supports, agitators, pumps, skirts, rings, legs, etc.
- o Localized stresses through equipment lift trunnions which cause deformation to a vessel sufficient to affect the tolerances during normal handling after completion of fabrication at the fabricator or after handling at the Savannah River Plant.
- o Stresses generated during shipment from the fabricator's shop to the Savannah River Plant and into and out of the process building.

Surface Finishes

- o Plate material for vessel walls are to be supplied as hot-rolled and annealed (or heat treated), then blast cleaned (or pickled), which is the condition and finish commonly preferred for corrosion resisting applications. This is essentially a No. 1 Finish that is used for existing SRP remotely handled equipment. This finish has been found adequate for effective decontamination prior to any maintenance work.
- o All gouges, crevices, and pits greater than 0.012-in. deep must be backfilled with weld metal, then ground smooth.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

Flange Surface Finishes

- o Ungasketed surfaces, such as cell tank agitator or pump mounting flanges, should have a 125 RMS or AA equivalent finish.
- o Gasketed surfaces, such as vessel nozzles or evaporator, reboiler and main body flanges, should have a 63 RMS or AA equivalent finish.

Vessel Coils

- o All pipe coils inside a vessel shall be seamless schedule 40 pipe (preferred) or welded schedule 80.
- o Weld shall not be located in the vapor space, but preferably as close to the coil as possible. Experience has shown that welds located in the vessel vapor space are most subject to failure.
- o Coil dimensions be held to a tolerance of +/- 1/16 in. to make certain they provide no obstructions below tank nozzles.
- o Support frames are fabricated from rolled bars.
- o All exposed edges of the bars and bottom support plate are sealed by fusion welding these exposed edges with 1/16-in. thick weld metal (for end grain corrosion protection).

Heat Exchanger Tube Bundles

- o Only welded tube bundles are acceptable and must use a special, three-pass tube-to-tube sheet weld which has exhibited better life than other weld designs. See Figure 20-1, Appendix B.
- o All tubing shall be inspected by the method described in ASTM A655 Section 17 -- "RZ Ultrasonic Inspection" or Section 16 -- RY Radiographic examination. In addition, short end samples of tubing will be taken, polished, and examined. Evidence of interior carburization in excess of 0.005 in. will be cause for rejection.

Corrosion Allowance

No corrosion allowance is required for process cell equipment. Erosion allowances may be required pending results of ongoing research.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

Crevice and End Grain Corrosion

- o Crevices, corners, pockets, and gouges must be avoided to prevent entrapment of contaminated material and to minimize crevice corrosion. All bubble tray risers, if any, and nozzles should be seal-welded on both sides of the tray or vessel shell, and all heat exchanger tube-to-tube sheet joints exposed to process solutions should be seal-welded to eliminate crevices.
- o All internal and external attachment pads must be welded all the way around to avoid pockets. The use of weld backup strips should be avoided. If used, the strips should be completely seal-welded in all areas contacting process solutions or vapors.
- o The faces of all cut surfaces in contact with process or decontamination solutions must be buttered to avoid end-grain corrosion.

Stress Corrosion Cracking of 300 Series Stainless Steel Parts

During fabrication and installation, the total chloride level for any material in long term contact (3 months or more) with stainless steel must be limited to 250 ppm per SRP Specification 5992. Controls must be exercised to minimize exposure of stainless steel to chlorides and/or other contaminants which cause stress corrosion cracking, or to remove chloride bearing materials by thorough cleaning if contact is unavoidable. Chloride-bearing items which have caused stress corrosion cracking of 300 series stainless steel at SRP include cutting fluids, welding flux, neoprene gaskets, plastic and painted labels, caulking compounds, marking pencils, thermal insulation, and PVC tape. The guidelines for minimizing stress-corrosion cracking outlined in Specification 5992 must be followed.

Vessel Arrangements and Details

- o Insofar as practical, the top head arrangement should be standardized regarding the size of agitator openings, size of pump openings, and the nozzle circle in the interest of standardizing jumper, pump, and agitator designs to the minimum number of configurations.
- o The arrangement shall be such that the space below all nozzles and other openings are free of obstruction from coils, coil support, or other internal items which would interfere with insertion of pumps, agitators, dip tubes, etc.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

- o Provide for complete pumpout of vessels as nearly as possible. Avoid bottom outlets.
- o Make all remote connections and lifting lugs sufficiently visible through the crane viewing system to permit removal and installation of all piping and equipment.
- o Designs should be kept as simple as possible consistent with the intended purpose, to minimize the degree of skill required for operation and maintenance. On more complicated equipment consider subassemblies which can be removed remotely to facilitate decontamination, repair or replacement.
- o To the extent that it can be economically justified, in-cell vessels should be limited to a minimum number of standard sizes and be as large as practical to gain full advantage of utilizing standard accessories (jumpers, pumps, agitators, etc.).
- o All equipment normally operating at elevated temperatures should be insulated or cooled or both so that outside surface temperatures are 50°C or less.
- o All coils in vessels must be kept pressurized automatically by air, water, or condensate to keep coil pressure higher than vessel pressure whenever cooling or heating of the vessels is not required.
- o Each vessel except those connected to the melter off-gas system must have an overflow at the top of the tank and a nozzle for a connection to the vessel vent system. The overflow should be piped to discharge near the cell floor. **Vessels serving as evaporators or operating on total reflux should have their vent and overflow points downstream of the condenser and deentrainment and stripping columns (if any) or may have conservation vents on the vessels.**
- o Openings in vessels at entry points for agitator shafts, pumps, etc. should be kept sufficiently small so that the controlling pressure drop for limiting air flow into a vessel is through the overflow (see Part 5, Item 420).

Acme Studs and Nuts

Acme studs and nuts are used to bolt equipment to vessels and for bolting main body flanges on gasketed surfaces. Design and material requirements for the 2-in. studs to be used is shown on D118033. Studs are attached to equipment flanges with two No. 9 taper pins and a 1/4-in. fillet weld at the bottom as shown in D137949. The length of the stud shank is equal to the thickness of the equipment flange plus 1/4 in. When space will not permit use of taper pins, the alternate weld fastening shown on D138653 Section "V-V" is acceptable.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

The overall length of an Acme Stud is based on the requirement of the impact wrench that there be a length of 6-7/8 in. from the top of the stud to the bottom of its mating nut after impactation.

Acme studs shall be located to have their centerline a nominal 2 in. from the edge of a flange. This is necessary to permit the shank of the impact wrench to rest against the flange edge and to provide the necessary resistance for impacting. If rotation of the wrench must be limited to a predetermined orientation to prevent damage to nearby equipment, lugs shall be welded to the edge of the flange.

From a test of a stud/nut assembly, loads in the range of 40,000 to 50,000 lb were developed after 10 to 12 seconds of impacting. The time-load curve flattens after 12 seconds so that further impacting does not increase the load proportionately. Using the values obtained, the torque developed at the pitch line of the threads will be (assumed coef. of friction - 0.1):

$$T = \frac{1.806 \text{ in. P.D.}}{2} \times \tan (2.3^\circ \text{ thread angle} + 4.7^\circ \text{ friction angle})$$

$$\times 40,000 \text{ to } 53,000 \text{ lb} = 5,100 \text{ to } 6,750 \text{ lb in.}$$

This torque applied to the double pitch Acme threads on the studs will develop a pull of (assumed coef. of friction = 0.1):

$$P = \frac{5,100 \text{ to } 6,750 \text{ lb in. torque}}{\frac{1.8754 \text{ in. P.D.}}{2} \times \tan (4.8^\circ \text{ thread angle} + 2 \times 5.7^\circ \text{ friction angle})}$$

$$= 19,000 \text{ to } 25,000 \text{ lb}$$

Since these values are based on assumed friction coefficients, limits of 20,000 to 30,000 lb were used as the basis for design of the flanges and stud fastening.

When using studs on equipment which will not permit the shank of the impact wrench to clear in the vertical dimension, use a Dutchman as shown on Detail 2 and 7 of D-137901.

The bolt holes of mating flanges through which the Acme studs pass shall have nut retainer rings 3-11/16 in. inside diameter x 3-5/16 in. outside by 1-1/2 in high, all +/- 1/16 in. placed around them. The rings are welded to the back (top) side of the mating flange by a 1/8-in. fillet on the outside diameter.

The design and material requirements for a 1-in. Acme nut are shown on D-136208.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

Equipment Locating Dowel Pins

Two-in. diameter dowel pins are used for locating and orienting equipment attached to other equipment. Two dowels are normally required to locate an equipment item; these must be of different lengths to enable a crane operator to first engage the longer dowel and then to move slowly to engage the short dowel. Drawing D-118032 shows the details and material of construction for a 2-in-diameter dowel.

Trunnions and Trunnion Guides

Each major in-cell equipment space is provided with a pair of permanent trunnion guides to precisely locate the equipment. Design and material requirements for a trunnion guide are shown on D127519B and D127520B; W146665 shows a typical arrangement of a vessel equipped with its trunnions and supports.

Trunnion guides shall be installed to retain their orientation for earthquakes less than the DBE (see Part 4, Item 700). **The installation requirements should incorporate how the trunnion guide $\pm 1/32$ tolerance should be systematically maintained during construction via designs comparable to D-127719, W-146424, and W-706916. The trunnion guide layout should be referenced to the permanent building bench mark.**

Material of Construction and Corrosion Evaluation

The material of construction selected for piping and equipment must be compatible with process chemicals at the concentration given in the flowsheet.

All materials purchased for fabrication of process equipment and piping must be corrosion evaluated in accordance with Du Pont Standards SW 800M or Specification 4498 for 304L stainless steel. Additional testing specifications may be required after final selection of the materials of construction.

Most of the design drawing references cited in this part and elsewhere specify 304L which is the material used at SRP. These may need to change after flowsheet compositions and concentrations are confirmed.

Fabrication Tolerances

High Maintenance Equipment
(Pumps Agitators)

+/-1/16

Melter Frame, Wall and Vessel
Nozzles (X, Y and Z)

Spec. SG2S

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Cell Tanks, Vessels, and Specialized Auxiliary Equipment

Melter Frame, Wall and Vessel Nozzles (Tilt)	0.0025 ins per in
Trunnions, Trunnion Supports and Equipment Positioning Guides	<u>**+/-1/32**</u>
Vessel Support Feet (Levelness)	+/-1/16
Rack Piping (Permanent Sections)	+/-1/16
Jumpers (X, Y and Z)	+/-1/16
Cell Floor Sleepers (Levelness of those common to one vessel)	+/-0.005 ins

Fabrication Cleaning and Shipping Requirements

All canyon vessels shall be fabricated in accordance with the ASME Boiler and Pressure Vessel Code Section VIII, Division 1; but only those vessels which fall within the scope of Section D-1 shall require a code and national board stamp.

All welding is to be done in accordance with techniques recommended by Du Pont Standards for the selected material of construction.

All welds in contact with process solutions require 100% radiographic inspection with acceptance criteria per Paragraph UW-51, Section VIII of the ASME Boiler Code. Liquid penetrant inspection of the root and final weld pass is required for all containment welds which cannot be inspected by radiography. (For welds in vessels requiring a Code Stamp, Boiler Code procedures predominate.)

To assure that the dimensional tolerances are met, only those fabricators should be chosen:

- o Who can fully demonstrate the capability to manufacture the complete unit.
- o Who are code-qualified fabricators for the shell and coil and then ship the unfinished unit to a specialized fabricator with demonstrated ability to meet the tolerances.
- o Who are code-qualified fabricators for the shell and coil and then ship the unfinished unit to SRP for completion of the tolerance items.

Cleaning of vessels is required by the fabricator to remove all oils, grease, weld splatter, dirt and other soils.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: In-Cell Piping and Nozzles

Transfer of chemicals to the process cell, process solutions between cells, and transmission of power and instrument signal to, from, and between cells is accomplished through piping and conduit embedded in the concrete shielding or dividing walls of the cells. Transfers and transmissions to, from, and between vessels and equipment in the cells is made using pipe and electrical jumpers. Each jumper is an individual length of pipe with connector blocks and connector assemblies at each end. The block fits into a remotely operated connector assembly which mates the block with flanged nozzles on walls, vessels, or other jumpers. **Jumper length and complexity should be minimized consistent with equipment and building arrangement requirements.**

Pipe Jumpers

There are two basic sizes of blank connector blocks shown on D138570 used for liquid or gas jumpers at SRP. There are:

- A 5-1/2 in. (nominal) diameter x 4.50-in. high block
and
- A 5-1/2 in. (nominal) diameter x 5.50-in. high block.

These two blank sizes are drilled to provide the variety of multiport connector blocks shown on D138602 to D138609 and D138618. These blocks are designed specifically for use with gaskets retained by a snap ring which prevents the gasket from rotating during impaction. Gasket location is particularly important for multiport blocks.

Changes required to the above basic blocks to permit the use of an unretained "lampshade" gasket are shown on D138708. The specific change is a decrease of approximately 18 mils in raised face to compensate for the metal thickness of the gasket holder shown on D111716, Detail 1. These two blanks are drilled to provide the variety of blocks shown on D138617 and D138618.

Drawing D138584 is a special block design used to support resistance temperature devices (RDT) at the vessel nozzles. The appropriate thermowell (shown on D138562) is added to the special block.

Cell pipe jumpers are attached to their mating wall or vessel nozzles by using the appropriate connector assembly selected from W234777. The assembly selected depends only on the orientation and size of the block and is independent of the type of gasket (snap ring or lampshade) used. However, assemblies with lampshade gaskets are identified by painting the upper surface of the jaw guide with red paint.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: In-Cell Piping and Nozzles

A special connector assembly shown on W232452, "General Agreement for Tube Pulled Nozzle," is used when the services required by a piece of canyon equipment exceeds the number of embedded pipe nozzles readily available. A bundle of six tubes, 1/2-in. OD x .065-in. thick wall is pulled through a free 3-in. diameter embedded pipe.

Drawing W133996 is an arrangement of an in-line connector used for rack piping when the hold up resulting from rack expansion loops can not be tolerated.

These arrangements, now used at SRP, should also be used in the DWPF. All of the types described may not be required and some new types may need to be designed for special DWPF equipment. Deviations from designs in use should be kept to a minimum.

Electrical Jumpers

Instead of the connector blocks described under pipe jumpers, electrical jumpers terminate in an assembly called "upper holder" which mates with a "lower holder" instead of a flanged nozzle. Three types of lower and two types of upper electrical holders are in use at SRP.

Each lower holder has three strike plates (or kick plates) separated radially by 120° with which the clamping jaws of the upper connector are aligned and make initial contact when connecting. The alignment of the kick plates and clamping jaws has a secondary function: namely, when removing a jumper, the jaws lower onto the kick plates and push the rest of the body of the upper holder upwards and thus break any pressure seal that may have formed with the gasket. Each has six electrical studs on 60° spacing and 30° spacing off the center line of the kick plates. Each is equipped for a conduit entrance. Details are shown on drawings D138234, D138278, and D138235. Uses of lower holders are shown on W234207.

Each upper holder has three clamping jaws separated radially by 120°. A 2-in. conduit entrance is provided midway between two of the clamping jaws and diametrically opposite the third jaw. Each has three skirt sections between adjacent jaws which serve the double function of shedding moisture away from the contact points and acting as a guide when being installed on a lower connector. Details are shown on drawings D138261, D138279, and W234198.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: In-Cell Piping and Nozzles

For the DWPf many canyon vessels will require electrical power to two or more pumps on a vessel. To minimize the number of electrical connections at the wall, it is preferred that one wall connection service two pumps requiring a lower holder on the vessel, which in turn connects to a lower holder at each of two pumps. Where in the past the lower holders and conduit was bolted to the vessel, it is now preferable to make this a removable electrical "harness." Drawing W233718 shows an arrangement of three such harnesses serving six different users on a bicylindrical tank used at SRP.

Improved electrical and electronic transmission connectors will be required for the DWPf for thermocouple, CCTV, and other low-level signals. Development work on design of such connectors is in progress at SRP. Also the wiring and terminal blocks in embedded SRP electrical piping cannot be replaced. Wiring and terminal blocks in DWPf design must allow removal and replacement of wires and terminal blocks including all electrical contacts.

Wall and Vessel Nozzles

All nozzle gasket faces must be designed to be 3-5/8 in. +/- 1/8 in. from a kick plate on the nozzles to permit the connector jaws to break the seal between the connector gasket and the nozzle flange. On vessels the top head may serve as the kick plate. Kick plates should be at least 1/4-in. thick and be rigidly supported to minimize dislocation of the nozzle.

Drawing D138620 shows the designs of special butt-welded nozzles used on embedded piping to connect with jumper connector assemblies at SRP.

Drawing D138553 shows a blank flange which can be drilled to give the variety of configurations shown on D138597 through D138600. Multihole flanges on D138599A and D138599B are the only ones normally used. The others were used for special projects.

Drawing D138599A is used for embedded sample piping and D138599B is used for lubrication lines, pneumatic instrument lines and for embedded condensate piping.

Corrosion and Erosion Allowances

No corrosion allowance is required for cell piping. Erosion allowance of special linings may be required pending result of on-going research. It is anticipated that frit-containing slurries will be abrasive; therefore, frit-containing slurry transfers should be routed only through replaceable piping. **Where this is impossible (such as in some embedded piping) use replaceable liners to protect the piping.

PART TITLE: SPECIAL EQUIPMENT DESIGN BASIS/CRITERIA

ITEM TITLE: Evaporators, Batch and Continuous

All evaporators in the operating cells must be remotely replaced by the overhead maintenance crane. Major components such as condensers, tube bundles, columns, agitators, pumps, etc., should be separately removable for decontamination and repair or replacement. All evaporators in the cells must be insulated or cooled or both to limit external temperatures to a maximum of 50°C; however, the insulation must not interfere with the remote handling features described above.

Evaporators located outside the operating cells may be of more conventional design because remote removal and maintenance are not required; however, most other design features given in Part 20, Item 200 are generally applicable, particularly those in Part 6, Item 301 of the Canyon Design Guide. Since all evaporators, in or out of the cells, normally will contain various levels of radioactive material it is required that the ease of maintenance is a necessary design feature to reduce the radiation exposure of maintenance personnel.

All evaporators, continuous or batch, should be capable of being emptied as completely as possible.

Steam and cooling water should be provided in separate remoteable coils in the evaporator pots. Steam pressure to evaporators inside canyon cells where steam must enter through embeded pipe should be limited to a maximum of 195 psig. Steam to evaporators outside the cells are limited only by available supply pressure.

Agitators should be provided on evaporators expected to contain significant amounts of undissolved solids.

All coils must be kept pressurized automatically by air, water or condensate to keep coil pressure higher than vessel pressure whenever the unit is shut down.

The evaporators should be designed to operate at a negative pressure of about two inches of water relative to the operating cell.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

The glass melter located in the vitrification section of the DWPF is a liquid-fed melter designed to evaporate water from a process waste-frit slurry and melt the mixture at temperature of 1150°C so the molten glass can be poured into metal canisters.

Design bases and specific criteria are outlined below.

General Requirements

- Melter should be capable of remote removal and replacement.
- All melter components with an anticipated life of less than 2 years should be designed for remote replacement by either overhead crane, in-cell crane, master-slave, or electromechanical manipulator. Removal of a minimum amount of piping is acceptable to obtain access to melter components. Candidates for remote replacement are the thermocouple clusters, pour spout bellows, TV cameras, feed tubes, conductivity probe, bubbler, and other lid instrumentation.
- Melter size should be based upon a glass minimum melting rate of 8 lb/(hr)/(ft²) of melt surface. For a glass melting rate of 228 lb/hr.
- Provide auxiliary overhead lid heat to: (1) supplement melt joule heating, and (2) provide a method of melter startup. Amount of lid heat supplied must satisfy the 8 lb/(hr)/(ft²) melting rate criteria. Melter interior must be at least 650°C before joule heating is established.
- Provide two independent continuous feed ports located at opposite sides of the melter to simultaneously introduce the feed slurry close to the melt surface at low velocity. The intent is to introduce the feed in such a manner as to minimize penetration below the glass melt surface, thereby minimizing the possibility of a steam eruption. Feed lines at the melter should be cooled sufficiently to prevent boiling and plugging in the line. Cooling of the feed lines will be required during replacement to prevent cracking due to thermal shock.
- Melter feed is a slurry containing 40 wt. % total solids.
- Provide for venting the pour spout and drain valve to the off-gas system during pouring or draining. At the completion of pouring (and after 1/2 hr of cooling in place) or draining, the canisters may be vented to the melter cell atmosphere through a loose fitting cap.

COMPLETE REVISION

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

- A bottom drain valve should be provided. Valve should be able to cycle at least enough times to empty melter contents into standard canisters filled to 3260 lbs each. SRL is planning to test various drain valve designs. Weight and level instrumentation should be provided to verify canister contents.
- Pouring can be either by differential pressure or by tilting. Differential pressure is preferred if a means can be developed to avoid canister overfill in the event melter is overpressurized with respect to pour spout.
- Melter external body surface temperature should be 50°C maximum, to minimize cell updrafts when the cell covers are removed for melter repair. When working on melter, power will be off, and cooling water flow reduced.
- Provide catch pans beneath melter to contain spilled glass in the event of canister overfill or melter failure. Catch pans should be large enough to contain the amount of glass calculated to be displaced in the event of melter pressurization. This quantity will be determined by the off-gas dynamic study. The pans should have interconnecting overflow weirs and lifting lugs. Pans should be removable from beneath the melter for placement into burial boxes for eventual long-term disposal. A splash shield should be provided to protect the canister turntable mechanism.
- Components which contact the glass will be electrically hot. Jumpers for these components must be electrically isolated.
- Provide ground fault interrupters to minimize electrical hazard.
- For emergency power requirements, see Part 13, Item 560.
- Design basis frit is 131. See Table 21-6, Appendix H.

Specific RequirementsGlass Contact Materials

Glass containment refractory
Electrode material

Monofrax K3
Inconel 690

Upper Sidewalls and Lid

Vertical distance from
normal melt level to the
nearest upper sidewall
penetration:

12 in. min.

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PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

Monofrax K3 height above
melt line: 9 in. min.

Monofrax K3 corrosion^a
allowance on sidewall
above melt line: 3 mils/day

No horizontal joints within 5 in. of melt line.

Freeboard: For disengagement space calculations, assume 1% carryover
of feed component particles. Measurements of particle size and
distribution are being accumulated by SRL.

Sidewalls Below Melt Line

Monofrax K3 corrosion allowance
on sidewall:^a

a) 2-4" below melt line 7.5 mils/day
b) greater than 4" below melt line 5.4 mils/day

Backup refractory materials:
(less than 800°C) Zirmul, Alfrax
RAM Cement,
Monofrax-M

Overall heat transfer
coefficient based on inside
wall area U_{wall} less than
or equal to
1.5 BTU/(hr)
(ft²)(°F)

Melter Bottom

Monofrax K3 corrosion allowance
on bottom:^a 3 mils/day

Refractory hot side minimum
temperature 1050°C

^aSee note on Page 7.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

Melt Chamber

Feedpile coverage:	80-90% ^a
Glass temperature:	1050-1170°C
Residence time:	12 hrs. minimum

^a80% minimum coverage is to enhance melt rate and reduce radionuclide volatilization; 90% maximum is to avoid feed pile bridging.

Melt Chamber Electrodes

Material	Inconel 690
Thickness	2 yr life min.
Corrosion rate ^a :	
a) 0-2" below melt line	1.3 mils/day
b) 2"-6" below melt line	1.8 mils/day
c) 6" below melt line	1.6 mils/day
Current flux	5 amps/in ² max.
DC component	less than 50 ^b milliamps
Power skew ratio	0.7-1.3 times nominal
Internal bus bars	Inconel 690

For electrode penetrations below melt line, provide secondary containment seal to prevent glass leakage.

Throat

Throat angle	10° from horizontal min.
Throat cooling	Optional (Min. glass temp. = 1050°C)

^aSee note on Page 7.

^bIf silicon controlled rectifiers are placed on the transformer secondary, a DC elimination circuit will be required to keep the DC component to a minimum.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

Throat (Cont'd.)

Glass velocity	20 in./hr. max.*
a) Material	Monofrax K3
Upward wear ^a	12 mils/day
Horizontal wear ^a (total, both sides)	4 mils/day
or b) Material	Inconel 690
Corrosion rate ^a	1.8 mils/day

Riser

Material	Monofrax K3
Corrosion rate ^a	5 mils/day
Glass temperature	1050°C - 1170°C

Riser Electrodes

Material	Inconel 690
Thickness	2 yr life min.
Corrosion rate ^a	1.8 mils/day
Current flux	5 amps/in ² max.
Internal bus bars	Inconel 690

Pour Spout

Direct pour spout downward into canister nozzle	
Pour spout temperature	950°C min.

^aSee note on Page 7.

*For continuing design. CAB design has a glass velocity of about 100 in/hr in the throat.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

Melter Instrumentation

- o Provide for glass melt temperature measurement at three depths in two locations. Depths at each location should be different with respect to each other. Instrument range 100-1500°C. Power to the glass is controlled by the six melt temperature thermocouples.
- o Provide for vapor space temperature measurement at one depth in one location. The well will contain from 3-7 sensors.
- o Provide for refractory cold face measurement 6 in. below the melt line at two locations.
- o Provide remote viewing of the glass melt surface by means of TV. It is desired to have the capability of seeing all of the surface all of the time, therefore two cameras with wide angle lens are acceptable. The viewing area should at least include the two feed entry points, the feedpile between one feed point and the nearest sidewall, and a portion of the sidewall. The CCTV cameras proposed for the melter require cooling at all times, including installation and removal. Provision should be made in the design to meet this requirement.
- o Provide method of determining foam and/or feedpile depth and radial distribution.
- o Provide glass level measurement to reflect three operating levels:
 - Start of pour
 - Midway through pour
 - At completion of pouring
- o Melter pressure relief should be by seal pot. Design should minimize glass pouring when the melter equilibrates to seal pot pressure.

Seal pot pressure setting: One inch of H₂O. To reduce entrance, line and exit losses, pot should be close coupled to melter and ducts should be as large as practical. Assume off-gas line is unplugged with normal flow.

The seal pot is vented to the cell atmosphere in the CAB design. For continuing design, the seal pot should be vented to vessel vent system or off-gas system to avoid contamination of melter cell.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS AND CRITERIA

ITEM TITLE: Glass Melter

- o The melter pressure control system should be capable of handling periodic steam excursions of seven times the nominal melter off-gas flowrate lasting for a period of 8 minutes*. In addition, the relief system should be large enough to handle an excursion of 12 times the steam generation rate for a period of 2.5 secs. without pressurizing the melter to one in. H₂O above atmospheric. The relief system must also handle the normal air leakage flow as well as relief line and TV camera purges. Assume that control air is shut off when the melter vapor space is pressurized. A velocity of 0.2 ft/sec. is recommended by Bechtel for the melter relief line, and 2.5 ft/sec. for the camera port. The intent is to minimize the amount of glass pushed out of the melter in the event of abnormal vapor space pressurization.
- o Melter off-gas temperature is controlled to 375 $\pm$ 25°C at the melter exit port. Cooling of the gas stream to the specified temperature can be by water spray nozzle, steam, or by a dilution air nozzle. Water or steam spray should avoid refractory contact, by use of an Inconel liner through the refractory.
- o Provide water sprays to cool the melt surface during idling to reduce radionuclide volatility.
- o Provide instrumentation to measure CO and H₂ concentration downstream of quencher for combustibility determination.

*Seven times (7X) off-gas flow excluding air inleakage and purges. Duration at 35% or more of peak height (2.5X) is one minute. Total duration is 8 minutes.

- a Corrosion data based upon tests in the Small Cylindrical Melter, Frit 131, continuous powder feed at 4.7 lb/hr/ft² of melt surface, electrodes uncooled, and melt depth of 10 inches.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

General criteria for the off-gas treatment is described in Part 5, Item 260 and DPSTD-80-38-2, Part 10, Item 250.

Design considerations for the off-gas treatment system are:

- Off-gas blowers should have motor-driven butterfly valves in the suction and impact wrench operation in the discharge piping. The suction valves should also have mechanical closure capability using the crane impact wrench.
- Valves to control air bleed to the off-gas system should be located in the operating area of the building because of the anticipated frequency of maintenance. Considerations should be given to locating the valves in the mercury purification cell or the exhaust entry/exit hood of the cell. A jumper mounted filter in the melt cell and a block valve in the operating area may be required to isolate the control valve.
- As a basis for continuing design, the line between the pour spout and ejector should be heated to 800°C up to the point of control air addition to prevent condensation in the line. The control air addition should be located as close as practical to the melter. The entire line should be remotely replaceable.
- Provide for caustic, nitric acid, and water flush addition to the Off-Gas Condensate Tank and Filter Pump Tank.
- Melter off-gas, after treatment, should be sampled for ^{137}Cs , ^{90}Sr , ^{106}Ru , ^{129}I , and mercury at a sample point downstream of the exhausters. Grab samples will be taken periodically.
- The recommended material of construction from melter exit to scrubber inlet should be "Inconel" 600 series, "Hastelloy" or similar alloy selected to resist corrosion from off-gas products.
- The two off-gas exhausters should be remotely replaceable.
- Water cooling systems require an independent pressurization source for individual coils or heat exchangers to minimize the potential for process backup into the service facilities.
- The ruthenium absorber and preheater and the I_2 absorber and preheater should be sized to last 6 years before replacement is required.

****COMPLETE REVISION****

INFORMATION ONLY

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

- Intermittent gas samples are required downstream of the ruthenium and iodine absorber beds to detect breakthrough of either bed.
- A particulate sampler should be provided before the ruthenium absorber to measure efficiency of the scrubbing system. The sample will be taken periodically.

Equipment SpecificationsQuencher

The function of the Quencher is to cool the melter off-gas below the dewpoint to achieve condensation, solids formation, and coalescing. Design for a vapor inlet temperature of 290 to 400°C, and contacting of the vapor stream with a cooled circulating quench stream. Condensables and noncondensables discharge into the Off-Gas Condensate Tank. The section of line through ventilation barrier connecting the Quencher to the Off-Gas Condensate Tank need not be remoteable, since the Quencher is expected to remove residual solids from the gas stream.

Off-Gas Condensate Tank

The Off-Gas Condensate Tank provides a collection reservoir for the condensables and the source of scrub solution for the Primary Deep Bed Filter and Quencher. Agitation should be provided that will suspend all solids. Off-Gas Condensate Tank solution is purged to the Recycle Collection Tank.

The tank requires instrumentation to monitor temperature, specific gravity, and liquid level. A sampler is also required. (See Part 6, Item 100).

Pump-Quencher

Part of the contents of the Off-Gas Condensate Tank is circulated to the quencher. The pump is on emergency power. Monitor discharge pressure and flow.

Pump-Primary Deep Bed Filter

This pump circulates a portion of the contents of the Off-Gas Condensate Tank through the spray nozzles to each stage in the Primary Deep Bed Filter housing.

Cooling Coils

The function of the cooling coils is to cool liquid circulating through the Off-Gas Condensate Tank. Cooling water flow to be automatically controlled to maintain the quench stream entering the Quencher at the desired temperature.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

Primary Deep Bed Filter^a

The function of the two stage Primary Deep Bed Filter is to scrub the majority of particulates from the vapor stream; the filter discharges into a two stage Secondary Deep Bed Filter. An acid-stable surfactant at a concentration of 10^{-3} wt% is used with the scrub stream to prevent plugging of the filters.

Filter Pump Tank^a

The Filter Pump Tank provides a source of scrub solution for the two stage Secondary Deep Bed Filter. Scrub solution is pumped from the Filter Pump Tank to the Off-Gas Condensate Tank on an overflow basis. Pumping is controlled by a level sensor that activates the pump on higher level and turns it off when the level is reduced to a practical minimum. The temperature of the vapor exiting the second stage of the Secondary Deep Bed Filter and the temperature of the scrub should be monitored. Liquid level measurement is also required.

Secondary Deep Bed Filter^a

The two stage Secondary Deep Bed Filter provides final scrubbing of the melter off-gas and discharges into the vapor space of the Filter Pump Tank.

Pump - Filter Pump Tank

This pump circulates a portion of the Filter Pump Tank contents through the two stage Secondary Deep Bed Filter spray nozzles.

Off-Gas Condenser

The Off-Gas Condenser cools the vapor stream from the Filter Pump Tank to a temperature of 28°C.

Quencher

A quencher is provided on the Filter Pump Tank to be used only when the Off-Gas Condensate Tank system is shutdown for repair. The bypass piping also permits bypassing the Filter Pump Tank through the adsorber beds and HEPA filters located on the exhausters inlet. When the bypass off-gas system is used, the melter is put into the idling mode. As a basis for continuing design, water is sprayed into the melter to reduce volatilization of particulates.

^aAlternate scrubber arrangements are acceptable if they meet the DF requirements of Part 5, Item 260.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

Ruthenium Adsorber Preheater

The Ruthenium Adsorber Preheater raises the temperature of the vapor stream to 80°C by controlling electrical power to the heater.

Ruthenium Adsorber

The function of the Ruthenium Adsorber is to adsorb volatile ruthenium from the vapor stream. The recommended design parameters are:

- Adsorbent: Davidson Chemicals grade 40 -- silica gel, 6 to 12 mesh
- Adsorbent capacity: 136 g ruthenium/ft³
- Bed depth: 52 in.
- Superficial face velocity: 0.4 ft/sec (maximum)
- Pressure drop: 0.6 in. H₂O/in. of bed at design face velocity
- Efficiency: 99% for volatile ruthenium; 50% for particulates

The pressure drop across the bed should be monitored and the concentration of ¹⁰⁶Ru should be intermittently monitored in the effluent to detect bed breakthrough. The temperature of the adsorbent should also be monitored throughout the bed. It may be necessary to concentrate a portion of the gas stream on a small adsorption bed located in the operating area and to monitor the radiation from this bed.

Iodine Adsorber Preheater

The Iodine Adsorber Preheater raises the temperature of the vapor stream to 150°C. Vapor temperature is controlled by adjusting electrical power to the heater.

Iodine Adsorber

The function of the Iodine Adsorber is to adsorb I₂ from the off-gas stream. The recommended design parameters are:

- Temperature: 150°C
- Superficial velocity: 0.82 ft/sec
- Adsorbent: Ag⁰Z (silver-exchanged mordenite)

COMPLETE REVISION

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

- Capacity: 100 mg I_2 /g of adsorbent
- Bulk density: 49.2 lb/ft³
- Collection efficiency: 99% for I_2
- Pressure drop: 0.5 in. H₂O/in. bed
- Gas residence time: greater than 2 seconds
- Insulation: Insulate adsorber to reduce thermal updrafts in cell.
- Active life: 6 years

It may be necessary to concentrate a portion of the gas stream on a small adsorption bed located in the operating area and to analyze this bed off-line.

Off-Gas Cooler

The Off-Gas Cooler reduces the temperature of the vapor leaving the Iodine Adsorber to a level selected to prevent exhausters from overheating.

HEPA Filters

Two HEPA filters are connected in parallel to the exhauster inlet. One filter is on-line continuously; the second filter is used when off-gas equipment replacement is required.

Off-Gas Exhausters

The Off-Gas Exhausters keep the melter under vacuum and pull the gases generated in the system through the Off-Gas Condensate Tank, Filter Pump Tank and the process adsorbers.

The exhauster should be spared and on emergency power, so the spare comes online automatically if the other exhauster fails. Failure of either exhauster should automatically shut off feed to the melter.

Instrumentation to monitor vapor temperature and pressure at both the inlet and outlet of the exhauster are required.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Off-Gas Treatment Equipment

Bypass System

As discussed in Part 5, Item 260, a bypass system is required to continue exhausting melter gases while the melter is in the idling mode. The bypass system described below is one concept designed to meet this objective. See Appendix B, Figure 20-2 for details.

- o Repair or replace equipment associated with the Off-Gas Condensate Tank (OGCT) or Primary Washed Deep Bed Filter (PWDBF):

Provide an alternative off-gas exit line with a quencher connecting between the melter-seal pot line and the Filter Pump Tank (FPT). Use of the by-pass line is controlled by a valve (A) on the quencher inlet line. The alternate quencher on the FPT serves the same function as the quencher on the OGCT.

- o Repair or replace equipment associated with the FPT or Secondary Washed Deep Bed Filter (SWDBF):

Provide a line connecting between the PWDBF-FPT and the inlet to the Ruthenium Adsorber Preheater. A three way valve (B, C) is required on each end of the by-pass line.

- o Repair or replace equipment associated with the Ruthenium Adsorber Preheater (RAP), Ruthenium Adsorber (RA), Iodine Adsorber Preheater (IAP) or Iodine Adsorber (IA):

Provide a line between the FPT Condenser-Ruthenium Adsorber Preheater and the inlet to the HEPA filters. The line should contain a heater performing a similar function as the RAP and IAP. Three way valves are required in positions C and D.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Mercury Purification Equipment

General

About 1.8 lb/hr of mercury will be recovered in the DWPF process. Mercury reduced to the metal in the Slurry Receipt and Adjustment Tank and in the Slurry Mix Evaporator is transferred to the Mercury Water Wash Tank in the Process Cell for washing. After water washing, mercury is sent from the Process Cell to the Mercury Purification Cell for further batch washing with acid and countercurrent washing with acid and water in packed columns. Final purification is accomplished in a ventilated hood facility by vacuum distillation and mercury is packaged into storage bottles. Packaged mercury is stored in a ventilated storage area until transfer to the mercury storage building in 200-H Area.

Design Criteria

Equipment must be designed to process on a batch basis the mercury recovered from the waste sludge slurry.

A decontamination factor from radioactivity of at least 10^6 must be provided by the purification facilities.

Each batch of mercury must be sampled and analyzed after the acid scrub and after distillation to verify effectiveness of purification operations.

Tanks in which mercury is to be handled must provide for collection, measurement and transfer of both mercury and aqueous solutions. Where batch washing of mercury is specified, an effective means of mixing mercury and aqueous solutions must be provided.

For the countercurrent washing steps specified, scrub columns must provide for effective dispersion of mercury and adequate contact time for washing. Spray, plate, packing or other type dispersion media should be considered.

A vacuum still is required to meet operating conditions below.

Temperature	- 195°C
Pressure	- 5×10^{-2} mm Hg
Distillate Temperature	- 38°C

Performance of the still should provide 100 lbs mercury distillate per lb of mercury bottoms, and a decontamination factor from radioactive fission products of 1×10^3 or greater.

COMPLETE REVISION

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Mercury Purification Equipment

Ventilation of the still, storage bottle filling station and storage area must be adequate to protect operating personnel from mercury vapor.

An interim storage area accommodating 100 storage bottles of recovered mercury should be provided.

****COMPLETE REVISION****

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Decontamination Station

Two identical decontamination stations are required. Either can be used for low pressure (overall) canister blasting or for high pressure (spot) blasting, thus permitting greater operating flexibility and permitting interchangeability of equipment.

Processing of canisters is described in Part 5, Item 275, and Figures 5-3, 5-6, and 5-9, Appendix B.

Following are criteria for the decontamination equipment:

General

- o **The design must be capable of decontaminating all surfaces of the canisters (including exposed inner surface of the nozzle and exposed portion of inner plug).**
- o Residual slurry or water are not to remain in the canister nozzle above the interim closure.
- o The system must contain contaminated slurry, water, vapors, and frit to prevent spread of contamination throughout the cell and especially to the smear station.
- o **The equipment must accommodate any glass that might be removed from canister surfaces. A method must be provided for removal and disposition of the glass.**
- o Slurries will contain frit, water and formic acid as set forth in Part 5, Item 275.
- o The equipment must be designed for remote operation and maintenance or replacement.
- o The equipment must also accommodate canister in overpacks. Overpack sizes are given in Part 20, Item 60.

Decontamination Chambers - shall

- o be sealed from cell atmosphere and shall not, when open, permit liquid, mist, or frit to drip or be expelled to cell
- o have means to flush contamination from all interior surfaces and to purge mist, water, slurry, and frit with chamber closed. **Air purge shall be at least 50 cfm and exhausted through the formic acid vent system.**

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Decontamination Station

- o have no bottom openings
- o have erosion resistant surfaces (inside)

Spray nozzles - shall be

- o **positioned about 2 to 18 inches from surface to be cleaned**
- o directed at surface with an angle between 30 and 90°
- o **individually removable by remote means in the CDC if possible, if not then by means of contact maintenance in the equipment decontamination cells**
- o made of boron carbide or material with equal or better wear resistance
- o flushable

Water and slurry source, pumps, tanks, and auxiliaries - shall provide

- o frit slurry supply tank and spent frit hold tank sufficient for handling frit and water for six canisters, minimum.
- o a source of variable high pressure water
- o venting through vessel vent system
- o a means to prevent backflow should the pressure of one component entering any common nozzle exceed that of the other component
- o variable pressure for each mode of operation
- o a source of variable low pressure air

Instrumentation and controls - provide

- o temperature check to assure canister surface is below 100°C before decontamination begins
- o canister position indexing and feedback ability to permit cleaning selected areas or bands
- o liquid level indicator and alarms for each vessel
- o cycle control with variable timing
- o interlock for pumps with vessel cover closure
- o pressure and flow rate instrumentation for water and for slurry

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Decontamination Station

Canister pickup and handling - provide

- o confirmation of canister grappler engagement
- o **canister movement inside the vessel decon chamber independent of in-cell crane. Crane to be used only for insertion and removal of canister.
- o means of removing canister in case canister grapple or handling mechanisms fail.

Working elements inside chambers (nozzle clusters, headers, etc.) - shall

- o be removable
- o have variable canister surface traversing speeds from 1/4 to 4 inches/sec
- o have sealed lifetime lubricated bearings
- o have minimum moving parts exposed to decontamination chamber atmosphere

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Smear Test (Decontamination Cell)

Requirements for smear testing after decontamination are set forth in Part 5, Item 276. The sequence of operations is shown in Figure 5-3, Appendix B.

Requirements for the equipment are as follows.

General

- **A system is required to introduce clean smear papers to the smear test station and to return them to a shielded counting area (hood) outside the cell.** Equipment is also required for counting smear paper activity. This system could share common parts with that for the final smear station in the weld test cell (see Part 20, Item 275).
- A method is required to smear those parts of the smear station that come into contact with, or are in close proximity to, the canisters to ensure that they have not become excessively contaminated. Methods are required to decontaminate or replace those parts.
- Materials of construction should, wherever practical, be compatible with decontamination solutions (see Part 14, Item 200).
- Facilities are to provide capability for visually examining the entire canister or overpack surface for residual oxide (not removed in decontamination), glass on the outer surface, and reading the identifying numbers.
- **A method is required for periodic cleaning of smear test area.**

Canister and Overpack Positioning

- The equipment must be capable of positioning the canister or overpack and/or implements to permit smearing of any place on the exposed surfaces of the canister, including the canister bottom, inside the nozzle, the lower surfaces of flanges, or patterns on the cylindrical surfaces.
- A system of indexing is required so that retesting of recleaned areas is possible.
- The positioning features are to be independent of in-cell handling equipment once the canister has been moved into position.

Maintenance

The smear test station shall be designed for hands-on maintenance or replacement.

PART TITLE: SPECIAL EQUIPMENT-DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Welding Equipment (Outer Closure)

The welding process is described in Part 5, Item 280, and shown in Figure 5-7, Appendix B.

Requirements for the DWPW welder are as follows:

- General

1. **Produce a weldment of 5 to 6 in. diameter.
2. Provide electrode force up to 150,000 lb acting through a distance of 1/2 inch minimum within a 2 second period and able to sustain force as long as weld current is on.
3. Provide ability to sustain an AC or DC current up to 300,000 amp, at about 11 volts, for up to 3.3 seconds.**
4. Electrode downstroke power is to be dry high pressure gas which may be lubricated if necessary. Hydraulic oils are not acceptable.
5. Equipment must be capable of performing a weld at least every 30 minutes without overheating of transformers.
6. Remote maintenance and/or replacement is not required. However, a method is required for remote removal of a canister from the welder, to shielded storage, should the equipment malfunction. **Welder must be designed so that replacement parts are sized for entry through an air lock from operating area.**
7. Materials of construction shall be compatible with decontamination solutions (refer to Part 14, Item 200), where practical, or the parts must be easily replaceable.

- Instrumentation

1. Provide measurement and digital displays for the following weld parameters:
 - a. In-line weld force (for example, using a load cell such as Strainert model FL1500U-3SP)
 - b. Distance of electrode travel during weld (for example, by eddy current device such as Kaman Sciences Corp -- Multi-Vit)
 - c. Pressure in cylinder supplying force to electrode (for example, by strain gage transducer)

PART TITLE: SPECIAL EQUIPMENT-DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Welding Equipment (Outer Closure)

- d. **Weld current (measurement at weld preferred but may be measured on busses).**
 - e. Pre-weld resistance measurement of welder secondary circuits (go-no-go measurement)
 - f. Current and voltage for transformer primary parameters
 - g. Time of weld duration
- 2. Provide dynamic recording with trace identification for all the above parameters during the weld.
 - 3. Provide a printout of the static values of the above parameters with each identified on the printout.
- Control
- 1. Provide an automatic sequence control system (for example, using the Pertron PWC 300) for press, weld, hold, and off-timing.
- The sequence is shown in Figure 5-3, Appendix B.
- The sequence controller is to be operable in either a "weld" or "no-weld" mode. In the "no-weld" mode, the operation is to be automatically sequenced but the weld is not to be made.
- Panel lights are to be provided to indicate "weld" or "no-weld" mode as well as the sequence step in progress.
- 2. Weld period is to be adjustable from 0 to 3.3 sec (or 200 cycles of 60 Hz).
 - 3. ** Provide an override weld timer.**
 - 4. An adjustable amperage control is to be provided having a range of 40% to 100% of full cycle conduction.
 - 5. Provide a controller to interrupt current if preset electrode force is not sustained through full weld time cycle.
 - 6. **Electrode force is to be adjustable between 30,000 and 150,000 lbs.**

PART TITLE: SPECIAL EQUIPMENT-DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Welding Equipment (Outer Closure)

- Safety

Safety considerations are:

1. Transmission of high power to the welder
2. Use of high pressure gas
3. Application of high force to a loosely held work piece with potential for ejecting a projectile.
4. Application of insufficient force during the weld cycle with potential for splatter of molten metal.

PART TITLE: SPECIAL EQUIPMENT-DESIGN BASIS/CRITERIA

ITEM TITLE: Overpack Welding Equipment

Requirements for welding overpacks are set forth in Part 5, Item 293.

Requirements for the equipment are as follows:

- o A gas tungsten arc (GTA) with helium/argon purge gas mixture is preferred.
- o Multiple weld passes should make one continuous weld (no interruption between passes).
- o The work piece should be rotated past a fixed torch to facilitate viewing of the welding.
- o The weld should be made on a horizontal surface (i.e. down hand position).
- o The equipment should be fully automatic, computer guided and controlled, including automatic weld and torch movement from pass to pass. Adjustments must be remote.
- o The canister fixture should locate the torch squarely and accurately in relocation to the weld groove.
- o The equipment must be capable of rewelding unacceptable welds.
- o Maintenance of the welding equipment will be hands-on, after the canister is removed remotely.

NEW ITEM

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Final Smear-Test and Inspection Equipment

The requirements for examining canisters or canisters in overpacks prior to Interim Storage are described in Part 5, Item 290 and shown in Figure 5-3, F-8, and 5-9, Appendix B.

Requirements for instruments and equipment to carry out these tests are given below.

General

- **A system shall be provided to introduce clean smear papers to the weld test cell smear-test location and to return them to a counting area (hood) outside the cell.** Equipment is also required for counting smear paper activity.
- Components and materials of construction should, wherever practical, be compatible with decontamination solutions. (See Part 14, Item 200.)

Canister Positioning/Control

- The equipment must be capable of positioning the canister and/or instruments for the following operations and tests:
 - o A minimum of two gross gamma radiation level measurements are required. The measurements should be made at a distance greater or equal to 22.75 ft from the canister centerline (so that the canister acts as a point source) and from directions 180° apart. The measurement must be made in an environment where the background correction is less than 5%.
 - o Temperature measurements on canister surface at 3 elevations (22, 45 and 68 inches from the bottom) in any one circumferential position.
 - o Smearing of any place on the canister surface, including canister bottom, weld area, lower surfaces of flanges, any area observed to have residual oxide or selected bands on cylindrical surfaces.
 - o Visual examination-all surfaces of canister (including full weld circumference, canister bottom, etc.)
 - o Measure surface defects-depth and size of any damaged area.
- The system shall be programmable for each repetitive mode of operation (eg-smearing bands).
- Operator control shall be provided for non-repetitive operations (eg-smearing area with oxide).

PART TITLE: SPECIAL EQUIPMENT DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Final Smear-Test and Inspection Equipment

- The equipment must be capable of being indexed to a desired location along the length of the canisters for retesting.
- The smear test and inspection equipment is to operate independent of the in-cell handling equipment once the canister has been moved into position.

Instruments

- An air ionization chamber with an operating range from 10^{-2} to 10^3 R/hr would be suitable for gamma radiation measurement. Radiation levels expected are given in Part 11, Item 430.
- Surface temperatures to be measured are expected to range from 30° to 150°C . Spring loaded type K thermocouples would be suitable.
- Limits for contamination are given in Part 8, Item 350.
- Facilities are to provide capability for visually inspecting the entire canister surfaces to determine the integrity and to read identifying numbers. In addition, canister surfaces are to be visually examined for residual oxide (not removed at decontamination). Weld symmetry (full circumference), height of plug above flange, and presence of spots on bottom of grounding flange are to be examined.
- Defect measurement capability is to be provided to measure the width, length, and depth of surface defects as small as $1/8$ in by $1/8$ in by $1/8$ in deep.

Data Collection

- **Facilities are required to videotape the visual examinations.**
- Provide local readout at operator station. Data entry to central computer will be both direct and from operator terminal. See Part 6, Item 200 for record data input requirements to the computer.

Maintenance

- The smear-test and inspection station equipment need not be designed for remote maintenance or replacement.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Transfer to Interim Storage

Equipment is required to transport filled canisters from the 221-S Building load-out cell to the 250-S Interim Storage Building. The method selected by the Design Division is a shielded transfer handling car. This section provides requirements for such a method, however alternative transport methods would be acceptable.

The sequence of operations to be performed by the shielded canister transporter (SCT) in the present concept is as follows:

- SCT enters 221-S and positions over the load-out station
- Cell shield plug is removed
- Canister is transferred from the cell into the SCT shield chamber
- SCT chamber shield is closed
- Cell plug is replaced
- SCT travels to Interim Storage Building and positions at designated storage position
- Vault deck shield-plug is removed
- SCT Chamber shield is opened
- Canister is transferred to storage position
- Vault deck shield plug is replaced (Note: Sequence of removing shield plugs and positioning of SCT may change depending on design concept for Interim Storage Building and SCT)

Requirements for the SCT are:

General

- Shield cask shall be continuously capable of providing shielding on sides, top and bottom at all times (e.g., should the car be overturned or involved in an accident with a canister inside). The system shall also provide shielding at all times over open holes at loadout or storage.
- Shielding on the SCT vehicle shall reduce the exposure rate in the operator's cab to 0.5 mrem/hr and the exposure at all other locations on and around the SCT to 5 mrem/hr when shield plugs are removed or canisters are being handled or transported. The SCT vehicle will always move under traffic and HP escort.
- Requirements for earthquake and tornado resistance are contained in Part 4, Item 700.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Transfer To Interim Storage

- SCT shall be an all-weather vehicle with head, warning, obstruction, and equipment illumination lights. Roads are to be shared with other traffic. Maximum speed of SCT is to be 5 mph.
- Design shall facilitate decontamination of the equipment, specifically, plug and canister chamber interiors should be lined with stainless steel.

Specific

- Lift grappler engagement and lock with the canister is to be confirmed before the canister is moved.
- A means shall be provided to confirm canister location when being raised, lowered or held in the chamber.
- Provision shall be made to prevent dropping of the canister in the event of power loss, and for auxiliary drives for raising or lowering of canister and operation of shield gates.
- Provide interlock or positive protection to prevent damage to canisters due to abnormal circumstances or equipment malfunction when canisters are being handled or when shield gates are being closed.
- If the vehicle is diesel driven it is to be refueled by an existing mobile tank truck.
- Instruments for monitoring radiation and airborne contamination to be provided for use during SCT operations are listed in Part 12, Items 110 and 120.
- Minimum dimensions of the shielded cask chamber shall be sufficient to accommodate an overpacked canister. See Part 20, Item 60 for overpack size.
- The SCT shall be capable of removal of canisters from the vault for transfer to other storage positions.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Canister Transfer to Interim Storage

- **Maintenance and decontamination shall be performed in the 221-S Building. See Part 11, Item 110 for further information.**
- Operational cycles for the SCT vehicle and design capacity is to be based on movement of 24 hour output from the Building 221-S to Building 250-S each eight hour shift. The transfer operations will be carried out on a multi-shift basis during early start-up and training, but normal operation assumes that this might become a 40 hour a week daytime operation.
- Operator of the SCT shall have 2 way radio communication with the CCR in 221-S Building.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Vessel Vent System

Exhaust Fans

- o A fan unit will consist of the motor, fan, couplings, and base **which are assembled as a single unit for remote handling.** An installed spare unit is required.
- o The exhausters and motors are to be designed for long life, with the capability for remote addition of lubricating oil where required. Upon failure, the motor-fan unit will probably be discarded because the contamination level is expected to make it impossible to satisfactorily decontaminate the unit to permit repairs.
- o An inertia base is required in addition to the mounting base; it may hold both **fan units.**

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Vessel Vent System

This equipment consists of an in-line air heater, a high efficiency filter, and redundant fans installed in the process cell. The installation is to be very similar to that provided for SRP under Project S9-2149, but sized for the DWPF ventilation requirements. Filter design is to be very similar to that shown on Du Pont engineering drawing D-116600. All equipment must be made of **304L corrosion released** stainless steel where possible as it will be subjected to nitric acid fumes.

The major equipment must be remotely installed as units and joined together with gas line jumpers. The jumpers are to contain motor-driven butterfly valves to provide isolation for automatic switching to a spare exhauster. The butterfly valves are to have mechanical drive capability also using the crane impact wrench. Electrical and instrument jumpers are to provide service for this equipment as needed. Design criteria for the system are:

In-line Air Heater

- o **Process vessel vent conditions
 - Inlet air to all vessels assumed to be at ambient conditions within the process cell.
 - Outlet air from all vessels assumed to be saturated air at vessel operating temperature.**
- o This heater is to **increase** vent header air **temperature 10°C.**
- o The heater is to be incorporated in the filter inlet jumper.
- o See Part 5, Item 405 for steam and condensate requirements.

Filter

- o The existing SRP filter design provides for 25 fpm air flow to attain the desired efficiency (greater than 99.9%)** for particulates. Volatiles are not removed.**
- o The high efficiency packing layer must be sealed around the edges to ensure **efficiency.
- o The filter will not be DOP tested after installation.
- o A single filter is required.**

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA ITEM

ITEM TITLE: Process Cell Pumps

Vertical, submerged centrifugal pumps without shaft seals and which can be installed in and removed from process vessels by the remotely operated process cell crane (Part 20, Item 180) are required. Pumps may be fitted with water jet primers.

Design features are as follows:

- No submerged bearings.
- Sealed bearings (no provision for lubrication required).
- Standardized mountings, bearings, shafts, etc., wherever possible to allow interchange of motors and pumps.
- Corrosion resistant materials of construction.
- Automatic DC or regenerative braking of motors if the pump operates above critical speed.
- Hardened or special alloys for impellers and casings where necessary to minimize erosion.
- Continuous service at maximum ambient operating temperature of 40°C, the temperature of vessel contents may reach 100-110°C for periods of time, but pumps will not be required to pump fluids above 50°C.
- Maximum pump heels should be equivalent to 1/2 inch of liquid at the nominal tank diameter.
- Some pumped streams will require flow rate control; a means for varying the speed of the pump motors must be available for the pumps in those services.
- Air flow at the point of pump shaft entry to the vessel must be into the vessel; however, the flow must be sufficiently restricted so that most of the air entering a vessel is through the vessel overflow pipe.
- Lead or steel shielding where practical to minimize exposure of insulation or other organic materials to radiation.

Pumps and mountings will handle highly radioactive solutions and slurries and must be designed for free drainage and without crevices and inaccessible areas to facilitate decontamination and minimize exposure to maintenance personnel.

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA ITEM

ITEM TITLE: Process Cell Pumps

Motors should be totally enclosed, fan cooled (with metal fans) type NEMA design B temperature rise with class H insulation. Motors may be subjected to sprays from process leaks and from high-pressure lances during decontamination prior to maintenance.

The number of different size pumps should be minimized to reduce spare part requirements and facilitate interchangeability. See Canyon Design Guide, DPE 3573, Part 7 for background and pump development information.

Rheology of solutions and slurries to be pumped is contained in Table 21-3, Appendix H.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Inter Area Transfer Pumps

The design features set forth in Part 20, Item 330 for process cell pumps apply to these pump tank pumps. However, the allowable heel in pump pit tanks is six inches. The basic design data for transferring sludge slurry through the inter-area piping and pump tanks are presented in **Table 21-3, Appendix H.** The sludge slurry is a Bingham plastic which is transferred at laminar flow conditions. The suggested rate is 3 fps (70 gpm) through 3-in. pipe. Pump requirements are further established by flow loss and head changes in the inter area transfer system.

**Where possible, pump assemblies are to be identical to make for interchangeability of pumps with minimum replacement of connecting jumpers. However, ** the pumps in recycle waste transfer service may differ from those in slurry transfer service if different capacities or discharge heads are required.

INFORMATION ONLY

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Special Process Cell Pumps

Special pumps for sampling process slurries and solutions and for transferring mercury are required. The sample pumps should be small, all one size, fit through a typical 3-inch vessel nozzle, if possible, and capable of transferring slurries or solutions from a vessel to a sampling station without changing the composition of the material.

Mercury, collected from the process, must be pumped to a recovery facility. This may require a positive displacement pump with means for draining the discharge piping prior to removal of the pump or piping for maintenance.

Design requirements are as follows:

- Sealed bearings (no provision for lubrication **allowed**). No submerged bearings.
- Corrosion resistant materials of construction.
- Hardened or special alloys, where necessary, for parts subject to erosion.
- Lead or steel shielding where practical to minimize exposure of insulation or other organic materials to radiation.
- Continuous service at maximum ambient operating temperature of 40°C. The temperature of vessel content may reach 100-110°C for periods of time, but pumps will not be required to pump fluids above 50°C.

Rheology of solutions and slurries to be pumped is contained in **Table 21-3, Appendix H.**

Sample pumps may be sealed and submerged provided they meet performance requirements and are sufficiently radiation resistant to handle process solutions and slurries.

PART TITLE: SPECIAL EQUIPMENT -- DESIGN BASIS/CRITERIA

ITEM TITLE: Process Cell Agitators

Agitators of sufficient horsepower to satisfactorily mix DWPF slurries are required. Ideally one size will fit all process vessels. The agitator assembly must be capable of being installed in and removed from the cell by the remotely operated process cell crane (Part 20, Item 180).

Design features are as follows:

- No submerged bearings
- Sealed bearings (no provision for lubrication required)
- Standardized mountings, bearings, shafts, gear boxes, etc., wherever possible to allow interchange of motors and parts.
- Remotely separable drive arrangement containing the drive motor, bearings and reduction gears, if possible.
- Corrosion resistant materials of construction.
- Automatic DC or regenerative braking of motors if the agitator operates above critical speed.
- Hardened or special alloys for agitator blades and shafts where necessary to minimize erosion.
- Continuous service at maximum ambient temperature of 40°C and solution and slurry temperatures **up to 110°C.**
- Air flow at the point of shaft entry to the vessel must be into the vessel; however, the flow must be sufficiently restricted so that most of the air entering a vessel is through the vessel overflow pipe.

Agitators and mountings will be exposed to highly radioactive solutions and slurries and must be designed for free drainage and without crevices and inaccessible areas to facilitate decontamination and minimize exposure to maintenance personnel.

Motors should be totally enclosed, fan cooled with (metal fans) **type NEMA design B temperature rise with Class H insulation.** Agitator motors may be subjected to sprays from process leaks and from high-pressure lances during decontamination prior to maintenance.

PART TITLE: SPECIAL EQUIPMENT - DESIGN BASIS/CRITERIA

ITEM TITLE: Design of Covered Burial Containers

Provide the design for covered burial containers for final disposal of contaminated process cell equipment that has become obsolete or is unrepairable. Fabrication will be completed on an as needed basis. Assume all equipment, except the glass melter, has been sufficiently decontaminated so that no shielding is required beyond that afforded by the covered burial container.

A shielded rail car capable of transporting a failed glass melter from the process building to burial is required. Design of the car should accomodate the weight of a full failed melter plus the shielding as stipulated in the following paragraph. Failed process cell equipment may be transported on this same car.

For the glass melter, assume a full charge of radioactive glass remains in the melter, and provide sufficient shielding in the burial container to reduce the radiation level to one R/hr at one meter around the burial container. The exposure rate to the operator of the rail cab must be limited to 50 mR/hr. Protection of the operator may be accomplished by additional shielding of the burial container, maintaining sufficient distance between the burial container and the operator to reduce exposure, or providing shielding on the truck or rail cab. See Table 3-11 for a basis for shielding.

PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Sludge Feed Composition

The composition of the Sludge Feed Stream is shown in Table 21-1, Appendix H.

COMPLETE REVISION

PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Salt Plant Product Composition

The compositions of product streams that are blended with Sludge Plant feed during coupled operation are shown in Table 21-2, Appendix H.

****COMPLETE REVISION****

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PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Slurry Properties

Slurry properties are shown in Table 21-3, Appendix H.

****NEW ITEM****

PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Stoichiometry

The process reactions to be assumed for preparing material balances are listed in Table 21-4, Appendix H. Reactions go to completion unless otherwise noted.

COMPLETE REVISION

INFORMATION ONLY

PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Physical Property Data

Physical property data for process stream components are shown in Table 21-5, Appendix H.

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PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Glass Frit Characteristics

The chemical composition and characteristics of Frit 131 are listed in Table 21-6, Appendix H.

PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Properties of DWPF Waste Glass

The following physical properties of simulated DWPF waste glass using frit 131 are tabulated in Tables 21-7 through 21-14, and Figure 21-1, Appendix H.

Table

21-7	Heat Capacities a) Mean (c_{pm}) from 0°C to temperature t . b) True (c_{pt}) at temperature t .
21-8	Density
21-9	Index of Refraction
21-10	Thermal Conductivity
21-11	Resistivity
21-13	Glass Surface Temperature
21-14	Canister Radiation
21-15	Material Balance Table - Sludge Only Material Balance
21-16	Material Balance Table - Supernate Sludge Material Balance
21-17	Sludge Only Curie Balance
21-18	Supernate Sludge Curie Balance
21-19	Isotopic Content of 5-Year In-Tank Waste
21-20	Radionuclide Content of 5-Year In-Tank Waste
21-21	Isotopic Content of Sludge Feed
21-22	dRadionuclide Content of Sludge Feed
21-23	Radionuclide Content of Feed to the Sludge Plant from Salt Plant
21-24	Radionuclide Content of Sludge Only Glass
21-25	Radionuclide Content of Supernate Sludge Glass
21-26	Estimated Annual Atmospheric Releases to the Environment - Sludge Only Operation
21-27	Estimated Annual Atmospheric Releases, Sludge Plus Supernate Operation

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PART TITLE: MISCELLANEOUS PROCESS DATA

ITEM TITLE: Properties of DWPF Waste Glass

Figure

21-1	Thermal Expansion
21-2	Process Summary Diagram - Melter Feed Preparation
21-3	Process Summary Diagram - Vitrification and Off-Gas Treatment
21-4	Process Summary Diagram - Mercury Purification and Packaging
21-5	Process Summary Diagram - Decontamination and Miscellaneous Waste Stream Treatment
21-6	Process Summary Diagram - Canister Decontamination Closure and Inspection
21-7	Sludge Only Glass Canister Decay Heat
21-8	Sludge Supernate Glass Canister Decay Heat

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TABLE 3-1
AREA LIGHTING REQUIREMENT

Area	Footcandle Illumination	Luminaire				Location of Luminaires, feet		
		Type	Beam	Lamp Size	Number	Inside Boundary	Height	Spacing
<u>Nonisolated Fenced Boundaries</u> (20 feet inside to 40 feet outside fence line)	0.04	Streetlight	Medium Wide Asymmetric	10,000 L	1	20	30	215
	0.04	Streetlight	Medium Wide	6,000 L	1	20	25	135
	0.04	Streetlight	Medium Wide	4,000 L	1	20	25	165
<u>Pedestrian Entrances</u> (25 feet inside to 25 feet outside boundary gate)	2	Streetlight	Wide Asymmetric	15,000 L	4		30	12.5
	2	Floodlight	Very Wide	750 W	3		25	25
	2	Floodlight	Very Wide	500 W	4		25	12.5
	2	Floodlight	Medium Wide	150 W	15	5 at each of 3 locations	25	50
<u>Vehicular Entrances</u> (50 feet inside to 50 feet outside boundary gate)	1	Streetlight	Wide Asymmetric	15,000 L	4		30	25
	1	Floodlight	Very Wide	750 W	3		25	50
	1	Floodlight	Very Wide	500 W	4		25	15
<u>Industrial Thoroughfares</u> (30 feet wide not bordered by buildings)	0.05	Streetlight	Two-way Four-Way	6,000 L	1	Overhang to center of road	25	225
	0.05	Streetlight	Four-way	4,000 L	1		25	190
	0.05	Streetlight	Narrow Asymmetric	6,000 L	1	Overhang side of road 2 feet	25	190
	0.05	Streetlight	Narrow	4,000 L	1		25	160
<u>Open Yards</u> (Storage and parking areas)	0.10	Floodlight	Wide	1,000 W	4		60	125
	0.10	Floodlight	Wide	750 W	4		60	113
	0.10	Floodlight	Very wide	500 W	4		40	95
	0.10	Floodlight	Very Wide	300 W	4		40	78

L = Lumens W = Watts

TABLE 3-2
PROPERTIES OF GROUND WATER FOR
DIFFERENT AQUIFERS IN THE SRP AREA

		ppm											
Number of Analyses		Sodium and					Dissolved Solids (residue on evaporation at 100°C)					Hardness as CaCO ₃	pH
		Iron	Calcium	Magnesium	Potassium Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate				
TUSCALOOGA FORMATION													
13	Max Limit	0.77	1.4	0.9	6.7	17	4.8	4.0	0.1	8.8	28	7	6.9
	Median	0.16	0.9	0.5	2.1	3	1.4	2.2	0.0	0.6	19	5	5.4
	Min Limit	0.00	0.3	0.0	0.9	0	0.3	0.8	0.00	0.0	14	2	4.4
ELLINGTON FORMATION													
16	Max Limit	4.1	8.7	1.3	4.2	23	27	6.0	0.2	0.9	54	30	6.8
	Median	1.1	4.4	1.0	2.7	12	11	2.1	0.1	0.0	41	19	5.9
	Min Limit	0.10	3.9	0.4	1.5	4	7.4	1.5	0.0	0.0	36	10	4.4
McBRIDE LENTZBURG													
15	Max Limit	1.0	47	9.4	19	171	14	4.5	0.5	6.2	192	132	7.6
	Median	0.25	27	2.0	1.7	94	4.3	2.8	0.1	0.2	95	72	7.1
	Min Limit	0.00	17	0.1	0.4	15	0.8	0.4	0.0	0.0	75	50	6.8
McBRIDE and LINGGAGE													
9	Max Limit	1.84	9.7	4.2	2.4	17	9.3	4.0	0.3	2.3	29	15	6.1
	Median	0.14	1.5	0.7	2.1	5.5	1.9	2.7	0.1	1.3	21	8	5.5
	Min Limit	0.04	0.5	0.3	0.4	1	0.8	1.5	0.00	0	20	4	4.2

TABLE 3-3
ELEVATIONS OF HIGH LEVEL LIQUID WASTE TANKS

Elevation, feet above mean sea level							
Area	Tank	Tank Type	Grade Level	Tank Top ^a (min)	Tank Bottom ^b (min)	High Water Table	Low Water Table
F	1-4	I	280	270	243	234	228
	5-8	I	278	267	240	234	228
	17-20	IV	268	274	229	234	228
	25-28	IIIA	285	286	249	234	228
	33-34	III	284	285	248	234	228
H	9-12	I	280 ^c	270	243	282	274
	13-16	II	304	305	274	282	274
	21-24	IV	322	328	284	282	274
	29-32	III	321	321	284	282	274
	35	III	323	324	287	282	274
	36-37	IIIA	323	324	287	282	274

- a. Top surface of concrete roof of lowest tank in group. Access riser lips are about 8 in. higher than roof surface in Type II and III tanks, and several ft higher (i.e., about 1 ft above grade) in Type I tanks. Elevations given for Type IV tank tops are for apex of domed roof; Type IV roof periphery is about 4 ft below final grade.
- b. Elevation of bottom steel of primary tank.
- c. When the water table in the H-Area tank farm rises above the present grade level at Tanks 9-12, water seeps from the surrounding embankments and drains to the storm sewer.

TABLE 3-4
TEMPERATURE AND RELATIVE HUMIDITY IN AUGUSTA, GA

Month	Average Temperature, °F			Extreme Temp, °F		Average Relative Humidity, %			
	Daily Maximum	Daily Minimum	Monthly Average	Record Maximum	Record Minimum	1 am	7 am	1 pm	7 pm
January	57.4	38.5	47.9	84	1	75	84	59	69
February	59.8	39.9	49.9	84	3	72	82	56	63
March	67.3	46.7	56.7	93	14	72	80	57	59
April	75.2	53.1	64.1	94	29	74	77	48	56
May	83.4	61.7	72.6	100	40	78	77	48	59
June	89.4	68.9	79.3	105	46	82	79	51	64
July	90.9	71.9	81.5	105	55	86	83	55	69
August	89.7	71.2	80.5	105	58	87	87	56	71
September	85.5	66.5	76.0	106	41	84	85	55	71
October	76.2	55.0	65.5	94	29	79	84	50	70
November	65.8	44.3	55.0	86	11	77	84	53	67
December	57.9	38.6	48.3	81	5	77	84	58	70

REVISED TABLE

TABLE 3-5
OBSERVED TEMPERATURE EXTREMES

	<u>Temperature °F</u>	<u>Observation Date</u>
Lowest SRP	1	January 1982
Lowest Augusta	1	January 1982
Highest SRP	105	June 1970
Highest Augusta	106	July 1952

REVISED TABLE

TABLE 3-6
WINTER WEATHER IN AUGUSTA

<u>Year</u>	<u>Time at less than 32°F, hours</u>	<u>Average Minimum Temperature, °F</u>
1966-1967	212	28.2
1967-1968	268	29.1
1968-1969	278	29.3
1969-1970	497	26.4
1970-1971	422	26.2
1971-1972	133	27.2
1972-1973	353	25.7

TABLE 3-7
SAVANNAH RIVER PLANT PRECIPITATION SUMMARY

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1952	2.07	3.23	6.55	3.12	5.56	5.67	2.82	5.98	3.34	1.36	2.86	3.99	46.55
1953	2.69	5.48	5.83	2.96	4.42	5.38	3.63	3.61	8.53	0.11	1.04	7.51	49.19
1954	1.26	1.64	2.95	2.50	2.89	2.91	2.03	4.10	1.43	1.29	2.94	2.88	28.82
1955	4.75	2.62	2.21	5.57	4.53	3.31	3.94	5.07	3.42	1.32	2.93	0.46	40.13
1956	1.67	7.94	4.84	3.21	3.07	2.34	4.34	3.18	4.56	1.83	0.93	2.05	39.96
1957	2.05	1.58	4.29	2.75	8.02	4.17	3.51	2.41	5.04	6.12	6.46	2.24	48.64
1958	4.01	4.38	4.96	5.63	2.07	2.50	5.32	2.76	1.12	0.96	0.21	4.42	38.34
1959	3.54	6.06	6.44	2.03	3.81	4.06	5.80	2.93	8.71	10.86	1.97	3.54	59.75
1960	6.91	5.81	5.76	5.07	1.96	3.66	5.27	2.81	4.84	0.97	0.83	2.93	46.82
1961	3.59	5.76	7.23	8.20	3.88	3.01	3.09	7.15	1.00	0.07	1.83	6.60	51.41
1962	4.64	5.14	6.52	4.03	3.50	4.41	2.56	3.43	5.55	2.27	3.50	2.20	47.75
1963	5.96	3.64	3.34	3.70	2.98	8.42	3.18	1.04	5.37	0.00	3.68	4.47	45.78
1964	7.79	6.00	5.79	5.94	3.62	4.50	10.42	12.34	5.68	6.13	0.88	4.38	73.47
1965	2.00	6.39	8.67	2.43	1.33	5.04	8.04	1.94	2.83	2.59	2.17	1.41	44.84
1966	7.18	5.96	4.43	2.53	5.51	4.66	4.11	5.23	3.64	1.25	1.05	3.40	48.95
1967	3.66	3.80	5.68	2.82	5.01	3.74	7.52	7.32	1.70	0.64	2.51	3.13	47.53
1968	3.88	0.94	1.49	2.12	3.46	6.20	3.88	4.27	2.24	3.00	3.39	2.73	37.70
1969	2.00	2.46	3.38	4.09	3.02	3.95	2.71	5.42	4.56	1.16	0.40	4.19	37.34
1970	2.79	2.69	7.36	1.38	4.16	3.46	4.85	3.79	1.71	5.01	1.68	4.92	43.80
1971	5.11	4.16	8.68	2.92	2.98	5.92	10.53	8.76	3.80	5.95	2.31	2.69	64.01
1972	8.91	4.42	2.82	0.57	4.72	6.57	2.64	6.05	1.47	1.20	3.56	5.23	48.26
Average	4.12	4.29	5.10	3.50	3.83	4.47	4.77	4.74	3.83	2.57	2.24	3.60	47.09

TABLE 3-8
FREQUENCY OF WIND SPEED AT VARIOUS ELEVATIONS

Wind Speed, m/sec	Frequency at each Elevation (in feet) ^a						Fraction at each Elevation (in feet)						Accum Fraction by Speed by Elevation (in feet)					
	1000	800	600	450	300	120	1000	800	600	450	300	120	1000	800	600	450	300	120
0 to 1	3054	4350	4530	7133	6655	11744	0.02	0.02	0.02	0.03	0.03	0.05	0.02	0.02	0.02	0.03	0.03	0.05
1 to 2	6634	9543	10370	9998	15345	26109	0.04	0.04	0.04	0.05	0.06	0.11	0.06	0.06	0.06	0.08	0.09	0.15
2 to 3	13042	18581	19837	18369	28575	47555	0.09	0.07	0.08	0.09	0.11	0.19	0.15	0.13	0.14	0.16	0.20	0.35
3 to 4	15266	24017	24782	22720	34373	56300	0.10	0.10	0.10	0.11	0.13	0.23	0.25	0.23	0.24	0.27	0.33	0.58
4 to 5	16158	25349	26490	23719	36510	46297	0.11	0.10	0.11	0.11	0.14	0.19	0.36	0.33	0.34	0.38	0.47	0.77
5 to 6	16207	26908	27726	26357	38747	29049	0.11	0.11	0.11	0.12	0.15	0.12	0.46	0.43	0.45	0.50	0.62	0.89
6 to 7	14218	23231	25474	24042	32190	12576	0.09	0.09	0.10	0.11	0.13	0.05	0.56	0.53	0.56	0.61	0.75	0.94
7 to 8	11780	21237	23311	21944	26761	6569	0.08	0.08	0.09	0.10	0.10	0.03	0.63	0.61	0.65	0.72	0.85	0.97
8 to 9	11222	20311	21970	20856	19411	3901	0.07	0.08	0.09	0.10	0.08	0.02	0.71	0.69	0.74	0.81	0.93	0.98
9 to 10	9836	17342	18055	15841	9688	2012	0.06	0.07	0.07	0.07	0.04	0.01	0.77	0.76	0.81	0.89	0.97	0.99
10 to 11	9738	16560	17454	12095	4526	1189	0.06	0.07	0.07	0.06	0.02	0.00	0.84	0.83	0.88	0.94	0.98	0.99
11 to 12	7463	13545	12417	6457	1963	585	0.05	0.05	0.05	0.03	0.01	0.00	0.89	0.88	0.93	0.97	0.99	1.00
12 to 13	5611	10098	8377	3321	992	318	0.04	0.04	0.03	0.02	0.00	0.00	0.92	0.92	0.96	0.99	1.00	1.00
13 to 14	4508	8055	5350	1522	615	165	0.03	0.03	0.02	0.01	0.00	0.00	0.95	0.95	0.98	0.99	1.00	1.00
14 to 15	3006	5093	2548	571	289	86	0.02	0.02	0.01	0.00	0.00	0.00	0.97	0.97	0.99	1.00	1.00	1.00
15 to 16	1940	3240	1194	281	144	41	0.01	0.01	0.00	0.00	0.00	0.00	0.98	0.99	1.00	1.00	1.00	1.00
16 to 17	1118	1826	539	150	82	13	0.01	0.01	0.00	0.00	0.00	0.00	0.99	0.99	1.00	1.00	1.00	1.00
17 to 18	610	879	181	61	43	11	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
18 to 19	316	338	76	32	18	5	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
19 to 20	172	144	36	10	5	1	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Over 20	120	111	41	46	52	65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Totals	152019	250758	250758	215525	256984	244591												

^a Number of records in this survey = 257292.

TABLE 3-9
PREVAILING WIND DIRECTION AT AUGUSTA

Month	Prevailing Wind ^a	Time at Given Direction, %
January	Northwest	26
February	Northwest	26
March	Northwest	25
April	Northwest	19
May	Northwest	17
June	South	21
July	South	26
August	South	23
September	East	20
October	Northwest	21
November	Northwest	28
December	Northwest	22

^a Direction from which wind blows.TABLE 3-10
DAILY SHIFT OF PREVAILING WIND DIRECTION IN AUGUSTA (1957)

Date	Shift, degrees ^a											
	January	February	March	April	May	June	July	August	September	October	November	December
1	NNW	SSW	W	ESE	E	NE	NW	SW	NW	NE	NW	W
2	15	150	30	120	30	75	90	75	180	0	90	45
3	0	120	165	105	75	0	90	0	105	15	105	15
4	165	0	0	0	0	30	45	60	15	60	15	90
5	120	180	0	45	0	135	135	165	75	0	0	15
6	180	45	0	90	90	15	180	0	30	45	90	135
7	180	45	75	60	165	30	135	90	0	0	90	0
8	135	120	150	0	120	30	60	135	45	60	0	0
9	75	90	30	105	150	180	15	135	15	0	165	135
10	30	15	15	75	15	45	165	75	30	45	60	45
11	180	135	165	120	0	135	0	75	15	105	60	30
12	15	30	120	150	75	0	30	105	15	15	15	30
13	135	75	60	30	75	150	90	150	0	45	0	90
14	30	15	30	105	15	120	0	120	0	30	90	60
15	165	180	90	0	60	75	120	45	30	120	45	30
16	45	180	90	75	0	45	30	105	0	0	60	0
17	60	0	45	0	90	135	105	0	30	45	30	135
18	0	180	180	0	60	180	45	75	180	135	60	0
19	150	180	135	15	120	135	30	15	60	30	120	45
20	135	105	30	15	90	30	90	30	60	15	30	60
21	15	0	30	30	105	15	15	60	30	15	120	150
22	180	15	0	0	0	0	45	0	60	30	150	60
23	120	75	165	0	0	15	45	15	165	60	15	30
24	135	165	75	0	105	30	0	45	90	0	90	0
25	0	0	180	15	105	0	165	135	135	120	180	90
26	0	60	15	15	45	90	15	90	45	60	135	150
27	180	30	75	30	60	90	15	75	90	15	60	0
28	0	90	30	0	165	60	15	120	0	0	105	180
29	0	0	45	15	15	60	45	30	45	45	45	120
30	90	0	45	15	0	30	150	120	0	60	90	30
31	105	0	150	0	15	0	150	90	0	150	0	30
Average	83	84	74	42	62	67	71	75	54	45	73	60

1. The change was taken as the smaller angular rotation from the previous day's prevailing wind. The actual change could be greater than indicated if the shift occurred through the larger angular rotation.

TABLE 3-11
BASIS FOR RADIATION SHIELDING --
PHOTON SOURCE TERMS FROM WASTE GLASS FOR SUPERNATE SLUDGE GLASS*

<u>Mean Energy (KeV)</u>	<u>Photons/cm³/sec</u>
100	2.449E07
125	9.533E07
225	6.305E06
375	1.994E07
575	2.129E09
850	3.973E07
1250	4.827E07
1750	9.746E05
2250	4.343E06
2750	1.491E04
3500	2.088E03

*Includes Cs, Sr and Pu separated from supernate during salt processing.
Curie balance used for these calculations is in Appendix H, Table 21-18.

REVISED TABLE

TABLE 3-12
WATER WELL DRAWDOWN DATA

Well No.	45H	48H	88H
Location	N 70600 E 63100	N 71200 E 62950	N 71400 E 63150
Water Elevation (Feet below ground)	107	109	120
Feet of Drawdown ^a	26	35	33

^aMeasured after 24 hours of pumping at 1000 gpm.

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado</u> <u>Resist.</u>	<u>DBE</u> <u>Resist.</u>	<u>IPE</u> <u>Resist.</u>	<u>Standard</u>	<u>Remarks</u>
<u>Waste Transfer Facilities</u>					
Pump Pits/Diversion Boxes					a
Transfer Lines					a
Process Equipment, Piping Service Auxiliaries					a
<u>Vitrification Building Structure</u>					
Vitrification Bldg (including building outer wall, floors, crane maintenance area, and process cells enclosure, etc.)	x	x	x		
Vitrification Bldg Air Supply Fan House				x	
Vitrification Bldg Railroad Airlock				x	
Vitrification Bldg Railroad Tunnel (access to process cell enclosure)			x		b
Vitrification Building SCT Loading Area			x		c
Process Equipment Repair Shop Space				x	d
E&I and Maintenance Shop Space				x	d
Central Instrument Control Room Space				x	d
Local Control Units Space	x	x	x		

REVISED TABLE

INFORMATION ONLY

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado Resist.</u>	<u>DBE Resist.</u>	<u>IPE Resist.</u>	<u>Standard</u>	<u>Remarks</u>
Space for Emergency Instrument Air Compressor and Bottled Breathing Air Storage	x	x	x		
Offices, Change Rooms, etc.				x	d
<u>Equipment Located in or Servicing Vitrification Bldg</u>					
Vitrification Bldg Air Supply Equipment				x	
Cranes					
o Process Cell Crane			x		e
o Melt Cell and Canister Decon Cell In-Cell Cranes				x	
o Weld Test Cell In-Cell Cranes			x		e
o Process Equipment Repair Shop Crane				x	
Process and Equipment Decon Cell Equipment:					
o Fixed Non-Removable Equipment such as Embedded piping, trunnions, sleepers, dowels, etc.			x		
o Removable Equipment (vessels, melter, jumpers, rack piping, etc.)				x	f
Melter and Process Cooling Water HX System Components				x	g
Maintenance and E & I Shop Equipment				x	

REVISED TABLE

AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

5 of 10

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado Resist.</u>	<u>DBE Resist.</u>	<u>IPE Resist.</u>	<u>Standard</u>	<u>Remarks</u>
Process Steam System Components				x	g
Other Process Equipment Outside Process Cell				x	
Central Control Room Computer				x	
Local Instrument Control Units (emergency units for process shutdown)				x	h
Health Protection Facilities:					
o Vitrification Building Air Effluent Monitor	x	x	x		i
o HP Computer				x	i, d, j
<u>Interim Storage Building Structure</u>					
Vault Storage Area	x	x	x		
Vault Supply Air Structure (above grade)				x	
Vault Exhaust Air Structure, including space for emergency ventilation and air monitoring equipment (above grade)				x	
Canister Support Rack/ Storage Grid with below grade air ducting structure	x	x	x		
Storage Bldg above Vault, Operating Area, Office, & Shop				x	

REVISED TABLE

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado</u> <u>Resist.</u>	<u>DBE</u> <u>Resist.</u>	<u>IPE</u> <u>Resist.</u>	<u>Standard</u>	<u>Remarks</u>
<u>Equipment Located in or</u> <u>Servicing Interim Storage</u> <u>Building</u>					
Shielded Canister Transport Vehicle					C
Emergency Ventilation Equipment including filters, electrical components, etc.				x	
Interim Storage Building Air Effluent Monitor				x	
<u>Other Facilities - Servicing</u> <u>the Confinement Functions of</u> <u>Vitrification and/or Interim</u> <u>Storage Building</u>					
Vitrification Building Sand Filter - Concrete Structure	x	x	x		
Sand Filter (integrity of media against breakthrough/bypass)	x	x	x		
Sand Filter Instrumentation				x	
Fan House - Structure housing Zone 1 exhaust fans	x	x	x		
Zone 2 and 3 exhaust fans				x	
Fan House - HEPA Filters for Operating Area of Vitrification Building				x	
Fan House - Exhaust Fans for Vitrification Bldg (all ventilation zones)				x	

REVISED TABLE

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado Resist.</u>	<u>DBE Resist.</u>	<u>IPE Resist.</u>	<u>Standard</u>	<u>Remarks</u>
Fan House - Maintenance Equipment (monorail, etc.)				x	
Exhaust Stack				x	
Air Tunnels (Vitrification Bldg to Blowout Port)	x	x	x		
Sand Filter Bypass Tunnel					k
Air Tunnels (Blowout Port to Stack)				x	
Space for Emergency Electrical Generation Equipment and Associated Switch Gear	x	x	x		
Emergency Electrical Generation System (including supply to usage points)				x	
Air Compressors				x	
Fire Protection Systems				x	
<u>Service Facilities</u>					
Receiving and Storage Area				x	
Cold Feed Area Structures				x	
Chemical and Industrial Waste Treatment				x	
Administration Building				x	
Patrol Building				x	
Water Treatment Facilities				x	

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

	<u>Tornado</u> <u>Resist.</u>	<u>DBE</u> <u>Resist.</u>	<u>IPE</u> <u>Resist.</u>	<u>Standard</u>	<u>Remarks</u>
Electrical Substations (Primary & Secondary)				x	d
Sewage Treatment Facilities				x	
Central Refrigeration Facilities				x	
Steam Supply Line				x	
Other Power, General and Service Facilities not Tabulated				x	

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTSFootnotes

- (a) Design of pump pits, diversion box and waste transfer line is to be based on the criteria as used for existing waste tank farm facilities, namely to meet earth loads and radiation shielding requirements.
- (b) The portion of the railroad tunnel which provides access to the process cell is to be useable after an IPE at least to the extent that the tunnel is not permanently blocked by the IPE and that the tunnel can be restored to full operation.
- (c) The SCT must provide earthquake and tornado protection to the canister during transfer from the vitrification building to interim storage to the extent that the canister cannot be ruptured by an accident, missile, tipping over, etc. The SCT loading area of the vitrification building must resist the IPE to the extent that the loading area is not permanently blocked by an IPE.
- (d) If any space is available within the seismic resistant portion of the vitrification building after locating essential functions (process cells, crane areas, sample cells, cold feed tanks, piping galleries, etc.), the space should be utilized for other supporting services. Services to be considered for location in the vitrification building are; HP computer, secondary substation, central instrument control; HP facilities; shops, and offices. The decision for locating in the seismic portion of the building should be based on space availability, function, operating convenience, etc. Some facilities such as shops should be located close to the facilities serviced and preferred locations are specified in items in this BDR describing these facilities.
- (e) **Process cell crane and weld test cell in-cell crane are to be operational following an IPE at least to the extent that the crane can be retrieved to crane maintenance area and repaired as necessary. This requirement implies that the crane shielding doors must resist the IPE or be repairable.**
- (f) Provided its failure will not compromise the DBE or IPE resistant structures equipment. For example, the heavy melter and its frame may require special consideration to the extent that any "rocking motion" does not impair the alignment integrity of fixed positioning components and wall nozzles.
- (g) Service equipment outside the cell enclosure must not fail in a manner that compromises the DBE or IPE structure. Process cooling water and steam systems should survive a DBE or IPE event to the extent that damage does not result in unacceptable levels of leakage of potentially contaminated cooling water from the circulating process water side to the circulating cooling tower side and potentially contaminated steam condensate to the delay tanks.

REVISED TABLE

TABLE 4-1
CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

Footnotes (Cont'd)

- (h) Instrumentation for local control units must always remain operable to the extent necessary to achieve and maintain a safe shutdown of the process operations.
- (i) Effluents released to the environment must be monitored at all times. The effluent monitor and the computer must provide the capability or a seismic and tornado resistant sampling system must provide for continuous sampling of the exhaust air stream during natural phenomena for off-line analyses in an existing portable Health Protection trailer containing analytical equipment.
- (j) If the HP computer is located in the seismic structure, it should be placed on a "soft-mount" so that it will survive the IPE.
- (k) **Temporary structure to be used before 221-S receives waste. To be sealed when the DWPW Sludge Plant starts up.**

General Note

If standard construction steel structure or components collapse or fail as a result of a DBE, IPE or a DBT event, they are not to penetrate a seismic structure or compromise the containment integrity or facility function of a seismic structure.

TABLE 5-4
COMPONENT QUALITY EXAMINATIONS

<u>Location</u>	<u>Characteristic</u>	<u>Sample</u>	<u>Method</u>
Vendor	Chemical composition	Melt	Laboratory
	Metallurgical characteristics	Plate	Laboratory
	Mechanical properties	Plate	Laboratory
	Metal soundness	Billets and/or stock	Ultrasonic
	Weld quality	Canister & overpack	Radiograph
	Cleanliness	All components	Visual
	Surface finish	All components	Gage
	Dimensions	All components	Gages
SRP Laboratories	Chemical composition	Melt	Laboratory
	Metallurgical characteristics	Plate	Laboratory
	Mechanical properties	Plate	Laboratory
S-Area Receiving inspection	Gross damage	Canister & overpack	Visual
S-Area audit inspection	Weld quality	Canister & overpack	Radiograph
	Surface finish	All components	Gage
	Dimensions		
	Length	Canister & overpack	Length gage
	Wall thickness	Canister & overpack	Ultrasonic
	All others	All components	Hand gages

TABLE 5-4
COMPONENT QUALITY EXAMINATIONS

<u>Location</u>	<u>Characteristic</u>	<u>Sample</u>	<u>Method</u>
S-Area Inprocess inspection ^c	Cleanliness	All components	Visual
	Surface mars	All components	Depth gage
	Throat ID & OD	Canister	Go,no-go gage
	Flange OD	Canister	Go,no-go gage
	Outer diameter	Canister & overpack	Go,no-go gage
	Inner diameter	Overpack	Go,no-go gage
	Length	Canister & overpack	Go,no-go gage
	Parallelism -- flange to bottom	Canister	Go,no-go gage
	Concentricity -- throat to canister	Canister	Go,no-go gage
	Weight	Canister	Load cell
	Helium leak test	Canister & overpack	Mass spec
	OD	Plug ^a	Go,no-go gage
	ID	Plug ^b	Go,no-go gage

^aBoth inner plug and outer plug

^bInner plug only

^cComplete list of critical dimensions to be inspected for overpacks and overpack covers to be determined pending component design.

REVISED TABLE

TABLE 5-1
INVENTORY STANDARD BASES

Requirements for raw materials receipt and storage are based on the standards outlined below.

Bulk chemical storage gross tank capacities must be equivalent to a 2-month supply and there must be at least two tanks for each commodity.

Inventory requirements are based on:

- 1) For normal-type chemicals:
 - Minimum inventory -- 1-month supply
 - Normal inventory -- 2-month supply
 - Maximum inventory -- 2-1/2-month supply
- 2) For special-type chemicals:
 - Minimum inventory -- 2-month supply
 - Normal inventory -- 4-month supply
 - Maximum inventory -- 5-month supply
- 3) For items requiring periodic replacement more than two times per year:
 - Minimum inventory -- equivalent to two replacements
 - Normal inventory -- equivalent to three replacements
 - Maximum inventory -- equivalent to four replacements
- 4) For items requiring periodic replacement (two or less times per year):
 - Minimum inventory -- equivalent to one bed or line replacement
 - Normal inventory -- equivalent to two replacements
 - Maximum inventory -- equivalent to three replacements
- 5) Canister components (including six sets of overpack components) storage gross capacity will be equivalent to a 2-month supply.
- 6) **Silver mordenite and silica gel - one bed change.**

TABLE 5-2
INVENTORY REQUIREMENTS

The estimated consumption, inventory requirements, and receipt sources are shown below.

Item	Consumption	Inventory ^a			Category (From Table 5-1)	Receipt
		Min	Max	Normal		
Canisters	60/mo	60	120	90	5	Rail or truck
Canister plugs (each - inner and outer)	60/mo	60	120	90	5	Rail or truck
Overpack components and repair caps	NA	NA	NA	6	5	Rail or truck
Silver mordenite	290 lbs	290	290	290	6	Truck - drums, 2 ft ³
Smear papers	1,220/mo	2,500	6,000	5,000	2	Truck - Box, 1,000/ft ³
Potassium permananate	225 lbs/mo	225	565	450	1	Truck - 110 lb Can, 15" dia. x 18" h; 9 cans/ pallet ^c
Sodium hydroxide, 50%	190 gal/mo	-	-	-	b	
Nitric acid, 50%	665 gal/mo	-	-	-	b	
Glass frit	1,700 ft ³ /mo		2,500	5,000	3,700	1
Rail hopper car						
Formic acid	2,100 gal/mo	2,100	5,300	4,200	1	Tank Truck
Oxalic acid	4,200 lbs/mo	4,200	10,500	8,400	1	Truck, 50 lb bags, 32 bags/ pallet
Detergent	135 lbs/mo	135	335	270	1	Truck - boxes
Silica Gel	45 ft ³	45	45	45	6	Truck - 120 lb can, 20" dia. x 21" h, 4 cans/ pallet
Acid-Stable Surfactant	5 lbs/mo	5	13	10	1	Truck - bottles

^a Same units as shown under consumption.

^b Will be received by 1,000 gal portable tanks from F Area (provided from an AED allowance in Table 16-1, Appendix A by SRP). No storage tanks required.

^c Pallets are 48" x 48" and may normally be stacked 3 high.

NOTE: Chemicals for water treatment will be received and stored at those facilities.

****REVISED TABLE****

TABLE 5-3
DESIGN REQUIREMENTS -- COLD FEED VESSELS INSIDE BUILDING 221-S

	<u>Agi-</u> <u>tator</u>	<u>Air</u> <u>Sparge</u>	<u>Heat-</u> <u>ing</u>	<u>Cool-</u> <u>ing</u>	<u>Sampler</u> <u>(cold)</u>	<u>Vent</u>	<u>Pumps</u>	<u>Function</u>	<u>Special Equipment</u>
Nitric Acid Dilution Tank (Mercury Purif.)	x	-	-	CW	x	CF	-	MF	
Remote Decon Nitric Acid Feed Tank	x	-	-	-	-	CF	-	F	Lance & jet oper controls
Remote Decon Oxalic Acid Feed Tank	x	-	HW	-	-	CF	-	F	Lance & jet oper controls
Contact Decon Nitric Acid Feed Tank	x	-	-	-	-	CF	-	F	Lance & jet oper controls
Contact Decon Oxalic Acid Feed Tank	x	-	HW	-	-	CF	-	F	Lance & jet oper controls
Crane Decon Nitric Acid Feed Tank	x	-	-	-	-	CF	-	F	Lance & jet oper controls
Crane Decon Oxalic Acid Feed Tank	x	-	HW	-	-	CF	-	F	Lance & jet oper controls
Decon Soln Makeup Tank	x	-	HW	CW	x	CF	1	M	
Process Frit Weigh Bin	-	-	-	-	-	A	-	F	
Process Frit Slurry Feed Tank	x	x	-	-	-	CF ^a	x	F	

REVISED TABLE

TABLE 5-3
DESIGN REQUIREMENTS -- COLD FEED VESSELS INSIDE BUILDING 221-S

	<u>Agi-</u> <u>tator</u>	<u>Air</u> <u>Sparge</u>	<u>Heat-</u> <u>ing</u>	<u>Cool-</u> <u>ing</u>	<u>Sampler</u> <u>(cold)</u>	<u>Vent</u>	<u>Pumps</u>	<u>Function</u>	<u>Special Equipment</u>
Nitric Acid Feed Tank	-	x	-	-	x	CF	x	F	
Caustic Feed Tank	-	x	-	-	x	CF	x	F	
KMnO ₄ Feed Tank	-	x	-	-	x	CF	-	F	
Decon Frit Weigh Bin	-	-	-	-	-	A	-	F	
Decon Frit Slurry Feed Tank	x	x	-	-	-	CF ^a	x	F	
Organic Acid Drain Catch Tank	x	-	-	-	x	CF ^a	1	C	
Surfactant Addition Tank	x	-	-	-	x	CF	1	F	
Acid Drain Catch Tank	x	-	-	-	x	CF	1	C	
Floor Drain Catch Tank	x	-	-	CW	x	CF	1	C	
90% Formic Acid Feed Tank	-	-	-	-	-	CF ^a	1	F	Special inter- lock to prevent overflow
Process Con- densate Tanks ^b	x	-	-	CW	x	CF	1	C	

****REVISED TABLE****

TABLE 5-3
DESIGN REQUIREMENTS -- COLD FEED VESSELS INSIDE BUILDING 221-S

	<u>Agi-</u> <u>tator</u>	<u>Air</u> <u>Sparge</u>	<u>Heat-</u> <u>ing</u>	<u>Cool-</u> <u>ing</u>	<u>Sampler</u> <u>(cold)</u>	<u>Vent</u>	<u>Pumps</u>	<u>Function</u>	<u>Special Equipment</u>
CW Delay Tanks ^b	x	-	-	-	x	CF	1	C	

(x) - Service Required

(A) - Separate outside vent if air from frit transport would overload CF vent system.

(-) - Service not required

(M) - Makeup tank

(CW) - Cooling water

(F) - Feed or batch addition tank

(HW) - Hot water preferred, but steam is acceptable

(C) - Collection tank for chemicals, etc. for disposal.

(CF) - Cold Feed vent system

^aWill require a condenser to isolate formic acid fumes from the rest of the vent system.^bThese tanks may be located outside 221-S.****REVISED TABLE******INFORMATION ONLY**

TABLE 5-5
DESIGN REQUIREMENTS -- IN-CELL VESSELS

<u>Tank or Vessel</u>	<u>Agitator</u>	<u>Cooling Water</u>	<u>Chilled Water</u>	<u>Sampler</u>	<u>Vent</u>	<u>Transfer Pumps</u>	<u>Cold Feeds*</u>	<u>Special Equipment</u>
Spare Equipment Modules	x	x	x	-	x	V	2	Air Sparge
Sludge Receipt & Adj Tank	x	x	x	-	x	-	1	Mercury Pump, Air Sparge
Sludge Receipt & Adj Tank Column	-	-	-	-	-	-	PW Flush	-
Sludge Receipt & Adj Tank Condenser	-	-	x	-	-	AV	-	-
Slurry Mix Evap	x	x	x	-	x	-	1	Mercury Pump, (F) Air Sparge
Slurry Mix Evap Col	-	-	-	-	-	-	PW Flush	-
Slurry Mix Evap Cond'r	-	-	x	-	-	AV	-	-
Slurry Mix Evap Cond Tank	x	-	-	-	x	AV	1	Mercury Pump (F)
Formic Acid Vent Cond'r	-	-	-	x	-	V	-	-
Mercury Water Wash Tank	-	-	-	-	x	AV	-	Mercury Pump, (F) Air Sparge

REVISED TABLE

TABLE 5-5
DESIGN REQUIREMENTS -- IN-CELL VESSELS

Tank or Vessel	Agi- tator	Steam	Cooling Water	Chilled Water	Sampler	Vent	Transfer Pumps	Cold Feeds*	Special Equipment
Melter Feed Tank	x	-	-	-	x	AV	2	Frit (Temp Jumper) Formic Acid	Mercury Pump (F), Circ Feed, Loops, Air Spurge
Melter	-	-	x	-	-	OG	-	-	Foam Level Detector, Power, CCTV, OG Water Spray
Off-Gas Condensate Tank	x	-	x	-	x	OG	4	Surfac- tant	Mercury Pump (F) OG Analy- zer for Canister Vent
Filter Pump Tank	x	-	x	-	x	OG	3	Surfac- tant & PW	Mercury Pump (F)
Quencher	-	-	-	-	-	-	-	-	-
Off-Gas Condenser	-	-	-	x	-	-	-	-	-
Ru Adsorber Preheater	-	-	-	-	-	OG	-	-	Electric Heater
Ru Adsorber	-	-	-	-	x	OG	-	-	Gas Sampler & Analyzer
I ₂ Adsorber Preheater	-	-	-	-	-	OG	-	-	Electric Heater
I ₂ Adsorber	-	-	-	-	x	OG	-	-	Gas Sampler & Analyzer
Off-Gas Cooler	-	-	x	-	-	OG	-	-	-

REVISED TABLE

TABLE 5-5
DESIGN REQUIREMENTS -- IN-CELL VESSELS

Tank or Vessel	Agitation	Steam	Cooling Water	Chilled Water	Sampler	Vent	Transfer Pumps	Cold Feeds*	Special Equipment
Primary Deep Bed Filters	-	-	-	-	-	OG	-	-	-
Secondary Deep Bed Filters	-	-	-	-	-	OG	-	-	-
Spent Frit Hold Tank	x	-	-	-	x	V	1	-	Air Sparge
Decontamination Chambers (2)	-	-	-	-	-	V	2	Frit Slurry	Air Sparge
Recycle Coll Tank	x	-	x	-	x	AV	1	50% NaOH	-
Vessel Vent Preheater	-	x	-	-	-	V	-	-	-
Vessel Vent Filter	-	x	-	-	x	V	-	-	-
Decontamination Waste Treatment Tank	x	x	x	-	x	-	1	50% NaOH, 50% HNO ₃ , KMnO ₄ Sol'n	-
AWNT Column	-	-	-	-	-	-	-	PW Flush	-
AWNT Condenser	-	-	x	-	-	V	-	-	-

Abbreviations: AV - Formic Acid Vent Condenser
V - Vessel Vent
x - Service Required
OG - Melter Off-Gas System
- - Service Not Required
PW - Process Water
F - Future (Provide services, pump to be installed as required.)

*All in-cell tanks are to be equipped with an addition line capable of being used to add NaOH, HNO₃, or process water.

****REVISED TABLE***

TABLE 6-1
INSTRUMENTATIONGeneral

This table reflects the following instrumentation schemes:

- Process Cells:
- Power measurements on all motors
 - Position indicators on control valves
 - Liquid level, specific gravity and temperature measured on all tanks
 - Temperature measurement on condensers and differential pressure measurement across de-entrainment filters.
 - Flow and pressure measurement on steam coils.
 - Flow and discharge temperature on cooling coils
 - Sample systems will be operated from the sample cells with power indication if motor driven pump, or pressure indication if air lift. Flow indication for sample slurry can be visual observation of the slurry through the sample bottle.
 - Flow measurements on ventilation/exhaust blowers and differential pressure measurements across filters.
- Cold Feeds:
- Pressure indication on all pump discharges - no power measurements.

This table does not describe every instrument. It shows typical instrument requirements for the major process, cold feed, and utility systems. Instruments with standard package systems (e.g. refrigeration units, Clayton and Sellers jets, etc.) are not shown.

The following key identifies the readout location:

- A - Central Control Room Process Console with emergency operation at Field Operating Stations.
- B - Central Control Room Power Console - Roving operator - with emergency backup at field operating station.
- C - Process Field Operating Station - Operator normally present - CCR surveillance
- D - Process Field Operating Station - Roving operator - CCR surveillance
- E - Power Field Operating Station - Roving operator - CCR surveillance
- F - Crane Console - Operator present when crane is being operated - Supervisory viewing room surveillance
- G - Crane Console - E & I Shop Crane Maintenance
- H - H-Area Waste Tank Farm Control Room - CCR surveillance
- I - 751-A Power Dispatcher
- K - Power Field Operating Station at substation
- O - Local indication only
- 2 - Combination of D&H, defined above
- 3 - Combination of I&K, defined above

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
INTERAREA TRANSFER (DA 511/550)														
Interarea Line Jackets (Leak Detection Boxes)									H					
Auxiliary ^a Pump Tank														2 H 2
Transfer Pump								2						
Recirculating Pump								2						
Sump Pump								2						
Sump														2 H
Underliner Sump									H					
Pump Pit Vessel Vent Blower(s)								2						
Filter (s)												2 2		
Heater														H
Low Point ^a Sludge Pump Tank														2 H 2
Transfer Pump								2						
Recirculating Pump								2						
Sump Pump								2						
Sump														2 H
Underliner Sump									H					

^a Requires redundant LL and SpG

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

[illegible]

^a Requires redundant LL and SpG.

VARIABLES TO BE MEASURED AND LEADOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	PH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
INTERAREA TRANSFER (DA 511/550)														
Interarea Line Jackets (Leak Detection Boxes)									H					
Auxiliary ^a Pump Tank	2	H	2											
Transfer Pump							2							
Recirculating Pump							2							
Sump Pump							2							
Sump	2	H												
Underliner Sump									H					
Pump Pit Vessel Vent Blower(s)							2							
Filter (s)											2	2		
Heater													H	
Low Point ^a Sludge Pump Tank	2	H	2											
Transfer Pump							2							
Recirculating Pump							2							
Sump Pump							2							
Sump	2	H												
Underliner Sump									H					

^a Requires redundant LL and SpG

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

[illegible]

a Requires redundant LL and SpG.

OTHER MEASUREMENTS

[illegible]

OTHER MEASUREMENTS

EQUIPMENT OR SERVICE	OTHER MEASUREMENT																
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
<u>COLD FEEDS OUTSIDE 221-S (DA 422)</u>																	
<u>Caustic Portable Storage Tank</u>															D		
<u>Transfer Pump</u>														D			
<u>Steam Coil</u>														O			
<u>50% Nitric Acid Portable Storage Tank</u>																D	
<u>Transfer Pump</u>														D			
<u>Nitric-Acid-Potassium Permanganate Make-up Tank</u>															D	D	D
<u>Cooling Coils</u>														D			
<u>Transfer Pump</u>														D			
<u>Sampler</u>														O			
<u>Formic Acid Storage Tanks (2)</u>															D	D	
<u>Transfer Pump</u>														D			
<u>Sampler</u>														O			
<u>Formic Acid Dilution Tank</u>															D	D	D
<u>Transfer Pump</u>														D			
<u>Sampler</u>														O			

VARIABLES TO BE MEASURED AND READOUT LOCATIONS		OTHER MEASUREMENTS	
EQUIPMENT OR SERVICE	COLD FEEDS OUTSIDE 221-S (DA 422 - Continued)	pH (at sample cell)	
		Radiation	
	Dilute Formic Acid Feed Tank	RPM	
		Resistance	
	Transfer Pump	DC Milliamps	
		Current	
	Sampler	Voltage	
		Power	
	Potassium-Permanganate Make-up Tank	Liquid Presence	
		Mercury Presence	
	Transfer Pump	Mercury Interface/Level	
		Flow	
	Sampler	Differential Pressure	
		Pressure	
	Oxalic Acid Make-up Tank	Temperature	
		Specific Gravity	
	Steam Coil	Liquid Level	
	Transfer Pump		
	Sampler		
	Cold Feed Vent System		
	Filter		
	Organic Acid Vent System		
	Filter		

OTHER MEASUREMENTS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS																
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
FEED VESSELS INSIDE 221-S (DA 329)																	
Nitric Acid Dilution Tank															D	D	D
Transfer Pump															D		
Sampler															0		Flow (Sight Glass)
Remote Decon Nitric Acid Feed Tank																D	
Sampler															0		Flow (Sight Glass)
Remote Decon Oxalic Acid Feed Tank																D	
Sampler															0		Flow (Sight Glass)
Contact Decon Oxalic Acid Feed Tank																D	
Sampler															0		Flow (Sight Glass)
Contact Decon Nitric Acid Feed Tank																D	
Sampler															0		Flow (Sight Glass)
Caustic Feed Tank																D	
Transfer Pump															0		
Sampler															0		Flow (Sight Glass)

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

OTHER MEASUREMENTS

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
COLD FEEDS - (DA 329 - Continued)														
Cold Feed Vent Filter													D	
Medium Pressure Process Water Tank													D	D
Feed Pump													D	
Potassium Permanganate Feed Tank													D	
Sampler													O	
														Flow (Sight Glass)
Nitric Acid Feed Tank													D	
Feed Pump													D	
Sampler													O	
														Flow (Sight Glass)
FRIT SYSTEM - INSIDE 221-S (DA-329)														
Decon Frit Weigh Bin													C	
Bag filter													C	
Feeder Valve														

WEIGHT/C

POSITION/C

[illegible]

OTHER MEASUREMENTS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS																
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
COLD FEEDS - (DA-329 - Continued)																	
Organic Acid Drain Catch Tank																D	
Transfer Pump														D			
Sampler														O			Flow (Sight Glass)
Floor Drain Catch Tank															D	D	
Transfer Pump														D			
Sampler														O			Flow (Sight Glass)
Cooling Coils														O	D		
HEPA Filter														O			
CHEMICAL PROCESSING CELL -(DA 350)																	
Spent Frit Hold Tank																A	A
Agitator									A								
Air Sparger												A					
Transfer Pump									A								
Sampler														D			Flow in Sample Cell

OTHER MEASUREMENTS

[illegible]

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
CHEMICAL PROCESSING CELL (DA 350 - Continued)														
Slurry Mix Evaporator	A													
Agitator								A						
Air Sparger											A			
Transfer Pump								A						
Sample Pump								D						Flow Measurement In Sample Cell
Mercury Sump										A				
De-entrainment Filter												A		
Condenser													A	
Steam Coils													A	
Cooling Water Coils													A	
SME - Condensate Tank														
Air Sparger												A		
Transfer Pump								A						
Sample Pump												D		Flow Measurement In Sample Cell
Mercury Sump										A				

[illegible]

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	PH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
CHEMICAL PROCESSING CELL (DA 350 - Continued)														
Melter														
Vapor Space														
Main Electrodes														
Riser Electrode														
Riser														
Drain Heater														
Drain Valve														
Dome Heaters														
Pour Spout														
Pour Spout Heater														
Melt Surface														
Seal Pot														
Refractory														
Cooling Water Systems														
Melter Feed Tubes														
Waste Glass Canister ^C (at Fill Station)														
Canister inner plug closure														

^C Redundant LL

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS												
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure
CHEMICAL PROCESSING CELL (DA 350 - Continued)													
Filter Pump Tank													
Agitator								A					
Transfer Pump								A					
Sample Pump								D					
Mercury Sump										A			
Deep Bed Filter Pump								A					
Secondary Deep Bed Filters											A		
Deep Bed Filter Air Nozzles											A		
Back-up Quencher											A		
Back-up Quencher Pump								A					
Off Gas Condenser												A	
Off Gas De-entrainer											A		
Cooling Coils												A	
Ru Adsorber Preheater								A	A				
Ru Adsorber													
								A	A				

Flow In Sample Cell

AIR SAMPLER/D

Ru/A

EQUIPMENT OR SERVICE	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level	OTHER MEASUREMENTS
CHEMICAL PROCESSING CELL (DA 350 - Continued)																		
I ₂ Adsorber Preheater						A	A											
I ₂ Adsorber						A	A											I ₂ /A
Off Gas Cooler						A												
Cooling Coils						A	A											
Off Gas Exhauster						A	A	A										AIR SAMPLERS/D
Spare Exhauster						A	A	A										(TEMP & FLOW IN COMMON DISCH LINE)
Off Gas Exhauster Valves																		POSITION/A
Mercury Water Wash Tank																		
Air Sparger												A						
Mercury Sump												A						
Mercury Transfer Pump												A						

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS						
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage
	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
	Temperature	Specific Gravity	Liquid Level				
	POSITION/C	TIME/C	FORCE, DIST, TIME/C	POSITION/C	POSITION, VISUAL/C		
CANISTER DECON (DA-360)							
Decon Chambers (2)							
Nozzles							
Canister Welder							
Canister Transfer Units							
Canister Smear, Test Insp Stations (2)							
Counting Station							
MERCURY PURIFICATION CELL (DA-378)							
Mercury Acid Wash Tank							
Air Sparger							
Mercury Feed Tank No. 1							
Transfer Pump							

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
MERCURY PURIFICATION CELL (DA-378)														
Acid Scrub Feed Tank ^e														
Mercury Feed Tank No. 2														
Transfer Pump														
Water Wash Feed Tank ^e														
Mercury Water Wash Column*														
Mercury Hold Tank														
Mercury Vent Condenser														
Cooling Water														
Mercury Acid Scrub Column*														
Mercury Vacuum Still														
Mercury Flask														
Spent Wash Tank														

VACUUM/0

WEIGHT/0

^e May be located outside of purification cell

*No instrumentation required if equipment is constructed of glass.

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
CHEMICAL PROCESSING CELL - (DA 395)														
Recycle Collection Tank														
Agitator								A						
Transfer Pump								A						
Sample Pump								D						Flow In Sample Cell
Cooling Coils												A		
Decon Waste Treatment Tank														
Agitator								A						
Transfer Pump								A						
Sample Pump								D						Flow In Sample Cell
Cooling Coils												A		
Steam Coils												A		
Reflux Condenser & Cooling Coils												A		
Vessel Vent Header									A					Gas Sample
Preheater												A		
Filter (s)												A		
Blowers (2)									A			A		Gas Sample

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS																
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
WASTE TREATMENT SYSTEM (DA 980)																	
Acid Waste Hold Tank															D	D	D
Transfer Pump														D			
Sampler														D			Flow (Sight Glass)
Organic Acid Waste Neutralization Tanks															D	D	D
Agitator																	
Transfer Pump														D			
Sampler														D			Flow (Sight Glass)
Caustic Waste Neutralization Tank(s)															D	D	D
Agitator																	
Metering Pump														D			
Sampler														D			Flow (Sight Glass)
Sodium Sulfide Make-up Tank															D	D	D
Transfer Pump														D			
Sampler														D			Flow (Sight Glass)
In line Mixer (Chlorine Destruct)												D					D

OTHER MEASUREMENTS

EQUIPMENT OR SERVICE	OTHER MEASUREMENT																
	PH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
WASTE TREATMENT SYSTEM (DA 980 - Continued)																	
Settling Tank																	D
Transfer Pump															D		
Sampler														D	D		
Composite Sampler													D				D
WATER SUPPLY SYSTEM (DA 980)																	
Deep Wells #1 (Dual Drive)														E	E		
#2														E	E		
Cooling Tower Basin																	E
Purge																	E
Emergency Fire Line														E	E		
Caustic Addition																	E
Chlorine Addition																	E
Pump (s)														E			

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS																
	pH (at sample cell)	Radiation	RPM	Resistance	DC Milliamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure	Temperature	Specific Gravity	Liquid Level
WATER SUPPLY SYSTEM (DA 980 - Continued)																	
Raw Water Degas (CO ₂)												E					
Caustic Adjustment		E										E					
Neutralized Water Pumps								E									
Water Pumps (Emer. Power)							E	E					E				
H&V Chilled Water System												E		E			
Hypochlorite Addition Tks														E			E
Pumps													E				
Domestic Water Storage Tank														E			
Domestic Water Pumps (3) (Emer. Power)													E	E			
Fire Water Storage Tank														E			
Fire Water System													E	E			

OTHER MEASUREMENTS

[illegible]

VARIABLES TO BE MEASURED AND READOUT LOCATIONS

EQUIPMENT OR SERVICE	OTHER MEASUREMENTS													
	pH (at sample cell)	Radiation	RPM	Resistance	DC Millamps	Current	Voltage	Power	Liquid Presence	Mercury Presence	Mercury Interface/Level	Flow	Differential Pressure	Pressure
AIR SYSTEMS														
221-S Zone 1 Air Supply Fans														
Air														
Air Exhaust Ducts														
Sand Filter														
Air Exhaust Fans														
221-S Zone 2 & 2A Air Supply Fans														
Air														
Air Exhaust Ducts														
HEPA Filters														
Air Exhaust Fans														
221-S Zone 3 Air Supply Ducts														
Air														
H&V Systems Non-Regulated														

MOISTURE/E

[illegible]

INFORMATION ONLY

TABLE 6-2
CONTROLSGeneral

All motors for agitators, pumps and blowers should have remote off-on controls located at the control area responsible for their operation (i.e. H-Area Control Room, 221-S Central Control Room or 751-A Power Dispatcher). Additionally, off-on control should be available at the Field Operating Station (FOS) for operation and/or emergency shutdown.

Process Cell sampling systems should be controlled from the sample cells.

The following key identifies the readout location:

- A - Central Control Room Process Console with emergency operation at Field Operating Stations.
- B - Central Control Room Power Console - Roving operator - with emergency backup at field operating station.
- C - Process Field Operating Station - Operator normally present - CCR surveillance
- D - Process Field Operating Station - Roving operator - CCR surveillance
- E - Power Field Operating Station - Roving operator - CCR surveillance
- F - Crane Console - Operator present when crane is being operated - Supervisory viewing room surveillance
- G - Crane Console - E & I Shop Crane Maintenance
- H - H-Area Waste Tank Farm Control Room - CCR surveillance
- I - 751-A Power Dispatcher
- K - Power Field Operating Station at substation
- O - Local indication only

<u>EQUIPMENT OR SERVICE</u>	<u>CONTROLS AND LOCATIONS</u>
<u>Interarea Transfer (DA 511/550)</u>	
Pump & Fan Motors	Off-On/D&H
Pump Pit Sump Pumps	Off-On/D
Pump Pit Vessel Heaters	Temperature/H
<u>Cold Feeds Outside 221-S (DA 422)</u>	
Air Filter & Receiver/Dryer	Temperature, Flow/D
Unloading Screen Conveyor	Off-On/C
Transport Blow Tank(s)	Off-On/C
Caustic Portable Storage Tank	Temperature/C
Nitric-Acid-Potassium Permanganate Make-Up Tank	Liquid Level (Batch Sequence Controller), Temperature/C
Formic Acid Dilution Tank	Liquid Level (Batch Sequence Controller)/C
Oxalic Acid Make-Up Tank	Temperature/C
<u>Cold Feeds Inside 221-S (DA 329)</u>	
Sellers Jets	Flow, Pressure, Temperature/C
Clayton Jets	Flow, Pressure, Temperature/C
Decon Frit Weigh Bin	Weight/C
Decon Frit Slurry Feed Tank Air Sparger	Air Flow/C
Process Frit Weigh Bin	Weight/C
Process Frit Slurry Feed Tank Air Sparger	Air Flow/C
Floor Drain Catch Tank	Temperature/D

<u>EQUIPMENT OR SERVICE</u>	<u>CONTROLS AND LOCATIONS</u>
<u>Cold Feeds Inside 221-S (DA 329)</u>	
Nitric Acid Dilution Tank	Liquid Level (Local Sequence Controller)
Cold Feed Organic Acid Vent Condenser	Temperature/A
Medium Pressure Process Water Tank	Pressure, Liquid Level/A
Decon Solution Make-up Tank	Liquid Level (Sequence Controller)/A
Floor Drain Catch Tank	Temperature/A
<u>Chemical Processing Cell (DA 350)</u>	
Spent Frit Hold Tank - Air Sparger	Air Flow/A
Sludge Receipt & Adjustment Tank	Temperature/A
Air Sparger	Air Flow/A
Condenser	Temperature/A
Steam & Cooling Coil	Flow/A
Slurry Mix Evaporator	Temperature/A
Air Sparger	Air Flow/A
Condenser	Temperature/A
Steam & Cooling Coils	Flow/A
SME-Condensate Tank	Liquid Level, Temperature/A
Air Sparger	Air Flow/A
Steam and Cooling Coils	Flow/A
Formic Acid Vent Condenser	Temperature/A
Melter Feed Tank	
Air Sparger	Air Flow/A
Melter Feed Pump(s)	Flow/A
Melter	Temperature, Pressure & Differential Pressure/A
Main Electrodes	Temperature/A
Riser	Temperature/A
Riser Electrode	Temperature/A
Drain Heater	Temperature/A
Dome Heaters	Temperature/A
Cooling Water Systems	Flow/A
Pour Spout	Differential Pressure/A
Seal Pot	Liquid Level/A

REVISED TABLE

<u>EQUIPMENT OR SERVICE</u>	<u>CONTROLS AND LOCATIONS</u>
<u>Chemical Processing Cell (DA 350), Cont'd.)</u>	
Off-Gas Line	Air Dilution/A
Off-Gas Condensate Tank	Liquid Level, Temperature/A
Air Flow to Deep Bed Nozzles	Air Flow/A
Filter Pump Tank	Liquid Level, Temperature/A
Air Flow to Deep Bed Nozzles	Flow/A
Off-Gas Condenser	Temperature/A
Ru Adsorber Preheater	Temperature/A
I ₂ Adsorber Preheater	Temperature/A
Off-Gas Cooler	Temperature/A
Off-Gas Exhausters	Pressure (Automatic Switchover upon failure)/A
Mercury Water Wash Tank	Temperature/A
Air Sparger	Air Flow/A
<u>Chemical Processing Cell (DA 395)</u>	
Recycle Collection Tank	Temperature/A
Decon Waste Treatment Tank	Temperature/A
Reflux Condenser	Temperature/A
Vessel Vent Header-Preheater	Differential Temperature/A
<u>Mercury Purification Cell (DA 378)</u>	
Mercury Acid Wash Tank	
Air Sparger	Air Flow/O
Mercury Vent Condenser	Temperature/O
Mercury Vacuum Still	Temperature, Vacuum/O

<u>EQUIPMENT OR SERVICE</u>	<u>CONTROLS AND LOCATIONS</u>
<u>Canister Decon (DA 360)</u>	
Decon Chambers Spray Nozzles	Liquid Level/C Flow/C
Canister Welder	Force, Sequence, Current Time/C
Canister Decon Stations	Position/C
Canister Smear Test Inspection Stations	Position/C
<u>Waste Treatment System (DA 980)</u>	
Acid Waste Hold Tanks	Liquid Level/D
Organic Acid Waste Neutralization Tanks	Liquid Level/D
Caustic Waste Neutralization Tanks	Liquid Level/D
Sodium Sulfide Addition Tank	Liquid Level/D
<u>Water Systems</u>	
Wells	Flow/D
Storage Tanks	Liquid Level/D
<u>Interim Storage Building (DA 250)</u>	No Automatic-Remote Manual On-Off for Forced Air Ventilation/B
<u>Electrical Supply System</u>	
115 KV Breakers and Switches	On-Off/E&I
115 KV - 13.8 KV Transformer Tap Switch	Position/B
13.8 KV Secondary and Tie Breakers	On-Off/E&I
13.8 KV Feeder Breakers	On-Off/B&E
440 Volt Feeder and Tie Breaker	On-Off/E
Emergency Generator Breaker	On-Off/B&E
H&V System Non-Regulated	On-Off/E

<u>EQUIPMENT OR SERVICE</u>	<u>CONTROLS AND LOCATIONS</u>
<u>Air Systems</u>	On-Off/B&E
<u>Other Utilities</u>	
Steam Headers	Flow, Pressure/D
Refrigeration Machines	Temperature, Flow/D
Air Supply Systems	Flow, Pressure/D

TABLE 8-1
GUIDE FOR OFFSITE EXPOSURE
(Revised March 1972)

A. APPLICABILITY

This guide applies to the release of radioactive materials in gaseous and liquid effluents from the Savannah River Plant and Laboratory.

B. OBJECTIVE

The objective for prescribing the dose-limits in this guide is to keep exposures to the public in the vicinity of the Savannah River Plant as low as practicable.

C. LIMITS

The annual exposure in an individual in the offplant population caused specifically by release of radioactivity from the Savannah River Plant and Laboratory shall not exceed the following limits:

<u>Type of Exposure</u>	<u>Dose Limit, mrem/yr</u>
Whole body	10
Gonads	10
Bone marrow	10
Gastrointestinal tract	30
Bone	30
Thyroid	30
All other individual organs	30

D. BASES

The bases for this guide are operating experience, recommendations of the International Commission on Radiological Protection (ICRP), the National Council on Radiation Protection and Measurements (NCRP), the Federal Radiation Council (FRC), and the guidelines of the Energy Research and Development Administration.

This guide does not in any way modify the guides recommended by the ICRP, NCRP, and FRC for control of population exposure. The numerical limit recommended by these guides-setting organizations of 170 mrem/yr for the average dose to the whole population remains as the basic radiation protection criterion for control of public exposure. The Savannah River Plant's objective is to keep offsite exposures as far below this criterion as practicable.

TABLE 8-2
RADIOACTIVE RELEASE GUIDES (CY-78)a. Release Guides for Liquid Radioactive Releases to Streams and Basins

The quantity of each radionuclide entering Plant streams or basins from reactor area facilities shall not exceed the following guides.

Radionuclide	Misc Releases	Purge Releases ^a			Oil and Chemical Pit
	PKC Areas	P Area	K Area	C Area	L Area
Ci/yr					
Tritium	600	9,000	9,000	9,000	600
Reactor HX Cooling Water		3,600	3,600	7,200	
Process Sewer		300	300	300	
mCi/yr					
³² P	b	18	18	18	b
³⁵ S	b	240	240	240	b
⁵¹ Cr	b	240	240	240	b
^{58,60} Co, ⁵⁹ Fe	b	6	6	6	3
⁹⁰ Sr	b	12	12	12	b
⁹⁰ Sr	1.2	12	12	12	1.2
⁹¹ Y	b	42	42	42	b
⁹⁵ Zr- ⁹⁵ Nb	b	180	180	180	b
¹⁰³ Ru, ¹⁰⁶ Ru-Rh	b	18	18	18	b
^{124,125} Sb	b		96 ^c		b
¹³¹ I	b	36	36	36	b
¹³⁴ Cs	b	54	54	54	b
¹³⁷ Cs	3	120	120	120	3
¹⁴¹ Ce, ¹⁴⁴ Ce	b	36	36	36	b
¹⁴⁷ Pm	b	36	36	36	b
All other beta or gamma emitters, total	60	5	5	5	12
All alpha emitters, total	6	5	5	5	3

^a K-Area disassembly basin is purged to the 50-million gallon containment basin. P- and C-Area disassembly basins are purged to the effluent stream. Recommended criteria for use of existing small seepage basins in P and C Areas are being prepared; revised purge guides will be considered prior to their use.

^b Included in all other beta or gamma emitters guide.

^c K Area only.

b. Release Guides for Atmospheric Radioactivity Releases

The quantity of each radionuclide entering the atmosphere from reactor area facilities shall not exceed the following guides.

Radionuclide	P Area	K Area	C Area
Ci/yr			
Tritium	60,000	60,000	60,000
¹⁴ C (calculated value)	20	20	20
⁴¹ Ar	36,000	36,000	36,000
^{83,85m,87,88} Kr	1,620	1,620	1,620
^{133m,133,135} Xe	2,700	2,700	2,700
mCi/yr			
¹³¹ I			
Stack	1.2	1.2	1.2
Disassembly	4.8	4.8	4.8
All other beta or gamma emitters, total	1	1	1
uCi/yr			
All alpha emitters, total	6	6	6

TABLE 8-2 (contd)
RADIOACTIVE RELEASE GUIDES (CY-78)

a. Release Guides for Liquid Radioactivity Releases to Streams and Basins

The quantity of each radionuclide entering Plant streams or basins from separations areas facilities shall not exceed the following guides.

[1] Seepage Basin

Radionuclide	Ci/year	
	F Area	H Area
T	15,000	24,000
⁵¹ Cr	*	10.0
⁵⁸ Co	*	1.0
⁶⁰ Co	*	1.0
⁶⁵ Zn	*	1.0
⁸⁹ Sr	0.2	0.5
⁹⁰ Sr	0.2	0.6
⁹⁵ Zr	4.0	1.0
⁹⁵ Nb	4.0	2.0
¹⁰³ Ru	2.0	2.0
¹⁰⁶ Ru	10.0	7.5
^{124,125} Sb	*	0.2
¹³¹ I	1.0	0.5
¹³⁴ Cs	0.4	1.0
¹³⁷ Cs	4.0	6.0
¹⁴¹ Ce	0.1	0.5
¹⁴⁴ Ce	0.5	1.5
¹⁴⁷ Pm	1.0	1.5
All other beta or gamma emitters, total	0.5	0.8
All alpha emitters, total	0.5	0.2

* Included in all other beta or gamma emitters guide.

[2] Plant Streams
(Combined F and H Areas)

Radionuclide	mCi/year	Ci/year
		150
T		
^{89,90} Sr	25	
^{134,137} Cs	50	
All other beta or gamma emitters, total	125	
All alpha emitters, total	10	

TABLE 8-2 (contd)
RADIOACTIVE RELEASE GUIDES (CY-78)

b. Release Guides for Atmospheric Radioactivity Releases

The quantity of each radionuclide entering the atmosphere from separations areas facilities shall not exceed the following guides (combined F and H Areas).

Radionuclide	mCi/year	Ci/year	kCi/year
T			275
^{14}C (Calculated value)		50	
^{85}Kr (Calculated value)			950
$^{89,90}\text{Sr}$	10		
^{95}Zr	50		
^{95}Nb	75		
^{103}Ru	75		
^{106}Ru	500		
^{129}I (Calculated value)	250		
^{131}I	500		
$^{131\text{m}}, ^{132}\text{Xe}$ (Calculated value)		500	
^{134}Cs	0.5		
^{137}Cs	3		
^{141}Ce	2		
^{144}Ce	30		
$^{235,238}\text{U}$	10		
$^{238,239}\text{Pu}$	10		
All other beta or gamma emitters, total	5		
All other alpha emitters, total	1		

TABLE 8-2 (contd)
RADIOACTIVE RELEASE GUIDES (CY-78)

300-M AREA

a. Release Guides for Liquid Releases to Streams and Basins

The quantity of each radionuclide entering plant streams and basins from 300-Area facilities shall not exceed the following guides.

Radionuclide	mCi/year
$^{235}, ^{238}\text{U}$ to streams	100
$^{235}, ^{238}\text{U}$ to basins	400

b. Release Guides for Atmospheric Radioactivity Releases

The quantity of each radionuclide entering the atmosphere from 300-Area facilities shall not exceed the following guides.

	Radionuclide	$\mu\text{Ci/year}$	Ci/year
313-M	^{238}U	25	
321-M	Total alpha	25	
322-M	T		100
322-M	Total alpha	25	

400-D AREA

a. Release Guides for Liquid Releases to Streams and Basins

The quantity of each radionuclide entering plant streams from 400-Area facilities shall not exceed the following guides.

Radionuclide	mCi/year	Ci/year
T		3000
$^{89}, ^{90}\text{Sr}$	5	
$^{134}, ^{137}\text{Cs}$	5	
All other beta or gamma emitters, total	50	
All alpha emitters, total	1	

b. Release Guides for Atmospheric Radioactivity Releases

The quantity of each radionuclide entering the atmosphere from 400-Area facilities shall not exceed the following guide

Radionuclide	Ci/year
T	5000

TABLE 8-2 (contd)
RADIOACTIVE RELEASE GUIDES (CY-78)

TECHNICAL AREAS

a. Release Guides for Liquid Radioactive Releases to Streams and Basins

The quantity of each radionuclide entering Plant streams or basins from technical area facilities shall not exceed the following guides.

(1) Building 773-A Seepage Basins

Radionuclide	mCi/year	Ci/year
T		15
^{89,90} Sr	2	
^{134,137} Cs	1	
All other beta or gamma emitters, total	10	
^{235,238} U, Pu	4	
All other alpha emitters, total	10	

(2) Plant Streams

Radionuclide	mCi/year
All beta or gamma emitters, total	8
All alpha emitters, total	4

(3) CMX-TNX Seepage Basins

Radionuclide	mCi/year
^{235,238} U	2.5

b. Release Guides for Atmospheric Radioactivity Releases

The quantity of each radionuclide entering the atmosphere from technical area facilities shall not exceed the following guides.

(1) Building 773-A

Radionuclide	mCi/year	Ci/year
T		500
⁶⁰ Co	2	
¹³¹ I	30	
All other beta or gamma emitters, total	0.5	
All alpha emitters, total	0.2	

TABLE 8-3
NONRADIOACTIVE DISCHARGE LIMITS

Limits	Ash Basin	Ash and Coal Pile Runoff	Water Treatment	Cooling Water	Boiler Blowdown	Storm ^a Sewers	Process Sewer
Oil and grease, ppm							
Daily average	15						
Daily maximum	20					15	
Suspended solids, ppm							
Daily average	30		30				
Daily maximum	100	50	30			50	
pH, units — range	6-9	6-9	6-9		6-10		
Chromium, ppm							
Daily average							
Daily maximum				1.0			
Zirconium, ppm							
Daily average				0.5			
Daily maximum				1.0			
Copper, ppm							
Daily average				0.5			
Daily maximum				1.0			
Residual Cl ₂ , ppm							
Daily average				0.2			
Daily maximum							
Temp, °C							
Daily average				35	35 ^b		
Daily maximum				38	38	38	
Other	c						d

^a Limits are applicable to storm sewers which receive waste discharges from any source. Storm sewers consisting entirely of uncontaminated surface runoff do not require monitoring.

^b Temperature limits are not applicable where discharges are directed to Beaver Dam Creek, Four Mile Creek, Indian Graves Branch, Pen Branch, and Steel Creek.

^c The permit specifies monitoring but no limits for arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, zinc, and vanadium.

^d The permit specifies the monitoring of process sewer effluent for oil and grease, suspended solids, chromium, cadmium, copper, lead, mercury, nickel, zinc, and pH. After reviewing the release data, the EPA may specify limits.

TABLE 10-1
WORK ASSIGNMENTS -- SUPERVISION

<u>Dept</u>	<u>Position</u>	<u>No</u>	<u>Days</u>	<u>ABCD</u>	<u>Offices</u>	<u>Location</u>	<u>Remarks</u>
Health Protection	Sr Supvr	1	x		1	Adm Bldg	1 man Office
	Rad Survey Supvr	1	x		1	Service Bldg	1 man Office Near HP Area
	Rad Survey	4		x	1	Service Bldg Counting Rm	4 man Office Near HP Area
Waste Management Technology	Chief Supvr	1	x		1	Adm Bldg	1 man office
	Area Supvr	1	x		1	Adm Bldg	1 man office
	Engineers	5	x		3	Service Bldg	2 man office
Waste Management Operations	Area Supt	1	x		1	Adm Bldg	1 man office
	Area Supvr	1	x		1	Adm Bldg	1 man office
	Sr Supvr	4		x	1	Service Bldg	4 man office
	Shift Supvr	4		x	1	Service Bldg	4 man office
	Foreman	8		x	2	Service Bldg	4 man office
	Relief Supvr	4	x		2	Service Bldg	2 man offices
	Sr Supvr	1	x		1	Service Bldg	1 man office
	Foreman	4	x		2	Service Bldg	2 man offices
	Sr Supvr	1	x		1	Cold Feed	1 man office
	Foreman	2	x		1	Cold Feed (Control Rm)	2 man office
	Foreman	1	x		1	Service Bldg (Canister Insp)	1 man office
	Shift Supvr	1	x		1	Service Bldg	1 man office
	Shift Supvr	2	x		1	Adm Bldg	2 man office

REVISED TABLE

WORK ASSIGNMENTS -- SUPERVISION

<u>Department</u>	<u>Position</u>	<u>No</u>	<u>Days</u>	<u>ABCD</u>	<u>Offices</u>	<u>Location</u>	<u>Remarks</u>
Maintenance Department	Area Engr	1	x		1	Adm Bldg	1 man office
	Engineer	1	x		1	Adm Bldg	1 man office
	Foreman	1	x		1	Service Bldg	1 man office in shop
	Foreman	1	x		1	Process Area Reg.Mach.Shop	1 man office
	Foreman	1	x		1	Process Area Crane Maint	1 man office
	Foreman	1	x		1	Process Area Manip Repair	1 man office
E & I Department	Area Engr	1	x		1	Adm Bldg	1 man office
	Foreman	1	x		1	Service Bldg (Near Computer Rm)	Shop #4
	Foreman	1	x		1	Crane Maint	Shop #3
	Foreman	2	x		2	Process Area	Shop #2
	Foreman	1	x		1	Service Bldg	Shop #5
	Foreman	4		x	1	Process Area	Shop #1
T & T Department	Foreman	1	x		1	Service Bldg	1 man office
Safety & Security	Lieutenant	4		x	1	Adm Bldg	1 man office
	Safety Eng	1	x		1	Adm Bldg	1 man office
Project Dept	Area Eng	1	x		1	Adm Bldg	1 man close to files
	Mech Eng	2	x		1	Adm Bldg	2 man office
	Electrical Engineers	2	x		1	Adm Bldg	2 man office
Personnel	Employee Counsler	1	x		1	Adm Bldg	1 man office

REVISED TABLE

WORK ASSIGNMENTS -- LOCAL ROLL

<u>Department</u>	<u>Position</u>	<u>No</u>	<u>Days</u>	<u>ABCD</u>	<u>Offices</u>	<u>Location</u>	<u>Remarks</u>
Health Protection	Clerk	1	x		1/2	Adm Bldg	Near HP office
	Inspector	1	x				
	Inspector	8		x			
Waste Mgt Tech	Clerk	1	x		1/2	Adm Bldg	
Waste Management Operations	Secretary	2	x		1	Adm Bldg	1 man office
	Operators	48		x			
	Clerk	1	x		1	Service Bldg Control Rm	1 man office with files
	Operators	15	x				
	Clerk	1	x		1/2	Cold Feed	
Maintenance	Clerk	1	x		1/2	Adm Bldg	
	Project Ass't	1	x		1/2	Adm Bldg	
	Mech's	17	x				
	Mech's	8		x			
E & I	Clerk	1	x		1/2	Adm Bldg	
	Project Ass't	1	x		1/2	Adm Bldg	
	Mech's	19	x				
	Mech's	8		x			
T & T	Riggers	3	x				
Safety & Security	Patrolmen	3	x				
	Patrolmen	12		x			

REVISED TABLE

WORK ASSIGNMENTS -- LOCAL ROLL

<u>Department</u>	<u>Position</u>	<u>No</u>	<u>Days</u>	<u>ABCD</u>	<u>Offices</u>	<u>Location</u>	<u>Remarks</u>
Cafeteria	Food Servers	2	x				
Info Systems	File Clerk	1	x		1	Adm Bldg	File Room
Project Dept	Draftsman	1	x		1	Adm Bldg	Close to Engineers
	Eng Ass't	1	x		1/2	Adm Bldg	
	Clerk	1	x		1/2	Adm Bldg	
Power	Operators	4		x			
Service	Janitors	3	x				
Total		238			51		

TABLE 10-2
SUMMARY OF OFFICES, LOCKERS, AND REST ROOM REQUIREMENTSOffice Locations

<u>Type</u>	<u>Control Room Space</u>	<u>Process Area</u>	<u>Adm Bldg</u>	<u>Service Bldg</u>	<u>Patrol</u>	<u>Cold Feed</u>
1 man	-	6	14	12	- -	2
2 man	-	-	7	5	1	1
4 man	-	-	-	7	-	-
File Room	-	-	1	-	-	-
Control Rm	-	-	-	1	-	1
Total	-	6	22	24	1	4

Locker Requirements

<u>Location</u>	<u>Service Bldg</u>	<u>Patrol</u>
Male	141	15
Female	42	5
Total	183	20

Female lockers based on 23% of total
Allow additional space for 10 male and 5 female
Lockers in service bldg to accomodate personnel changes

Rest Room Requirements

<u>Location</u>	<u>Service Bldg</u>	<u>Patrol Gatehouse</u>	<u>Adm Bldg</u>
Male	71	5	26
Female	25	5	9
Total	96	10	35

Female facilities based on 25% except for Administration which was increased due to Clerical.

Showers are not to be included in Administration Building.

****REVISED TABLE****

PERMANENTLY INSTALLED HEALTH PROTECTION MONITORS

	<u>Radiation Monitors</u>		<u>Air Monitors</u>	
	<u>Beta/Gamma Ion. Chamber</u>	<u>Filter Paper Air Sampler</u>	<u>Continuous Alpha/Beta/Gamma Air Monitor</u>	
Regulated Corridors	Every 100 ft	Every 100 ft	-	
Locker rooms	1 each at entrance	1 each	-	
Service piping corridors	Every 100 ft.	-	Every 200 ft	
Manipulator aisles	Every 20 ft.	-	Every 20 ft	
Transfer tunnels	1 each	1 each	-	
Sample stations	1 each	-	1 each	
Regulated shops	2 each	-	1 as required at workstation	
Crane maint. area	2 each	-	2 each	
Decon. cells	2 each	-	1 each	
Process eqpt repair shop	2 each	-	1 each	
Canister storage cells	1 each	-	1 each	
Supply air to pers areas	-	1 each	1 each	
Supply air to cells	-	1 each	1 each	
Exhaust duct from each regulated area	-	-	1 each with repr sampler	
Before Process Vessel Vent System	-	1 each	-	
After Process Vessel Vent System	-	1 each	-	
After treatment of melter off-gas	-	1	-	
Air leaving fan house HEPA filters	-	1	-	
Waste storage area	1 each	-	-	
Exhaust ducts from canister storage	-	1 each	1 each with repr sampler	
Sand filter influent	-	1	-	
Exhaust air from vitrification bldg	-	1 each with repr sampler	1 each with repr sampler*	
Exhaust air from canister storage bldg	-	1 each with repr sampler	2 each with repr sampler*	
Pump pit exhaust air	-	-	1 each with repr sampler	
Air locks	-	1 each	-	
Pump pits	1 each	-	-	

*Note: 2 stacks

REVISED TABLE

AED ALLOWANCE REQUEST

The Following Items Will Require An AED Allowance
For Purchase By The SRP Project Department

Item

Portable laboratory equipment	\$ 25,000
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Maintenance Tools

Tool crib tools, ladder tool chests and carts	\$ 35,000
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E & I Tools

Tool crib tools, ladder tool chests, and carts	\$ 35,000
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A. Items that have been estimated.

Furniture, Office Equipment, Accessories

Furniture

50 - desks, executive, steel	\$ 50,000
40 - tables, steel, assorted sizes	16,800
75 - file cabinets, steel, 3-4-5 drawer	52,200
50 - chairs, executive	9,550
40 - chairs, straight with arms	2,080
12 - desks, secretary, steel	9,300
12 - chairs, secretary	2,280
50 - bookcases, steel 2-3-4 shelf	9,800
4 - 6 tab-vertical file	1,600
3 - print racks, tracing	600
10 - chairs, lab stool Kramer or equal	2,950
12 - supply cabinets, steel	1,596
25 - chalkboards	1,482
25 - bulletin boards	1,475
1 - draftsman table	245
2 - safe, combo-lock	442

Misc - 65 clocks, 100 waste baskets, 45 desk lamps, 80 mail boxes, 6 mail room bins, 12 clothing bins, 3 microfilm files - 500 linear feet storage shelves	86,195
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Conference Room Equipment

6 - conference room tables	\$ 4,590
50 - conference room chairs	3,500
4 - projector screens, overhead	1,200
3 - TV monitor sets	7,500
3 - TV tape players	
3 - Vu graph projectors	450
4 - speakers stands	320
1 - movie projector	1,000
1 - slide projector 35 mm	300

Office Equipment

15 - typewriters IBM Selectric or equal	\$ 18,000
40 - calculators	6,000
1 - reader printer	700
2 - copiers with collator Xerox or equal	900
1 - microfiche reader	280
1 - 1 blueprint printer-copier	2,000

Janitors Items

4 - janitors carts	\$ 1,000
2 - supply carts	500
1 - furniture mover	200
1 - pallet mover	200
8 - vacuum cleaners	5,360
2 - buffers	3,200
4 - supply cabinets	532
2 - Load Luggers - as specified in Part 5, Item 450	1,000
3 - clean dumpsters, front-load compactor, 8 cubic yd, white	10,500

H. P. Items

1 - Velometer	\$ 850
6 - foot lockers emergency eqpt	1,590
7 - beta gamma counting systems Eberline model RD-15	14,000
10 - miniscalers, Eberline model MS-3	9,250
2 - alpha counting systems Eberline model RD-14	3,480
1 - PHA system including Canberra 30 analyzer, plotter with interface and cable, Tl 743 printer, high voltage supply 3x3 in. NaI detector and base, 7410 shield assembly	25,000

H. P. Items, Continued

1 - lot self reading dosimeters	\$ 78
1 - charger	107
1 - lot industrial hygiene survey insts.	25,000
100 - count rate meters Eberline RM 15/400756	60,000
125 - count rate meter probes Drawing S5-C-334	55,625
7 - alpha survey meters Eberline model PRM 4B/AC-3	8,400
55 - GM survey meter Victoreen model 496 with 489-40 probe N-112F	1,102
55 - GM tube	
35 - beta gamma survey meters Eberline Model RD-25	29,260
25 - NRC - cutie pies, Nuclear Research Corp. Model CP-10 per ORNL Spec Q2299-2	25,000
8 - hand and foot counters	112,000
10 - high volume air samplers Staplex model TF1A	2,150
10 - low volume air samplers ITT model SYCGH-19-1	2,150

Carts - Materials Handling

3 - gas cylinder carts	\$ 750
1 - shielded waste buggy	500
12 - sample carts	1,800
4 - supply carts - aluminum Nutting or equal	1,600

Vehicles, Special Handling Equipment

10 - cars sedan	\$ 25,962
3 - cars sedan radio equipped	31,962
1 - station wagon	8,900
1 - pickup truck, 1 ton	12,620
2 - pickup trucks, 3/4 ton	15,940
4 - pickup trucks, 1/2 ton	28,460
1 - van	12,000
1 - sample truck	16,000
2 - forklift trucks	31,400
1 - forklift truck, 2 ton	19,780
1 - canister handling forklift	17,550
1 - RR car mover	75,000
2 - portable welder, 300 amp gasoline engine powered	11,040
2 - Dempster Dumpster containers for acid and caustic transfers (See drawing S5-6-594.)	78,200

Fire and Safety Items

12 - Scott air packs	\$ 2,400
4 - walkie talkie radios	2,000
126 - fire extinguishers	14,645

Security Equipment

1 - gun cabinet	\$ 1,200
1 - work bench wooden top	1,000
1 - storage shelves 40 linear feet	1,000
6 - footlockers	1,590
1 - safe, combo-lock	221

Cafeteria and Lunch Room Equipment
 (Serving Line Equipment not Included)

3 - grills, single	\$ 1,650
1 - grill, double	700
4 - microwave ovens	2,000
3 - hot plates, 2-4 eye	3,000
3 - sinks	2,100
3 - icemakers	9,360
3 - refrigerators	5,100
28 - tables - 4 person	1,400
112 - chairs for tables	1,624

E&I Shop Equipment

Shop #1 -

1 Each Heavy Duty Vise, 3"	\$ 40
1 Each Heavy Duty Vise, 6"	80
2 Each Clamp Vise, 3"	400
1 Each Ridgid #700 Portable Power Drive	
1 Each Ridgid Portable Band Saw	2,300
1 Each #2 Pipe Reamer	
1 Each #3 Pipe Reamer	
1 Each #40-A Tristand Yoke Vise	165
2 Each 500 Volt Meggers	1,100
4 Each Digital Portable Volt-Ohm Meters	760
2 Each Digital Clamp On Ammeter	400
1 Each Dual Trace Memory Scope	800
1 Each Signal Generator	220
8 Each Adjustable Posture Chairs	1,080
1 Each Vacuum Cleaner	670
2 Each Swing About Magnifier Lamps	210
6 Each Workbenches - 34" x 60"	1,800
18 Each Drawers, Bench	1,170
8 Each Cabinets, Industrial Storage	4,184

E&I Shop Equipment, Continued

Shop #1, Continued -

4 Each	Head Visors	\$ 400
4 Each	Pocket Beeper Receivers	600
1 Each	Pocket Beeper Transmitter	150
4 Sets	Two-Way Radios	6,000
1 Each	Standard Recording Voltmeter	190
1 Each	Standard Recording Ammeter	355
1 Each	Standard Recording Wattmeter	190
1 Each	Portable Mechanic Tool Chest	17
1 Each	Wheatstone Bridge	1,500
2 Each	Meggers	1,000
3 Each	Digital Multimeter	375
2 Each	Set of Bearing Pullers up to 4"	1,200
2 Each	Digital Ammeter	400

2 sets of television test and repair equipment will be required for in-cell CCTV equipment.

Shop #2 -

1 Each	Heavy Duty Vise, 3"	\$ 40
1 Each	Heavy Duty Vise, 6"	80
2 Each	Clamp Vise, 3"	400
1 Each	Ridgid #700 Portable Power Drive	
1 Each	Ridgid Portable Band Saw	2,300
1 Each	#2 Pipe Reamer	
1 Each	#3 Pipe Reamer	
1 Each	#40-A Tristand Yoke Vise	165
2 Each	500 Volt Meggers	1,000
4 Each	Digital Portable Volt-Ohm Meters	760
2 Each	Digital Clamp On Ammeter	400
8 Each	Adjustable Posture Chairs	1,080
1 Each	Vacuum Cleaner	670
2 Each	Swing About Magnifier Lamps	210
6 Each	Workbenches - 34" x 60"	1,800
18 Each	Drawers, Bench	1,170
8 Each	Cabinets, Industrial Storage	4,184
4 Each	Head Visors	400
4 Each	Pocket Beeper Receivers	600
1 Each	Pocket Beeper Transmitter	150
2 Each	Dual Trace Memory Scope	1,600
2 Each	Standard Digital Potentiometer	1,600
3 Each	Standard Digital Pneumatic Pressure Indicator	120
1 Each	Standard Frequency Generator and Counter	170

E&I Shop Equipment, Continued

Shop #2, Continued -

2 Each	Standard Pulse Generator	\$ 300
2 Each	Power Supplies D. C.	1,720
3 Each	Digital Multimeters	375
3 Each	Digital Ohmmeters	735
2 Each	IC Tester	900
1 Each	Differential Voltmeter	300
1 Each	Capacitance Meter	25
2 Each	4 to 20 MA Current Recorder	360
1 Each	Chicago Conduit Bender	1,200
1 Each	Pipe Threading Machine	1,850
2 Each	Transister Tester	120
3 Each	Multimeter	420
1 Set	Pneumatic Valve Tool	200
2 Sets	Logic Pulsers	300
4 Each	Standard Digital Temp. Indicator	2,400

Shop #3

1 Each	Heavy Duty Vise, 3"	\$ 40
1 Each	Heavy Duty Vise, 6"	80
2 Each	Clamp Vise, 3"	400
1 Each	Ridgid #700 Portable Power Drive	
1 Each	Ridgid Portable Band Saw	2,300
1 Each	#2 Pipe Reamer	
1 Each	#3 Pipe Reamer	
1 Each	#40-A Tristand Yoke Vise	165
2 Each	500 Volt Meggers	1,000
4 Each	Digital Portable Volt-Ohm Meters	760
2 Each	Digital Clamp On Ammeter	400
1 Each	Dual Trace Memory Scope	800
1 Each	Signal Generator	220
8 Each	Adjustable Posture Chairs	1,080
1 Each	Vacuum Cleaner	670
2 Each	Swing About Magnifier Lamps	210
6 Each	Workbenches - 34" x 60"	1,800
18 Each	Drawers, Bench	1,170
8 Each	Cabinets, Industrial Storage	4,184
4 Each	Head Visors	400
4 Each	Pocket Beeper Receivers	600
1 Each	Pocket Beeper Transmitter	150
2 Each	Dual Trace Memory Scope	1,600
3 Each	Standard Digital Potentiometer	2,400
3 Each	Standard Digital Pneumatic Pressure Indicator	120
1 Each	Standard Frequency Generator and Counter	170

E&I Shop Equipment, Continued

Shop #3, Continued -

2 Each	Standard Pulse Generator	\$ 300
2 Each	Power Supplies D. C.	1,720
3 Each	Digital Multimeters	375
3 Each	Digital Ohmmeters	735
2 Each	IC Testers	900
1 Each	Differential Voltmeter	300
1 Each	Capacitance Meter	25
3 Each	4 to 20 MA Current Recorder	540
3 Each	Meggers	1,500
1 Each	Chicago Conduit Bender	1,200
1 Each	Pipe Threading Machine	1,850
4 Each	Transistor Tester	240
6 Each	Multimeter	840
3 Sets	Logic Pulsers	450
1 Each	TV Signal Generator	500
1 Each	TV Sweep Generator	500
2 Each	Portable Mechanic Tool Chest	34
1 Each	Wheatstone Bridge	1,500
1 Each	Set of Bearing Pullers Up to 4"	600
2 Each	Digital Ammeter	400
3 Sets	Two-Way Radios	4,500
1 Each	Standard Recording Voltmeter	190
1 Each	Standard Recording Ammeter	355
1 Each	Standard Recording Wattmeter	190
4 Each	Standard Digital Temp. Indicator	2,400
1 Each	TV Monitor	400
1 Each	Camera Tripod	200
1 Each	Console cabinet to house monitors and crane control panel	1,500
1 Each	Crane control unit to exercise all functions of the crane	2,000
1 Each	Set of cables for console and camera test unit	1,500

2 sets of radio control test equipment
will be required if the crane is remotely
controlled by radio.

Shop #4

2 Each	500 Volt Meggers	\$ 1,000
4 Each	Digital Portable Volt-Ohm Meters	760
2 Each	Digital Clamp On Ammeter	400
2 Each	Dual Trace Memory Scope	1,600
1 Each	Signal Generator	220
8 Each	Adjustable Posture Chairs	1,080

E&I Shop Equipment, Continued

Shop #4, Continued -

1 Each	Vacuum Cleaner	\$ 670
2 Each	Swing About Magnifier Lamps	210
6 Each	Workbenches 34" x 60"	1,800
18 Each	Drawers, Bench	1,170
8 Each	Cabinets, Industrial Storage	4,184
4 Each	Head Visors	400
4 Each	Pocket Beeper Receivers	600
1 Each	Pocket Beeper Transmitter	150
2 Each	Standard Digital Potentiometer	1,600
1 Each	Standard Digital Pneumatic Press Indicator	40
1 Each	Standard Digital Frequency Generator and Counter	170
1 Each	Standard Pulse Generator	150
1 Each	Power Supply D. C.	860
1 Each	IC Tester	450
1 Each	Capacitance Meter	25
1 Each	4-20 MA Current Recorder	180
2 Each	Standard Digital Temp. Indicator	1,200
1 Each	Wheatstone Bridge	1,500
1 Each	Electrical Cord Tester	100
1 Each	Differential Voltmeter	300
2 Each	Transistor Tester	120
4 Each	Multimeter	560
2 Each	Logic Pulser	300
1 Each	Precision Ohmmeter to 5 Decimal Place	400

Shop #5 -

2 Each	Standard Digital Potentiometer	\$ 1,600
2 Each	Standard Digital Pneumatic Press. Ind.	80
1 Each	Standard Frequency Generator and Counter	170
1 Each	Power Supply D. C.	860
1 Each	I. C. Tester	450
1 Each	Capacitance Meter	25
1 Each	4-20 MA Current Recorder	180
1 Each	Chicago Conduit Bender	1,200
1 Each	Pipe Threading Machine	1,850
1 Each	Transistor Tester	60
2 Each	Multimeter	280
1 Each	Logic Pulser	150
2 Each	Standard Digital Temp. Indicator	1,200
2 Sets	Two-Way Radios with Ear Communication	3,000

E&I Shop Equipment, Continued

Shop #5, Continued -

1 Each	Standard Recording Voltmeter	\$ 190
1 Each	Standard Recording Ammeter	355
1 Each	Standard Recording Wattmeter	190
1 Each	Wheatstone Bridge	1,500
2 Each	Digital Strobotac	940
1 Each	Heavy Duty Vise, 3"	40
1 Each	Heavy Duty Vise, 6"	80
2 Each	Clamp Vise, 3"	400
1 Each	Ridgid #700 Portable Power Drive	600
1 Each	Ridgid Portable Band Saw	1,300
1 Each	#2 Pipe Reamer	200
1 Each	#3 Pipe Reamer	200
1 Each	#40-A Tristand Yoke Vise	165
2 Each	500 Volt Meggers	1,000
4 Each	Digital Portable Volt-Ohm Meters	760
2 Each	Digital Clamp On Ammeter	400
1 Each	Dual Trace Memory Scope	800
1 Each	Signal Generator	220
8 Each	Adjustable Posture Chairs	1,080
1 Each	Vacuum Cleaner	670
2 Each	Swing About Magnifier Lamps	210
6 Each	Workbenches - 34" x 60"	1,800
18 Each	Drawers, Bench	1,170
8 Each	Cabinets, Industrial Storage	4,184
4 Each	Head Visors	400
4 Each	Pocket Beeper Receivers	600
1 Each	Pocket Beeper Transmitter	150

TOTAL 2Q80 = \$1,387,554

Add 8% for contingency items and SRP
 project costs for purchase \$1,498,583

TABLE 18-1
ESTIMATED COMBUSTIBLES-VITRIFICATION FACILITY

<u>Material</u>	<u>Quantity</u>	<u>Location</u>
Oil	50 gallon	E & I, Maintenance shops
Grease	20 lbs	E & I, Maintenance shops
Clothing	4 bags - 60 lbs ea	Work locations
Clothing	15 bags - 60 lbs ea	Change rooms
Supplies (paper, gloves, plastics, etc)	2,000 cu ft	Supply storage rooms (Adm, process bldg, control rm)
Paper	Approximately 10-15,000 lb	Approximately 200-300 lb/office
Wood(pallets, canister packing)	200 cu ft	Service Bldg
Diesel Fuel	Day Tank	Emergency diesels
Electrical Insulation	5,000 cu ft	Motor Control Center, Control room wiring, etc.
Solid waste	0-225 cu ft	Loading dock
Acetylene	4 cylinders on line 4 cylinders on standby 8 cylinders in storage 2 cylinders on cart	Maintenance shops

REVISED TABLE

TABLE 18-2
RECOMMENDED FIRE PROTECTION SYSTEMS -- VITRIFICATION FACILITY

<u>Area</u>	<u>Fire Protection</u>
Computer Areas (HP and CCR)	Halon-1301
Central Control Room	Halon-1301
Electrical Substations	**Fire Detection - Portable Extinguisher**
Electrical Control Room (Motor Control Centers)	**Fire Detection - Portable Extinguisher**
Sample Cells	Halon-1301
Emergency generators	**Fire Detection - Portable Extinguisher**
Cafeteria Exhaust duct	Halon-1301
Process Cell, Weld Test Cell, Equipment Decon cells	Fire detector
Maintenance and E & I Shop Areas	Fire detector
**Service Bldg	Fire detector
Lunchroom, Conference rooms	Fire detector
Offices, 24 hr occupancy	Sprinklers
Offices, straight day occupancy	Sprinklers
Boxed waste storage area	Sprinklers
Records Room	Sprinklers
Cooling Tower	Sprinklers
Hallways	Hose Boxes
Cold Feed	Hose Boxes
Area	Fire hydrants, pull boxes

****REVISED TABLE****

TABLE 20-1
COMPONENT REQUIREMENTS

<u>Item</u>	<u>Canister</u>	<u>Outer Plug</u>	<u>Inner Plug</u>	<u>Overpack</u>	<u>Overpack Cover</u>	<u>Repair Cap</u>
Material	304L-SS	304L-SS	a	304L-SS	304L-SS	304L-SS
Length or height (ft, in.)	9'10"	a	a	a	a	a
Outer diameter (in.)	24.0	5.070	a	a	a	a
Inner diameter (in.)	-	-	a	27.5 (min)	a	a
Wall thickness (in.)	3/8 (nom)	-	a	3/8 (nom)	3/8 (nom)	3/8 (nom)
Nozzle ID (in.)	4.995	-	-	-	-	-
Minimum Weld flange contact area (in. ²)	13	-	-	-	-	-
Volume total (ft ³)	25.7	-	-	a	a	-
Unmachined surface finish	2B	a	2B	No. 4	No. 4	a

^aTo be provided by Design.**REVISED TABLE**

FIGURE 2-1. LOCATION OF SRP RELATIVE TO
SURROUNDING POPULATION CENTERS

FIGURE 2-2. THE SAVANNAH RIVER PLANT SITE

FIGURE 2. AREA

FIGURE 3-1. GEOLOGIC PROVINCES OF SOUTHEASTERN UNITED STATES

FIGURE 3-2. COASTAL TERRACES ON THE SAVANNAH RIVER PLANT

FIGURE 3-3. PROFILE OF GEOLOGIC FORMATION
BENEATH THE SAVANNAH RIVER PLANT

FIGURE 3.4. RELATIVE LOCATIONS OF SEPARATIONS AREAS
AND ASSOCIATED WASTE HANDLING FACILITIES

FIGURE 3-5. PREVAILING ELEVATION OF THE WATER TABLE AT THE TANK FARMS AND BURIAL GROUND CONTOURS SHOWN IN FEET ABOVE SEA LEVEL

FIGURE 3-6. DEPTH TO HIGH WATER TABLE (MARCH 1965) AT THE TANK FARMS AND BURIAL GROUND (CONTOURS SHOWN IN FEET BELOW GRADE)

FIGURE 3-7. THE SAVANNAH RIVER PLANT SITE

FIGURE 3-8. HYDROSTATIC HEAD IN GROUND WATER NEAR H AREA

FIGURE 3.9. FLOW IN TUSCALOOSA AQUIFER

FIGURE 3-10. SUMMARY OF TEMPERATURES
AT SRP FROM 1961 TO 1972

FIGURE 3-11. TOTAL RAINFALL AT DIFFERENT LOCATIONS ON SRP FOR 1971 AND 1972

FIGURE 3-12. WIND DIRECTION FREQUENCY NEAR SRP AT 300 FEET

FIGURE 3-13. SEISMIC ACTIVITY IN SOUTHERN APPALACHIAN AREA BETWEEN 1754 AND 1970

AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

6 of 10

FIGURE 5-1. DWPf PROCESS BLOCK FLOW DIAGRAM

FIGURE 5-2. INTERAREA TRANSFER CONCEPT - DWPF SLUDGE PLANT

FIGURE 5-3. CONTAINERIZATION PROCESS

Legend

- (1) Details in Figures 5-4 & 5-5
- (2) Details in Figure 5-6
- (3) Details in Figure 5-7
- (4) Details in Figure 5-8

— = Accept
 — = Recycle

FIGURE 5-4. CANISTER PLUG AND OVERPACK COVER RECEIPT, INSPECTION AND STORAGE

FIGURE 5-5. CANISTER AND OVERPACK RECEIPT,
INSPECTION AND STORAGE

FIGURE 5-6. DECONTAMINATION PROCESS

FIGURE 5-7. WELDING PROCESS

Note: Sequence may vary; however, smear must be last operation just before canister leaves WTC. Gamma measurement may be made outside WTC.

FIGURE 5-8. CANISTER INSPECTION AND FINAL SMEAR TEST

****REVISED FIGURE****

FIGURE 5-9. OVERPACK PROCESS

****REVISED FIGURE****

Legend: See cafeteria equipment list for identification of equipment.

FIGURE 11-1. PROPOSED SERVING LINE S-AREA CAFETERIA

FIGURE 13-1. WATER SYSTEM

FIGURE 13-2. WATER UTILITY DISTRIBUTION AND MAKEUP SYSTEMS

[NOTE: The first pass is to be made without filler material. The second and third passes shall be made with the addition of filler material. The second pass shall not burn through the first, and the third not through the second. These passes shall result in covering the end of the tube with 1/4" minimum thickness of weld metal. Welding shall be done with an inert gas shield process.]

FIGURE 20-1. PROCEDURE FOR WELDING TUBES TO TUBE SHEETS IN HEAT EXCHANGERS

MELTER OFF-GAS BY-PASS SYSTEM

DU PONT AND DOE REFERENCES

1. DOE-EIS-0023, Final Environmental Impact Statement, Long-Term Management of Defense High-Level Radioactive Waste (Research and Development Report for Immobilization). Savannah River Plant, Aiken, SC, November, 1979.
2. Final Environmental Statement, Waste Management Operations, Savannah River Plant, Aiken, SC, ERDA 1537, 1977. Energy Research and Development Administration.
3. Langley, T. M., and W. L. Marter, The Savannah River Plant Site. USAEC Report DP-1323, 1973. E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, SC 29801.
4. DOE Manual, Appendix 2401.
5. **Technical Data Summary for the Defense Waste Processing Facility, DPSTD-80-38-2.**
6. Preliminary Technical Data Summary No. 1 for the Defense Waste Processing Facility, DPSTD-77-13-3, May 1980.
7. Deleted
8. Deleted
9. Deleted
10. DOE Order 5480.1, "Environmental Protection, Safety, and Health Protection Program for DOE Operations."
11. DOE Order 6430, "General Design Criteria Manual."
12. Deleted
13. ERDA 76-21, Nuclear Air Cleaning Handbook.
14. Deleted
15. Deleted
16. Deleted
17. **Preliminary Safety Analysis, Defense Waste Processing Facility, DPST-82-675.**
18. Recommended Stack Height for DWPF-Stage 1 Design, DPST-80-647, November 3, 1980.

MISCELLANEOUS TECHNICAL REFERENCES

1. G. A. Briggs, Estimation of Downwash Effects, chapter 6, Power Generation: Air Pollution Monitoring and Control. Edited by K. E. Null and W. T. Davis, Ann Arbor Science Publishers, Ann Arbor, Michigan, 1976.
2. G. Nonhebel, Process for Air Pollution Control, p 632. CRC Press, 1972.

NATIONAL CODES AND STANDARDS REFERENCES

1. ANSI N.300 American National Standard for Decommissioning at Nuclear Fuel Reprocessing Plants.

FEDERAL AND STATE REGULATORY REFERENCES

1. NUREG-0278, Technology, Safety and Costs of Decommissioning a Reference Nuclear Fuel Reprocessing Plant. Battelle Pacific Northwest Laboratory, October 1977.
2. NRC Regulatory Guide 3.30, Selection, Application and Inspection of Protective Coatings (Paints) to Fuel Reprocessing Plants.

****DWPf SLUDGE FEED COMPOSITION (DRY BASIS)****

Soluble Solids		Insoluble Solids			
Species	Wt %	Species	Wt %	Species	Wt %
NaNO ₃	2.89E+1	Fe(OH) ₃	3.81E+1	PbSO ₄	1.76E-1
NaNO ₂	1.17E+1	Al(OH) ₃	1.57E+1	Cr(OH) ₃	4.80E-1
NaAlO ₂	1.61E+1	MnO ₂	6.42	AgOH	2.52E-2
NaOH	3.16E+1	UO ₂ (OH) ₂	4.24	Cu(OH) ₂	1.39E-1
Na ₂ CO ₃	4.88	Ni(OH) ₂	2.42	Co(OH) ₃	7.57E-2
Na ₂ SO ₄	6.54	CaCO ₃	5.00	Zn(OH) ₂	3.66E-1
NaCl	1.98E-1	Zeolite	4.60	Mg(OH) ₂	6.31E-1
NaF	1.28E-2	SiO ₂	7.34	C	1.26E-1
Na[HgO(OH)]	3.97E-2	NaOH	4.10		
		NaNO ₃	3.53	Group A ^a	3.42E-1
Group A ^a	8.26E-4	HgO	1.99	Group B ^b	1.12
Group B ^b	2.37E-4	CaSO ₄	5.93E-1	PuO ₂	4.58E-2
Na ₂ PuO ₂ (OH) ₄	1.61E-6	CaC ₂ O ₄	5.05E-1	SrCO ₃	1.31E-1
UO ₂ (OH) ₂	1.15E-4	Ca ₃ (PO ₄) ₂	4.67E-1	Y ₂ (CO ₃) ₃	8.63E-2
Na ₂ RuO ₄	3.23E-3	CaF ₂	1.26E-1	RuO ₂	8.25E-2
Na ₂ RhO ₄	3.31E-4	NaCl	1.26E-1	RhO ₂	1.75E-2
CsNO ₃	6.18E-3	NaI	1.26E-2	CsNO ₃	1.32E-2
Ba(NO ₃) ₂	1.04E-5	ThO ₂	7.19E-1		
Sr(NO ₃) ₂	9.28E-6	BaSO ₄	1.87E-1		
Y(NO ₃) ₃	6.59E-6				
Na ₂	1.86E-5				

^a Tc, Se, Te, Rb, Mo^b Ag, Cd, Cr, Pd, Th, La, Ce, Pr, Pm, Nd, Sm, Tb, Sn, Sb, Co, Zr, Nb, Eu, Np, Am, Cm

****SALT PLANT PRODUCT COMPOSITION****

<u>Ion Exchange Eluate</u>		<u>Waste Filter Media</u>	
<u>Species</u>	<u>Wt %</u>	<u>Species</u>	<u>Wt %</u>
H ₂ O	4.058E+1	H ₂ O	8.369E+1
NaCOOH	4.487	NaOH	3.315
HCOOH	5.493E+1	C	2.365
		SiO ₂	1.063E+1

^a 8.66E-2 lb NaCOOH in eluate per lb
insoluble solids in Stage 1 feed.

****NOTE:** This table is based on the Ion Exchange Process for the Salt Plant.
It has been retained for material balance purposes only.**

SLURRY PROPERTIES

	Washed ^a Sludge Slurry		SRAT ^b Slurry		Melter ^{c, e} Feed Slurry	
	Max	Min	Max	Min	Max	Min
Yield Stress, dynes/cm ²	100	25	50	15	150	25
Consistency, Cp	12	4	12	5	40	10
Density, g/cc	1.17	1.09	1.23	1.21	1.45	1.33
Transfer Velocity, ft/sec	5	3	5	3	5	3 ^d
Solids content, weight %	19	13	25	21	50	40

^aAluminum dissolved and washed^bFormic acid added^cFormic acid and frit added^dExcept for feed dropline to melter where tubing or pipe is to have a 0.30" minimum inside diameter^eProperties of 250 dynes/cm² and 60 cp should be expected and agitation to dilute must be provided.

Pumps in all 3 services must be capable of pumping water to flush systems.

The data presented in this table are a mixture of experimental and theoretical values. Research is still active to determine properties of slurries, and more definite data will be supplied as it becomes available.

If slurries are encountered with higher solids contents than shown in the table, they may be diluted to the value desired.

****REVISED TABLE****

STOICHIOMETRY

Each reaction goes to completion unless otherwise noted.

A. Mercury Reduction (In Slurry Receipt Adjustment Tank)

<u>Reactants</u>	<u>Products</u>
$2\text{NaNO}_2 + 3\text{HCOOH}$	$2\text{NaCOOH} + 2\text{NO} + 2\text{H}_2\text{O}$
$\text{Na}_2\text{CO}_3 + 2\text{HCOOH}$	$2\text{NaCOOH} + \text{CO}_2 + \text{H}_2\text{O}$
$\text{MnO}_2 + 3\text{HCOOH}$	$\text{Mn}(\text{COOH})_2 + 2\text{H}_2\text{O} + \text{CO}_2$
$\text{Ni}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Ni}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{UO}_2(\text{OH})_2 + 2\text{HCOOH}$	$\text{UO}_2(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{CaCO}_3 + 2\text{HCOOH}$	$\text{Ca}(\text{COOH})_2 + \text{CO}_2 + \text{H}_2\text{O}$
$\text{Mn}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Mn}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{HgO} + \text{HCOOH}$	$\text{Hg} + \text{CO}_2 + \text{H}_2\text{O} (99\%)^a$
$\text{NaOH} + \text{HCOOH}$	$\text{NaCOOH} + \text{H}_2\text{O}$
$2\text{AgOH} + \text{HCOOH}$	$2\text{Ag}^b + \text{CO}_2 + 2\text{H}_2\text{O} (99\%)^a$
$2\text{Cu}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Cu}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$2\text{Co}(\text{OH})_3 + 5\text{HCOOH}$	$2\text{Co}(\text{COOH})_2 + 6\text{H}_2\text{O} + \text{CO}_2$
$\text{Zn}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Zn}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{Mg}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Mg}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{SrCO}_3 + 2\text{HCOOH}$	$\text{Sr}(\text{COOH})_2 + \text{CO}_2 + \text{H}_2\text{O}$
$\text{Y}_2(\text{CO}_3)_3 + 6\text{HCOOH}$	$2\text{Y}(\text{COOH})_3 + 3\text{H}_2\text{O} + 3\text{CO}_2$
$\text{Ca}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Ca}(\text{COOH})_2 + \text{H}_2\text{O}$
$\text{Co}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Co}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{Pd}(\text{OH})_2 + \text{HCOOH}$	$\text{Pd}^b + \text{CO}_2 + 2\text{H}_2\text{O} (70\%)^a$
$\text{Sr}(\text{OH})_2 + 2\text{HCOOH}$	$\text{Sr}(\text{COOH})_2 + 2\text{H}_2\text{O}$
$\text{Y}(\text{OH})_3 + 3\text{HCOOH}$	$\text{Y}(\text{COOH})_3 + 3\text{H}_2\text{O}$

^a The remaining HgO, AgOH, and Pd(OH)₂ are transferred to the SME.

^b Amalgamates with mercury.

REVISED TABLE

STOICHIOMETRYB. Vitrification

<u>Reactants</u>	<u>Products</u>
4KNO ₃ + 6NaCOOH	2K ₂ O + 3Na ₂ O + 4NO + 6CO ₂ + 3H ₂ O
4NaNO ₃ + 6NaCOOH	5Na ₂ O + 4NO + 6CO ₂ + 3H ₂ O
2Na ₂ SO ₄ + 2NaCOOH	3Na ₂ O + 2CO ₂ + 2SO ₂ + H ₂ O
4CsNO ₃ + 6NaCOOH	2Cs ₂ O + 3Na ₂ O + 4NO + 6CO ₂ + 3H ₂ O
2Ba(NO ₃) ₂ + 6NaCOOH	2BaO + 3Na ₂ O + 4NO + 6CO ₂ + 3H ₂ O
2Sr(NO ₃) ₂ + 6NaCOOH	2SrO + 3Na ₂ O + 4NO + 6CO ₂ + 3H ₂ O
4Y(NO ₃) ₃ + 18NaCOOH	2Y ₂ O ₃ + 9Na ₂ O + 12NO + 18CO ₂ + 9H ₂ O
2CaSO ₄ + 2NaCOOH	2CaO + Na ₂ O + 2SO ₂ + 2CO ₂ + H ₂ O
2BaSO ₄ + 2NaCOOH	2BaO + Na ₂ O + 2SO ₂ + 2CO ₂ + H ₂ O
2PbSO ₄ + 2NaCOOH	2PbO + Na ₂ O + 2SO ₂ + 2CO ₂ + H ₂ O
HCOOH	CO + H ₂ O
4Fe(OH) ₃ + 2NaCOOH	4FeO + 7H ₂ O + 2CO ₂ + Na ₂ O (33%) ^c
2Fe(OH) ₃	Fe ₂ O ₃ + 3H ₂ O (67%)
2NaCOOH	Na ₂ O + CO + CO ₂ + H ₂
Mn(COOH) ₂	MnO + CO + CO ₂ + H ₂
Ni(COOH) ₂	NiO + CO + CO ₂ + H ₂
Ca(COOH) ₂	CaO + CO + CO ₂ + H ₂
UO ₂ (COOH) ₂	UO ₂ + H ₂ O + CO + CO ₂
2C + O ₂	2CO
2CuCOOH	Cu ₂ O + CO + CO ₂ + H ₂
Co(COOH) ₂	CoO + CO + CO ₂ + H ₂
Zn(COOH) ₂	ZnO + CO + CO ₂ + H ₂
Mg(COOH) ₂	MgO + CO + CO ₂ + H ₂
Sr(COOH) ₂	SrO + CO + CO ₂ + H ₂
2Y(COOH) ₃	Y ₂ O ₃ + 3CO + 3CO ₂ + 3H ₂
CaC ₂ O ₄	CaO + CO ₂ + CO
2NaAlO ₂	Na ₂ O + Al ₂ O ₃
NaCl	NaCl(v)
NaF	NaF(v)
2Na[HgO(OH)]	Na ₂ O + 2Hg(v) + H ₂ O + O ₂
2Na ₂ PuO ₂ (OH) ₄	2Na ₂ O + 2PuO ₂ + 4H ₂ O + O ₂
2Na ₂ RuO ₄	2Na ₂ O + 2RuO ₂ + O ₂
2Na ₂ RhO ₄	2Na ₂ O + 2RhO ₂ + O ₂
NaI	NaI(v)
2Al(OH) ₃	Al ₂ O ₃ + 3H ₂ O
Hg	Hg(v)
CaF ₂ + Na ₂ O	CaO + 2NaF
2Cr(OH) ₃	Cr ₂ O ₃ + 3H ₂ O
2CsCOOH	Cs ₂ O + CO + CO ₂ + H ₂
Pu(COOH) ₄	PuO ₂ + 2CO + 2CO ₂ + 2H ₂
2Pd + O ₂	2PdO
H ₂ O + CO	CO ₂ + H ₂ ^d
Pd(OH) ₂	PdO + H ₂ O
2AgOH	Ag ₂ O + H ₂ O
Na ₂ C ₂ O ₄	Na ₂ O + CO ₂ + CO

^cMaximum percentage of Fe(OH)₃ to be reduced. If insufficient NaCOOH available, the unreduced Fe(OH)₃ is decomposed to Fe₂O₃ and H₂O.

^dSee DPSTD-80-38-2, Part 6, Item 610 for equilibrium constants.

****REVISED TABLE****

STOICHIOMETRYB. Vitrification (Contd)

<u>Reactants</u>	<u>Products</u>
Cs ₂ O	Cs ₂ O(v) (5%)
B ₂ O ₃ + Na ₂ O	2NaBO ₂ (0.5%)
Group A	Group A (5.0%)
RuO ₂ + O ₂	RuO ₄ (v) (10%)
4Ag + O ₂	2Ag ₂ O
2HgO	2Hg(v) + O ₂
CsCl	CsCl(v)

Unreacted Melter Feed Components

SiO ₂ ^f	Ca ₃ (PO ₄) ₂ ^e	ZrO ₂ ^g	MgO ^f
Group B ^e	ThO ₂ ^e	La ₂ O ₃ ^g	Li ₂ O ^g
Zeolite ^e	PuO ₂ ^e	TiO ₂ ^g	

^e Source - Feed
^f Source - Feed and Frit
^g Source - Frit

C. Off-Gas Treatment

<u>Reactants</u>	<u>Products</u>
4NaI + O ₂	2I ₂ + 2Na ₂ O (1%)
2Hg + O ₂	2HgO
2NaF + H ₂ O	2HF + Na ₂ O (25%)
Cs ₂ O + 2NaCl	2CsCl + Na ₂ O
4NaBO ₂	Na ₂ B ₄ O ₇ + Na ₂ O
RuO ₄	RuO ₂ + O ₂
2NO + O ₂	2NO ₂ (10%)

D. Quenching

<u>Reactants</u>	<u>Products</u>
HF + Na ₂ O	H ₂ O + 2NaF

REVISED TABLE

STOICHIOMETRYE. Process Waste TreatmentOxalic Acid Destruction Caustic Adjustment F. Recycle CollectionStoichiometry (components not listed are unreacted) G. Mercury Purification Spent Wash Neutralization **REVISED TABLE**

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Ag	107.88	655.49(20)		s a: 6.0097E+00 s b: 1.5000E-03
AgNO3	169.89	271.70(19)		s a: 2.3200E+01 s b: 1.6000E-02
AgOH	124.89	312.16(20)		s 0.0976(0) s 0.1223(1500)
Ag2O	231.76	445.92(17)		s a: 1.5183E+01 s b: 7.0400E-03
Al(OH)3	77.99	151.04(20)		s 0.3173(0) s 0.4523(1500)
AlOOH	59.99	187.91(20)		s 0.2920(0) s 0.4690(500) s 0.6610(1700)
Al2O3	101.94	249.72(20)		s a: 1.7527E+01 s b: 8.9710E-03
Ba(NO3)2	261.38	202.47(23)		s a: 3.9800E+01
BaCl2	208.27	240.67(20)		s a: 1.7912E+01 s b: 3.3400E-03
BaO	153.36	357.10(20)		s 0.0291(-217) s 0.0724(26) s 0.0908(989)

* - Temperatures in degrees C shown in parentheses

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
BaSO ₄	233.42	280.87(15)		s a: 2.5201E+01 s b: 1.4100E-02
B ₂ O ₃	69.64	115.49(20)		s a: 1.3881E+01 s b: 3.2000E-02
Ca(COOH) ₂	130.12	125.76(20)		s 0.2137(0) s 0.3729(1500)
Ca(OH) ₂	74.10	137.35(20)		s a: 2.1400E+01
Carbon	12.01	141.09(20)		s a: 1.8210E+00 s b: 2.6170E-03
CaCO ₃	100.09	182.87(20)		s a: 1.8805E+01 s b: 1.1890E-02
CaC ₂ O ₄	128.10	137.34(4)		s 0.1636(0) s 0.3159(1500)
CaF ₂	78.08	198.48(20)		s a: 1.5738E+01 s b: 3.8000E-03
CaO	56.08	207.21(20)		s a: 9.8745E+00 s b: 4.8400E-03
CaSO ₄	136.14	184.75(20)		s a: 2.2420E+01 s b: 2.1970E-02
Ca ₃ (PO ₄) ₂	310.20	195.98(20)		s 0.1696(0) s 0.3265(1500)

* - Temperatures in degrees C shown in parentheses

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Cement	70.00	196.00(20)		s 0.1860(0) s 0.1860(100)
Co(COOH)2	148.98	132.91(22)		s 0.1846(0) s 0.3317(1500)
Co(OH)2	92.95	224.56(15)		s 0.1996(0) s 0.3127(1500)
Co(OH)3	109.96	278.43(20)		s 0.2263(0) s 0.3404(1500)
CoO	74.94	354.51(20)		s a: 1.0401E+01 s b: 2.2000E-03
Cr(OH)3	103.03	230.99(20)		s 0.2368(0) s 0.3359(1500)
Cr2O3	152.02	325.18(20)		s a: 2.7093E+01 s b: 4.0000E-03
CsCl	168.36	248.96(20)		s a: 1.2544E+01 s b: 3.0900E-03
Cs(COOH)	177.93	187.29(20)		s 0.1890(0) s 0.2116(1500)
CsNO3	194.92	230.18(28)		s 0.1007(0) s 0.1259(1500)
Cs2O	281.81	265.32(20)		s a: 1.7975E+01 s b: 5.4000E-03

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****REVISED TABLE****

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Cu(COOH)2	153.61	114.31(20)		s 0.1979(25)
Cu(OH)2	97.59	210.26(20)		s 0.1894(0) s 0.2541(1500)
CuO	79.57	399.55(20)		s a: 9.8283E+01 s b: 3.5760E-03
CO	28.01	50.82(-195)	1.00(-222) 760.00(-191) 7600(-161)	v a: 6.9278E+00 v b: 1.2000E-03 l 0.5132(-204) l 0.5198(-190) s 0.1410(0) s 0.2080(1000)
CO2	44.01	68.74(-37)	1.00(-134) 760.00(-78) 7600(-40)	v a: 8.4682E+00 v b: 2.7400E-03 l 0.4460(-55) l 0.4930(-15) l 0.7860(20)
Fe(OH)3	106.87	243.48(20)		s 0.0551(0) s 0.3842(1500)
FeO	71.85	355.85(20)		s 0.1224(0) s 0.2826(1500)
Fe2O3	159.70	327.12(20)		s a: 2.3427E+01 s b: 1.6040E-02
GroupA (a)	98.30	461.88(20)		s 0.0600(0) s 0.0740(300)

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a - Mo, Rb, Se, Te, Te

REVISED TABLE

PHYSICAL PROPERTY DATA

Compound	Molecular Weight	Density, lb/cuft*	Vapor Pressure mm Hg*	Heat Capacity **
GroupB (b)	122.20	425.00(20)		s 0.0550(0) s 0.0650(300)
Hg	200.61	845.68(20)		v a: 4.9700E+00 l a: 6.6100E+00 s 0.0232(-253) s 0.0232(-196) s 0.0315(-40)
Hg(NO3)2	324.59	274.69(20)		s 0.0995(0) s 0.1259(1500)
HgO	216.61	695.29(20)		s a: 1.1500E+01
HCl	36.47	79.16(0)		v a: 6.9294E+00 v b: 8.4000E-04
HCOOH	46.03	76.15(20)	1.00(-20) 100.00(44)	l 0.3790(0) l 0.4420(16) l 0.4550(100) s 0.3870(-22) s 0.4300(0)
HF	20.01	61.67(14)	3.30(-80) 2000(50) 10000(111)	v 0.3500(0) l 0.3500(20)
HNO3	63.02	93.75(20)	3.35(-20) 940.00(90)	s 0.2857(20)

* - Temperatures in degrees C shown in parentheses

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b - Ag, Am, Cd, Ce, Cm, Co, Cr, Eu, La, Nb, Nd, Np, Pd, Pm, Pr, Sb, Sm, Sn, Tb, Tl, Zr

REVISED TABLE

PHYSICAL PROPERTY DATA

Compound	Molecular Weight	Density, lb/cuft*	Vapor Pressure mm Hg*	Heat Capacity **
H2	2.02	4.43(-253)	1.00(-263) 760.00(-253) 7600(-242)	v a: 6.8413E+00 v b: 8.1000E-04
H2C2O4	90.03	103.20(19)		s 0.1070(-200) s 0.2970(50)
H2O	18.02	62.43(4)	1.00(-17) 760.00(100) 7600(181)	v a: 8.3610E+00 v b: 8.8204E-04 v c: 1.3400E-06 l 1.01(0) l 1.01(100) l 0.9986(34)
H2O2	34.02	89.75(20)	1.70(20) 145.00(100) 760.00(150)	l 0.5780(0) s 0.4710(-25)
I2	253.84	307.77(20)	1.00(39) 100.00(117)	v a: 9.0000E+00
KMnO4	158.03	168.74(20)		s a: 2.8000E+01
KNO3	101.10	131.73(11)		s a: 2.0897E+01 s b: 5.3000E-02
K2O	94.19	144.84(20)		s a: 1.7645E+01 s b: 6.4000E-03
La2O3	325.82	406.41(15)		s a: 2.5311E+01 s b: 3.0760E-03

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Li2O	29.88	125.64(25)		s a: 1.2875E+01 s b: 5.4000E-03
Mg(COOH)2	114.35	88.65(20)		s 0.2402(0) s 0.4088(1500)
Mg(OH)2	58.34	147.33(20)		s a: 1.8200E+01
MgO	40.32	227.81(20)		s a: 8.3898E+00 s b: 1.1970E-03
Mn(COOH)2	144.98	121.93(20)		s 0.1913(0) s 0.3363(1500)
Mn(NO3)2	178.37	113.62(20)		s 0.1714(0) s 0.2579(1500)
Mn(OH)2	88.95	203.40(13)		s 0.2112(0) s 0.3193(1500)
MnO	70.93	340.86(20)		s a: 1.2180E+01 s b: 1.6402E-02 s c: -3.6200E-06
MnO2	86.93	313.69(20)		s a: 1.2569E+01 s b: 3.0875E-02 s c: -2.9700E-05
Na(HgO(OH))	256.59	412.97(20)		s 0.0875(0) s 0.1268(1500)

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REVISED TABLE

PHYSICAL PROPERTY DATA

Compound	Molecular Weight	Density, lb/cuft*	Vapor Pressure mm Hg*	Heat Capacity **
NaAlO ₂	81.97	153.83(20)		s 0.0283(-220) s 0.1074(-149) s 0.2137(25)
NaBO ₂	65.81	153.82(20)		s a: 1.5836E+01 s b: 1.9900E-02
NaCl	58.45	135.04(20)		s a: 1.1937E+01 s b: 4.2000E-03
NaCOOH	68.01	119.77(20)		s 0.2557(0) s 0.4673(1500)
NaF	42.00	174.18(20)		s a: 1.1189E+01 s b: 2.8900E-03
NaI	149.92	228.87(0)		s a: 1.2943E+01 s b: 1.6200E-03
NaNO ₂	69.01	135.35(0)		s 0.2301(0) s 0.3772(1500)
NaNO ₃	85.01	140.87(20)		s a: 2.0403E+01 s b: 5.8000E-02
NaOH	40.00	132.94(20)		s 0.3230(0) s 0.5401(1500)
Na ₂ B ₄ O ₇	201.27	147.73(20)		s a: 4.7900E+01
Na ₂ CO ₃	106.00	158.09(20)		s a: 2.8900E+01

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Na2C2O4	134.01	146.09(20)		s 0.2085(0) s 0.4142(1500)
Na2O	61.99	141.68(20)		s a: 1.7175E+01 s b: 5.4000E-03
Na2PuO2(OH)4	385.01	369.96(20)		s 0.1312(0) s 0.2083(1500)
Na2RhO4	212.88	187.29(20)		s 0.1447(0) s 0.2494(1500)
Na2RuO4	211.05	187.29(20)		s 0.1444(0) s 0.2451(1500)
Na2SO4	142.05	168.39(20)		s a: 3.2800E+01
Ni(COOH)2	148.72	134.47(20)		s 0.1855(0) s 0.3605(1500)
Ni(OH)2	92.71	272.19(20)		s 0.2011(0) s 0.3588(1500)
NiO	74.69	464.98(20)		s a: 1.1887E+01 s b: 2.1500E-03
NO	30.01	79.22(-150)	1.00(-185) 760.00(-152) 7600(-127)	v 0.2130(27) v 0.3070(4727)
NO2	46.01	90.38(20)	1.00(-56) 100.00(7)	v 0.2090(50) v 0.2500(450) v 0.2790(850) l 0.3563(-7) l 0.3727(32)

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REVISED TABLE

INFORMATION ONLY

PHYSICAL PROPERTY DATA

Compound	Molecular Weight	Density, lb/cuft*	Vapor Pressure mm Hg*	Heat Capacity **
N2	28.02	64.05(-253) 50.44(-196)	1.00(-226) 760.00(-196) 7600(-170)	v a: 6.7731E+00 v b: 1.0000E-03 l 0.4794(-207) l 0.7349(-151)
O2	32.00	71.17(-183) 89.03(-253)	1.00(-219) 760.00(-183) 7600(-153)	v a: 5.8248E+00 v b: 2.5800E-04 l 0.3937(218) l 0.3949(-193)
PbO	223.21	594.94(20)		s a: 1.1199E+01 s b: 3.1800E-03
PbSO4	303.27	386.97(20)		s a: 2.6400E+01
Pd	106.70	749.16(20)		s a: 5.9126E+00 s b: 1.8400E-03
Pd(NO3)2	230.41	187.29(20)		s 0.1327(0) s 0.1844(1500)
Pd(OH)2	140.72	387.07(20)		s 0.1339(0) s 0.1774(1500)
PdO	122.40	543.14(20)		s a: 7.1787E+00 s b: 1.4200E-02
Polyelectrolyte	71.08	38.00(16)		
Pozzolite	102.00	71.79(20)		

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PHYSICAL PROPERTY DATA

Compound	Molecular Weight	Density, lb/cuft*	Vapor Pressure mm Hg*	Heat Capacity **
Pu(COOH) ₄	419.13	374.58(20)		s 0.1179(0) s 0.2045(1500)
PuO ₂	274.00	715.42(20)		s 0.0530(0) s 0.0700(500)
RhO ₂	134.90	435.12(20)		s 0.0876(0) s 0.1331(1500)
RuO ₂	133.07	435.12(20)		s a: 1.3039E+01 s b: 6.0000E-03
RuO ₄	165.70	360.22(100)		s a: 2.0000E+01
SiO ₂	60.06	143.55(20)		s a: 9.8411E+00 s b: 8.2000E-03
Sr(COOH) ₂	177.66	168.08(20)		s 0.1552(0) s 0.2539(1500)
Sr(NO ₃) ₂	211.65	186.42(20)		s 0.1588(-153) s 0.2392(25) s 0.4243(627)
Sr(OH) ₂	121.65	226.31(20)		s 0.1532(0) s 0.2035(1500)
SrCO ₃	147.64	230.93(20)		s 0.1009(-111) s 0.1603(182) s 0.2122(913)

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
SrO	103.63	293.35(20)		s a: 1.0225E+01 s b: 1.1200E-03
Surfactant		66.80(20)		
SO2	64.06	86.66(20)	1.00(-96) 760.00(-10) 7600(56)	v a: 9.0855E+00 v b: 4.8466E-03 v c: -8.3000E-07 l 0.2910(-20) l 0.2580(-100)
ThO2	264.12	604.79(20)		s a: 1.5985E+01 s b: 5.0700E-03
TiO2	79.90	262.21(20)		s a: 1.3305E+01 s b: 7.5400E-03
Tritium	3.02	62.43(4)	1.00(-17) 760.00(100) 7600(181)	l 1.01(0) l 1.01(100) l 0.9986(34)
UO2	270.07	680.31(20)		s a: 1.4339E+01 s b: 1.6200E-03
UO2(COOH)2	360.06	230.37(19)		s 0.0944(0) s 0.1763(1500)
UO2(OH)2	304.04	369.96(20)		s 0.0823(0) s 0.1418(1500)
Y(COOH)3	223.96	187.29(20)		s 0.1724(0) s 0.2907(1500)

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REVISED TABLE

PHYSICAL PROPERTY DATA

<u>Compound</u>	<u>Molecular Weight</u>	<u>Density, lb/cuft*</u>	<u>Vapor Pressure mm Hg*</u>	<u>Heat Capacity **</u>
Y(NO ₃) ₃	274.92	167.44(20)		s 0.1557(0) s 0.2214(1500)
Y(OH) ₃	139.93	218.51(20)		s 0.1800(0) s 0.2472(1500)
Y ₂ (CO ₃) ₃	357.87	218.51(20)		s 0.1209(0) s 0.2111(1500)
Y ₂ O ₃	225.81	312.76(20)		s 0.1120(0) s 0.1420(500)
Zeolite	600.20	43.00(20)		s 0.2650(1000)
Zn(COOH) ₂	155.42	147.83(20)		s 0.1777(0) s 0.3003(1500)
Zn(OH) ₂	99.40	190.59(20)		s 0.1878(0) s 0.2649(1500)
ZnO	81.38	341.40(20)		s 0.1150(0) s 0.1670(1300)
ZrO ₂	123.22	357.63(20)		s a: 1.2095E+01 s b: 1.0460E-02

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REVISED TABLE

GLASS FRIT CHARACTERISTICS
(FRIT 131)A. Composition

<u>Compound</u>	<u>Wt %</u>
SiO ₂	57.9
Na ₂ O	17.7
TiO ₂	1.0
B ₂ O ₃	14.7
Li ₂ O	5.7
MgO	2.0
ZrO ₂	0.5
La ₂ O ₃	0.5

B. Physical Properties

Particle size: -80, +325 mesh
Bulk density: 70 to 94 lb/ft³
Specific density: 152 lb/ft³
Angle of repose: 30 to 43°

HEAT CAPACITIES FOR DWPF WASTE GLASS WITH FRIT 131

Temperature, °C	Composite TDS-3A	
	C _{pm} $\frac{\text{Cal}}{\text{gm} \cdot ^\circ\text{C}}$	C _{pt} $\frac{\text{Cal}}{\text{gm} \cdot ^\circ\text{C}}$
0	0.186	0.186
100	0.213	0.237
200	0.234	0.271
300	0.251	0.296
400	0.264	0.314
500	0.276	0.328
600	0.285	0.338
700	0.293	0.346
800	0.300	0.353
900	0.307	0.359
950	0.309	0.361
1,000	0.312	0.363
1,025	0.313	0.364
1,050	0.315	0.365
1,075	0.316	0.366
1,100	0.317	0.367
1,125	0.318	0.368
1,150	0.319	0.369
1,175	0.320	0.369
1,200	0.321	0.370
1,250	0.323	0.372
1,300	0.325	0.373

DENSITIES OF DWPF WASTE GALSES WITH FRIT 131

<u>Temperature</u> <u>°C</u>	<u>TDS-3A</u> <u>g/cm³</u>
20	2.750
100	2.743
200	2.735
300	2.726
400	2.718
T _r - 459	2.713
500	2.672
600	2.575
700	2.481
800	2.391
900	2.305
1,000	2.223
1,025	2.202
1,050	2.183
1,075	2.163
1,100	2.143
1,125	2.124
1,150	2.105
1,175	2.086
1,200	2.068

INDEX OF REFRACTION FOR DWPF GLASS WITH FRIT 131

$N = 1.662$ at $\text{Lambda} = 4,860$ angstroms

K_{rad} AND K_{eff} FOR DWPF GLASS WITH FRIT 131

Temperature °C	Composite Waste	
	K _{rad}	K _{eff}
0	0	0.4893
100	0	0.5616
200	0	0.6339
300	0	0.7062
400	0	0.7785
500	0	0.8508
600	0	0.9231
670	3.5 E-3	0.9737
685	-	1.0105
700	4.83 E-2	1.044
800	2.45 E-1	1.313
900	5.20 E-1	1.660
1,000	8.73 E-1	2.085
1,025	9.72 E-1	2.200
1,050	1.08	2.33
1,075	1.18	2.45
1,100	1.30	2.58
1,125	1.41	2.71
1,150	1.53	2.85
1,175	1.65	2.99
1,200	1.78	3.14

RESISTIVITY OF DWPF GLASS WITH FRIT 131

<u>Temperature</u> <u>(°C)</u>	<u>Resistivity</u> <u>(ohm-cm)</u>
800	9.2
900	5.4
1,000	3.8
1,100	2.7
1,200	1.8

SURFACE TEMPERATURE FOR DWPF WASTE GLASS
(TDS-3A and Frit 131)

Glass Power (watts)	Glass Surface Temperature (No Canister or Overpack) °C
100	40
300	44
500	48
1,000	57

Reference DWPF waste form (2 ft x 7 ft 7 in.).

165 gal of waste glass containing 35% sludge oxides.

Air temperature: 38°C.

Natural convection heat transfer coefficient = 1.0 pcu/(hr)(ft²)(°C).

RADIATION FROM REFERENCE
DWPf CANISTER
5 YEAR OLD SLUDGE PLUS
15 YEAR OLD SUPERNATE
(STAGE I + STAGE II)

<u>Distance from Surface (ft)</u>	<u>Radiation Level rems/hr</u>
Contact	5565
0.33	3835
1	1745
3	570
4	400
5	295
10	97
15	45
20	26
30	12
60	3
100	1.1

Basis of Calculations

o Geometry

2' OD x 10' Length
0.375" S/S Walls
7.59' Fill Height

o Glass Density 2.75 g/cm³

o The Source Term is given in Appendix A, Table 3-11.

o Source Model

Cylinder volume source with self-adsorption

o Data Base: ORNL DOE/TIC-11026, 1981.

o Code: SDC, Shielding-Design Calculation Code for Fuel-Handling Facilities, ORNL-3041, March 1966.

****REVISED TABLE****

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED
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MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	1 Wshed Sludge fr Tank Farm	2 90 wt% Formic Acid	3 Supenate Concentrate	4 Hg From SME
COMPONENT FLOWS, LB/HR				
1 H2O	885.8	2.841	.0000	.8656E-05
45 Ag	.0000	.0000	.0000	.9693E-04
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.2236E-01	.0000	.0000	.0000
74 Al(OH)3	18.98	.0000	.0000	.1892E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.2895E-06
9 Ba(NO3)2	.1848E-06	.0000	.0000	.1829E-14
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1659	.0000	.0000	.1653E-08
66 CO	.0000	.0000	.0000	.2440E-32
37 CO2	.0000	.0000	.0000	.1073E-16
142 CO2 (C14)	.0000	.0000	.0000	.8052E-28
63 Ca(COOH)2	.0000	.0000	.0000	.5734E-07
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.4185	.0000	.0000	.4119E-08
20 CaC2O4	.4472	.0000	.0000	.4455E-08
18 CaCO3	4.428	.0000	.0000	.0000
78 CaF2	.1118	.0000	.0000	.1114E-08
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.5253	.0000	.0000	.5283E-08
29 Carbon	.1118	.0000	.0000	.1114E-08
26 Co(COOH)2	.0000	.0000	.0000	.9054E-09
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.6708E-01	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.4250	.0000	.0000	.4284E-08
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.1669E-13
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.1074E-13
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1182E-01	.0000	.0000	.1173E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.1984E-08
52 Cu(OH)2	.1233	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	83.72	.0000	.0000	.8370E-06
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	1 Wshed Sludge fr Tank Farm	2 90 wt% Formic Acid	3 Supernate Concentrate	4 Hg From SME
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.8035	.0000	.0000	.8102E-08
103 GroupB	.9938	.0000	.0000	.9900E-08
25 H2	.0000	.0000	.0000	.5108E-31
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	26.14	.0000	.2812E-07
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.6552E-02
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	1.766	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.9099E-11
105 La2O3	.0000	.0000	.0000	.8118E-08
108 Li2O	.0000	.0000	.0000	.9286E-07
65 Mg(COOH)2	.0000	.0000	.0000	.1091E-07
55 Mg(OH)2	.5590	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.8254E-07
60 Mn(COOH)2	.0000	.0000	.0000	.9781E-07
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	5.688	.0000	.0000	.0000
81 N2	.0000	.0000	.0000	.2628E-10
143 Na2CO3 (C14)	.2517E-09	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.7767E-22
84 NO2	.0000	.0000	.0000	.9128E-16
70 Na(HgO(OH))	.7036E-03	.0000	.0000	.6981E-11
94 Na2B4O7	.0000	.0000	.0000	.4003E-11
109 Na2C2O4	.0000	.0000	.0000	.8651E-11
5 Na2CO3	.8666E-01	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.2887E-06
71 Na2PuO2(OH)4	.2853E-07	.0000	.0000	.2831E-15
73 Na2RhO4	.5866E-05	.0000	.0000	.5821E-13
72 Na2RuO4	.5724E-04	.0000	.0000	.5680E-12
6 Na2SO4	.1161	.0000	.0000	.1152E-08
68 NaAlO2	.2853	.0000	.0000	.2831E-08
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.7407E-07

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	1 Washed Sludge fr Tank Farm	2 90 wt% Formic Acid	3 Supernate Concentrate	4 Hlg From SME
7 NaCl	.1153	.0000	.0000	.1148E-08
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.2268E-03	.0000	.0000	.6006E-11
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1118E-01	.0000	.0000	.1112E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.2078	.0000	.0000	.0000
2 NaNO3	8.635	.0000	.0000	.8622E-07
4 NaOH	4.189	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.8481E-07
17 Ni(OH)2	2.147	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	.0000	.1470E-10
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1562	.0000	.0000	.1556E-08
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.4064E-01	.0000	.0000	.4048E-09
22 RhO2	.1553E-01	.0000	.0000	.1547E-09
79 RuO2	.7320E-01	.0000	.0000	.7577E-09
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.1760E-31
111 SiO2	6.504	.0000	.0000	.1008E-05
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.1393E-08
10 Sr(NO3)2	.1645E-06	.0000	.0000	.1632E-14
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.1162	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.6371	.0000	.0000	.6347E-08
107 TiO2	.0000	.0000	.0000	.1623E-07
119 Tritium	.7300E-09	.0000	.0000	.4007E-17
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.4438E-07
16 UO2(OH)2	8.762	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.9548E-09
11 Y(NO3)3	.1168E-06	.0000	.0000	.1159E-14
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.7657E-01	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	1	2	3	4
	Washed Sludge	90 wt%	Supernate	Hg From
	fr Tank Farm	Formic Acid	Concentrate	SME
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	4.078	.0000	.0000	.4057E-07
44 Zn(COOH)2	.0000	.0000	.0000	.5045E-08
54 Zn(OH)2	.8289	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.8118E-08
TOTAL FLOW, LB/HR	475.70	28.98	.00	.01
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.88	.05	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	71.0778	74.5489	.0000	834.7531
TEMPERATURE, DEG C	60.00	25.00	88.50	50.00
PRESSURE, ATM	1.00	1.00	1.00	.97
PRESSURE, PSIG	.00	.00	.00	-.51
PRESSURE, MM HG				733.86
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	24511.17	407.21	.00	.01

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	5 Hg from SRAT to MWWT	6 SRAT Cond Vent to FAVC	7 SRAT Trans fer to SME	8 Rinse Water to Can Decon
COMPONENT FLOWS, LB/HR				
1 H2O	.1073E-01	7.776	897.4	70.04
45 Ag	.1919E-01	.1919E-09	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.6058E-08	.2244E-11	.2244E-03	.0000
74 Al(OH)3	.8787E-03	.1403E-06	14.03	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4718E-05	.1748E-08	.1748	.0000
9 Ba(NO3)2	.4975E-11	.1848E-14	.1848E-06	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.4496E-05	.1666E-08	.1666	.0000
66 CO	.5258E-20	.2053E-10	.1948E-15	.0000
87 CO2	.1627E-07	5.864	.6028E-03	.0000
142 CO2 (C14)	.3252E-18	.1072E-09	.1205E-13	.0000
63 Ca(COOH)2	.1560E-03	.5779E-07	5.779	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1120E-04	.4151E-08	.4151	.0000
20 CaC2O4	.1212E-04	.4490E-08	.4490	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.8029E-05	.1122E-08	.1122	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1423E-04	.5274E-08	.5274	.0000
29 Carbon	.8029E-05	.1122E-08	.1122	.0000
26 Co(COOH)2	.2463E-05	.9124E-09	.9124E-01	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1152E-04	.4267E-08	.4267	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.4539E-10	.1682E-18	.1682E-05	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2921E-10	.1082E-13	.1082E-05	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.8191E-06	.1182E-09	.1182E-01	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.5260E-05	.1949E-08	.1949	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.9167E-03	.8896E-06	83.96	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	5 Hg from SRAT to MWWT	6 SRAT Cond Vent to FAVC	7 SRAT Trans fer to SME	8 Rinse Water to Can Decon
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.8437E-05	.8126E-08	.8126	.0000
103 GroupB	.2693E-04	.9977E-08	.9977	.0000
25 H2	.8976E-19	.3091E-09	.8326E-14	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.6732E-04	.4386E-01	2.494	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
80 HResin	.0000	.0000	.0000	.0000
36 Hg	1.622	.1835E-07	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.4774E-06	.1769E-09	.1769E-01	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2475E-07	.9170E-11	.9170E-03	.0000
105 La2O3	.8687E-07	.3219E-10	.8219E-02	.0000
108 Li2O	.1824E-05	.6757E-09	.6757E-01	.0000
65 Mg(COOH)2	.2969E-04	.1100E-07	1.100	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.5394E-06	.1999E-09	.1998E-01	.0000
60 Mn(COOH)2	.2647E-03	.9807E-07	9.807	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2944E-08	64.93	.1091E-03	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.4317E-10	.9017E-01	.1600E-05	.0000
84 NO2	.8573E-10	.8550E-04	.1324E-05	.0000
70 Na(HgO(OH))	.1899E-07	.7036E-11	.7036E-03	.0000
94 Na2B4O7	.1089E-07	.4034E-11	.4034E-03	.0000
109 Na2C2O4	.9930E-08	.8679E-11	.8679E-03	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.6722E-05	.2490E-08	.2490	.0000
71 Na2PuO2(OH)4	.7701E-12	.2853E-15	.2853E-07	.0000
73 Na2RhO4	.1583E-09	.5866E-13	.5866E-05	.0000
72 Na2RuO4	.1545E-08	.5724E-12	.5724E-04	.0000
6 Na2SO4	.3133E-05	.1161E-08	.1161	.0000
68 NaAlO2	.7701E-05	.2853E-08	.2853	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.2015E-03	.7465E-07	7.464	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS (CONT'D)-
 STREAM NAME

	5	6	7	8
	Hg from	SRAT Cond	SRAT Trans	Rinse Water
	SRAT to MWWT	Vent to FAVC	fer to SME	to Can Decon
7 NaCl	.3123E-05	.1157E-08	.1157	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1634E-07	.6053E-11	.6052E-03	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.3025E-06	.1121E-09	.1121E-01	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.9852E-04	.3650E-07	3.650	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.9333E-04	.3458E-07	3.458	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1600E-08	19.61	.5929E-04	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.4232E-05	.1568E-08	.1568	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1101E-05	.4080E-09	.4080E-01	.0000
22 RhO2	.4207E-06	.1559E-09	.1559E-01	.0000
79 RuO2	.2061E-05	.7636E-09	.7636E-01	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.6705E-20	.1185E-10	.2484E-15	.0000
111 SiO2	.1954E-03	.7240E-07	7.240	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.3790E-05	.1404E-08	.1404	.0000
10 Sr(NO3)2	.4439E-11	.1645E-14	.1645E-06	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1726E-04	.6396E-08	.6396	.0000
107 TiO2	.1676E-06	.6210E-10	.6210E-02	.0000
119 Tritium	.1942E-18	.1405E-10	.7197E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1207E-08	.4473E-07	4.473	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.2597E-05	.9622E-09	.9622E-01	.0000
11 Y(NO3)3	.3152E-11	.1168E-14	.1168E-06	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	5	6	7	8
	Hg from	SRAT Cond	SRAT Trans	Rinse Water
	SRAT to MWWT	Vent to FAVC	fer to SME	to Can Decon
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1104E-03	.4089E-07	4.089	.0000
44 Zn(COOH)2	.1372E-04	.5084E-08	.5084	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8687E-07	.8219E-10	.8219E-02	.0000
TOTAL FLOW, LB/HR	1.65	97.81	501.55	70.04
VAPOR FLOW, CFM		25.51		
LIQUID FLOW, GPM	.00		.88	.14
DESIGN FLOW,				
DENSITY, LBS/FT3	773.8155	.0639	70.8346	62.4300
TEMPERATURE, DEG C	50.00	50.00	50.00	80.00
PRESSURE, ATM	1.00	.97	1.00	137.09
PRESSURE, PSIG	.00	-.51	.00	1999.98
PRESSURE, MM HG		733.86		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	8.81	215.33	21130.03	2183.73

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
COMPONENT FLOWS, LB/HR				
1 H2O	116.8	13.98	6.967	178.3
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	6.616	.1757E-05	.8911E-06	6.616
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.4504	.2977E-01	.1460E-01	.4060
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.0000	.0000	.0000	.0000
105 La2O3	.2250	.5976E-07	.8031E-07	.2250
108 Li2O	2.566	.6812E-06	.8455E-06	2.566
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.9002	.2390E-06	.1212E-06	.9002
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	875.9	188.0	.2780E-02
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	7.967	.2115E-05	.1073E-05	7.967
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	113.6	56.78	.1652E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	26.06	.6920E-05	.8510E-05	26.06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.4501	.1195E-06	.6062E-07	.4501
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2250	.5976E-07	.8031E-07	.2250
TOTAL FLOW, LB/HR	162.25	508.44	251.74	223.69
VAPOR FLOW, CFM		121.94	60.98	
LIQUID FLOW, GPM	.27			.40
DESIGN FLOW,				
DENSITY, LBS/FT ³	73.7839	.0688	.0688	70.2707
TEMPERATURE, DEG C	80.00	29.99	29.99	80.00
PRESSURE, ATM	5.08	.97	.97	.97
PRESSURE, PSIG	59.96	-.51	-.51	-.51
PRESSURE, MM HG		733.86	733.86	738.86
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	504.57	-22733.39	-11368.04	5934.74

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	13 Waste Sand	14 Fresh Frit Slurry to SME	15 SME Condens ate to SMECT	16 SME Cndnsate to RCT
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	78.70	265.2	842.9
45 Ag	.0000	.0000	.1166E-07	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.6382E-09
74 Al(OH)3	.0000	.0000	.8439E-03	.8445E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	17.34	.1451E-02	.1454E-02
9 Ba(NO3)2	.0000	.0000	.1108E-10	.1109E-10
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.1002E-04	.1003E-04
66 CO	.0000	.0000	.1948E-15	.1013E-14
87 CO2	.0000	.0000	.4235E-02	.3031E-05
142 CO2 (C14)	.0000	.0000	.1205E-13	.1129E-16
63 Ca(COOH)2	.0000	.0000	.3475E-03	.3478E-03
120 Ca(OH)2	.0000	.0000	.0000	.1593E-09
113 Ca3(PO4)2	.0000	.0000	.2497E-04	.2498E-04
20 CaC2O4	.0000	.0000	.2700E-04	.2702E-04
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.6750E-05	.6755E-05
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.3172E-04	.3174E-04
29 Carbon	.0000	.0000	.6750E-05	.6755E-05
26 Co(COOH)2	.0000	.0000	.5487E-05	.5491E-05
121 Co(OH)2	.0000	.0000	.0000	.2756E-11
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.2566E-04	.2568E-04
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.1012E-09	.1012E-09
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.6508E-10	.6799E-10
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.7110E-06	.7115E-06
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1172E-04	.1173E-04
52 Cu(OH)2	.0000	.0000	.0000	.5995E-11
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.2043E-02	.2044E-02
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	18 Waste Sand	14 Fresh Frit Slurry to SME	15 Condens ate to SMECT	16 SME Cndnsate to RCT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.1880E-04	.1881E-04
103 GroupB	.0000	.0000	.6000E-04	.6004E-04
25 H2	.0000	.0000	.8326E-14	.6697E-16
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	1.181	1.614	1.892
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.8277E-02	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.1261E-09
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.5515E-07	.5762E-07
105 La2O3	.0000	.5899	.4920E-04	.4928E-04
108 Li2O	.0000	6.725	.5628E-03	.5636E-03
65 Mg(COOH)2	.0000	.0000	.6615E-04	.6620E-04
55 Mg(OH)2	.0000	.0000	.0000	.2717E-10
38 MgO	.0000	2.860	.1972E-03	.1975E-03
60 Mn(COOH)2	.0000	.0000	.5898E-03	.5902E-03
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.2485E-08
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.0000	17.08	.4093E-02
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.1600E-05	.1144E-09
84 NO2	.0000	.0000	.1288E-05	.1110E-03
70 Na(HgO(OH))	.0000	.0000	.4231E-07	.4234E-07
94 Na2B4O7	.0000	.0000	.2426E-07	.2535E-07
109 Na2C2O4	.0000	.0000	.2213E-07	.2312E-07
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	20.88	.1750E-02	.1753E-02
71 Na2PuO2(OH)4	.0000	.0000	.1716E-11	.1717E-11
73 Na2RhO4	.0000	.0000	.8528E-09	.8530E-09
72 Na2RuO4	.0000	.0000	.8443E-08	.8445E-08
6 Na2SO4	.0000	.0000	.6981E-05	.6986E-05
68 NaAlO2	.0000	.0000	.1716E-04	.1717E-04
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.4489E-03	.4493E-03

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	13 Waste Sand	14 Fresh Frit Slurry to SME	15 SME Condens ate to SMECT	16 SME Cndnsate to RCT
7 NaCl	.0000	.0000	.6960E-05	.6966E-05
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.8640E-07	.8743E-07
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.6740E-06	.6745E-06
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.2195E-03	.2197E-03
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.2080E-03	.2081E-03
17 Ni(OH)2	.0000	.0000	.0000	.1044E-09
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	5.159	.2361E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.9429E-05	.9435E-05
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.2454E-05	.2455E-05
22 RhO2	.0000	.0000	.9375E-06	.9382E-06
79 RuO2	.0000	.0000	.4592E-05	.4595E-05
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.2484E-15	.2304E-14
111 SiO2	.0000	68.31	.6111E-02	.6120E-02
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.8445E-05	.8451E-05
10 Sr(NO3)2	.0000	.0000	.9891E-11	.9898E-11
127 Sr(OH)2	.0000	.0000	.0000	.4656E-11
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.8847E-04	.8849E-04
107 TiO2	.0000	1.180	.9840E-04	.9854E-04
119 Tritium	.0000	.0000	.2914E-09	.3094E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.2690E-03	.2692E-03
16 UO2(OH)2	.0000	.0000	.0000	.1829E-09
27 Y(COOH)3	.0000	.0000	.5787E-05	.5791E-05
11 Y(NO3)3	.0000	.0000	.7024E-11	.7029E-11
128 Y(OH)3	.0000	.0000	.0000	.2911E-11
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	13 Waste Sand	14 Fresh Frit Slrry to SME	15 Condens ate to SMECT	16 SME Cndnsate to RCT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.2459E-03	.2461E-03
44 Zn(COOH)2	.0000	.0000	.8057E-04	.8060E-04
54 Zn(OH)2	.0000	.0000	.0000	.1574E-10
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.5899	.4920E-04	.4928E-04
TOTAL FLOW, LB/HR	.00	197.85	289.03	844.78
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.26	.58	.69
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	93.2861	61.7592	62.4938
TEMPERATURE, DEG C	88.00	80.00	50.00	50.00
PRESSURE, ATM	1.00	1.84	.97	.97
PRESSURE, PSIG	.00	5.00	-.51	-.51
PRESSURE, MM HG			783.86	783.86
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	.00	8719.89	15002.77	17565.74

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	17 SMECT Hg to MWWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.2507E-04	869.8	852.3	.3304
45 Ag	.2682E-07	.9693E-04	.9693E-04	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.4667E-16	.2233E-01	.2233E-01	.0000
74 Al(OH)3	.6176E-10	14.03	14.03	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1063E-09	24.13	24.13	.0000
9 Ba(NO3)2	.8112E-18	.1843E-06	.1843E-06	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7331E-12	.1666	.1666	.0000
66 CO	.7407E-22	.2459E-24	.6964E-29	.0000
87 CO2	.2253E-12	.1081E-08	.7696E-12	.0000
142 CO2 (C14)	.8256E-24	.8076E-20	.2189E-23	.0000
68 Ca(COOH)2	.2548E-10	5.778	5.778	.0000
120 Ca(OH)2	.1165E-16	.0000	.0000	.0000
113 Ca3(PO4)2	.1827E-11	.4151	.4151	.0000
20 CaC2O4	.1976E-11	.4489	.4489	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4940E-12	.1122	.1122	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2321E-11	.5273	.5273	.0000
29 Carbon	.4940E-12	.1122	.1122	.0000
26 Co(COOH)2	.4016E-12	.9124E-01	.9124E-01	.0000
121 Co(OH)2	.2016E-18	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1878E-11	.4267	.4267	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7404E-17	.1682E-05	.1682E-05	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.4972E-17	.1082E-05	.1082E-05	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.5203E-13	.1182E-01	.1182E-01	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8578E-12	.1949	.1949	.0000
52 Cu(OH)2	.4384E-18	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.1495E-09	83.96	83.96	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	17 SMECT Hg to MWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1376E-11	.8126	.8126	.0000
103 GroupB	.4891E-11	.9976	.9976	.0000
25 H2	.4898E-23	.5148E-23	.1502E-27	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.1383E-06	2.272	2.149	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.8424E-02	.6552E-02	.6551E-02	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.9223E-17	.2589E-04	.2589E-04	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.4214E-14	.9169E-03	.9169E-03	.0000
105 Ln2O3	.8604E-11	.8181	.8181	.0000
108 Li2O	.4122E-10	9.357	9.857	.0000
65 Mg(COOH)2	.4841E-11	1.100	1.100	.0000
55 Mg(OH)2	.1987E-17	.0000	.0000	.0000
33 MgO	.1445E-10	8.280	8.280	.0000
60 Mn(COOH)2	.4316E-10	9.806	9.806	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1781E-15	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2994E-09	.2668E-02	.4206E-02	15.11
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.8365E-17	.7827E-14	.5114E-18	.0000
84 NO2	.8121E-11	.5709E-04	.1525E-04	.0000
70 Na(HgO(OH))	.3096E-14	.7035E-03	.7035E-03	.0000
94 Na2B4O7	.1854E-14	.4034E-03	.4034E-03	.0000
109 Na2C2O4	.1691E-14	.3679E-03	.3679E-03	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1282E-09	29.10	29.10	.0000
71 Na2PuO2(OH)4	.1256E-18	.2853E-07	.2853E-07	.0000
73 Na2RhO4	.2582E-16	.5866E-05	.5866E-05	.0000
72 Na2RuO4	.2519E-15	.5724E-04	.5724E-04	.0000
6 Na2SO4	.5109E-12	.1161	.1161	.0000
68 NaAlO2	.1256E-11	.2853	.2853	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3286E-10	7.549	7.549	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-

STREAM NAME

	17 SMECT Hg to MWWT	18 SME Concent rate to MFT	19 Molter Feed	20 Molter Seal Pot Purge
7 NaCl	.5094E-12	.1157	.1157	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.2737E-14	.6052E-03	.6052E-03	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.4938E-13	.1121E-01	.1121E-01	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1607E-10	3.728	3.728	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1522E-10	3.458	3.458	.0000
17 Ni(OH)2	.7633E-17	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1727E-09	.1493E-02	.2427E-02	4.563
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6900E-12	.1568	.1568	.0000
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1796E-12	.4080E-01	.4080E-01	.0000
22 RhO2	.6861E-13	.1559E-01	.1559E-01	.0000
79 RuO2	.3861E-12	.7635E-01	.7635E-01	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1685E-21	.1774E-23	.1500E-27	.0000
111 SiO2	.4475E-09	101.6	101.6	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.6180E-12	.1404	.1404	.0000
10 Sr(NO3)2	.7238E-18	.1645E-06	.1645E-06	.0000
127 Sr(OH)2	.3405E-18	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2815E-11	.6396	.6396	.0000
107 TiO2	.7207E-11	1.636	1.636	.0000
119 Tritium	.2262E-16	.4038E-09	.3805E-09	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1969E-10	4.473	4.473	.0000
16 UO2(OH)2	.1837E-16	.0000	.0000	.0000
27 Y(COOH)3	.4235E-12	.9621E-01	.9621E-01	.0000
11 Y(NO3)3	.5140E-18	.1168E-06	.1168E-06	.0000
128 Y(OH)3	.2129E-18	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	17 SMECT Hg to MWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1800E-10	4.089	4.089	.0000
44 Zn(COOH)2	.2237E-11	.5084	.5084	.0000
54 Zn(OH)2	.1151E-17	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3604E-11	.8181	.8181	.0000
TOTAL FLOW, LB/HR	.00	636.81	619.20	20.00
VAPOR FLOW, CFM				4.72
LIQUID FLOW, GPM	.00	.97	.94	
DESIGN FLOW,				
DENSITY, LBS/FT3	774.7016	81.6111	82.8263	.0706
TEMPERATURE, DEG C	50.00	49.96	50.00	35.00
PRESSURE, ATM	.97	1.00	.97	1.00
PRESSURE, PSIG	-.51	.00	-.51	.00
PRESSURE, MM HG	733.86		733.86	
PHASE	LIQUID	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	.01	22699.77	21821.00	-1029.96

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
COMPONENT FLOWS, LB/HR				
1 H2O	.6609	.3304	368.5	.0000
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.2062E-01
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.2233E-03	.0000
74 Al(OH)3	.0000	.0000	.1403	.0000
77 Al2O3	.0000	.0000	.0000	9.254
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.2413	23.77
9 Ba(NO3)2	.0000	.0000	.1843E-08	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.1053
24 BaSO4	.0000	.0000	.1666E-02	.0000
66 CO	.0000	.0000	5.598	.0000
37 CO2	.0000	.0000	13.09	.0000
142 CO2 (C14)	.0000	.0000	.2189E-23	.0000
63 Ca(COOH)2	.0000	.0000	.5778E-01	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.4151E-02	.4109
20 CaC2O4	.0000	.0000	.4489E-02	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.1122E-02	.0000
41 CaO	.0000	.0000	.0000	2.955
19 CaSO4	.0000	.0000	.5273E-02	.0000
29 Carbon	.0000	.0000	.1122E-02	.0000
26 Co(COOH)2	.0000	.0000	.9124E-03	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.4544E-01
99 Cr(OH)3	.0000	.0000	.4267E-02	.0000
98 Cr2O3	.0000	.0000	.0000	.3103
42 Cs2O	.0000	.0000	.1682E-07	.8039E-02
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.1082E-07	.0000
136 CsCl Semi Vol	.0000	.0000	.5066E-03	.0000
8 CsNO3	.0000	.0000	.1182E-03	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1949E-02	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.9994E-01
13 Fe(OH)3	.0000	.0000	.3396	.0000
80 Fe2O3	.0000	.0000	.0000	18.93

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
101 FeO	.0000	.0000	.0000	5.574
126 Group A Semi Vo	.0000	.0000	.1547E-01	.0000
102 GroupA	.0000	.0000	.8126E-02	.2940
103 GroupB	.0000	.0000	.9976E-02	.9877
25 H2	.0000	.0000	.8657	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.1431E-01	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.7688E-02	.0000
97 I2	.0000	.0000	.9392E-04	.0000
39 K2O	.0000	.0000	.0000	.4229E-03
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.9169E-05	.0000
105 La2O3	.0000	.0000	.8181E-02	.8099
108 Li2O	.0000	.0000	.9357E-01	9.264
65 Mg(COOH)2	.0000	.0000	.1100E-01	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.8280E-01	8.631
60 Mn(COOH)2	.0000	.0000	.9806E-01	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	4.750
14 MnO2	.0000	.0000	.0000	.0000
81 N2	30.21	15.11	60.43	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	1.175	.0000
84 NO2	.0000	.0000	.2001	.0000
70 Na(HgO(OH))	.0000	.0000	.7035E-05	.0000
94 Na2B4O7	.0000	.0000	.1726	.8993E-03
109 Na2C2O4	.0000	.0000	.8679E-05	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.3664	33.52
71 Na2PuO2(OH)4	.0000	.0000	.2853E-09	.0000
73 Na2RhO4	.0000	.0000	.5866E-07	.0000
72 Na2RuO4	.0000	.0000	.5724E-06	.0000
6 Na2SO4	.0000	.0000	.1161E-02	.0000
68 NaAlO2	.0000	.0000	.2853E-02	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.7549E-01	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
7 NaCl	.0000	.0000	.1157E-02	.0000
138 NaCl Semi Vol	.0000	.0000	.1144	.0000
69 NaF	.0000	.0000	.6052E-05	.0000
139 NaF Semi Vol	.0000	.0000	.9010E-01	.0000
12 NaI	.0000	.0000	.1121E-03	.0000
125 NaI Semi Vol	.0000	.0000	.1098E-01	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.3728E-01	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.8458E-01	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	1.719
82 O2	9.127	4.563	18.19	.0000
67 PbO	.0000	.0000	.0000	.1142
28 PbSO4	.0000	.0000	.1568E-02	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.4080E-03	.4039E-01
22 RhO2	.0000	.0000	.1559E-03	.1544E-01
79 RuO2	.0000	.0000	.7635E-03	.6806E-01
23 RuO2 Semi Vol	.0000	.0000	.7563E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.8755	.0000
111 SiO2	.0000	.0000	1.016	100.6
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.1404E-02	.0000
10 Sr(NO3)2	.0000	.0000	.1645E-08	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.8109E-01
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.6896E-02	.6832
107 TiO2	.0000	.0000	.1636E-01	1.620
119 Tritium	.0000	.0000	.3805E-09	.0000
93 UO2	.0000	.0000	.0000	8.821
62 UO2(COOH)2	.0000	.0000	.4478E-01	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.9621E-03	.0000
11 Y(NO3)3	.0000	.0000	.1168E-08	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
47 Y2O3	.0000	.0000	.0000	.4802E-01
100 Zeolite	.0000	.0000	.4089E-01	4.048
44 Zn(COOH)2	.0000	.0000	.5084E-02	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.2635
104 ZrO2	.0000	.0000	.8181E-02	.8099
TOTAL FLOW, LB/HR	40.00	20.00	471.10	228.11
VAPOR FLOW, CFM	9.45	4.72	420.55	
LIQUID FLOW, GPM				.19
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0187	152.6455
TEMPERATURE, DEG C	85.00	85.00	520.00	1050.00
PRESSURE, ATM	1.00	1.00	.99	.99
PRESSURE, PSIG	.00	.00	-.18	-.18
PRESSURE, MM HG			750.88	750.88
PHASE	VAPOR	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	-2059.93	-1029.96	327421.58	77096.27

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
COMPONENT FLOWS, LB/HR				
1 H2O	44.08	412.6	2.612	415.2
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.2238E-03	.0000	.2238E-03
74 Al(OH)3	.0000	.1403	.0000	.1403
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.2413	.0000	.2413
9 Ba(NO3)2	.0000	.1843E-08	.0000	.1843E-08
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1666E-02	.0000	.1666E-02
66 CO	.0000	5.598	.0000	5.598
37 CO2	.0000	13.09	.0000	13.09
142 CO2 (C14)	.0000	.2189E-23	.0000	.2189E-23
63 Ca(COOH)2	.0000	.5778E-01	.0000	.5778E-01
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.4151E-02	.0000	.4151E-02
20 CaC2O4	.0000	.4489E-02	.0000	.4489E-02
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.1122E-02	.0000	.1122E-02
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.5273E-02	.0000	.5273E-02
29 Carbon	.0000	.1122E-02	.0000	.1122E-02
26 Co(COOH)2	.0000	.9124E-03	.0000	.9124E-03
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.4267E-02	.0000	.4267E-02
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.1682E-07	.0000	.1682E-07
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.1082E-07	.0000	.1082E-07
136 CsCl Semi Vol	.0000	.5066E-03	.0000	.5066E-03
8 CsNO3	.0000	.1182E-03	.0000	.1182E-03
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1949E-02	.0000	.1949E-02
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.8396	.0000	.8396
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	25	26	27	28
	Off-Gas Spray Water	Cooled Off-Gas	Melter Con trol Air	Inlet Gas to Quencher
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.1547E-01	.0000	.1547E-01
102 GroupA	.0000	.8126E-02	.0000	.8126E-02
103 GroupB	.0000	.9976E-02	.0000	.9976E-02
25 H2	.0000	.8657	.0000	.8657
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.7688E-02	.0000	.7688E-02
97 I2	.0000	.9392E-04	.0000	.9392E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.9169E-05	.0000	.9169E-05
105 La2O3	.0000	.8181E-02	.0000	.8181E-02
108 Li2O	.0000	.9357E-01	.0000	.9357E-01
65 Mg(COOH)2	.0000	.1100E-01	.0000	.1100E-01
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.3280E-01	.0000	.3280E-01
60 Mn(COOH)2	.0000	.9806E-01	.0000	.9806E-01
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	60.43	119.4	179.8
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	1.175	.0000	1.175
84 NO2	.0000	.2001	.0000	.2001
70 Na(HgO(OH))	.0000	.7035E-05	.0000	.7035E-05
94 Na2B4O7	.0000	.1726	.0000	.1726
109 Na2C2O4	.0000	.3679E-05	.0000	.3679E-05
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.8442	.0000	.8442
71 Na2PuO2(OH)4	.0000	.2853E-09	.0000	.2853E-09
73 Na2RhO4	.0000	.5866E-07	.0000	.5866E-07
72 Na2RuO4	.0000	.5724E-06	.0000	.5724E-06
6 Na2SO4	.0000	.1161E-02	.0000	.1161E-02
68 NaAlO2	.0000	.2853E-02	.0000	.2853E-02
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.7549E-01	.0000	.7549E-01

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
7 NaCl	.0000	.1157E-02	.0000	.1157E-02
138 NaCl Seal Vol	.0000	.1144	.0000	.1144
69 NaF	.0000	.8004E-01	.0000	.8004E-01
139 NaF Semi Vol	.0000	.9010E-01	.0000	.9010E-01
12 NaI	.0000	.1121E-03	.0000	.1121E-03
125 NaI Semi Vol	.0000	.1098E-01	.0000	.1098E-01
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.8728E-01	.0000	.8728E-01
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.8458E-01	.0000	.8458E-01
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	18.19	36.07	54.25
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1568E-02	.0000	.1568E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.4080E-03	.0000	.4080E-03
22 RhO2	.0000	.1559E-03	.0000	.1559E-03
79 RuO2	.0000	.7635E-03	.0000	.7635E-03
23 RuO2 Semi Vol	.0000	.7563E-02	.0000	.7563E-02
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.8755	.0000	.8755
111 SiO2	.0000	1.016	.0000	1.016
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1404E-02	.0000	.1404E-02
10 Sr(NO3)2	.0000	.1645E-08	.0000	.1645E-08
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.6396E-02	.0000	.6396E-02
107 TiO2	.0000	.1636E-01	.0000	.1636E-01
119 Tritium	.0000	.8805E-09	.0000	.8805E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.4473E-01	.0000	.4473E-01
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.9621E-03	.0000	.9621E-03
11 Y(NO3)3	.0000	.1168E-08	.0000	.1168E-08
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.4089E-01	.0000	.4089E-01
44 Zn(COOH)2	.0000	.5084E-02	.0000	.5084E-02
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.8181E-02	.0000	.8181E-02
TOTAL FLOW, LB/HR	44.08	515.17	158.07	673.25
VAPOR FLOW, CFM		880.75	87.34	480.79
LIQUID FLOW, GPM	.09			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4300	.0226	.0706	.0260
TEMPERATURE, DEG C	40.00	375.00	85.00	829.79
PRESSURE, ATM	1.34	.98	1.00	.98
PRESSURE, PSIG	5.00	-.26	.00	-.84
PRESSURE, MM HG		746.55		742.44
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	1795.61	828924.96	-8140.56	320784.40

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	29 Liquid to Quencher	80 Dilution Air	81 Quencher Exit	82 Off-Gas to PWDBF
COMPONENT FLOWS, LB/HR				
1 H2O	.2766E+05	7.835	.2808E+05	106.0
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.6797E-02	.0000	.6806E-02	.18C1E-03
74 Al(OH)3	7.253	.0000	7.269	.1169
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	12.48	.0000	12.50	.2011
9 Ba(NO3)2	.5696E-07	.0000	.5704E-07	.1536E-03
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5140E-01	.0000	.5147E-01	.1388E-02
66 CO	.8156E-02	.0000	5.602	5.598
87 CO2	.1700	.0000	13.26	13.09
142 CO2 (C1)	.2842E-25	.0000	.2217E-23	.2188E-23
68 Ca(COOH)2	1.783	.0000	1.786	.4815E-01
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 CaS(PO4)2	.1281	.0000	.1283	.3459E-02
20 CaC2O4	.1385	.0000	.1387	.3741E-02
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.3463E-01	.0000	.3468E-01	.9353E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1627	.0000	.1629	.4394E-02
29 Carbon	.3463E-01	.0000	.3468E-01	.9353E-03
26 Co(COOH)2	.2815E-01	.0000	.2819E-01	.7603E-03
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1317	.0000	.1318	.3556E-02
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.5246E-06	.0000	.5254E-06	.1401E-07
137 Cs2O Semi Vol	.1007E-03	.0000	.1010E-03	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1962E-06	.0000	.1962E-06	.9018E-03
136 CsCl Semi Vol	.1780E-01	.0000	.1775E-01	.5066E-03
8 CsNO3	.3654E-02	.0000	.3659E-02	.9851E-04
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.6014E-01	.0000	.6022E-01	.1624E-02
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	17.56	.0000	17.59	.2830
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	29 Liquid to Quencher	80 Dilution Air	81 Quencher Exit	82 Off-Gas to PWDBF
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.5924	.0000	.5908	.1547E-01
102 GroupA	.9570E-01	.0000	.9583E-01	.2605E-02
103 GroupB	.8079	.0000	.8083	.8314E-02
25 H2	.2147E-08	.0000	.8660	.8657
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.2367	.0000	.2357	.7688E-02
97 I2	.0000	.0000	.0000	.9892E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2111E-03	.0000	.2113E-03	.7641E-05
105 La2O3	.2525	.0000	.2528	.6818E-02
108 Li2O	4.826	.0000	4.836	.7798E-01
65 Mg(COOH)2	.8394	.0000	.8399	.9166E-02
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	1.487	.0000	1.490	.2739E-01
60 Mn(COOH)2	8.028	.0000	8.033	.8172E-01
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2966	358.2	180.1	678.5
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.1491E-02	.0000	1.176	1.175
84 NO2	1.016	.0000	1.216	.1773
70 Na(HgO(OH))	.2175E-03	.0000	.2177E-03	.5869E-05
94 Na2B4O7	6.701	.0000	6.713	.1489
109 Na2C2O4	.8471E-04	.0000	.8476E-04	.3066E-05
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	17.80	.0000	17.84	.2869
71 Na2PuO2(OH)4	.8819E-08	.0000	.8830E-08	.2378E-09
73 Na2RhO4	.1813E-05	.0000	.1815E-05	.4888E-07
72 Na2RuO4	.1769E-04	.0000	.1772E-04	.4770E-06
6 Na2SO4	.3588E-01	.0000	.3593E-01	.9673E-03
68 NaAlO2	.8819E-01	.0000	.8830E-01	.2378E-02
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	3.529	.0000	3.536	.6291E-01

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	29 Liquid to Quencher	30 Dilution Air	31 Quencher Exit	32 Off-Gas to PWRDF
7 NaCl	.3575E-01	.0000	.3530E-01	.9643E-03
138 NaCl Semi Vol	6.863	.0000	6.858	.1144
69 NaF	.9472	.0000	.9485	.2503E-01
139 NaF Semi Vol	4.996	.0000	4.992	.9010E-01
12 NaI	.8461E-02	.0000	.8465E-02	.9339E-04
125 NaI Semi Vol	.4288	.0000	.4277	.1098E-01
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	1.152	.0000	1.154	.3107E-01
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	1.067	.0000	1.069	.2882E-01
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1699	108.2	54.42	204.9
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.4838E-01	.0000	.4844E-01	.1306E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1259E-01	.0000	.1261E-01	.3400E-03
22 RhO2	.4810E-02	.0000	.4817E-02	.1299E-03
79 RuO2	.2819E-01	.0000	.2822E-01	.6363E-03
23 RuO2 Semi Vol	.2291	.0000	.2282	.7563E-02
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.6104E-03	.0000	.3761	.8755
111 SiO2	52.53	.0000	52.64	.8467
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4333E-01	.0000	.4339E-01	.1170E-02
10 Sr(NO3)2	.5083E-07	.0000	.5090E-07	.1370E-08
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1974	.0000	.1976	.5330E-02
107 TiO2	.4912	.0000	.4919	.1363E-01
119 Tritium	.1092E-07	.0000	.1126E-07	.4184E-10
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	1.380	.0000	1.382	.3727E-01
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.2969E-01	.0000	.2973E-01	.8018E-03
11 Y(NO3)3	.8610E-07	.0000	.8614E-07	.9732E-09
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	29 Liquid to Quencher	80 Dilution Air	81 Quencher Exit	82 Off-Gas to 8WDBF
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	1.262	.0000	1.263	.8407E-01
44 Zn(COOH)2	.1569	.0000	.1571	.4236E-02
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2525	.0000	.2528	.6818E-02
TOTAL FLOW, LB/HR	27815.50	474.22	28485.92	1012.79
VAPOR FLOW, CFM		112.02		271.05
LIQUID FLOW, GPM	55.38		56.80	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6253	.0706	62.5314	.0623
TEMPERATURE, DEG C	55.00	35.00	64.37	54.94
PRESSURE, ATM	8.72	1.00	.99	.99
PRESSURE, PSIG	89.97	.00	-.14	-.21
PRESSURE, MM HG			752.78	748.90
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	1559676.19	-24421.69	1879907.84	15933.34

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	38 Liq to PWDBF Nozzles	84 PWDBF #1 Atomzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	8998.	2.698	1993.	126.2
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.9823E-03	.0000	.6714E-03	.1861E-06
74 Al(OH)3	1.048	.0000	.6374	.1169E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	1.803	.0000	1.096	.2011E-03
9 Ba(NO3)2	.8233E-08	.0000	.5604E-08	.1536E-11
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7429E-02	.0000	.5059E-02	.1388E-05
66 CO	.4561E-03	.0000	.1972E-03	5.598
37 CO2	.2457E-01	.0000	.1091E-01	13.09
142 CO2 (C14)	.4108E-26	.0000	.1824E-26	.2189E-23
63 Ca(COOH)2	.2577	.0000	.1755	.4816E-04
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1851E-01	.0000	.1261E-01	.8460E-05
20 CaC2O4	.2002E-01	.0000	.1363E-01	.3742E-05
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.5006E-02	.0000	.3409E-02	.9355E-06
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2352E-01	.0000	.1601E-01	.4395E-05
29 Carbon	.5006E-02	.0000	.3409E-02	.9355E-06
26 Co(COOH)2	.4069E-02	.0000	.2771E-02	.7604E-06
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1903E-01	.0000	.1296E-01	.3556E-05
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7583E-07	.0000	.5148E-07	.1402E-10
137 Cs2O Semi Vol	.1455E-04	.0000	.7274E-05	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2836E-07	.0000	.2291E-07	.9019E-11
136 CsCl Semi Vol	.2573E-02	.0000	.1742E-02	.5066E-05
8 CsNO3	.5281E-03	.0000	.3594E-03	.9853E-07
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8692E-02	.0000	.5919E-02	.1624E-05
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	2.537	.0000	1.543	.2831E-03
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	83	84	85	86
	Liq to PWDBF Nozzles	PWDBF #1 Atomzg Air	PWDBF #1 Exit Liquid	PWDBF #2 Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.8561E-01	.0000	.5673E-01	.1547E-03
102 GroupA	.1383E-01	.0000	.9438E-02	.2605E-05
103 GroupB	.4449E-01	.0000	.8030E-01	.8315E-05
25 H2	.3104E-04	.0000	.1337E-04	.8657
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.342 01	.0000	.2402E-01	.7688E-04
97 I2	.0000	.0000	.0000	.9392E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.3051E-04	.0000	.2266E-04	.7642E-08
105 La2O3	.8649E-01	.0000	.2485E-01	.6819E-05
108 Li2O	.6975	.0000	.4242	.7799E-04
65 Mg(COOH)2	.4906E-01	.0000	.8340E-01	.9168E-05
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.2149	.0000	.1339	.2733E-04
60 Mn(COOH)2	.4377	.0000	.2980	.8173E-04
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4287E-01	123.1	.2202E-01	924.7
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2155E-03	.0000	.9384E-04	1.175
84 NO2	.1468	.0000	.6961E-01	.1886
70 Na(HgO(OH))	.3143E-04	.0000	.2189E-04	.5864E-03
94 Na2B4O7	.9685	.0000	.6235	.1439E-03
109 Na2C2O4	.1224E-04	.0000	.9090E-05	.8066E-03
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	2.572	.0000	1.564	.2869E-03
71 Na2PuO2(OH)4	.1275E-08	.0000	.8675E-09	.2378E-12
73 Na2RhO4	.2620E-06	.0000	.1784E-06	.4889E-10
72 Na2RuO4	.2557E-05	.0000	.1740E-05	.4771E-09
6 Na2SO4	.5185E-02	.0000	.8529E-02	.9675E-06
68 NaAlO2	.1275E-01	.0000	.8675E-02	.2378E-05
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.5100	.0000	.3159	.6292E-04

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	33 Liq to PWDBF Nozzles	84 PWDBF #1 Atomzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
7 NaCl	.5167E-02	.0000	.3517E-02	.9645E-06
133 NaCl Semi Vol	.9196	.0000	.5628	.1144E-02
69 NaF	.1369	.0000	.9269E-01	.2504E-04
139 NaF Semi Vol	.7220	.0000	.4421	.9010E-03
12 NaI	.5002E-03	.0000	.8405E-03	.9340E-07
125 NaI Semi Vol	.6197E-01	.0000	.4087E-01	.1698E-03
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1665	.0000	.1133	.3105E-04
4 NaOH	.0000	.0000	.0000	.0000
87 NaResir	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1542	.0000	.1050	.2882E-04
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.2456E-01	37.19	.1264E-01	279.3
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6992E-02	.0000	.4761E-02	.1307E-05
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1820E-02	.0000	.1239E-02	.3400E-06
22 RhO2	.6952E-03	.0000	.4734E-03	.1299E-06
79 RuO2	.8352E-02	.0000	.2292E-02	.6364E-06
23 RuO2 Semi Vol	.3311E-01	.0000	.2336E-01	.7563E-04
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.8823E-04	.0000	.8854E-04	.3755
111 SiO2	7.592	.0000	4.616	.8468E-03
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.6262E-02	.0000	.4264E-02	.1170E-05
10 Sr(NO3)2	.7346E-08	.0000	.5009E-03	.1371E-11
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2852E-01	.0000	.1942E-01	.5331E-05
107 TiO2	.7100E-01	.0000	.4870E-01	.1364E-04
119 Tritium	.1579E-08	.0000	.7860E-09	.4978E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1995	.0000	.1358	.3728E-04
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.4291E-02	.0000	.2922E-02	.8019E-06
11 Y(NO3)3	.5217E-08	.0000	.3551E-08	.9784E-12
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-

STREAM NAME	33 Liq to PWDBF Nozzles	84 PWDBF #1 Atomzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1823	.0000	.1242	.8408E-04
44 Zn(COOH)2	.2267E-01	.0000	.1544E-01	.4237E-05
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8649E-01	.0000	.2485E-01	.6819E-05
TOTAL FLOW, LB/HR	4020.14	162.98	2006.80	1350.99
VAPOR FLOW, CFM		10.52		370.08
LIQUID FLOW, GPM	8.00		3.99	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6253	.2583	62.6714	.0608
TEMPERATURE, DEG C	55.00	40.00	53.48	52.46
PRESSURE, ATM	3.18	3.72	.97	.95
PRESSURE, PSIG	32.04	39.97	-.51	-.72
PRESSURE, MM HG			733.70	722.76
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	225417.85	-8198.74	109255.65	8726.08

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	37 FPT Liquid to OGCT	88 Canister Air Inleakage	39 Inlet Air to Ejector	40 Liquid Feed to Ejector
COMPONENT FLOWS, LB/HR				
1 H2O	103.8	.6654	1.331	.8850E+05
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1309E-06	.0000	.0000	.2174E-01
74 Al(OH)3	.8425E-04	.0000	.0000	23.20
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1449E-03	.0000	.0000	39.91
9 Ba(NO3)2	.1107E-11	.0000	.0000	.1822E-06
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.9986E-06	.0000	.0000	.1644
66 CO	.6723E-05	.0000	.0000	.1010E-01
37 CO2	.4203E-03	.0000	.0000	.5438
142 CO2 (C14)	.7028E-28	.0000	.0000	.9093E-25
63 Ca(COOH)2	.3464E-04	.0000	.0000	5.704
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.2489E-05	.0000	.0000	.4098
20 CaC2O4	.2691E-05	.0000	.0000	.4432
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.6729E-06	.0000	.0000	.1108
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.3161E-05	.0000	.0000	.5206
29 Carbon	.6729E-06	.0000	.0000	.1108
26 Co(COOH)2	.5475E-06	.0000	.0000	.9007E-01
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2558E-05	.0000	.0000	.4212
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.9265E-11	.0000	.0000	.1678E-05
137 Cs2O Semi Vol	.0000	.0000	.0000	.3220E-03
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.3128E-11	.0000	.0000	.6277E-06
136 CsCl Semi Vol	.3610E-05	.0000	.0000	.5695E-01
8 CsNO3	.7102E-07	.0000	.0000	.1169E-01
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1168E-05	.0000	.0000	.1924
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.2039E-03	.0000	.0000	56.17
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	37 FPT Liquid to OGCT	88 Canister Air Inleakage	89 Inlet Air to Ejector	40 Liquid Feed to Ejector
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.1090E-03	.0000	.0000	1.895
102 GroupA	.1854E-05	.0000	.0000	.8062
103 GroupB	.5981E-05	.0000	.0000	.9849
25 H2	.4489E-06	.0000	.0000	.6870E-03
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.5475E-04	.0000	.0000	.7571
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.3546E-08	.0000	.0000	.6754E-03
105 La2O3	.4905E-05	.0000	.0000	.8076
108 Li2O	.5606E-04	.0000	.0000	15.44
65 Mg(COOH)2	.6594E-05	.0000	.0000	1.086
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.1964E-04	.0000	.0000	4.757
60 Mn(COOH)2	.5886E-04	.0000	.0000	9.688
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1219E-02	30.42	60.84	.9490
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.3310E-05	.0000	.0000	.4770E-02
84 NO2	.3508E-02	.0000	.0000	8.249
70 Na(HgO(OH))	.4226E-08	.0000	.0000	.6956E-03
94 Na2B4O7	.1037E-03	.0000	.0000	21.44
109 Na2C2O4	.1423E-08	.0000	.0000	.2710E-03
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2067E-03	.0000	.0000	56.94
71 Na2PuO2(OH)4	.1714E-12	.0000	.0000	.2821E-07
73 Na2RhO4	.3524E-10	.0000	.0000	.5800E-05
72 Na2RuO4	.3439E-09	.0000	.0000	.5660E-04
6 Na2SO4	.6973E-06	.0000	.0000	.1148
68 NaAlO2	.1714E-05	.0000	.0000	.2821
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.4530E-04	.0000	.0000	11.29

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	87	88	39	40
	FPT Liquid	Canister Air	Inlet Air	Liquid Feed
	to OGCT	Inleakage	to Ejector	to Ejector
7 NaCl	.6940E-06	.0000	.0000	.1144
138 NaCl Semi Vol	.8146E-03	.0000	.0000	20.23
69 NaF	.1798E-04	.0000	.0000	3.030
139 NaF Semi Vol	.6405E-03	.0000	.0000	15.98
12 NaI	.6724E-07	.0000	.0000	.1107E-01
125 NaI Semi Vol	.7826E-04	.0000	.0000	1.372
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2237E-04	.0000	.0000	8.685
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2073E-04	.0000	.0000	3.414
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.7065E-03	9.189	18.38	.5435
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.9399E-06	.0000	.0000	.1548
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.2446E-06	.0000	.0000	.4027E-01
22 RhO2	.9345E-07	.0000	.0000	.1539E-01
79 RuO2	.4487E-06	.0000	.0000	.7419E-01
28 RuO2 Semi Vol	.5278E-04	.0000	.0000	.7329
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1880E-05	.0000	.0000	.1953E-02
111 SiO2	.6101E-03	.0000	.0000	168.0
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8418E-06	.0000	.0000	.1386
10 Sr(NO3)2	.9879E-12	.0000	.0000	.1626E-06
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.3834E-05	.0000	.0000	.6314
107 TiO2	.9808E-05	.0000	.0000	1.572
119 Tritium	.1628E-10	.0000	.0000	.3494E-07
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2681E-04	.0000	.0000	4.415
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.5768E-06	.0000	.0000	.9498E-01
11 Y(NO3)3	.7016E-12	.0000	.0000	.1155E-06
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	87 FPT Liquid to OGCT	88 Canister Air Inleakage	89 Inlet Air to Ejector	40 Liquid Feed to Ejector
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2451E-04	.0000	.0000	4.036
44 Zn(COOH)2	.8048E-05	.0000	.0000	.5019
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.4905E-05	.0000	.0000	.8076
TOTAL FLOW, LB/HR	103.85	40.28	80.55	88984.02
VAPOR FLOW, CFM		9.88	20.70	
LIQUID FLOW, GPM	.21			177.15
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4318	.0680	.0648	62.6253
TEMPERATURE, DEG C	46.47	35.00	84.98	55.00
PRESSURE, ATM	.99	.96	.92	3.72
PRESSURE, PSIG	-.21	-.54	-1.19	39.97
PRESSURE, MM HG	748.90	732.03	698.44	
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	4924.28	-2074.10	-4148.21	4989529.19

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	41 Ejector Exit Vapor	42 Ejector Exit Liquid	43 Liquid Spray to SWDBF #1	44 Atomizg Air SWDEF #1
COMPONENT FLOWS, LB/HR				
1 H2O	9.053	.8849E+05	2912.	3.913
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.2165E-01	.3671E-05	.0000
74 Al(OH)3	.0000	23.18	.2363E-02	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	39.87	.4064E-02	.0000
9 Ba(NO3)2	.0000	.1815E-06	.3105E-10	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1638	.2800E-04	.0000
66 CO	.9888E-02	.2082E-03	.1885E-03	.0000
37 CO2	.3660	.1778	.1179E-01	.0000
142 CO2 (C14)	.6120E-25	.2973E-25	.1971E-26	.0000
63 Ca(COOH)2	.0000	5.681	.9715E-03	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.4081	.6979E-04	.0000
20 CaC2O4	.0000	.4414	.7548E-04	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.1103	.1887E-04	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.5185	.8866E-04	.0000
29 Carbon	.0000	.1103	.1887E-04	.0000
26 Co(COOH)2	.0000	.8970E-01	.1535E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.4195	.7173E-04	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.1672E-05	.2598E-09	.0000
137 Cs2O Semi Vol	.0000	.3231E-03	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.6219E-06	.8772E-10	.0000
136 CsCl Semi Vol	.0000	.5678E-01	.1012E-03	.0000
8 CsNO3	.0000	.1164E-01	.1992E-05	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1916	.3277E-04	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	56.11	.5719E-02	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	41 Ejector Exit Vapor	42 Ejector Exit Liquid	43 Liquid Spray to SWDBF #1	44 Atomizg Air SWDBF #1
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	1.890	.8057E-02	.0000
102 GroupA	.0000	.8049	.5200E-04	.0000
103 GroupB	.0000	.9809	.1677E-03	.0000
25 H2	.6722E-03	.1474E-04	.1259E-04	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.7540	.1535E-02	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.6710E-03	.9945E-07	.0000
105 La2O3	.0000	.8044	.1375E-03	.0000
103 Li2O	.0000	15.42	.1572E-02	.0000
65 Mg(COOH)2	.0000	1.081	.1849E-03	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	4.749	.5508E-03	.0000
60 Mn(COOH)2	.0000	9.649	.1651E-02	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	60.80	.9933	.3418E-01	178.9
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.4554E-02	.2160E-03	.9281E-04	.0000
84 NO2	.1507E-01	3.234	.9839E-01	.0000
70 Na(HgO(OH))	.0000	.6928E-03	.1185E-06	.0000
94 Na2B4O7	.0000	21.38	.2907E-02	.0000
109 Na2C2O4	.0000	.2692E-03	.3990E-07	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	56.88	.5796E-02	.0000
71 Na2PuO2(OH)4	.0000	.2810E-07	.4807E-11	.0000
73 Na2RhO4	.0000	.5777E-05	.9882E-09	.0000
72 Na2RuO4	.0000	.5637E-04	.9643E-08	.0000
6 Na2SO4	.0000	.1143	.1955E-04	.0000
68 NaAlO2	.0000	.2810	.4807E-04	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	11.27	.1270E-02	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-

STREAM NAME

	41 Ejector Exit Vapor	42 Ejector Exit Liquid	43 Liquid Spray to SWDBF #1	44 Atomizg Air SWDBF #1
7 NaCl	.0000	.1139	.1946E-04	.0000
188 NaCl Semi Vol	.0000	20.34	.2284E-01	.0000
69 NaF	.0000	3.018	.5043E-03	.0000
139 NaF Semi Vol	.0000	15.97	.1796E-01	.0000
12 NaI	.0000	.1103E-01	.1886E-05	.0000
125 NaI Semi Vol	.0000	1.368	.2195E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	3.670	.6273E-03	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	3.400	.5814E-03	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	18.35	.5688	.1981E-01	54.04
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1541	.2636E-04	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.4011E-01	.6859E-05	.0000
22 RhO2	.0000	.1533E-01	.2621E-05	.0000
79 RuO2	.0000	.7888E-01	.1258E-04	.0000
23 RuO2 Semi Vol	.0000	.7299	.1480E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1841E-02	.1119E-03	.3869E-04	.0000
111 SiO2	.0000	167.9	.1711E-01	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1381	.2361E-04	.0000
10 Sr(NO3)2	.0000	.1620E-06	.2770E-10	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.6288	.1075E-03	.0000
107 TiO2	.0000	1.565	.2751E-03	.0000
119 Tritium	.8560E-11	.3480E-07	.4566E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	4.398	.7520E-03	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.9460E-01	.1618E-04	.0000
11 Y(NO3)3	.0000	.1150E-06	.1967E-10	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	41	42	43	44
	Ejector	Ejector	Liquid Spray	Atomzg Air
	Exit Vapor	Exit Liquid	to SWDBF #1	SWDBF #1
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	4.020	.6874E-03	.0000
44 Zn(COOH)2	.0000	.4998	.8547E-04	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.8044	.1375E-03	.0000
TOTAL FLOW, LB/HR	88.60	88975.45	2912.20	236.86
VAPOR FLOW, CFM	23.68			15.28
LIQUID FLOW, GPM		177.18	5.82	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0624	62.6250	62.4318	.2583
TEMPERATURE, DEG C	54.95	54.95	46.47	40.00
PRESSURE, ATM	.99	.99	3.18	8.72
PRESSURE, PSIG	-.21	-.21	32.04	39.97
PRESSURE, MM HG	748.90	748.90		
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	1071.84	4984302.56	138094.43	-11915.22

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	45 SWDBF #1 Exit Liquid	46 SWDBF #1 Exit Gas	47 Liquid Spray to SWDBF #2	48 SWDBF #2 Atomizg Air
COMPONENT FLOWS, LB/HR				
1 H2O	2917.	126.9	2912.	3.913
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.3851E-05	.5887E-08	.8671E-05	.0000
74 Al(OH)3	.2476E-02	.3699E-05	.2363E-02	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4258E-02	.6361E-05	.4064E-02	.0000
9 Ba(NO3)2	.8254E-10	.4858E-18	.8105E-10	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2935E-04	.4391E-07	.2800E-04	.0000
66 CO	.2021E-03	5.598	.1885E-03	.0000
87 CO2	.1237E-01	18.09	.1179E-01	.0000
142 CO2 (C14)	.2068E-26	.2189E-23	.1971E-26	.0000
63 Ca(COOH)2	.1018E-02	.1523E-05	.9715E-03	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.7314E-04	.1094E-06	.6979E-04	.0000
20 CaC2O4	.7910E-04	.1183E-06	.7548E-04	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1978E-04	.2958E-07	.1887E-04	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.9291E-04	.1390E-06	.8866E-04	.0000
29 Carbon	.1978E-04	.2958E-07	.1887E-04	.0000
26 Co(COOH)2	.1609E-04	.2405E-07	.1535E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.7518E-04	.1125E-06	.7173E-04	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2734E-09	.4433E-12	.2598E-09	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.9645E-10	.2852E-12	.8772E-10	.0000
136 CsCl Semi Vol	.1058E-03	.5066E-06	.1012E-03	.0000
8 CsNO3	.2087E-05	.3116E-08	.1992E-05	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8434E-04	.5137E-07	.3277E-04	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.5998E-02	.8952E-05	.5719E-02	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	45	46	47	48
	SWDBF #1 Exit Liquid	SWDBF #1 Exit Gas	Liquid Spray to SWDBF #2	SWDBF #2 Atomzng Air
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.3196E-02	.1547E-04	.8057E-02	.0000
102 GroupA	.5453E-04	.8289E-07	.5200E-04	.0000
103 GroupB	.1758E-03	.2630E-06	.1677E-03	.0000
25 H2	.1353E-04	.8657	.1259E-04	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1605E-02	.7688E-05	.1535E-02	.0000
97 I2	.0000	.9392E-04	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1068E-06	.2417E-09	.9945E-07	.0000
105 La2O3	.1441E-03	.2156E-06	.1375E-03	.0000
103 Li2O	.1648E-02	.2467E-05	.1572E-02	.0000
65 Mg(COOH)2	.1938E-03	.2899E-06	.1849E-03	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.5773E-03	.8645E-06	.5508E-03	.0000
60 Mn(COOH)2	.1730E-02	.2585E-05	.1651E-02	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.8404E-01	1183.	.8418E-01	178.9
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.9894E-04	1.175	.9281E-04	.0000
84 NO2	.9795E-01	.1890	.9839E-01	.0000
70 Na(HgO(OH))	.1242E-06	.1854E-09	.1185E-06	.0000
94 Na2B4O7	.8046E-02	.4550E-05	.2907E-02	.0000
109 Na2C2O4	.4287E-07	.9697E-10	.8990E-07	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.6074E-02	.9074E-05	.5796E-02	.0000
71 Na2PuO2(OH)4	.5037E-11	.7521E-14	.4807E-11	.0000
73 Na2RhO4	.1036E-08	.1546E-11	.9882E-09	.0000
72 Na2RuO4	.1010E-07	.1509E-10	.9643E-08	.0000
6 Na2SO4	.2049E-04	.3060E-07	.1955E-04	.0000
68 NaAlO2	.5037E-04	.7521E-07	.4807E-04	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1831E-02	.1990E-05	.1270E-02	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	45 SWDBF #1 Exit Liquid	46 SWDBF #1 Exit Gas	47 Liquid Spray to SWDBF #2	48 SWDBF #2 Atomized Air
7 NaCl	.2040E-04	.3050E-07	.1946E-04	.0000
188 NaCl Semi Vol	.2387E-01	.1144E-03	.2284E-01	.0000
69 NaF	.5285E-03	.7918E-06	.5043E-03	.0000
139 NaF Semi Vol	.1877E-01	.9010E-04	.1796E-01	.0000
12 NaI	.1976E-05	.2954E-08	.1886E-05	.0000
125 NaI Semi Vol	.2294E-02	.1098E-04	.2195E-02	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6574E-03	.9828E-06	.6273E-03	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.6093E-03	.9115E-06	.5814E-03	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1970E-01	357.4	.1981E-01	54.04
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2762E-04	.4132E-07	.2636E-04	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.7188E-05	.1075E-07	.6859E-05	.0000
22 RhO2	.2747E-05	.4109E-08	.2621E-05	.0000
79 RuO2	.1320E-04	.2013E-07	.1258E-04	.0000
23 RuO2 Semi Vol	.1548E-02	.7563E-05	.1480E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.4114E-04	.3755	.3869E-04	.0000
111 SiO2	.1798E-01	.2678E-04	.1711E-01	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2474E-04	.8701E-07	.2361E-04	.0000
10 Sr(NO3)2	.2903E-10	.4335E-13	.2770E-10	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1127E-03	.1686E-06	.1075E-03	.0000
107 TiO2	.2883E-03	.4312E-06	.2751E-03	.0000
119 Tritium	.4852E-09	.2110E-10	.4566E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.7881E-03	.1179E-05	.7520E-03	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.1695E-04	.2536E-07	.1618E-04	.0000
11 Y(NO3)3	.2062E-10	.3078E-13	.1967E-10	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS (CONT'D)-
 STREAM NAME

	45 SWDBF #1 Exit Liquid	46 SWDBF #1 Exit Gas	47 Liquid Spray to SWDBF #2	48 SWDBF #2 Atomzg Air
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.7204E-03	.1078E-05	.6874E-03	.0000
44 Zn(COOH)2	.8957E-04	.1840E-06	.8547E-04	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1441E-03	.2156E-06	.1375E-03	.0000
TOTAL FLOW, LB/HR	2917.24	1688.25	2912.20	236.86
VAPOR FLOW, CFM		462.56		15.28
LIQUID FLOW, GPM	5.83		5.82	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4318	.0608	62.4318	.2583
TEMPERATURE, DEG C	47.71	47.74	46.47	40.00
PRESSURE, ATM	.93	.93	8.18	8.72
PRESSURE, PSIG	-1.01	-1.06	82.04	39.97
PRESSURE, MM HG	707.56	705.05		
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	142089.85	-12616.99	138094.43	-11915.22

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Centimeter

Inches

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MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	49 SWDBF #2 Exit Liquid	50 SWDBF #2 Exit Gas	51 Ru Adsorber Gas Feed	52 I2 Adsorber Prehter Feed
COMPONENT FLOWS, LB/HR				
1 H2O	2909.	134.1	50.04	50.04
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.3677E-05	.1862E-09	.1862E-09	.9308E-10
74 Al(OH)3	.2366E-02	.1170E-06	.1170E-06	.5348E-07
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4070E-02	.2012E-06	.2012E-06	.1006E-06
9 Ba(NO3)2	.8110E-10	.1536E-14	.1536E-14	.7682E-15
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2805E-04	.1389E-08	.1389E-08	.6943E-09
66 CO	.1760E-03	5.598	5.598	5.598
87 CO2	.1112E-01	13.09	13.09	13.09
142 CO2 (C14)	.1860E-26	.2189E-23	.2189E-23	.2189E-23
63 Ca(COOH)2	.9730E-03	.4817E-07	.4817E-07	.2409E-07
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.6989E-04	.3460E-08	.3460E-08	.1730E-08
20 CaC2O4	.7559E-04	.3742E-08	.3742E-08	.1871E-08
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1890E-04	.9356E-09	.9356E-09	.4678E-09
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.8879E-04	.4396E-08	.4396E-08	.2198E-08
29 Carbon	.1890E-04	.9356E-09	.9356E-09	.4678E-09
26 Co(COOH)2	.1538E-04	.7606E-09	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.7184E-04	.3557E-08	.3557E-08	.1778E-08
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2603E-09	.1402E-13	.1402E-13	.7010E-14
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.8799E-10	.9021E-14	.5066E-07	.2533E-07
136 CsCl Semi Vol	.1017E-03	.5066E-07	.0000	.0000
8 CsNO3	.1995E-05	.9855E-10	.9855E-10	.4927E-10
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.3282E-04	.1625E-08	.1625E-08	.8123E-09
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.5728E-02	.2831E-06	.2831E-06	.1416E-06
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	49	50	51	52
	SWDBF #2 Exit Liquid	SWDBF #2 Exit Gas	Ru Adsorber Gas Feed	I2 Adsorber Prehter Feed
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.8071E-02	.1547E-05	.0000	.0000
102 GroupA	.5208E-04	.2606E-08	.1550E-05	.7749E-06
103 GroupB	.1680E-03	.8317E-08	.8317E-08	.4158E-08
25 H2	.1173E-04	.8657	.8657	.8657
183 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1542E-02	.7688E-06	.7688E-06	.3844E-06
97 I2	.0000	.9392E-04	.9392E-04	.9392E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.9968E-07	.7644E-11	.7644E-11	.3822E-11
105 La2O3	.1378E-03	.6820E-08	.6820E-08	.3410E-08
108 Li2O	.1575E-02	.7800E-07	.7800E-07	.3900E-07
65 Mg(COOH)2	.1852E-03	.9169E-08	.9169E-08	.4585E-08
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.5516E-03	.2734E-07	.2734E-07	.1367E-07
60 Mn(COOH)2	.1653E-02	.8175E-07	.8175E-07	.4087E-07
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.8435E-01	1862.	1862.	1862.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.8691E-04	1.175	1.175	1.175
84 NO2	.9478E-01	.1926	.1850	.1850
70 Na(HgO(OH))	.1187E-06	.5865E-11	.5865E-11	.2932E-11
94 Na2B4O7	.2911E-02	.1439E-06	.1439E-06	.7195E-07
109 Na2C2O4	.4000E-07	.3067E-11	.3067E-11	.1533E-11
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.5805E-02	.2870E-06	.2870E-06	.1485E-06
71 Na2PuO2(OH)4	.4814E-11	.2378E-15	.2378E-15	.1189E-15
78 Na2RhO4	.9897E-09	.4890E-13	.4890E-13	.2445E-13
72 Na2RuO4	.9658E-08	.4772E-12	.4772E-12	.2386E-12
6 Na2SO4	.1958E-04	.9676E-09	.9676E-09	.4838E-09
68 NaAlO2	.4814E-04	.2378E-08	.2378E-08	.1189E-08
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1272E-02	.6293E-07	.6293E-07	.3146E-07

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	49	50	51	52
	SWDBF #2	SWDBF #2	Ru Adsorber	I2 Adsorber
	Exit Liquid	Exit Gas	Gas Feed	Prechter Feed
7 NaCl	.1949E-04	.9646E-09	.1144E-04	.3729E-05
198 NaCl Semi Vol	.2295E-01	.1144E-04	.0000	.0000
69 NaF	.5050E-03	.2504E-07	.9035E-05	.4518E-05
139 NaF Semi Vol	.1804E-01	.9010E-05	.0000	.0000
12 NaI	.1889E-05	.9342E-10	.1098E-05	.5492E-06
125 NaI Semi Vol	.2205E-02	.1098E-05	.0000	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6283E-03	.3108E-07	.3108E-07	.1554E-07
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.5823E-03	.2883E-07	.2883E-07	.1441E-07
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1993E-01	411.4	411.4	411.4
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2640E-04	.1307E-08	.1307E-08	.6534E-09
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.6869E-05	.3401E-09	.3401E-09	.1700E-09
22 RhO2	.2625E-05	.1299E-09	.1299E-09	.6497E-10
79 RuO2	.1260E-04	.6365E-09	.7569E-06	.3784E-06
23 RuO2 Semi Vol	.1487E-02	.7563E-06	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
98 SO2	.8628E-04	.3755	.3755	.3755
111 SiO2	.1714E-01	.8470E-06	.8470E-06	.4235E-06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2364E-04	.1171E-08	.1171E-08	.5853E-09
10 Sr(NO3)2	.2775E-10	.1371E-14	.1371E-14	.6855E-15
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1077E-03	.5332E-08	.5332E-08	.2666E-08
107 TiO2	.2755E-03	.1364E-07	.1364E-07	.6819E-08
119 Tritium	.4566E-09	.2105E-10	.7856E-11	.7856E-11
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.7531E-03	.3729E-07	.3729E-07	.1864E-07
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.1620E-04	.8021E-09	.8021E-09	.4010E-09
11 Y(NO3)3	.1970E-10	.9735E-15	.9735E-15	.4868E-15
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	49	50	51	52
	SWDBF #2 Exit Liquid	SWDBF #2 Exit Gas	Ru Adsorber Gas Feed	I2 Adsorber Prehter Feed
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.6884E-03	.8408E-07	.8408E-07	.1704E-07
44 Zn(COOH)2	.8560E-04	.4238E-08	.4238E-08	.2119E-08
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1378E-03	.6820E-08	.6820E-08	.8410E-08
TOTAL FLOW, LB/HR	2908.87	1928.44	1844.37	1844.37
VAPOR FLOW, CFM		530.88	575.10	631.62
LIQUID FLOW, GPM	5.81			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4318	.0605	.0535	.0487
TEMPERATURE, DEG C	45.97	45.97	80.00	80.00
PRESSURE, ATM	.92	.92	.87	.80
PRESSURE, PSIG	-1.21	-1.24	-1.85	-3.00
PRESSURE, MM HG	697.45	695.70	664.09	604.66
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	136453.47	-22894.38	-59622.31	-59622.31

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	53 I2 Adsorber Gas Feed	54 Off-Gas Cool er Gas Feed	55 HEPA Gas Feed	56 Off-Gas Exh Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	50.04	50.04	50.04	50.04
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.9308E-10	.4654E-10	.4654E-10	.4654E-13
74 Al(OH)3	.5848E-07	.2924E-07	.2924E-07	.2924E-10
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1006E-06	.5029E-07	.5029E-07	.5029E-10
9 Ba(NO3)2	.7682E-15	.3841E-15	.3841E-15	.3841E-18
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6943E-09	.3471E-09	.3471E-09	.3471E-12
66 CO	5.598	5.598	5.598	5.598
87 CO2	13.09	13.09	13.09	13.09
142 CO2 (C14)	.2189E-23	.2189E-23	.2189E-23	.2189E-23
63 Ca(COOH)2	.2409E-07	.1204E-07	.1204E-07	.1204E-10
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1730E-08	.8651E-09	.8651E-09	.8651E-12
20 CaC2O4	.1871E-08	.9356E-09	.9356E-09	.9356E-12
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4678E-09	.2339E-09	.2339E-09	.2339E-12
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2198E-08	.1099E-08	.1099E-08	.1099E-11
29 Carbon	.4678E-09	.2339E-09	.2339E-09	.2339E-12
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1778E-08	.8892E-09	.8892E-09	.8892E-12
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7010E-14	.3505E-14	.3505E-14	.3505E-17
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2533E-07	.1266E-07	.1266E-07	.1266E-10
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.4927E-10	.2464E-10	.2464E-10	.2464E-13
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8123E-09	.4062E-09	.4062E-09	.4062E-12
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1416E-06	.7078E-07	.7078E-07	.7078E-10
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	53	54	55	56
	I2 Adsorber Gas Feed	Off-Gas Cool er Gas Feed	HEPA Gas Feed	Off-Gas Exh Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.7749E-06	.8875E-06	.8875E-06	.8875E-09
103 GroupB	.4158E-08	.2079E-08	.2079E-08	.2079E-11
25 H2	.3657	.3657	.3657	.3657
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.3844E-06	.1922E-06	.1922E-06	.1922E-09
97 I2	.9392E-04	.9392E-06	.9392E-06	.9392E-09
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.3822E-11	.1911E-11	.1911E-11	.1911E-14
105 La2O3	.3410E-08	.1705E-08	.1705E-08	.1705E-11
108 Li2O	.3900E-07	.1950E-07	.1950E-07	.1950E-10
65 Mg(COOH)2	.4585E-08	.2292E-08	.2292E-08	.2292E-11
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.1367E-07	.6835E-08	.6835E-08	.6835E-11
60 Mn(COOH)2	.4087E-07	.2044E-07	.2044E-07	.2044E-10
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1362.	1362.	1362.	1362.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	1.175	1.175	1.175	1.175
84 NO2	.1850	.1850	.1850	.1850
70 Na(HgO(OH))	.2932E-11	.1466E-11	.1466E-11	.1466E-14
94 Na2B4O7	.7195E-07	.3598E-07	.3598E-07	.3598E-10
109 Na2C2O4	.1533E-11	.7667E-12	.7667E-12	.7667E-15
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1435E-06	.7174E-07	.7174E-07	.7174E-10
71 Na2PuO2(OH)4	.1189E-15	.5946E-16	.5946E-16	.5946E-19
73 Na2RhO4	.2445E-13	.1222E-13	.1222E-13	.1222E-16
72 Na2RuO4	.2386E-12	.1193E-12	.1193E-12	.1193E-15
6 Na2SO4	.4838E-09	.2419E-09	.2419E-09	.2419E-12
68 NaAlO2	.1189E-08	.5946E-09	.5946E-09	.5946E-12
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3146E-07	.1573E-07	.1573E-07	.1573E-10

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	53	54	55	56
	I2 Adsorber Gas Feed	Off-Gas Cooler Gas Feed	HEPA Gas Feed	Off-Gas Exh Exit Gas
7 NaCl	.5720E-05	.2860E-05	.2860E-05	.2860E-05
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.4518E-05	.2259E-05	.2259E-05	.2259E-05
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.5492E-06	.2746E-06	.2746E-06	.2746E-06
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1554E-07	.7770E-08	.7770E-08	.7770E-11
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1441E-07	.7207E-08	.7207E-08	.7207E-11
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	411.4	411.4	411.4	411.4
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6534E-09	.3267E-09	.3267E-09	.3267E-12
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1700E-09	.8502E-10	.8502E-10	.8502E-13
22 RhO2	.6497E-10	.3249E-10	.3249E-10	.3249E-13
79 RuO2	.8784E-06	.1892E-06	.1892E-06	.1892E-09
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.3755	.3755	.3755	.3755
111 SiO2	.4235E-06	.2117E-06	.2117E-06	.2117E-09
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.5853E-09	.2926E-09	.2926E-09	.2926E-12
10 Sr(NO3)2	.6855E-15	.3427E-15	.3427E-15	.3427E-18
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2666E-08	.1333E-08	.1333E-08	.1333E-11
107 TiO2	.6819E-08	.3409E-08	.3409E-08	.3409E-11
119 Tritium	.7856E-11	.7856E-11	.7856E-11	.7856E-11
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1864E-07	.9321E-08	.9321E-08	.9321E-11
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.4010E-09	.2005E-09	.2005E-09	.2005E-12
11 Y(NO3)3	.4868E-15	.2434E-15	.2434E-15	.2434E-18
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	53 I2 Adsorber Gas Feed	54 Off-Gas Cooler Gas Feed	55 HEPA Gas Feed	56 Off-Gas Exh Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1704E-07	.8521E-08	.8521E-08	.8521E-11
44 Zn(COOH)2	.2119E-08	.1059E-08	.1059E-08	.1059E-11
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3410E-08	.1705E-08	.1705E-08	.1705E-11
TOTAL FLOW, LB/HR	1844.87	1844.87	1844.37	1844.37
VAPOR FLOW, CFM	762.96	816.77	647.92	520.15
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0403	.0376	.0474	.0591
TEMPERATURE, DEG C	150.00	150.00	50.00	89.76
PRESSURE, ATM	.79	.74	.71	.99
PRESSURE, PSIG	-8.10	-8.86	-4.27	-.11
PRESSURE, MM HG	599.79	560.27	539.37	754.53
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-28079.42	-28079.42	-78041.29	-55239.40

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVH	60 PVVH Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	409.2	21.60	24.99	24.99
45 Ag	.0000	.2084E-14	.1547E-07	.1547E-07
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.2539E-07	.2539E-07
51 AgOH	.1005E-03	.4959E-16	.4848E-08	.4848E-08
74 Al(OH)3	.1073	.6562E-10	.5799E-06	.5799E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1845	.1180E-09	.2201E-05	.2201E-05
9 Ba(NO3)2	.8427E-09	.8619E-18	.7609E-14	.7609E-14
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7604E-03	.7790E-12	.6877E-08	.6877E-08
66 CO	.4669E-04	.8675E-10	.4639E-04	.4639E-04
87 CO2	.2515E-02	.4446E-02	10.94	10.94
142 CO2 (C14)	.4205E-27	.1629E-13	.1072E-09	.1072E-09
63 Ca(COOH)2	.2638E-01	.2702E-10	.2383E-06	.2383E-06
120 Ca(OH)2	.0000	.1238E-16	.1600E-09	.1600E-09
113 Ca3(PO4)2	.1895E-02	.1941E-11	.1714E-07	.1714E-07
20 CaC2O4	.2049E-02	.2100E-11	.1854E-07	.1854E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.5124E-03	.5249E-12	.4634E-08	.4634E-08
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2407E-02	.2466E-11	.2177E-07	.2177E-07
29 Carbon	.5124E-03	.5249E-12	.4634E-08	.4634E-08
26 Co(COOH)2	.4165E-03	.4267E-12	.3763E-08	.3763E-08
121 Co(OH)2	.0000	.2142E-18	.2768E-11	.2768E-11
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1948E-02	.1995E-11	.1762E-07	.1762E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7761E-08	.7867E-17	.9015E-13	.9015E-13
137 Cs2O Semi Vol	.1489E-05	.0000	.0000	.0000
90 CsCO3H	.0000	.0000	.0000	.0000
96 CsCl	.2903E-08	.5283E-17	.2919E-11	.2919E-11
136 CsCl Semi Vol	.2634E-03	.0000	.0000	.0000
8 CsNO3	.5405E-04	.5529E-13	.4881E-09	.4881E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8897E-03	.9114E-12	.8037E-08	.8037E-08
52 Cu(OH)2	.0000	.4659E-18	.6022E-11	.6022E-11
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2597	.1588E-09	.1404E-05	.1404E-05
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVH	60 PVVH Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.8763E-02	.0000	.0000	.0000
102 GroupA	.1416E-02	.1462E-11	.1300E-07	.1800E-07
103 GroupB	.4554E-02	.4666E-11	.4119E-07	.4119E-07
25 H2	.8177E-05	.2359E-11	.8156E-05	.8156E-05
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.1113	.6663E-01	.6663E-01
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.8725E-07	.8797E-03	.8797E-03
135 HgNO32	.0000	.0000	.1589E-10	.1589E-10
21 HgO	.8501E-02	.9800E-17	.1312E-09	.1312E-09
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
181 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.3128E-05	.4478E-14	.7204E-08	.7204E-08
105 La2O3	.3785E-02	.3829E-11	.7472E-07	.7472E-07
108 Li2O	.7139E-01	.4880E-10	.8534E-06	.8534E-06
65 Mg(COOH)2	.5021E-02	.5144E-11	.4536E-07	.4536E-07
55 Mg(OH)2	.0000	.2112E-17	.2729E-10	.2729E-10
83 MgO	.2200E-01	.1535E-10	.2993E-06	.2993E-06
60 Mn(COOH)2	.4480E-01	.4586E-10	.4044E-06	.4044E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.1892E-15	.6598E-08	.6598E-08
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4388E-02	188.0	1292.	1292.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2206E-04	.1799E-05	1.259	1.259
84 NO2	.1502E-01	.3130E-03	.1835E-01	.1835E-01
70 Na(HgO(OH))	.8217E-05	.8290E-14	.2905E-10	.2905E-10
94 Na2B4O7	.9913E-01	.1970E-14	.1088E-08	.1088E-08
109 Na2C2O4	.1253E-05	.1797E-14	.2891E-08	.2891E-08
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.2633	.1362E-09	.2652E-05	.2652E-05
71 Na2PuO2(OH)4	.1305E-09	.1334E-18	.1178E-14	.1178E-14
73 Na2RhO4	.2682E-07	.2748E-16	.2422E-12	.2422E-12
72 Na2RuO4	.2617E-06	.2677E-15	.2863E-11	.2863E-11
6 Na2SO4	.5307E-03	.5429E-12	.4792E-08	.4792E-08
68 NaAlO2	.1805E-02	.1334E-11	.1178E-07	.1178E-07
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.5220E-01	.3491E-10	.3803E-06	.3803E-06

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVH	60 PVVH Exit Gas
7 NaCl	.5288E-03	.5413E-12	.5372E-08	.5372E-03
138 NaCl Semi Vol	.9413E-01	.0000	.0000	.0000
69 NaF	.1401E-01	.2908E-14	.1030E-03	.1030E-03
139 NaF Semi Vol	.7391E-01	.0000	.0000	.0000
12 NaI	.5119E-04	.5242E-13	.5338E-09	.5338E-09
125 NaI Semi Vol	.6343E-02	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1704E-01	.1707E-10	.3032E-06	.3032E-06
4 NaOH	.0000	.0000	.1200E-09	.1200E-09
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1579E-01	.1617E-10	.1426E-06	.1426E-06
17 Ni(OH)2	.0000	.8111E-17	.1048E-09	.1048E-09
40 NiO	.0000	.0000	.0000	.0000
82 O2	.2513E-02	56.78	390.3	390.3
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.7157E-03	.7332E-12	.6473E-08	.6473E-08
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1862E-03	.1908E-12	.1684E-08	.1684E-08
22 RhO2	.7116E-04	.7290E-13	.6436E-09	.6436E-09
79 RuO2	.3431E-03	.3571E-12	.3188E-08	.3188E-08
23 RuO2 Semi Vol	.3389E-02	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.9030E-05	.2799E-10	.8969E-05	.8969E-05
111 SiO2	.7770	.4755E-09	.8940E-05	.8940E-05
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.6410E-03	.6567E-12	.5791E-08	.5791E-08
10 Sr(NO3)2	.7519E-09	.7691E-18	.6790E-14	.6790E-14
127 Sr(OH)2	.0000	.8618E-18	.4676E-11	.4676E-11
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2920E-02	.2991E-11	.2641E-07	.2641E-07
107 TiO2	.7267E-02	.7658E-11	.1494E-06	.1494E-06
119 Tritium	.1616E-09	.1949E-10	.5190E-10	.5190E-10
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2042E-01	.2092E-10	.1845E-06	.1845E-06
16 UO2(OH)2	.0000	.1421E-16	.1837E-09	.1837E-09
27 Y(COOH)3	.4392E-03	.4500E-12	.3968E-08	.3968E-08
11 Y(NO3)3	.5340E-09	.5462E-18	.4822E-14	.4822E-14
128 Y(OH)3	.0000	.2262E-18	.2924E-11	.2924E-11
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVH	60 PVVH Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1866E-01	.1912E-10	.1688E-06	.1688E-06
44 Zn(COOH)2	.2321E-02	.2377E-11	.2096E-07	.2096E-07
54 Zn(OH)2	.0000	.1223E-17	.1581E-10	.1581E-10
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3735E-02	.3829E-11	.7472E-07	.7472E-07
TOTAL FLOW, LB/HR	411.48	266.47	1719.59	1719.59
VAPOR FLOW, CFM		70.85	413.18	429.72
LIQUID FLOW, GPM	.82			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6253	.0627	.0694	.0667
TEMPERATURE, DEG C	55.00	50.00	16.63	26.63
PRESSURE, ATM	.97	.97	.92	.92
PRESSURE, PSIG	-.51	-.51	-1.16	-1.23
PRESSURE, MM HG	733.40	733.86	700.26	696.54
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	23072.67	-1069.26	-97140.09	-93055.19

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	61 PVVF Exit Gas	62 HNO3 Rinse to MVS	63 Water Rinse to MVS	64 MVS Rinses to SWT
COMPONENT FLOWS, LB/HR				
1 H2O	24.99	.1014	.8317	.4330
45 Ag	.1547E-10	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.2539E-10	.0000	.0000	.3007E-05
51 AgOH	.4848E-11	.0000	.0000	.4437E-13
74 Al(OH)3	.5799E-09	.0000	.0000	.1248E-10
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2201E-08	.0000	.0000	.1633E-10
9 Ba(NO3)2	.7609E-17	.0000	.0000	.1640E-18
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6877E-11	.0000	.0000	.1482E-12
66 CO	.4639E-04	.0000	.0000	.0000
87 CO2	10.94	.0000	.0000	.2826E-32
142 CO2 (C14)	.1072E-09	.0000	.0000	.0000
63 Ca(COOH)2	.2383E-09	.0000	.0000	.5141E-11
120 Ca(OH)2	.1600E-12	.0000	.0000	.3839E-24
113 Ca3(PO4)2	.1714E-10	.0000	.0000	.3693E-12
20 CaC2O4	.1854E-10	.0000	.0000	.3994E-12
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4634E-11	.0000	.0000	.9985E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2177E-10	.0000	.0000	.4691E-12
29 Carbon	.4634E-11	.0000	.0000	.9985E-13
26 Co(COOH)2	.3763E-08	.0000	.0000	.8117E-13
121 Co(OH)2	.2768E-14	.0000	.0000	.6641E-26
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1762E-10	.0000	.0000	.3796E-12
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.9015E-16	.0000	.0000	.1496E-17
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2919E-14	.0000	.0000	.9627E-18
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.4881E-12	.0000	.0000	.1052E-13
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8037E-11	.0000	.0000	.1734E-12
52 Cu(OH)2	.6022E-14	.0000	.0000	.1444E-25
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1404E-08	.0000	.0000	.3021E-10
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	61	62	63	64
	PVVF Exit Gas	HNO3 Rinse to MVS	Water Rinse to MVS	MVS Rinses to SWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1800E-10	.0000	.0000	.2781E-12
103 GroupB	.4119E-10	.0000	.0000	.8875E-12
25 H2	.8156E-05	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.6663E-01	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.1882E-01	.0000	.1882E-01
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.8797E-03	.0000	.0000	.0000
135 HgNO32	.1589E-13	.0000	.0000	.1500E-05
21 HgO	.1312E-12	.0000	.0000	.1578E-13
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.7204E-11	.0000	.0000	.8157E-15
105 La2O3	.7472E-10	.0000	.0000	.8130E-14
108 Li2O	.8534E-09	.0000	.0000	.6315E-18
65 Mg(COOH)2	.4536E-10	.0000	.0000	.9785E-12
55 Mg(OH)2	.2729E-13	.0000	.0000	.6547E-25
33 MgO	.2993E-09	.0000	.0000	.1884E-13
60 Mn(COOH)2	.4044E-09	.0000	.0000	.8724E-11
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.6598E-11	.0000	.0000	.5868E-23
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1292.	.0000	.0000	.9213E-17
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	1.259	.0000	.0000	.0000
84 NO2	.1835E-01	.0000	.0000	.1239E-05
70 Na(HgO(OH))	.2905E-13	.0000	.0000	.6259E-15
94 Na2B4O7	.1088E-11	.0000	.0000	.8588E-15
109 Na2C2O4	.2891E-11	.0000	.0000	.8273E-15
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2652E-08	.0000	.0000	.2310E-12
71 Na2PuO2(OH)4	.1178E-17	.0000	.0000	.2538E-19
73 Na2RhO4	.2422E-15	.0000	.0000	.5218E-17
72 Na2RuO4	.2363E-14	.0000	.0000	.5092E-16
6 Na2SO4	.4792E-11	.0000	.0000	.1033E-12
68 NaAlO2	.1178E-10	.0000	.0000	.2538E-12
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3803E-09	.0000	.0000	.6640E-11

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	61 PVVF Exit Gas	62 HNO3 Rinse to MVS	63 Water Rinse to MVS	64 MVS Rinses to SWT
7 NaCl	.5872E-11	.0000	.0000	.1029E-12
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1030E-11	.0000	.0000	.5884E-15
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.5338E-12	.0000	.0000	.9970E-14
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8032E-09	.0000	.0000	.8612E-11
4 NaOH	.1200E-12	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1426E-09	.0000	.0000	.8076E-11
17 Ni(OH)2	.1048E-12	.0000	.0000	.2515E-24
40 NiO	.0000	.0000	.0000	.0000
82 O2	890.3	.0000	.0000	.8979E-17
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6473E-11	.0000	.0000	.1395E-12
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1684E-11	.0000	.0000	.8629E-13
22 RhO2	.6486E-12	.0000	.0000	.1887E-13
79 RuO2	.3188E-11	.0000	.0000	.6793E-13
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8969E-05	.0000	.0000	.0000
111 SiO2	.8940E-08	.0000	.0000	.6471E-11
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.5791E-11	.0000	.0000	.1249E-12
10 Sr(NO3)2	.6790E-17	.0000	.0000	.1463E-18
127 Sr(OH)2	.4676E-14	.0000	.0000	.1122E-25
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2641E-10	.0000	.0000	.5690E-12
107 TiO2	.1494E-09	.0000	.0000	.6057E-14
119 Tritium	.5190E-10	.0000	.0000	.8011E-26
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1845E-09	.0000	.0000	.8979E-11
16 UO2(OH)2	.1837E-12	.0000	.0000	.4406E-24
27 Y(COOH)3	.3968E-11	.0000	.0000	.8559E-13
11 Y(NO3)3	.4822E-17	.0000	.0000	.1089E-18
128 Y(OH)3	.2924E-14	.0000	.0000	.7013E-26
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	61	62	63	64
	PVVF Exit Gas	HNO3 Rinse to MVS	Water Rinse to MVS	MVS Rinses to SWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1688E-09	.0000	.0000	.8637E-11
44 Zn(COOH)2	.2096E-10	.0000	.0000	.4522E-12
54 Zn(OH)2	.1581E-18	.0000	.0000	.3793E-25
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7472E-10	.0000	.0000	.3130E-14
TOTAL FLOW, LB/HR	1719.59	.12	.83	.45
VAPOR FLOW, CFM	486.78			
LIQUID FLOW, GPM		.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	.0656	65.0373	62.4300	63.0822
TEMPERATURE, DEG C	26.63	25.00	25.00	38.00
PRESSURE, ATM	.90	1.00	1.00	1.00
PRESSURE, PSIG	-1.44	.00	.00	.00
PRESSURE, MM HG	685.37			
PHASE	VAPOR	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	-93055.19	2.67	8.41	16.90

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT 11
COMPONENT FLOWS, LB/HR				
1 H2O	.9544E-04	.2494	.0000	.1157E-01
45 Ag	.1927E-07	.8003E-09	.0000	.1929E-03
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.6629E-09	.2539E-07	.0000	.1724E-02
51 AgOH	.9779E-17	.4209E-08	.0000	.1902E-10
74 Al(OH)3	.2751E-14	.2141E-10	.0000	.1190E-05
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.8600E-16	.2801E-12	.0000	.1557E-07
9 Ba(NO3)2	.8614E-22	.2812E-18	.0000	.1563E-13
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.8266E-16	.2542E-12	.0000	.1412E-07
66 CO	.0000	.4846E-27	.0000	.5054E-34
87 CO2	.6229E-36	.1782E-05	.0000	.5327E-11
142 CO2 (C14)	.0000	.7431E-24	.0000	.2430E-29
63 Ca(COOH)2	.1183E-14	.8817E-11	.0000	.4899E-06
120 Ca(OH)2	.8462E-28	.6585E-24	.0000	.8659E-19
113 Ca3(PO4)2	.8189E-16	.6333E-12	.0000	.3519E-07
20 CaC2O4	.8803E-16	.6850E-12	.0000	.8806E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2201E-16	.1712E-12	.0000	.9516E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1084E-15	.8046E-12	.0000	.4471E-07
29 Carbon	.2201E-16	.1712E-12	.0000	.9516E-03
26 Co(COOH)2	.1789E-16	.1392E-12	.0000	.7785E-03
121 Co(OH)2	.1464E-29	.1139E-25	.0000	.6329E-21
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.8366E-13	.6510E-12	.0000	.8617E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8298E-21	.2566E-17	.0000	.1426E-12
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2122E-21	.1651E-17	.0000	.9174E-13
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2318E-17	.1804E-13	.0000	.1002E-08
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8821E-16	.2974E-12	.0000	.1652E-07
52 Cu(OH)2	.8184E-29	.2478E-25	.0000	.1377E-20
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.6659E-14	.5182E-10	.0000	.2879E-05
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT 11
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.6129E-16	.4769E-12	.0000	.2650E-07
103 GroupB	.1956E-15	.1522E-11	.0000	.8458E-07
25 H2	.0000	.8403E-26	.0000	.8777E-33
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.3045E-05	.4663E-02	.0000	.1665E-03
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.1825E-01	.2327E-03	.0000	1.644
135 HgNO32	.3307E-09	.1589E-10	.0000	.1074E-05
21 HgO	.3478E-17	.4902E-11	.0000	.1499E-08
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1798E-18	.1399E-14	.0000	.7774E-10
105 La2O3	.6898E-18	.5368E-14	.0000	.2983E-09
108 Li2O	.1892E-16	.1083E-12	.0000	.6018E-08
65 Mg(COOH)2	.2157E-15	.1678E-11	.0000	.9326E-07
55 Mg(OH)2	.1443E-28	.1123E-24	.0000	.6240E-20
33 MgO	.4153E-17	.8232E-18	.0000	.1796E-08
60 Mn(COOH)2	.1923E-14	.1496E-10	.0000	.8314E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1293E-26	.1006E-22	.0000	.5592E-18
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2031E-20	17.16	.0000	.3015E-06
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.9053E-17	.0000	.2316E-23
84 NO2	.2731E-09	.8185E-02	.0000	.1910E-04
70 Na(HgO(OH))	.1380E-18	.1073E-14	.0000	.5965E-10
94 Na2B4O7	.7910E-19	.6155E-15	.0000	.3420E-10
109 Na2C2O4	.7214E-19	.5613E-15	.0000	.8119E-10
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.5091E-16	.3962E-12	.0000	.2201E-07
71 Na2PuO2(OH)4	.5595E-23	.4353E-19	.0000	.2419E-14
73 Na2RhO4	.1150E-20	.8950E-17	.0000	.4973E-12
72 Na2RuO4	.1122E-19	.8734E-16	.0000	.4853E-11
6 Na2SO4	.2276E-16	.1771E-12	.0000	.9841E-08
68 NaAlO2	.5595E-16	.4353E-12	.0000	.2419E-07
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1464E-14	.1139E-10	.0000	.6328E-06

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT 11
7 NaCl	.2269E-16	.1766E-12	.0000	.9811E-03
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1187E-18	.9234E-15	.0000	.5131E-10
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2197E-17	.1710E-13	.0000	.9501E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.7962E-15	.8481E-07	.0000	.3095E-06
4 NaOH	.0000	.0000	.0000	.0000
57 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.6780E-15	.5276E-11	.0000	.2932E-06
17 Ni(OH)2	.5543E-28	.4313E-24	.0000	.2397E-19
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1979E-20	5.185	.0000	.1770E-05
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.3074E-16	.2392E-12	.0000	.1329E-07
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.8000E-17	.6225E-13	.0000	.3459E-03
22 RhO2	.3057E-17	.2378E-13	.0000	.1322E-03
79 RuO2	.1497E-16	.1165E-12	.0000	.6473E-03
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.1865E-26	.0000	.6345E-33
111 SiO2	.1426E-14	.1110E-10	.0000	.6167E-06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2753E-16	.2142E-12	.0000	.1190E-07
10 Sr(NO3)2	.3225E-22	.2509E-18	.0000	.1394E-13
127 Sr(OH)2	.2472E-29	.1924E-25	.0000	.1069E-20
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1254E-15	.9758E-12	.0000	.5422E-07
107 TiO2	.1335E-17	.1039E-13	.0000	.5773E-09
119 Tritium	.6637E-30	.1906E-15	.0000	.1928E-16
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.8770E-15	.6824E-11	.0000	.3792E-06
16 UO2(OH)2	.9712E-28	.7557E-24	.0000	.4199E-19
27 Y(COOH)3	.1887E-16	.1468E-12	.0000	.8157E-03
11 Y(NO3)3	.2290E-22	.1782E-18	.0000	.9901E-14
128 Y(OH)3	.1546E-29	.1203E-25	.0000	.6684E-21
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D) - STREAM NAME	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT 11
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8017E-15	.6238E-11	.0000	.8466E-06
44 Zn(COOH)2	.9968E-16	.7757E-12	.0000	.4310E-07
54 Zn(OH)2	.8361E-29	.6506E-25	.0000	.8615E-20
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.6898E-18	.5368E-14	.0000	.2983E-09
TOTAL FLOW, LB/HR	.01	22.61	.00	1.66
VAPOR FLOW, CFM		5.13	.00	
LIQUID FLOW, GPM	.00			.00
DESIGN FLOW,				
DENSITY, LBS/FT3	774.7558	.0735	.0000	775.8329
TEMPERATURE, DEG C	88.00	15.00	88.00	88.00
PRESSURE, ATM	1.00	.97	.02	.99
PRESSURE, PSIG	.00	-.43	-14.42	-.07
PRESSURE, MM HG		737.58	14.37	756.20
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	.02	-1353.03	.00	2.52

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	69 Hg Feed to MASC	71 HNO3 Wash to MASC	72 HNO3 Wash from MASC	73 NaOH to SWT
COMPONENT FLOWS, LB/HR				
1 H2O	.2548	.2218	.4755	.8689E-01
45 Ag	.1929E-03	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.1724E-02	.0000	.2018E-02	.0000
51 AgOH	.4228E-08	.0000	.4218E-03	.0000
74 Al(OH)3	.1190E-05	.0000	.1187E-05	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1557E-07	.0000	.1553E-07	.0000
9 Ba(NO3)2	.1563E-13	.0000	.1559E-13	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1412E-07	.0000	.1409E-07	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.1446E-14	.0000	.1442E-14	.0000
142 CO2 (C14)	.6016E-83	.0000	.6002E-83	.0000
63 Ca(COOH)2	.4899E-06	.0000	.4887E-06	.0000
120 Ca(OH)2	.8659E-19	.0000	.8650E-19	.0000
113 Ca3(PO4)2	.8519E-07	.0000	.8511E-07	.0000
20 CaC2O4	.3806E-07	.0000	.3797E-07	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.9516E-08	.0000	.9493E-08	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.4471E-07	.0000	.4460E-07	.0000
29 Carbon	.9516E-08	.0000	.9493E-08	.0000
26 Co(COOH)2	.7735E-08	.0000	.7717E-08	.0000
121 Co(OH)2	.6329E-21	.0000	.6314E-21	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.8617E-07	.0000	.8609E-07	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1426E-12	.0000	.1422E-12	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.9175E-13	.0000	.9152E-13	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1002E-08	.0000	.9998E-09	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1652E-07	.0000	.1648E-07	.0000
52 Cu(OH)2	.1377E-20	.0000	.1373E-20	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2879E-05	.0000	.2872E-05	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-

STREAM NAME

	69 Hg Feed to MASC	71 HNO3 Wash to MASC	72 HNO3 Wash from MASC	78 NaOH to SWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2650E-07	.0000	.2644E-07	.0000
103 GroupB	.8458E-07	.0000	.8438E-07	.0000
25 H2	.4854E-38	.0000	.4854E-38	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.8493E-03	.8025E-01	.8029E-01	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	1.645	.0000	.0000	.0000
135 HgNO32	.1074E-05	.0000	.1965E-04	.0000
21 HgO	.1504E-08	.0000	.1500E-08	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.7774E-10	.0000	.7755E-10	.0000
105 La2O3	.2983E-09	.0000	.2975E-09	.0000
108 Li2O	.6018E-08	.0000	.6004E-08	.0000
65 Mg(COOH)2	.9326E-07	.0000	.9303E-07	.0000
55 Mg(OH)2	.6240E-20	.0000	.6224E-20	.0000
33 MgO	.1796E-08	.0000	.1792E-08	.0000
60 Mn(COOH)2	.8314E-06	.0000	.8294E-06	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.5592E-18	.0000	.5579E-18	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.6010E-05	.0000	.5996E-05	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.8536E-28	.0000	.8527E-28	.0000
84 NO2	.6605E-05	.0000	.9311E-04	.0000
70 Na(HgO(OH))	.5965E-10	.0000	.5950E-10	.0000
94 Na2B4O7	.8420E-10	.0000	.8412E-10	.0000
109 Na2C2O4	.3119E-10	.0000	.3112E-10	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2201E-07	.0000	.2196E-07	.0000
71 Na2PuO2(OH)4	.2419E-14	.0000	.2413E-14	.0000
73 Na2RhO4	.4973E-12	.0000	.4961E-12	.0000
72 Na2RuO4	.4853E-11	.0000	.4841E-11	.0000
6 Na2SO4	.9841E-08	.0000	.9817E-08	.0000
68 NaAlO2	.2419E-07	.0000	.2413E-07	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.6328E-06	.0000	.6313E-06	.0000

MATERIAL BALANCE TABLES
SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	69 Hg Feed to MASC	71 HNO3 Wash to MASC	72 HNO3 Wash from MASC	73 NaOH to SWT
7 NaCl	.9811E-03	.0000	.9787E-03	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.5131E-10	.0000	.5119E-10	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.9501E-09	.0000	.9478E-09	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8443E-06	.0000	.8434E-06	.0000
4 NaOH	.0000	.0000	.0000	.8689E-01
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2932E-06	.0000	.2925E-06	.0000
17 Ni(OH)2	.2397E-19	.0000	.2391E-19	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.3528E-05	.0000	.3520E-05	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1329E-07	.0000	.1326E-07	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.3459E-08	.0000	.3450E-08	.0000
22 RhO2	.1322E-03	.0000	.1318E-03	.0000
79 RuO2	.6474E-03	.0000	.6458E-03	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.6167E-03	.0000	.6152E-03	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1190E-07	.0000	.1188E-07	.0000
10 Sr(NO3)2	.1394E-13	.0000	.1391E-13	.0000
127 Sr(OH)2	.1069E-20	.0000	.1066E-20	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.5422E-07	.0000	.5409E-07	.0000
107 TiO2	.5773E-09	.0000	.5759E-09	.0000
119 Tritium	.6060E-16	.0000	.6045E-16	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.3792E-06	.0000	.3783E-06	.0000
16 UO2(OH)2	.4199E-19	.0000	.4189E-19	.0000
27 Y(COOH)3	.8158E-03	.0000	.8138E-03	.0000
11 Y(NO3)3	.9901E-14	.0000	.9877E-14	.0000
128 Y(OH)3	.6684E-21	.0000	.6668E-21	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	69	71	72	73
	Hg Feed to	HNO ₃ Wash	HNO ₃ Wash	NaOH to
	MASC	to MASC	from MASC	SWT
47 Y2O ₃	.0000	.0000	.0000	.0000
100 Zeolite	.3466E-06	.0000	.3458E-06	.0000
44 Zn(COOH) ₂	.4310E-07	.0000	.4300E-07	.0000
54 Zn(OH) ₂	.3615E-20	.0000	.3606E-20	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO ₂	.2983E-09	.0000	.2975E-09	.0000
TOTAL FLOW, LB/HR	1.90	.25	.51	.17
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT ³	315.0483	65.0373	63.9048	84.9613
TEMPERATURE, DEG C	38.00	25.00	38.00	25.00
PRESSURE, ATM	2.36	1.34	1.00	1.00
PRESSURE, PSIG	19.99	5.00	.00	.00
PRESSURE, MM HG				
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	11.93	5.84	18.73	2.91

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MWWC	78 Water Wash to MWWC
COMPONENT FLOWS, LB/HR				
1 H2O	1.357	.1159E-02	.3814E-01	.2419
45 Ag	.0000	.1929E-05	.1929E-05	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.4921E-05	.4921E-05	.0000
51 AgOH	.2233E-01	.1029E-10	.1029E-10	.0000
74 Al(OH)3	.2063E-04	.2894E-08	.2894E-08	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2699E-05	.3786E-10	.3786E-10	.0000
9 Ba(NO3)2	.2710E-12	.3801E-16	.3801E-16	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2449E-06	.3435E-10	.3435E-10	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.2084E-13	.3516E-17	.1113E-21	.0000
142 CO2 (C14)	.8691E-32	.1463E-35	.0000	.0000
63 Ca(COOH)2	.8496E-05	.1192E-08	.1192E-08	.0000
120 Ca(OH)2	.6345E-18	.8900E-22	.8900E-22	.0000
113 Ca3(PO4)2	.6103E-06	.8561E-10	.8561E-10	.0000
20 CaC2O4	.6601E-05	.9259E-10	.9259E-10	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1650E-06	.2315E-10	.2315E-10	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7754E-05	.1088E-09	.1088E-09	.0000
29 Carbon	.1650E-06	.2315E-10	.2315E-10	.0000
26 Co(COOH)2	.1342E-05	.1882E-10	.1882E-10	.0000
121 Co(OH)2	.1098E-19	.1540E-23	.1540E-23	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.6274E-05	.8800E-10	.8800E-10	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2473E-11	.3468E-15	.3468E-15	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1591E-11	.2232E-15	.2232E-15	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1788E-07	.2438E-11	.2438E-11	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2866E-03	.4019E-10	.4019E-10	.0000
52 Cu(OH)2	.2388E-19	.3349E-23	.3349E-23	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.4994E-04	.7004E-08	.7004E-08	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MWWC	78 Water Wash to MWWC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.4596E-06	.6447E-10	.6447E-10	.0000
103 GroupB	.1467E-05	.2058E-09	.2058E-09	.0000
25 H2	.1003E-36	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.7386E-04	.1859E-04	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	1.645	1.644	.0000
135 HgNO32	.0000	.4792E-07	.4792E-07	.0000
21 HgO	.2589E-04	.8658E-11	.8658E-11	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1348E-08	.1891E-12	.1891E-12	.0000
105 La2O3	.5173E-08	.7255E-12	.7255E-12	.0000
108 Li2O	.1044E-06	.1464E-10	.1464E-10	.0000
65 Mg(COOH)2	.1617E-05	.2268E-09	.2268E-09	.0000
55 Mg(OH)2	.1082E-18	.1518E-22	.1518E-22	.0000
83 MgO	.3115E-07	.4369E-11	.4369E-11	.0000
60 Mn(COOH)2	.1442E-04	.2022E-08	.2022E-08	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.9698E-17	.1360E-20	.1360E-20	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1975E-04	.1462E-07	.2855E-05	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.6483E-27	.8601E-31	.2129E-36	.0000
84 NO2	.5708E-04	.2270E-06	.5239E-08	.0000
70 Na(HgO(OH))	.1034E-08	.1451E-12	.1451E-12	.0000
94 Na2H4O7	.5931E-09	.8319E-13	.8319E-13	.0000
109 Na2C2O4	.5409E-09	.7587E-13	.7587E-13	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.3818E-06	.5355E-10	.5355E-10	.0000
71 Na2PuO2(OH)4	.4195E-13	.5884E-17	.5884E-17	.0000
73 Na2RhO4	.8625E-11	.1210E-14	.1210E-14	.0000
72 Na2RuO4	.8416E-10	.1180E-13	.1180E-13	.0000
6 Na2SO4	.1707E-06	.2394E-10	.2394E-10	.0000
63 NaAlO2	.4195E-06	.5884E-10	.5884E-10	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1097E-04	.1539E-08	.1539E-08	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MFWC	78 Water Wash to MFWC
7 NaCl	.1701E-06	.2386E-10	.2386E-10	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8899E-09	.1248E-12	.1248E-12	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1648E-07	.2311E-11	.2311E-11	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.7842E-01	.8374E-09	.8374E-09	.0000
4 NaOH	.4999E-01	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.5084E-05	.7132E-09	.7132E-09	.0000
17 Ni(OH)2	.4157E-18	.5830E-22	.5830E-22	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1160E-04	.8582E-08	.1676E-05	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2305E-06	.8233E-10	.8233E-10	.0000
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.5999E-07	.8414E-11	.8414E-11	.0000
22 RhO2	.2292E-07	.3215E-11	.3215E-11	.0000
79 RuO2	.1123E-06	.1575E-10	.1575E-10	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.2861E-86	.0000	.0000	.0000
111 SiO2	.1070E-04	.1500E-08	.1500E-08	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2065E-06	.2896E-10	.2896E-10	.0000
10 Sr(NO3)2	.2418E-12	.8392E-16	.8392E-16	.0000
127 Sr(OH)2	.1854E-19	.2600E-23	.2600E-23	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.9404E-06	.1319E-09	.1319E-09	.0000
107 TiO2	.1001E-07	.1404E-11	.1404E-11	.0000
119 Tritium	.3285E-15	.1474E-18	.7404E-19	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.6576E-05	.9224E-09	.9224E-09	.0000
16 UO2(OH)2	.7283E-18	.1021E-21	.1021E-21	.0000
27 Y(COOH)3	.1415E-06	.1984E-10	.1984E-10	.0000
11 Y(NO3)3	.1717E-12	.2408E-16	.2408E-16	.0000
128 Y(OH)3	.1159E-19	.1626E-23	.1626E-23	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	74	75	76	78
	Neut Hg Wash	Washed Hg	Hg Feed	Water Wash
	to SME	from MASC	to MWWC	to MWWC
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.6012E-05	.8432E-09	.8432E-09	.0000
44 Zn(COOH)2	.7475E-06	.1048E-09	.1048E-09	.0000
54 Zn(OH)2	.6269E-19	.8793E-23	.8793E-23	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.5173E-08	.7255E-12	.7255E-12	.0000
TOTAL FLOW, LB/HR	1.51	1.65	1.68	.24
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	66.3062	837.9657	658.3542	62.4300
TEMPERATURE, DEG C	38.00	38.00	38.00	25.00
PRESSURE, ATM	.99	1.00	2.36	1.84
PRESSURE, PSIG	-.07	.00	19.99	5.00
PRESSURE, MM HG	756.20			
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	54.50	2.10	3.53	6.13

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	79 Water Wash from MWWC	80 Washed Hg from MWWC	81 Washed Hg to MVS	82 Purified Hg
COMPONENT FLOWS, LB/HR				
1 H2O	.2789	.1210E-02	.1210E-02	.1210E-02
45 Ag	.0000	.1929E-05	.1929E-05	.1929E-05
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.4900E-05	.2125E-07	.2125E-07	.2125E-10
51 AgOH	.1024E-10	.4442E-13	.4442E-13	.4442E-16
74 Al(OH)3	.2881E-08	.1250E-10	.1250E-10	.1250E-13
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.8770E-10	.1635E-12	.1635E-12	.1635E-15
9 Ba(NO3)2	.8785E-16	.1642E-18	.1642E-18	.1642E-21
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.3420E-10	.1484E-12	.1484E-12	.1484E-15
66 CO	.0000	.0000	.0000	.0000
37 CO2	.1108E-21	.4805E-24	.4805E-24	.4805E-24
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.1187E-08	.5147E-11	.5147E-11	.5147E-14
120 Ca(OH)2	.8862E-22	.3844E-24	.3844E-24	.3844E-27
113 Ca3(PO4)2	.8524E-10	.3697E-12	.3697E-12	.3697E-15
20 CaC2O4	.9219E-10	.3999E-12	.3999E-12	.3999E-15
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2305E-10	.9997E-13	.9997E-13	.9997E-16
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1083E-09	.4697E-12	.4697E-12	.4697E-15
29 Carbon	.2305E-10	.9997E-13	.9997E-13	.9997E-16
26 Co(COOH)2	.1874E-10	.8127E-13	.8127E-13	.8127E-16
121 Co(OH)2	.1533E-23	.6649E-26	.6649E-26	.6649E-29
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.8762E-10	.3800E-12	.3800E-12	.3800E-15
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8453E-15	.1498E-17	.1498E-17	.1498E-20
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2222E-15	.9638E-18	.9638E-18	.9638E-21
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2427E-11	.1053E-13	.1053E-13	.1053E-16
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.4002E-10	.1736E-12	.1736E-12	.1736E-15
52 Cu(OH)2	.8334E-23	.1446E-25	.1446E-25	.1446E-28
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.6974E-08	.3025E-10	.3025E-10	.3025E-13
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	79 Water Wash from MWWC	80 Washed Hg from MWWC	81 Washed Hg to MVS	82 Purified Hg
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.6419E-10	.2784E-12	.2784E-12	.2784E-15
103 GroupB	.2049E-09	.8886E-12	.8886E-12	.8886E-15
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.1851E-04	.8027E-07	.8027E-07	.8027E-07
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	1.644	1.644	1.631
135 HgNO32	.4772E-07	.2070E-09	.2070E-09	.2070E-12
21 HgO	.3642E-11	.1580E-13	.1580E-13	.1580E-16
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1883E-12	.8167E-15	.8167E-15	.8167E-18
105 La2O3	.7224E-12	.3133E-14	.3133E-14	.8133E-17
103 Li2O	.1458E-10	.6322E-13	.6322E-13	.6322E-16
65 Mg(COOH)2	.2259E-09	.9797E-12	.9797E-12	.9797E-15
55 Mg(OH)2	.1511E-22	.6555E-25	.6555E-25	.6555E-28
33 MgO	.4350E-11	.1887E-13	.1887E-13	.1887E-16
60 Mn(COOH)2	.2014E-08	.8734E-11	.8734E-11	.8734E-14
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1354E-20	.5875E-23	.5875E-23	.5875E-26
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2843E-05	.1233E-07	.1233E-07	.1233E-07
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2129E-36	.0000	.0000	.0000
84 NO2	.5216E-08	.2262E-10	.2262E-10	.2262E-10
70 Na(HgO(OH))	.1445E-12	.6266E-15	.6266E-15	.6266E-18
94 Na2B4O7	.8283E-13	.3593E-15	.3593E-15	.3593E-18
109 Na2C2O4	.7555E-13	.3277E-15	.3277E-15	.3277E-18
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.5332E-10	.2313E-12	.2313E-12	.2313E-15
71 Na2PuO2(OH)4	.5859E-17	.2541E-19	.2541E-19	.2541E-22
73 Na2RhO4	.1205E-14	.5225E-17	.5225E-17	.5225E-20
72 Na2RuO4	.1175E-13	.5098E-16	.5098E-16	.5098E-19
6 Na2SO4	.2384E-10	.1034E-12	.1034E-12	.1034E-15
68 NaAlO2	.5859E-10	.2541E-12	.2541E-12	.2541E-15
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1533E-08	.6648E-11	.6648E-11	.6648E-14

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	79 Water Wash from MWWC	80 Washed Hg from MWWC	81 Washed Hg to MVS	82 Purified Hg
7 NaCl	.2376E-10	.1031E-12	.1031E-12	.1031E-15
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1243E-12	.5391E-15	.5391E-15	.5391E-18
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2301E-11	.9982E-14	.9982E-14	.9982E-17
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8338E-09	.3617E-11	.3617E-11	.3617E-14
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.7101E-09	.3080E-11	.3080E-11	.3080E-14
17 Ni(OH)2	.5805E-22	.2518E-24	.2518E-24	.2518E-27
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1669E-05	.7240E-08	.7240E-08	.7240E-08
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.3219E-10	.1396E-12	.1396E-12	.1396E-15
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.8377E-11	.3634E-13	.3634E-13	.3634E-16
22 RhO2	.3201E-11	.1388E-13	.1388E-13	.1388E-16
79 RuO2	.1568E-10	.6801E-13	.6801E-13	.6801E-16
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	.1494E-08	.6479E-11	.6479E-11	.6479E-14
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2883E-10	.1251E-12	.1251E-12	.1251E-15
10 Sr(NO3)2	.3377E-16	.1465E-18	.1465E-18	.1465E-21
127 Sr(OH)2	.2589E-23	.1123E-25	.1123E-25	.1123E-28
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1313E-09	.5697E-12	.5697E-12	.5697E-15
107 TiO2	.1398E-11	.6065E-14	.6065E-14	.6065E-17
119 Tritium	.7372E-19	.3198E-21	.3198E-21	.3198E-21
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.9184E-09	.3984E-11	.3984E-11	.3984E-14
16 UO2(OH)2	.1017E-21	.4412E-24	.4412E-24	.4412E-27
27 Y(COOH)3	.1976E-10	.8570E-13	.8570E-13	.8570E-16
11 Y(NO3)3	.2398E-16	.1040E-18	.1040E-18	.1040E-21
128 Y(OH)3	.1619E-23	.7022E-26	.7022E-26	.7022E-29
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)-

STREAM NAME

	79	80	81	82
	Water Wash	Washed Hg	Washed Hg	Purified Hg
	from MWWC	from MWWC	to MVS	
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8396E-09	.8642E-11	.8642E-11	.8642E-14
44 Zn(COOH)2	.1044E-09	.4528E-12	.4528E-12	.4528E-15
54 Zn(OH)2	.8755E-23	.8798E-25	.8798E-25	.8798E-28
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7224E-12	.3133E-14	.3133E-14	.3133E-17
TOTAL FLOW, LB/HR	.28	1.65	1.65	1.63
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4321	837.9511	837.9511	837.8893
TEMPERATURE, DEG C	28.56	28.56	88.00	88.00
PRESSURE, ATM	1.34	1.34	.99	1.00
PRESSURE, PSIG	5.00	5.00	-.07	.00
PRESSURE, MM HG			756.20	
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	8.09	1.58	2.11	2.09

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	83 Purified Hg	84 PVVF Exhaust to Ex Tunnel	85 Sand Filter Condensate	86 Fan House Condensate
COMPONENT FLOWS, LB/HR				
1 H2O	.1210E-02	24.99	13.80	13.80
45 Ag	.1929E-08	.1547E-10	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.2125E-10	.2539E-10	.0000	.0000
51 AgOH	.4442E-16	.4848E-11	.0000	.0000
74 Al(OH)3	.1250E-13	.5799E-09	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1635E-15	.2201E-08	.0000	.0000
9 Ba(NO3)2	.1642E-21	.7609E-17	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1484E-15	.6877E-11	.0000	.0000
66 CO	.0000	.4639E-04	.0000	.0000
87 CO2	.4805E-24	10.94	.0000	.0000
142 CO2 (C14)	.0000	.1072E-09	.0000	.0000
63 Ca(COOH)2	.5147E-14	.2383E-09	.0000	.0000
120 Ca(OH)2	.3844E-27	.1600E-12	.0000	.0000
113 Ca3(PO4)2	.3697E-15	.1714E-10	.0000	.0000
20 CaC2O4	.3999E-15	.1854E-10	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.9997E-16	.4634E-11	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.4697E-15	.2177E-10	.0000	.0000
29 Carbon	.9997E-16	.4634E-11	.0000	.0000
26 Co(COOH)2	.8127E-16	.8763E-08	.0000	.0000
121 Co(OH)2	.6649E-29	.2768E-14	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.3800E-15	.1762E-10	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1498E-20	.9015E-16	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.9638E-21	.2919E-14	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1053E-16	.4881E-12	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1786E-15	.8037E-11	.0000	.0000
52 Cu(OH)2	.1446E-28	.6022E-14	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.3025E-13	.1404E-08	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	83 Purified Hg	84 PVVF Exhaust to Ex Tunnel	85 Sand Filter Condensate	86 Fan House Condensate
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2784E-15	.1800E-10	.0000	.0000
103 GroupB	.8886E-15	.4119E-10	.0000	.0000
25 H2	.0000	.8156E-05	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.6663E-01	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.8027E-07	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	1.631	.8797E-03	.0000	.0000
135 HgNO32	.2070E-12	.1589E-18	.0000	.0000
21 HgO	.1580E-16	.1312E-12	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.8167E-18	.7204E-11	.0000	.0000
105 La2O3	.8133E-17	.7472E-10	.0000	.0000
108 Li2O	.6322E-16	.8534E-09	.0000	.0000
65 Mg(COOH)2	.9797E-15	.4536E-10	.0000	.0000
55 Mg(OH)2	.6555E-28	.2729E-13	.0000	.0000
83 MgO	.1887E-16	.2993E-09	.0000	.0000
60 Mn(COOH)2	.8734E-14	.4044E-09	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.5875E-26	.6598E-11	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1233E-07	1292.	.0000	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	1.259	.0000	.0000
84 NO2	.2262E-10	.1835E-01	.0000	.0000
70 Na(HgO(OH))	.6266E-18	.2905E-13	.0000	.0000
94 Na2B4O7	.3593E-18	.1088E-11	.0000	.0000
109 Na2C2O4	.8277E-18	.2891E-11	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2313E-15	.2652E-08	.0000	.0000
71 Na2PuO2(OH)4	.2541E-22	.1178E-17	.0000	.0000
73 Na2RhO4	.5225E-20	.2422E-15	.0000	.0000
72 Na2RuO4	.5098E-19	.2363E-14	.0000	.0000
6 Na2SO4	.1034E-15	.4792E-11	.0000	.0000
68 NaAlO2	.2541E-15	.1178E-10	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.6648E-14	.3803E-09	.0000	.0000

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	83 Purified Hg	84 PVVF Exhaust to Ex Tunnel	85 Sand Filter Condensate	86 Fan House Condensate
7 NaCl	.1031E-15	.5872E-11	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.5391E-13	.1030E-11	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.9982E-17	.5338E-12	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8617E-14	.3032E-09	.0000	.0000
4 NaOH	.0000	.1200E-12	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.3080E-14	.1426E-09	.0000	.0000
17 Ni(OH)2	.2518E-27	.1048E-12	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.7240E-08	390.8	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1396E-15	.6473E-11	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.3634E-16	.1684E-11	.0000	.0000
22 RhO2	.1388E-16	.6436E-12	.0000	.0000
79 RuO2	.6801E-16	.8188E-11	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.8969E-05	.0000	.0000
111 SiO2	.6479E-14	.8940E-08	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1251E-15	.5791E-11	.0000	.0000
10 Sr(NO3)2	.1465E-21	.6790E-17	.0000	.0000
127 Sr(OH)2	.1123E-28	.4676E-14	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.5697E-15	.2641E-10	.0000	.0000
107 TiO2	.6065E-17	.1494E-09	.0000	.0000
119 Tritium	.8198E-21	.5190E-10	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.8984E-14	.1845E-09	.0000	.0000
16 UO2(OH)2	.4412E-27	.1837E-12	.0000	.0000
27 Y(COOH)3	.8570E-16	.8968E-11	.0000	.0000
11 Y(NO3)3	.1040E-21	.4822E-17	.0000	.0000
128 Y(OH)3	.7022E-29	.2924E-14	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAMS(CONT'D)-

STREAM NAME

	83	84	85	86
	Purified Hg	PVVF Exhaust to Ex Tunnel	Sand Filter Condensate	Fan House Condensate
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8642E-14	.1688E-09	.0000	.0000
44 Zn(COOH)2	.4528E-15	.2096E-10	.0000	.0000
54 Zn(OH)2	.8798E-28	.1581E-13	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8133E-17	.7472E-10	.0000	.0000
TOTAL FLOW, LB/HR	1.63	1719.59	13.80	13.80
VAPOR FLOW, CFM		413.12		
LIQUID FLOW, GPM	.00		.03	.03
DESIGN FLOW,				
DENSITY, LBS/FT3	837.8893	.0694	62.4300	62.4300
TEMPERATURE, DEG C	88.00	89.04	25.00	25.00
PRESSURE, ATM	1.00	.99	1.00	1.00
PRESSURE, PSIG	.00	-.11	.00	.00
PRESSURE, MM HG		754.53		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	2.09	-87979.66	349.84	349.84

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	87 Decon Waste to DWT	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
COMPONENT FLOWS, LB/HR				
1 H2O	812.0	.7477E-01	.0000	3.307
45 Ag	.0000	.8423E-11	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.9279E-13	.0000	.0000
51 AgOH	.0000	.1939E-18	.0000	.0000
74 Al(OH)3	.0000	.5457E-16	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.7140E-18	.0000	.0000
9 Ba(NO3)2	.0000	.7167E-24	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.6478E-18	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.2098E-29	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.2247E-16	.0000	.0000
120 Ca(OH)2	.0000	.1678E-29	.0000	.0000
113 Ca3(PO4)2	.0000	.1614E-17	.0000	.0000
20 CaC2O4	.0000	.1746E-17	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.4365E-18	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.2051E-17	.0000	.0000
29 Carbon	.0000	.4365E-18	.0000	.0000
26 Co(COOH)2	.0000	.8548E-18	.0000	.0000
121 Co(OH)2	.0000	.2903E-31	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.1659E-17	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.6540E-23	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.4208E-23	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.4597E-19	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.7579E-18	.0000	.0000
52 Cu(OH)2	.0000	.6315E-31	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.1821E-15	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	87 Decon Waste to DWIT	88 MIIT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.1216E-17	.0000	.0000
103 GroupB	.0000	.3880E-17	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	5.750	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	4.930	.3505E-12	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.7180E-05	.0000	.0000
135 HgNO32	.0000	.9037E-15	.0000	.0000
21 HgO	.0000	.6893E-19	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.3080	.0000	.0000	.0000
118 KNO3	.0000	.3566E-20	.0000	.0000
105 La2O3	.0000	.1368E-19	.0000	.0000
108 Li2O	.0000	.2760E-18	.0000	.0000
65 Mg(COOH)2	.0000	.4273E-17	.0000	.0000
55 Mg(OH)2	.0000	.2862E-30	.0000	.0000
33 MgO	.0000	.8238E-19	.0000	.0000
60 Mn(COOH)2	.0000	.3814E-16	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.2565E-28	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	8.418	.0000	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.9878E-16	.0000	.0000
70 Na(HgO(OH))	.0000	.2736E-20	.0000	.0000
94 Na2B4O7	.0000	.1569E-20	.0000	.0000
109 Na2C2O4	.0000	.1431E-20	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.1010E-17	.0000	.0000
71 Na2PuO2(OH)4	.0000	.1110E-24	.0000	.0000
73 Na2RhO4	.0000	.2281E-22	.0000	.0000
72 Na2RuO4	.0000	.2226E-21	.0000	.0000
6 Na2SO4	.0000	.4514E-18	.0000	.0000
68 NaAlO2	.0000	.1110E-17	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.2903E-16	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	87 Decon Waste to DWTI	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
7 NaCl	.0000	.4500E-18	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.2354E-20	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.4358E-19	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.1579E-16	.0000	.0000
4 NaOH	.0000	.0000	.0000	3.307
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1345E-16	.0000	.0000
17 Ni(OH)2	.0000	.1099E-29	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	1.033	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.6097E-18	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.1587E-18	.0000	.0000
22 RhO2	.0000	.6062E-19	.0000	.0000
79 RuO2	.0000	.2969E-18	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.2829E-16	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.5461E-18	.0000	.0000
10 Sr(NO3)2	.0000	.6396E-24	.0000	.0000
127 Sr(OH)2	.0000	.4904E-31	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.2487E-17	.0000	.0000
107 TiO2	.0000	.2648E-19	.0000	.0000
119 Tritium	.0000	.1396E-26	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1739E-16	.0000	.0000
16 UO2(OH)2	.0000	.1926E-29	.0000	.0000
27 Y(COOH)3	.0000	.8742E-18	.0000	.0000
11 Y(NO3)3	.0000	.4542E-24	.0000	.0000
128 Y(OH)3	.0000	.3066E-31	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	87 Decon Waste to DWTI	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.1590E-16	.0000	.0000
44 Zn(COOH)2	.0000	.1977E-17	.0000	.0000
54 Zn(OH)2	.0000	.1658E-30	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.1368E-19	.0000	.0000
TOTAL FLOW, LB/HR	822.99	4.53	.00	6.61
VAPOR FLOW, CFM		1.07		
LIQUID FLOW, GPM	.64		.00	.01
DESIGN FLOW,				
DENSITY, LBS/FT3	63.2852	.0702	.0000	84.9613
TEMPERATURE, DEG C	25.00	34.98	35.00	25.00
PRESSURE, ATM	1.00	.99	1.00	1.00
PRESSURE, PSIG	.00	-.07	.00	.00
PRESSURE, MM HG		756.20		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	7984.71	-233.05	.00	110.69

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT11 Vent to MVC
COMPONENT FLOWS, LB/HR				
1 H2O	1078.	22.28	.1944	.1199
45 Ag	.0000	.2991E-11	.0000	.2740E-09
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.2449E-03
51 AgOH	.1005E-03	.0000	.8419E-08	.6006E-14
74 Al(OH)3	.1081	.2165E-06	.7777E-11	.1690E-11
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1860	.8723E-06	.1018E-12	.2211E-13
9 Ba(NO3)2	.8538E-09	.2844E-14	.1022E-18	.2220E-19
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7704E-03	.2570E-08	.9233E-13	.2006E-13
66 CO	.4442E-08	.3232E-20	.8259E-33	.1363E-33
87 CO2	.8492E-04	.8346E-06	.9521E-10	.2171E-10
142 CO2 (C14)	.2695E-19	.2374E-17	.3971E-28	.9034E-29
63 Ca(COOH)2	.0000	.8915E-07	.3203E-11	.6959E-12
120 Ca(OH)2	.1522E-01	.0000	.2392E-24	.5197E-25
113 Ca3(PO4)2	.1920E-02	.6404E-08	.2301E-12	.4999E-13
20 CaC2O4	.2076E-02	.6927E-08	.2488E-12	.5407E-13
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.5191E-03	.1732E-08	.6221E-13	.1352E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2439E-02	.8136E-08	.2923E-12	.6351E-13
29 Carbon	.5191E-03	.1732E-08	.6221E-13	.1352E-13
26 Co(COOH)2	.0000	.1408E-08	.5057E-13	.1099E-13
121 Co(OH)2	.2633E-03	.0000	.4138E-26	.8991E-27
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1973E-02	.6583E-08	.2365E-12	.5139E-13
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1497E-05	.2595E-13	.9322E-18	.2026E-18
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2634E-03	.1670E-13	.5998E-18	.1303E-18
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.5476E-04	.1824E-09	.6552E-14	.1424E-14
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.3007E-08	.1080E-12	.2347E-13
52 Cu(OH)2	.5727E-03	.0000	.9000E-26	.1956E-26
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2618	.5240E-06	.1882E-10	.4090E-11
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT11 Vent to MVC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1020E-01	.4823E-08	.1733E-12	.8765E-13
103 GroupB	.4614E-02	.1589E-07	.5530E-12	.1202E-12
25 H2	.3113E-09	.6250E-19	.1434E-31	.2282E-32
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.1337	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.4934E-03
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.2583E-06	.0000	.1070E-03
135 HgNO32	.0000	.0000	.0000	.1526E-11
21 HgO	.3501E-02	.0000	.9759E-11	.2136E-14
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1970	.1415E-10	.5082E-15	.1104E-15
105 La2O3	.3784E-02	.1262E-07	.1950E-14	.4237E-15
108 Li2O	.7195E-01	.1444E-06	.3934E-13	.8549E-14
65 Mg(COOH)2	.0000	.1697E-07	.6097E-12	.1325E-12
55 Mg(OH)2	.2596E-02	.0000	.4079E-25	.8863E-26
33 MgO	.2220E-01	.5060E-07	.1174E-13	.2551E-14
60 Mn(COOH)2	.0000	.1513E-06	.5435E-11	.1181E-11
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.2012	.0000	.3656E-23	.7944E-24
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1285E-01	47.85	3.418	3.418
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.5610E-07	.4970E-10	.3785E-22	.6786E-23
84 NO2	.8332E-02	.2700E-07	.3494E-03	.1329E-03
70 Na(HgO(OH))	.3259E-05	.1085E-10	.3900E-15	.8473E-16
94 Na2B4O7	.9913E-01	.6223E-11	.2236E-15	.4858E-16
109 Na2C2O4	.7906E-01	.5676E-11	.2039E-15	.4431E-16
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2650	.4489E-06	.1439E-12	.3127E-13
71 Na2PuO2(OH)4	.1322E-09	.4402E-15	.1581E-19	.3436E-20
73 Na2RhO4	.2717E-07	.9050E-13	.3251E-17	.7065E-18
72 Na2RuO4	.2652E-06	.8831E-12	.3173E-16	.6894E-17
6 Na2SO4	.5377E-03	.1791E-08	.6434E-13	.1398E-13
68 NaAlO2	.1322E-02	.4402E-08	.1581E-12	.3486E-13
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	2.951	.1152E-06	.4137E-11	.8989E-12

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT11 Vent to MVC
7 NaCl	.9466E-01	.1785E-08	.6414E-13	.1394E-18
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8792E-01	.9338E-11	.3355E-15	.7289E-16
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.6395E-02	.1729E-09	.6212E-14	.1350E-14
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	3.192	.5632E-07	.2956E-07	.4890E-12
4 NaOH	1.607	.0000	.1884E-07	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.5335E-07	.1917E-11	.4165E-12
17 Ni(OH)2	.9970E-02	.0000	.1567E-24	.3405E-25
40 NiO	.0000	.0000	.0000	.0000
82 O2	.7412E-02	14.45	1.033	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.7251E-03	.2419E-08	.8690E-13	.1888E-13
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1887E-03	.6294E-09	.2261E-13	.4913E-14
22 RhO2	.7210E-04	.2405E-09	.8640E-14	.1877E-14
79 RuO2	.8737E-02	.1178E-08	.4232E-13	.9196E-14
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.2565E-03	.9123E-20	.1037E-31	.1986E-32
111 SiO2	.7832	.1568E-05	.4032E-11	.8761E-12
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.2166E-08	.7783E-13	.1691E-13
10 Sr(NO3)2	.7618E-09	.2537E-14	.9115E-19	.1981E-19
127 Sr(OH)2	.4447E-03	.0000	.6989E-26	.1519E-26
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2958E-02	.9868E-08	.8545E-12	.7703E-13
107 TiO2	.7366E-02	.2524E-07	.3774E-14	.8200E-15
119 Tritium	.4625E-09	.2442E-10	.4705E-16	.2852E-16
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.6901E-07	.2479E-11	.5387E-12
16 UO2(OH)2	.1747E-01	.0000	.2745E-24	.5965E-25
27 Y(COOH)3	.0000	.1484E-08	.5333E-13	.1159E-13
11 Y(NO3)3	.5410E-09	.1802E-14	.6473E-19	.1407E-19
128 Y(OH)3	.2780E-03	.0000	.4370E-26	.9495E-27
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT11 Vent to MVC
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.1891E-01	.6808E-07	.2266E-11	.4924E-12
44 Zn(COOH)2	.0000	.7843E-08	.2818E-12	.6123E-13
54 Zn(OH)2	.1504E-02	.0000	.2363E-25	.5135E-26
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3784E-02	.1262E-07	.1950E-14	.4237E-15
TOTAL FLOW, LB/HR	1088.71	84.72	4.65	4.57
VAPOR FLOW, CFM		24.82	1.13	1.10
LIQUID FLOW, GPM	2.16			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.7502	.0569	.0685	.0691
TEMPERATURE, DEG C	50.00	50.00	37.99	37.99
PRESSURE, ATM	.97	.97	.99	.99
PRESSURE, PSIG	-.51	-.51	-.07	-.07
PRESSURE, MM HG	733.86	733.86	756.20	756.20
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	55262.62	10146.68	-156.32	-201.99

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	96 MFT12 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
COMPONENT FLOWS, LB/HR				
1 H2O	.8779E-01	.5378	.2883	21.60
45 Ag	.6472E-11	.6007E-09	.3003E-09	.5525E-11
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.1651E-10	.5078E-07	.2539E-07	.0000
51 AgOH	.8451E-16	.8419E-08	.4209E-08	.1273E-08
74 Al(OH)3	.9709E-14	.4282E-10	.2141E-10	.7998E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1270E-15	.5602E-12	.2801E-12	.1376E-05
9 Ba(NO3)2	.1275E-21	.5624E-18	.2812E-18	.1051E-13
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1153E-15	.5083E-12	.2542E-12	.9494E-08
66 CO	.0000	.4846E-27	.8545E-34	.2459E-24
37 CO2	.8516E-17	.1782E-05	.1584E-10	.1031E-08
142 CO2 (C14)	.1463E-35	.7431E-24	.6605E-29	.3074E-20
63 Ca(COOH)2	.8998E-14	.1763E-10	.8817E-11	.3294E-06
120 Ca(OH)2	.2986E-27	.1317E-23	.6585E-24	.0000
113 Ca3(PO4)2	.2872E-15	.1267E-11	.6333E-12	.2366E-07
20 CaC2O4	.8106E-15	.1370E-11	.6850E-12	.2559E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.7766E-16	.8425E-12	.1712E-12	.6397E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.8649E-15	.1609E-11	.8046E-12	.3006E-07
29 Carbon	.7766E-16	.8425E-12	.1712E-12	.6397E-08
26 Co(COOH)2	.6313E-16	.2784E-12	.1392E-12	.5200E-03
121 Co(OH)2	.5165E-29	.2278E-25	.1139E-25	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2952E-15	.1302E-11	.6510E-12	.2432E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1164E-20	.5132E-17	.2566E-17	.9586E-13
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.7487E-21	.3302E-17	.1651E-17	.6168E-13
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.8180E-17	.3607E-13	.1804E-13	.6738E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1348E-15	.5947E-12	.2974E-12	.1111E-07
52 Cu(OH)2	.1124E-28	.4955E-25	.2478E-25	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2850E-13	.1036E-09	.5182E-10	.1936E-05
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	96 MFT12 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2163E-15	.9539E-12	.4769E-12	.1782E-07
103 GroupB	.6903E-15	.8044E-11	.1522E-11	.5687E-07
25 H2	.0000	.8403E-26	.1897E-32	.5147E-23
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.1231
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.5527E-04	.5339E-02	.6761E-03	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.2257E-03	.4654E-03	.2327E-03	.6925E-07
135 HgNO32	.1608E-12	.3179E-10	.1589E-10	.0000
21 HgO	.1227E-16	.9803E-11	.4902E-11	.1476E-11
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.6344E-18	.2798E-14	.1399E-14	.5226E-10
105 La2O3	.2434E-17	.1074E-13	.5368E-14	.4663E-07
108 Li2O	.4911E-16	.2166E-12	.1083E-12	.5334E-06
65 Mg(COOH)2	.7611E-15	.8357E-11	.1678E-11	.6270E-07
55 Mg(OH)2	.5092E-28	.2246E-24	.1123E-24	.0000
83 MgO	.1466E-16	.6464E-13	.8232E-13	.1869E-06
60 Mn(COOH)2	.6785E-14	.2992E-10	.1496E-10	.5590E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.4564E-26	.2013E-22	.1006E-22	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	3.418	17.16	.2772E-05	188.0
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.8601E-31	.9053E-17	.4470E-28	.7827E-14
84 NO2	.2218E-06	.8305E-02	.1204E-03	.4184E-04
70 Na(HgO(OH))	.4868E-18	.2147E-14	.1073E-14	.4010E-10
94 Na2B4O7	.2791E-18	.1231E-14	.6155E-15	.2299E-10
109 Na2C2O4	.2546E-18	.1123E-14	.5613E-15	.2097E-10
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1796E-15	.7923E-12	.3962E-12	.1658E-05
71 Na2PuO2(OH)4	.1974E-22	.8707E-19	.4353E-19	.1626E-14
73 Na2RhO4	.4059E-20	.1790E-16	.8950E-17	.3343E-12
72 Na2RuO4	.8961E-19	.1747E-15	.8734E-16	.8263E-11
6 Na2SO4	.8031E-16	.3542E-12	.1771E-12	.6616E-08
68 NaAlO2	.1974E-15	.8707E-12	.4353E-12	.1626E-07
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.5165E-14	.2278E-10	.1139E-10	.4303E-06

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	96 MFT12 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
7 NaCl	.8007E-16	.8531E-12	.1766E-12	.6596E-03
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.4188E-18	.1847E-14	.9234E-15	.3450E-10
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.7754E-17	.8420E-13	.1710E-13	.6388E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2810E-14	.6962E-07	.3431E-07	.2125E-06
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2393E-14	.1055E-10	.5276E-11	.1971E-06
17 Ni(OH)2	.1956E-27	.8627E-24	.4313E-24	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	5.185	.1689E-05	56.78
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1085E-15	.4784E-12	.2392E-12	.8936E-03
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.2823E-16	.1245E-12	.6225E-13	.2325E-03
22 RhO2	.1079E-16	.4757E-13	.2378E-13	.8855E-09
79 RuO2	.5283E-16	.2330E-12	.1165E-12	.4352E-03
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.1865E-26	.1297E-32	.1774E-23
111 SiO2	.5038E-14	.2220E-10	.1110E-10	.5791E-05
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.9716E-16	.4285E-12	.2142E-12	.8004E-08
10 Sr(NO3)2	.1138E-21	.5018E-18	.2509E-18	.9374E-14
127 Sr(OH)2	.8724E-29	.8848E-25	.1924E-25	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.4425E-15	.1952E-11	.9758E-12	.8645E-07
107 TiO2	.4711E-17	.2078E-13	.1039E-13	.9325E-07
119 Tritium	.7336E-19	.2604E-15	.6981E-16	.2332E-10
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.3095E-14	.1365E-10	.6824E-11	.2549E-06
16 UO2(OH)2	.3427E-27	.1511E-23	.7357E-24	.0000
27 Y(COOH)3	.6657E-16	.2936E-12	.1468E-12	.5484E-08
11 Y(NO3)3	.8081E-22	.3564E-18	.1782E-18	.6657E-14
128 Y(OH)3	.5455E-29	.2406E-25	.1203E-25	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAMS(CONT'D)-

STREAM NAME

	96	98	99	100
	MFT12 Vent	Inlet Vapor	Condensate	MFT Vent
	to MVC	to MVC	from MVC	to FAVC
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2829E-14	.1248E-10	.6238E-11	.2830E-06
44 Zn(COOH)2	.8517E-15	.1551E-11	.7757E-12	.2898E-07
54 Zn(OH)2	.2950E-28	.1801E-24	.6506E-25	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2484E-17	.1074E-13	.5368E-14	.4663E-07
TOTAL FLOW, LB/HR	4.49	22.90	.29	266.48
VAPOR FLOW, CFM	1.07	5.50		70.85
LIQUID FLOW, GPM			.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0699	.0694	62.5333	.0627
TEMPERATURE, DEG C	37.99	37.40	15.00	50.00
PRESSURE, ATM	.99	.99	.99	.97
PRESSURE, PSIG	-.07	-.07	-.07	-.51
PRESSURE, MM HG	756.20	756.20	756.20	733.86
PHASE	VAPOR	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	-252.50	-1055.87	4.88	-1069.69

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Exh to Tunnel
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	19.68	50.04	9570.
45 Ag	.0000	.0000	.0000	.3480E-10
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.5713E-10
51 AgOH	.0000	.2484E-11	.1862E-09	.1091E-10
74 Al(OH)3	.0000	.2672E-08	.1170E-06	.1305E-08
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.4596E-08	.2012E-06	.4952E-08
9 Ba(NO3)2	.0000	.2110E-16	.1536E-14	.1712E-16
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1904E-10	.1389E-08	.1547E-10
66 CO	.0000	.4668E-04	5.598	.0000
87 CO2	.0000	.1459E-01	13.09	.0000
142 CO2 (C14)	.0000	.1126E-16	.2189E-23	.2412E-09
68 Ca(COOH)2	.0000	.0000	.4817E-07	.5362E-09
120 Ca(OH)2	.0000	.3761E-09	.0000	.3601E-12
113 Ca3(PO4)2	.0000	.4744E-10	.3460E-08	.8856E-10
20 CaC2O4	.0000	.5131E-10	.3742E-08	.4171E-10
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.1283E-10	.9356E-09	.1043E-10
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.6027E-10	.4396E-08	.4899E-10
29 Carbon	.0000	.1283E-10	.9356E-09	.1043E-10
26 Co(COOH)2	.0000	.0000	.0000	.8466E-03
121 Co(OH)2	.0000	.6506E-11	.0000	.6229E-14
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.4876E-10	.8557E-08	.9964E-10
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.8699E-13	.1402E-13	.2028E-15
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.6508E-11	.5066E-07	.6569E-14
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.1353E-11	.9855E-10	.1098E-11
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1625E-08	.1808E-10
52 Cu(OH)2	.0000	.1415E-10	.0000	.1355E-13
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.6468E-08	.2831E-06	.3158E-03
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Exh to Tunnel
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.2520E-09	.1550E-05	.2920E-10
103 GroupB	.0000	.1140E-09	.8317E-08	.9268E-10
25 H2	.0000	.8176E-05	.3657	.7101E-05
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.3576E-13
21 HgO	.0000	.8651E-10	.7688E-06	.2951E-12
97 I2	.0000	.0000	.9392E-04	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.4869E-08	.7644E-11	.1621E-10
105 La2O3	.0000	.9350E-10	.6820E-08	.1681E-09
108 Li2O	.0000	.1778E-08	.7800E-07	.1920E-08
65 Mg(COOH)2	.0000	.0000	.9169E-08	.1021E-09
55 Mg(OH)2	.0000	.6414E-10	.0000	.6141E-13
33 MgO	.0000	.5485E-09	.2734E-07	.6733E-09
60 Mn(COOH)2	.0000	.0000	.8175E-07	.9099E-09
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.4972E-08	.0000	.1485E-10
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	170.9	1362.	.4375E+06
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.2556E-03	1.175	.0000
84 NO2	.0000	.6803E-02	.1850	.0000
70 Na(HgO(OH))	.0000	.8053E-13	.5865E-11	.6536E-13
94 Na2B4O7	.0000	.2449E-08	.1439E-06	.2449E-11
109 Na2C2O4	.0000	.1954E-08	.3067E-11	.6504E-11
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.6549E-08	.2870E-06	.5968E-08
71 Na2PuO2(OH)4	.0000	.8266E-17	.2378E-15	.2651E-17
78 Na2RhO4	.0000	.6715E-15	.4890E-13	.5449E-15
72 Na2RuO4	.0000	.6552E-14	.4772E-12	.5317E-14
6 Na2SO4	.0000	.1329E-10	.9676E-09	.1078E-10
68 NaAlO2	.0000	.8266E-10	.2378E-08	.2651E-10
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.7291E-07	.6298E-07	.8557E-09

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas Exh	105 Process Cell to Tunnel
7 NaCl	.0000	.2389E-08	.1144E-04	.1821E-10
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.2172E-08	.9035E-05	.2311E-11
129 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.1580E-09	.1098E-05	.1201E-11
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.7887E-07	.8108E-07	.6822E-09
4 NaOH	.0000	.8972E-07	.0000	.2701E-12
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.2883E-07	.3201E-09
17 Ni(OH)2	.0000	.2464E-09	.0000	.2351E-12
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	51.63	411.4	.1821E-06 ✓
67 PbO	.0000	.0000	.0000	.0000
23 PbSO4	.0000	.1792E-10	.1807E-08	.1451E-10
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.4663E-11	.8401E-09	.3790E-11
22 RhO2	.0000	.1782E-11	.1299E-09	.1448E-11
79 RuO2	.0000	.9234E-10	.7569E-06	.7173E-11
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.9028E-05	.8755	.0000
111 SiO2	.0000	.1935E-07	.8470E-06	.2011E-07
115 Silica Gel	.0000	.0000	.0000	.0000
43 Sr(COOH)2	.0000	.0000	.1171E-08	.1803E-10
10 Sr(NO3)2	.0000	.1882E-16	.1371E-14	.1528E-16
127 Sr(OH)2	.0000	.1099E-10	.0000	.1052E-13
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.7309E-10	.5332E-08	.5941E-10
107 TiO2	.0000	.1820E-09	.1864E-07	.3362E-09
119 Tritium	.0000	.8440E-11	.7856E-11	.1168E-09
93 UO2	.0000	.0000	.0000	.0000
12 UO2(COOH)2	.0000	.0000	.8729E-07	.4150E-09
16 UO2(OH)2	.0000	.4316E-09	.0000	.4183E-12
27 Y(COOH)3	.0000	.0000	.8021E-09	.8928E-11
11 Y(NO3)3	.0000	.1337E-16	.9735E-15	.1085E-16
128 Y(OH)3	.0000	.6870E-11	.0000	.6578E-14
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Exh to Tunnel
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.4673E-09	.8408E-07	.8798E-09
44 Zn(COOH)2	.0000	.0000	.4238E-08	.4717E-10
54 Zn(OH)2	.0000	.3716E-10	.0000	.3558E-13
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.9850E-10	.6820E-08	.1681E-09
TOTAL FLOW, LB/HR	.00	242.22	1844.37	579240.71
VAPOR FLOW, CFM		64.41	486.81	187816.79
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0627	.0632	.0700
TEMPERATURE, DEG C	85.00	50.00	27.99	84.98
PRESSURE, ATM	1.00	.97	.88	.99
PRESSURE, PSIG	.00	-.51	-1.75	-.11
PRESSURE, MM HG		733.86	669.56	754.53
PHASE	N/A	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	.00	-961.48	-82844.09	-29829812.75

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	106 Recycle from Tank Farm	107 Ru Absorber Accumulation	108 I2 Absorber Accumulation	109 Spent Wash MWT to SRAT
COMPONENT FLOWS, LB/HR				
1 H2O	8.778	.0000	.0000	.2073
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1005E-03	.9308E-10	.4654E-10	.5728E-08
74 Al(OH)3	.1081	.5848E-07	.2924E-07	.3582E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1860	.1006E-06	.5029E-07	.4687E-05
9 Ba(NO3)2	.4213E-11	.7682E-15	.3841E-15	.4705E-11
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7704E-03	.6943E-09	.3471E-09	.4253E-05
66 CO	.2192E-10	.0000	.0000	.8414E-26
37 CO2	.1723E-06	.0000	.0000	.6456E-12
142 CO2 (C14)	.0000	.0000	.0000	.1290E-22
63 Ca(COOH)2	.0000	.2409E-07	.1204E-07	.1475E-03
120 Ca(OH)2	.1522E-01	.0000	.0000	.1102E-16
113 Ca3(PO4)2	.1920E-02	.1730E-08	.8651E-09	.1060E-04
20 CaC2O4	.2076E-02	.1871E-08	.9356E-09	.1146E-04
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.5191E-03	.4678E-09	.2339E-09	.2865E-05
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2439E-02	.2198E-08	.1099E-08	.1346E-04
29 Carbon	.5191E-03	.4678E-09	.2339E-09	.2865E-05
26 Co(COOH)2	.0000	.0000	.0000	.2329E-05
121 Co(OH)2	.2633E-03	.0000	.0000	.1906E-18
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1973E-02	.1778E-08	.8892E-09	.1089E-04
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1497E-05	.7010E-14	.3505E-14	.4294E-10
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1800E-05	.2533E-07	.1266E-07	.2763E-10
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2703E-06	.4927E-10	.2464E-10	.3018E-06
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.8123E-09	.4062E-09	.4976E-05
52 Cu(OH)2	.5727E-03	.0000	.0000	.4146E-18
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2618	.1416E-06	.7078E-07	.8671E-03
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	106	107	108	109
	Recycle from Tank Farm	Ru Absorber Accumulation	I2 Absorber Accumulation	Spent Wash MWWT to SRAT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1020E-01	.7749E-06	.3875E-06	.7981E-05
103 GroupB	.4614E-02	.4158E-08	.2079E-08	.2547E-04
25 H2	.3113E-09	.0000	.0000	.1459E-24
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.8236E-04
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.3501E-02	.3844E-06	.1922E-06	.4514E-06
57 I2	.0000	.0000	.9299E-04	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.9724E-03	.3822E-11	.1911E-11	.2341E-07
105 La2O3	.3784E-02	.3410E-08	.1705E-08	.8982E-07
108 Li2O	.7195E-01	.3900E-07	.1950E-07	.1812E-05
65 Mg(COOH)2	.0000	.4585E-08	.2292E-08	.2808E-04
55 Mg(OH)2	.2596E-02	.0000	.0000	.1879E-17
33 MgO	.2220E-01	.1367E-07	.6835E-08	.5408E-06
60 Mn(COOH)2	.0000	.4087E-07	.2044E-07	.2504E-03
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.2012	.0000	.0000	.1684E-15
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.6340E-04	.0000	.0000	.4353E-05
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2769E-09	.0000	.0000	.1572E-15
84 NO2	.4112E-04	.0000	.0000	.8721E-12
70 Na(HgO(OH))	.1608E-07	.2932E-11	.1466E-11	.1796E-07
94 Na2B4O7	.4892E-03	.7195E-07	.8598E-07	.1030E-07
109 Na2C2O4	.8902E-03	.1533E-11	.7667E-12	.9398E-08
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2650	.1435E-06	.7174E-07	.6629E-05
71 Na2PuO2(OH)4	.6523E-12	.1189E-15	.5946E-16	.7284E-12
73 Na2RhO4	.1341E-09	.2445E-13	.1222E-13	.1498E-09
72 Na2RuO4	.1309E-08	.2386E-12	.1193E-12	.1461E-08
6 Na2SO4	.2654E-05	.4838E-09	.2419E-09	.2963E-05
63 NaAlO2	.6523E-05	.1189E-08	.5946E-09	.7284E-05
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1456E-01	.3146E-07	.1573E-07	.1906E-03

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS(CONT'D)-
 STREAM NAME

	106	107	108	109
	Recycle from Ru Tank Farm	Absorber Accumulation	I2 Absorber Accumulation	Spent Wash MWWT to SRAT
7 NaCl	.4672E-03	.5720E-05	.2860E-05	.2954E-05
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.4339E-03	.4518E-05	.2259E-05	.1545E-07
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.3156E-04	.5492E-06	.2746E-06	.2861E-06
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1575E-01	.1554E-07	.7770E-08	.9319E-04
4 NaOH	.7933E-02	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1441E-07	.7207E-03	.8828E-04
17 Ni(OH)2	.9970E-02	.0000	.0000	.7217E-17
40 NiO	.0000	.0000	.0000	.0000
82 O2	.3658E-04	.0000	.0000	.2511E-05
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.7251E-03	.6534E-09	.3267E-09	.4003E-03
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1887E-03	.1700E-09	.8502E-10	.1042E-05
22 RhO2	.7210E-04	.6497E-10	.3249E-10	.3980E-06
79 RuO2	.8737E-02	.3784E-06	.1892E-06	.1949E-05
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1266E-10	.0000	.0000	.3239E-25
111 SiO2	.7832	.4235E-06	.2117E-06	.1857E-03
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.5853E-09	.2926E-09	.3585E-05
10 Sr(NO3)2	.8760E-11	.6855E-15	.3427E-15	.4199E-11
127 Sr(OH)2	.4447E-03	.0000	.0000	.3219E-18
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2958E-02	.2666E-08	.1333E-08	.1633E-04
107 TiO2	.7866E-02	.6819E-08	.3409E-08	.1738E-06
119 Tritium	.3765E-11	.0000	.0000	.9014E-14
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1864E-07	.9321E-08	.1142E-03
16 UO2(OH)2	.1747E-01	.0000	.0000	.1265E-16
27 Y(COOH)3	.0000	.4010E-09	.2005E-09	.2456E-05
11 Y(NO3)3	.2670E-11	.4868E-15	.2434E-15	.2982E-11
128 Y(OH)3	.2780E-03	.0000	.0000	.2013E-18
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	106 Recycle from Tank Farm	107 Ru Absorber Accumulation	108 I2 Absorber Accumulation	109 Spent Wash MWWT to SRAT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1891E-01	.1704E-07	.8521E-08	.1044E-03
44 Zn(COOH)2	.0000	.2119E-08	.1059E-08	.1298E-04
54 Zn(OH)2	.1504E-02	.0000	.0000	.1089E-17
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3784E-02	.3410E-08	.1705E-08	.8982E-07
TOTAL FLOW, LB/HR	10.84	.00	.00	.21
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.02			.00
DESIGN FLOW,				
DENSITY, LBS/FT3	70.3078	.0000	.0000	62.8835
TEMPERATURE, DEG C	60.00	80.00	150.00	50.00
PRESSURE, ATM	1.00	.80	.74	.97
PRESSURE, PSIG	.00	-3.00	-3.86	-.51
PRESSURE, MM HG		604.66	560.27	733.86
PHASE	LIQUID	SOLID	SOLID	LIQUID
ENTHALPY, PCU/HR	575.67	.00	.00	10.61

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	110 Water Wash to MWWT	111 MWWT Vent to FAVC	112 Hg from MWWT to MAWT	113 Air Sparge to MAWT
COMPONENT FLOWS, LB/HR				
1 H2O	.3601	.2280	.1194E-01	.1609E-02
45 Ag	.0000	.3014E-07	.1929E-01	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.9463E-14	.3299E-09	.0000
74 Al(OH)3	.0000	.5918E-09	.2063E-04	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.7744E-11	.2699E-06	.0000
9 Ba(NO3)2	.0000	.7774E-17	.2710E-12	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.7026E-11	.2449E-06	.0000
66 CO	.0000	.5332E-20	.4846E-27	.0000
87 CO2	.0000	.1627E-07	.3718E-13	.0000
142 CO2 (C14)	.0000	.3252E-18	.7431E-24	.0000
63 Ca(COOH)2	.0000	.2437E-09	.8496E-05	.0000
120 Ca(OH)2	.0000	.1820E-22	.6345E-18	.0000
113 Ca3(PO4)2	.0000	.1751E-10	.6103E-06	.0000
20 CaC2O4	.0000	.1894E-10	.6601E-06	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.4734E-11	.1650E-06	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.2224E-10	.7754E-06	.0000
29 Carbon	.0000	.4734E-11	.1650E-06	.0000
26 Co(COOH)2	.0000	.3848E-11	.1342E-06	.0000
121 Co(OH)2	.0000	.3149E-24	.1098E-19	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.1800E-10	.6274E-06	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.7094E-16	.2473E-11	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.4564E-16	.1591E-11	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.4986E-12	.1738E-07	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.8220E-11	.2866E-06	.0000
52 Cu(OH)2	.0000	.6849E-24	.2388E-19	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.1432E-08	.4994E-04	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	110 Water Wash to MWWT	111 MWWT Vent to FAVC	112 Hg from MWWT to MAWT	113 Air Sparge to MAWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 GroupA	.0000	.1318E-10	.4596E-06	.0000
103 GroupB	.0000	.4208E-10	.1467E-05	.0000
25 H2	.0000	.8976E-19	.8403E-26	.0000
123 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.3326E-04	.1864E-05	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
80 Hg	.0000	.2936E-03	1.631	.0000
135 HgNO22	.0000	.0000	.0000	.0000
21 HgO	.0000	.7457E-12	.2599E-07	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.3868E-13	.1848E-08	.0000
105 La2O3	.0000	.1484E-12	.5173E-08	.0000
108 Li2O	.0000	.2994E-11	.1044E-06	.0000
65 Mg(COOH)2	.0000	.4640E-10	.1617E-05	.0000
55 Mg(OH)2	.0000	.3104E-23	.1082E-18	.0000
82 MgO	.0000	.8935E-12	.8115E-07	.0000
60 Mn(COOH)2	.0000	.4136E-09	.1442E-04	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.2782E-21	.9698E-17	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	8.492	.2507E-06	.7357E-01
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.4317E-10	.9053E-17	.0000
84 NO2	.0000	.4293E-10	.5023E-13	.0000
70 Na(HgO(OH))	.0000	.2968E-13	.1034E-08	.0000
94 Na2B4O7	.0000	.1701E-13	.5931E-09	.0000
109 Na2C2O4	.0000	.1552E-13	.5409E-09	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.1095E-10	.3818E-06	.0000
71 Na2PuO2(OH)4	.0000	.1203E-17	.4195E-13	.0000
73 Na2RhO4	.0000	.2474E-15	.8625E-11	.0000
72 Na2RuO4	.0000	.2414E-14	.8416E-10	.0000
6 Na2SO4	.0000	.4896E-11	.1707E-06	.0000
68 NaAlO2	.0000	.1203E-10	.4195E-06	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.3148E-09	.1097E-04	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	110 Water Wash to MWWT	111 MWWT Vent to FAVC	112 Hg from MWWT to MAWT	113 Air Sparge to MAWT
7 NaCl	.0000	.4881E-11	.1701E-06	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.2553E-13	.8899E-09	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.4727E-12	.1648E-07	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.1540E-09	.5367E-05	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1459E-09	.5084E-05	.0000
17 Ni(OH)2	.0000	.1192E-22	.4157E-18	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	1.055	.1446E-06	.2222E-01
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.6613E-11	.2305E-06	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.1721E-11	.5999E-07	.0000
22 RhO2	.0000	.6575E-12	.2292E-07	.0000
79 RuO2	.0000	.8221E-11	.1123E-06	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.6873E-20	.1865E-26	.0000
111 SiO2	.0000	.8068E-09	.1070E-04	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.5923E-11	.2065E-06	.0000
10 Sr(NO3)2	.0000	.6937E-17	.2418E-12	.0000
127 Sr(OH)2	.0000	.5318E-24	.1854E-19	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.2698E-10	.9404E-06	.0000
107 TiO2	.0000	.2872E-12	.1001E-07	.0000
119 Tritium	.0000	.9917E-14	.5191E-15	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1887E-09	.6577E-05	.0000
16 UO2(OH)2	.0000	.2089E-22	.7283E-18	.0000
27 Y(COOH)3	.0000	.4058E-11	.1415E-06	.0000
11 Y(NO3)3	.0000	.4926E-17	.1717E-12	.0000
128 Y(OH)3	.0000	.8325E-24	.1159E-19	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	110 Water Wash to MWT	111 MWT Vent to FAVC	112 H ₂ g from MWT to MAWT	113 Air Sparge to MAWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.1725E-09	.6012E-05	.0000
44 Zn(COOH)2	.0000	.2144E-10	.7475E-06	.0000
54 Zn(OH)2	.0000	.1798E-23	.6269E-19	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.1484E-12	.5173E-08	.0000
TOTAL FLOW, LB/HR	.86	4.77	1.66	.10
VAPOR FLOW, CFM		1.25		.02
LIQUID FLOW, GPM	.00		.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4300	.0638	773.1063	.0706
TEMPERATURE, DEG C	25.00	49.99	50.00	35.00
PRESSURE, ATM	1.00	.97	.97	1.00
PRESSURE, PSIG	.00	-.51	-.51	.00
PRESSURE, MM HG		733.86	733.86	
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	9.18	-127.48	3.37	-5.02

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
COMPONENT FLOWS, LB/HR				
1 H2O	.1109	.1891	.2735	.0000
45 Ag	.3118E-09	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.4832E-07	.2817E-01	.0000	.0000
51 AgOH	.5331E-15	.8109E-09	.0000	.0000
74 Al(OH)3	.8834E-10	.1944E-04	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4862E-12	.2544E-06	.0000	.0000
9 Ba(NO3)2	.4879E-18	.2554E-12	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.8958E-12	.2308E-06	.0000	.0000
66 CO	.4846E-27	.8259E-83	.0000	.0000
87 CO2	.1782E-05	.9523E-10	.0000	.0000
142 CO2 (C14)	.7431E-24	.8971E-28	.0000	.0000
63 Ca(COOH)2	.1873E-10	.8007E-05	.0000	.0000
120 Ca(OH)2	.1025E-23	.5979E-18	.0000	.0000
113 Ca3(PO4)2	.9863E-12	.5751E-06	.0000	.0000
20 CaC2O4	.1067E-11	.6220E-06	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2667E-12	.1555E-06	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1253E-11	.7307E-06	.0000	.0000
29 Carbon	.2667E-12	.1555E-06	.0000	.0000
26 Co(COOH)2	.2168E-12	.1264E-06	.0000	.0000
121 Co(OH)2	.1774E-25	.1034E-19	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1014E-11	.5912E-06	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8996E-17	.2330E-11	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2571E-17	.1499E-11	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2809E-13	.1638E-07	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.4631E-12	.2700E-06	.0000	.0000
52 Cu(OH)2	.8858E-25	.2250E-19	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.8070E-10	.4706E-04	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D) - STREAM NAME	114 MAWT Vent to MVC	115 HNO ₃ WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 Group A	.7428E-12	.4331E-06	.0000	.0000
103 Group B	.2371E-11	.1382E-05	.0000	.0000
25 H ₂	.8403E-26	.1434E-31	.0000	.0000
133 H ₂ C ₂ O ₄	.0000	.0000	.0000	.0000
91 H ₂ O ₂	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO ₃	.4790E-02	.2721E-02	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.1255E-03	.0000	.0000	.0000
135 HgNO ₃ 2	.3010E-10	.1755E-04	.0000	.0000
21 HgO	.4201E-13	.2450E-07	.0000	.0000
97 I ₂	.0000	.0000	.0000	.0000
89 K ₂ O	.0000	.0000	.0000	.0000
131 KMnO ₄	.0000	.0000	.0000	.0000
118 KNO ₃	.2179E-14	.1270E-08	.0000	.0000
105 La ₂ O ₃	.8359E-14	.4874E-08	.0000	.0000
108 Li ₂ O	.1687E-12	.9835E-07	.0000	.0000
65 Mg(COOH) ₂	.2614E-11	.1524E-05	.0000	.0000
55 Mg(OH) ₂	.1749E-24	.1020E-18	.0000	.0000
33 MgO	.5033E-13	.2935E-07	.0000	.0000
60 Mn(COOH) ₂	.2330E-10	.1359E-04	.0000	.0000
132 Mn(NO ₃) ₂	.0000	.0000	.0000	.0000
129 Mn(OH) ₂	.1567E-22	.9139E-17	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO ₂	.0000	.0000	.0000	.0000
81 N ₂	8.492	.4927E-05	17.07	.0000
143 Na ₂ CO ₃ (C14)	.0000	.0000	.0000	.0000
35 NO	.9053E-17	.8786E-22	.0000	.0000
84 NO ₂	.7823E-02	.3121E-03	.0000	.0000
70 Na(HgO(OH))	.1672E-14	.9748E-09	.0000	.0000
94 Na ₂ B ₄ O ₇	.9585E-15	.5589E-09	.0000	.0000
109 Na ₂ C ₂ O ₄	.8742E-15	.5097E-09	.0000	.0000
5 Na ₂ CO ₃	.0000	.0000	.0000	.0000
32 Na ₂ O	.6169E-12	.3597E-06	.0000	.0000
71 Na ₂ PuO ₂ (OH) ₄	.6780E-19	.8953E-13	.0000	.0000
73 Na ₂ RhO ₄	.1894E-16	.8127E-11	.0000	.0000
72 Na ₂ RuO ₄	.1360E-15	.7931E-10	.0000	.0000
6 Na ₂ SO ₄	.2758E-12	.1608E-06	.0000	.0000
68 NaAlO ₂	.6780E-12	.8953E-06	.0000	.0000
114 NaBO ₂	.0000	.0000	.0000	.0000
140 NaBO ₂ Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1774E-10	.1034E-04	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
7 NaCl	.2750E-12	.1603E-06	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1438E-14	.8386E-09	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2663E-13	.1553E-07	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8673E-11	.5058E-05	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.8217E-11	.4791E-05	.0000	.0000
17 Ni(OH)2	.6717E-24	.8917E-18	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.055	.2892E-05	5.158	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.8725E-12	.2172E-06	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.9694E-13	.5653E-07	.0000	.0000
22 RhO2	.8704E-13	.2160E-07	.0000	.0000
79 RuO2	.1814E-12	.1058E-06	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1865E-26	.1037E-31	.0000	.0000
111 SiO2	.1728E-10	.1008E-04	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8337E-12	.1946E-06	.0000	.0000
10 Sr(NO3)2	.8908E-13	.2279E-12	.0000	.0000
127 Sr(OH)2	.2996E-25	.1747E-19	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1520E-11	.8862E-06	.0000	.0000
107 TiO2	.1618E-13	.9434E-08	.0000	.0000
119 Tritium	.1848E-15	.8151E-15	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1063E-10	.6197E-05	.0000	.0000
16 UO2(OH)2	.1177E-23	.6863E-18	.0000	.0000
27 Y(COOH)3	.2286E-12	.1333E-06	.0000	.0000
11 Y(NO3)3	.2775E-18	.1618E-12	.0000	.0000
128 Y(OH)3	.1873E-25	.1092E-19	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.9715E-11	.5665E-05	.0000	.0000
44 Zn(COOH)2	.1208E-11	.7044E-06	.0000	.0000
54 Zn(OH)2	.1013E-24	.5908E-19	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8359E-14	.4874E-08	.0000	.0000
TOTAL FLOW, LB/HR	4.67	.22	22.61	.00
VAPOR FLOW, CFM	1.12		5.84	
LIQUID FLOW, GPM		.00		
DESIGN FLOW,				
DENSITY, LBS/FT3	.0693	69.6294	.0706	.0000
TEMPERATURE, DEG C	37.99	38.00	35.00	160.00
PRESSURE, ATM	.99	.99	1.00	6.10
PRESSURE, PSIG	-.07	-.07	.00	74.99
PRESSURE, MM HG	756.20	756.20		
PHASE	VAPOR	LIQUID	VAPOR	N/A
ENTHALPY, PCU/HR	-212.02	7.54	-1164.14	.00

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	119 Steam Condens rate fr SME	120 Steam to SRAT Coil	121 Steam Condens rate Fr SRAT	122 Air Sparge to SRAT
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	.0000	.0000	.3735
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D) - STREAM NAME	119	120	121	122
	Steam Condens rate fr SME	Steam to SRAT Coil	Steam Condens rate Fr SRAT	Air Sparge to SRAT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
122 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.0000	.0000	17.07
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	119 Steam Condens rate fr SME	120 Steam to SRAT Coil	121 Steam Condens rate Fr SRAT	122 Air Sparge to SRAT
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO ₂	.0000	.0000	.0000	.0000
2 NaNO ₃	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH) ₂	.0000	.0000	.0000	.0000
17 Ni(OH) ₂	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O ₂	.0000	.0000	.0000	5.158
67 PbO	.0000	.0000	.0000	.0000
28 PbSO ₄	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH) ₂	.0000	.0000	.0000	.0000
112 PdNO ₃ 2	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH) ₄	.0000	.0000	.0000	.0000
76 PuO ₂	.0000	.0000	.0000	.0000
22 RhO ₂	.0000	.0000	.0000	.0000
79 RuO ₂	.0000	.0000	.0000	.0000
28 RuO ₂ Semi Vol	.0000	.0000	.0000	.0000
83 RuO ₄	.0000	.0000	.0000	.0000
88 SO ₂	.0000	.0000	.0000	.0000
111 SiO ₂	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH) ₂	.0000	.0000	.0000	.0000
10 Sr(NO ₃) ₂	.0000	.0000	.0000	.0000
127 Sr(OH) ₂	.0000	.0000	.0000	.0000
80 SrCO ₃	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO ₂	.0000	.0000	.0000	.0000
107 TiO ₂	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO ₂	.0000	.0000	.0000	.0000
62 UO ₂ (COOH) ₂	.0000	.0000	.0000	.0000
16 UO ₂ (OH) ₂	.0000	.0000	.0000	.0000
27 Y(COOH) ₃	.0000	.0000	.0000	.0000
11 Y(NO ₃) ₃	.0000	.0000	.0000	.0000
128 Y(OH) ₃	.0000	.0000	.0000	.0000
81 Y ₂ (CO ₃) ₃	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	119 Steam Condens sate fr SME	120 Steam to SRAT Coil	121 Steam Condens sate Fr SRAT	122 Air Sparge to SRAT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	.00	.00	22.61
VAPOR FLOW, CFM				5.84
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0000	.0000	.0706
TEMPERATURE, DEG C	60.00	160.00	60.00	35.00
PRESSURE, ATM	1.00	6.10	1.00	1.00
PRESSURE, PSIG	.00	74.99	.00	.00
PRESSURE, MM HG				
PHASE	N/A	N/A	N/A	VAPOR
ENTHALPY, PCU/HR	.00	.00	.00	-1164.14

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
COMPONENT FLOWS, LB/HR				
1 H2O	114.1	95.54	.3735	.6654
45 Ag	.3034E-07	.1517E-07	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1277E-08	.6386E-09	.0000	.0000
74 Al(OH)3	.1160E-05	.5799E-06	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4402E-05	.2201E-05	.0000	.0000
9 Ba(NO3)2	.1522E-13	.7609E-14	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1375E-07	.6877E-08	.0000	.0000
66 CO	.4639E-04	.3651E-10	.0000	.0000
37 CO2	5.383	.2135E-03	.0000	.0000
142 CO2 (C14)	.1072E-09	.4252E-14	.0000	.0000
63 Ca(COOH)2	.4766E-06	.2383E-06	.0000	.0000
120 Ca(OH)2	.3201E-09	.1600E-09	.0000	.0000
113 Ca3(PO4)2	.8428E-07	.1714E-07	.0000	.0000
20 CaC2O4	.3707E-07	.1854E-07	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.9268E-08	.4634E-08	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.4354E-07	.2177E-07	.0000	.0000
29 Carbon	.9268E-08	.4634E-08	.0000	.0000
26 Co(COOH)2	.7525E-08	.3762E-08	.0000	.0000
121 Co(OH)2	.5537E-11	.2768E-11	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.3523E-07	.1762E-07	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1803E-12	.9015E-13	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.5839E-11	.2919E-11	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.9761E-09	.4881E-09	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1607E-07	.8037E-08	.0000	.0000
52 Cu(OH)2	.1204E-10	.6022E-11	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2807E-05	.1404E-05	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2601E-07	.1300E-07	.0000	.0000
103 GroupB	.8238E-07	.4119E-07	.0000	.0000
25 H2	.3156E-05	.2342E-11	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.4563	.8880	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.2940E-03	.1470E-03	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.2526E-09	.1263E-09	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.4947E-08	.2474E-08	.0000	.0000
105 La2O3	.1494E-06	.7472E-07	.0000	.0000
108 Li2O	.1707E-05	.8534E-06	.0000	.0000
65 Mg(COOH)2	.9072E-07	.4536E-07	.0000	.0000
55 Mg(OH)2	.5458E-10	.2729E-10	.0000	.0000
33 MgO	.5985E-06	.2993E-06	.0000	.0000
60 Mn(COOH)2	.8088E-06	.4044E-06	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.4872E-08	.2436E-08	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1227.	.8842E-03	17.07	80.42
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.9042E-01	.1993E-06	.0000	.0000
84 NO2	.7186E-02	.4224E-03	.0000	.0000
70 Na(HgO(OH))	.5809E-10	.2905E-10	.0000	.0000
94 Na2B4O7	.2176E-08	.1088E-08	.0000	.0000
109 Na2C2O4	.1985E-08	.9925E-09	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.5304E-05	.2652E-05	.0000	.0000
71 Na2PuO2(OH)4	.2356E-14	.1178E-14	.0000	.0000
73 Na2RhO4	.4844E-12	.2422E-12	.0000	.0000
72 Na2RuO4	.4726E-11	.2363E-11	.0000	.0000
6 Na2SO4	.9585E-08	.4792E-08	.0000	.0000
68 NaAlO2	.2356E-07	.1178E-07	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.7606E-06	.3803E-06	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
7 NaCl	.1174E-07	.5872E-08	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.2060E-08	.1030E-08	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1068E-08	.5338E-09	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.3844E-06	.1922E-06	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2852E-06	.1426E-06	.0000	.0000
17 Ni(OH)2	.2097E-09	.1048E-09	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	870.7	.5389E-03	5.158	9.189
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1295E-07	.6473E-08	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.3369E-08	.1684E-08	.0000	.0000
22 RhO2	.1287E-08	.6436E-09	.0000	.0000
79 RuO2	.6375E-08	.3188E-08	.0000	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.8969E-05	.2783E-10	.0000	.0000
111 SiO2	.1788E-04	.8940E-05	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1158E-07	.5790E-08	.0000	.0000
10 Sr(NO3)2	.1358E-13	.6790E-14	.0000	.0000
127 Sr(OH)2	.9352E-11	.4676E-11	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.5281E-07	.2641E-07	.0000	.0000
107 TiO2	.2988E-06	.1494E-06	.0000	.0000
119 Tritium	.8931E-10	.3740E-10	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.8689E-06	.1844E-06	.0000	.0000
16 UO2(OH)2	.8674E-09	.1837E-09	.0000	.0000
27 Y(COOH)3	.7935E-08	.3968E-08	.0000	.0000
11 Y(NO3)3	.9648E-14	.4822E-14	.0000	.0000
128 Y(OH)3	.5847E-11	.2924E-11	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8376E-06	.1688E-06	.0000	.0000
44 Zn(COOH)2	.4193E-07	.2096E-07	.0000	.0000
54 Zn(OH)2	.3162E-10	.1581E-10	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1494E-06	.7472E-07	.0000	.0000
TOTAL FLOW, LB/HR	1717.66	95.93	22.61	40.28
VAPOR FLOW, CFM	454.96		5.84	9.88
LIQUID FLOW, GPM		.19		
DESIGN FLOW,				
DENSITY, LBS/FT3	.0629	62.4756	.0706	.0680
TEMPERATURE, DEG C	50.00	15.00	85.00	85.00
PRESSURE, ATM	.96	.96	1.00	.96
PRESSURE, PSIG	-.58	-.58	.00	-.54
PRESSURE, MM HG	730.13	730.13		732.03
PHASE	VAPOR	LIQUID	VAPOR	VAPOR
ENTHALPY, PCU/HR	-26967.07	1452.44	-1164.14	-2074.10

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWT Vent to PVVS
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	.0000	.0000	6.222
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	5.558
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D) - STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWTI Vent to PVVS
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 Group A	.0000	.0000	.0000	.0000
103 Group B	.0000	.0000	.0000	.0000
25 H ₂	.0000	.0000	.0000	.0000
123 H ₂ C ₂ O ₄	.0000	.0000	.0000	.0000
91 H ₂ O ₂	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO ₃	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
125 HgNO ₃ 2	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I ₂	.0000	.0000	.0000	.0000
89 K ₂ O	.0000	.0000	.0000	.0000
131 KMnO ₄	.0000	.0000	.0000	.0000
118 KNO ₃	.0000	.0000	.0000	.4731E-03
105 La ₂ O ₃	.0000	.0000	.0000	.0000
108 Li ₂ O	.0000	.0000	.0000	.0000
65 Mg(COOH) ₂	.0000	.0000	.0000	.0000
55 Mg(OH) ₂	.0000	.0000	.0000	.0000
23 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH) ₂	.0000	.0000	.0000	.0000
122 Mn(NO ₃) ₂	.0000	.0000	.0000	.0000
129 Mn(OH) ₂	.0000	.0000	.0000	.4162E-03
56 MnO	.0000	.0000	.0000	.0000
14 MnO ₂	.0000	.0000	.0000	.0000
81 N ₂	.0000	.0000	.0000	47.85
142 Na ₂ CO ₃ (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	1.168
84 NO ₂	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na ₂ B ₄ O ₇	.0000	.0000	.0000	.0000
109 Na ₂ C ₂ O ₄	.0000	.0000	.0000	.1898E-03
5 Na ₂ CO ₃	.0000	.0000	.0000	.0000
82 Na ₂ O	.0000	.0000	.0000	.0000
71 Na ₂ PuO ₂ (OH) ₄	.0000	.0000	.0000	.0000
73 Na ₂ RhO ₄	.0000	.0000	.0000	.0000
72 Na ₂ RuO ₄	.0000	.0000	.0000	.0000
6 Na ₂ SO ₄	.0000	.0000	.0000	.0000
68 NaAlO ₂	.0000	.0000	.0000	.0000
114 NaBO ₂	.0000	.0000	.0000	.0000
140 NaBO ₂ Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWIT Vent to PWS
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.7622E-07
4 NaOH	.0000	.0000	.0000	.1200E-09
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	.0000	14.45
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.3076E-02	.1038E-02	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWTI Vent to PVVS
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	.00	.00	75.25
VAPOR FLOW, CFM	.00			20.85
LIQUID FLOW, GPM		.00	.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	66.8000	66.8000	.0616
TEMPERATURE, DEG C	35.00	25.00	25.00	50.00
PRESSURE, ATM	1.00	1.00	1.00	.93
PRESSURE, PSIG	.00	.00	.00	-1.03
PRESSURE, MM HG				703.99
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	.00	.08	.03	272.00

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	131 Inlet Gas to Sand Filter	132 Sand Filter Exhaust	133 Fan Exhaust to Stack	134 Stack Exhaust
COMPONENT FLOWS, LB/HR				
1 H2O	9645.	9645.	9645.	9645.
45 Ag	.5027E-10	.5027E-13	.5027E-13	.5027E-13
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.8252E-10	.8252E-13	.8252E-13	.8252E-13
51 AgOH	.1580E-10	.1580E-13	.1580E-13	.1580E-13
74 Al(OH)3	.1914E-08	.1914E-11	.1914E-11	.1914E-11
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.7204E-08	.7204E-11	.7204E-11	.7204E-11
9 Ba(NO3)2	.2511E-16	.2511E-19	.2511E-19	.2511E-19
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2270E-10	.2270E-13	.2270E-13	.2270E-13
66 CO	5.598	5.598	5.598	5.598
37 CO2	24.03	24.03	24.03	24.03
142 CO2 (C14)	.3484E-09	.3484E-09	.3484E-09	.3484E-09
63 Ca(COOH)2	.7865E-09	.7865E-12	.7865E-12	.7865E-12
120 Ca(OH)2	.5201E-12	.5201E-15	.5201E-15	.5201E-15
113 Ca3(PO4)2	.5656E-10	.5656E-13	.5656E-13	.5656E-13
20 CaC2O4	.6118E-10	.6118E-13	.6118E-13	.6118E-13
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1529E-10	.1529E-13	.1529E-13	.1529E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7186E-10	.7186E-13	.7186E-13	.7186E-13
29 Carbon	.1529E-10	.1529E-13	.1529E-13	.1529E-13
26 Co(COOH)2	.1223E-07	.1223E-07	.1223E-07	.1223E-07
121 Co(OH)2	.8997E-14	.8997E-17	.8997E-17	.8997E-17
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.5814E-10	.5814E-13	.5814E-13	.5814E-13
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2965E-15	.2965E-18	.2965E-18	.2965E-18
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1267E-10	.1267E-13	.1267E-13	.1267E-13
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1611E-11	.1611E-14	.1611E-14	.1611E-14
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2653E-10	.2653E-13	.2653E-13	.2653E-13
52 Cu(OH)2	.1957E-13	.1957E-16	.1957E-16	.1957E-16
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.4632E-08	.4632E-11	.4632E-11	.4632E-11
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	181	182	183	184
	Inlet Gas to Sand Filter	Sand Filter Exhaust	Fan Exhaust to Stack	Stack Exhaust
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.4297E-09	.4297E-12	.4297E-12	.4297E-12
103 GroupB	.1359E-09	.1359E-12	.1359E-12	.1359E-12
25 H2	.8658	.8658	.8658	.8658
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.6663E-01	.6663E-01	.6663E-01	.6663E-01
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.3797E-03	.3797E-03	.3797E-03	.3797E-03
135 HgNO32	.5166E-13	.5166E-16	.5166E-16	.5166E-16
21 HgO	.1926E-09	.1926E-12	.1926E-12	.1926E-12
97 I2	.9392E-09	.9392E-09	.9392E-09	.9392E-09
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2342E-10	.2342E-13	.2342E-13	.2342E-13
105 La2O3	.2445E-09	.2445E-12	.2445E-12	.2445E-12
108 Li2O	.2793E-08	.2793E-11	.2793E-11	.2793E-11
65 Mg(COOH)2	.1497E-09	.1497E-12	.1497E-12	.1497E-12
55 Mg(OH)2	.8870E-13	.8870E-16	.8870E-16	.8870E-16
33 MgO	.9794E-09	.9794E-12	.9794E-12	.9794E-12
60 Mn(COOH)2	.1335E-08	.1335E-11	.1335E-11	.1335E-11
182 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.2144E-10	.2144E-13	.2144E-13	.2144E-13
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4402E+06	.4402E+06	.4402E+06	.4402E+06
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	2.433	2.433	2.433	2.433
84 NO2	.2034	.2034	.2034	.2034
70 Na(HgO(OH))	.9587E-13	.9587E-16	.9587E-16	.9587E-16
94 Na2B4O7	.3951E-10	.3951E-13	.3951E-13	.3951E-13
100 Na2C2O4	.9395E-11	.9395E-14	.9395E-14	.9395E-14
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.8692E-08	.8692E-11	.8692E-11	.8692E-11
71 Na2PuO2(OH)4	.3888E-17	.3888E-20	.3888E-20	.3888E-20
73 Na2RhO4	.7993E-15	.7993E-18	.7993E-18	.7993E-18
72 Na2RuO4	.7800E-14	.7800E-17	.7800E-17	.7800E-17
6 Na2SO4	.1582E-10	.1582E-13	.1582E-13	.1582E-13
68 NaAlO2	.3888E-10	.3888E-13	.3888E-13	.3888E-13
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1252E-08	.1252E-11	.1252E-11	.1252E-11

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-

STREAM NAME

	131 Inlet Gas to Sand Filter	132 Sand Filter Exhaust	133 Fan Exhaust to Stack	134 Stack Exhaust
7 NaCl	.2879E-08	.2879E-11	.2879E-11	.2879E-11
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.2262E-08	.2262E-11	.2262E-11	.2262E-11
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2763E-09	.2763E-12	.2763E-12	.2763E-12
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.9932E-09	.9932E-12	.9932E-12	.9932E-12
4 NaOH	.8901E-12	.8901E-15	.8901E-15	.8901E-15
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.4707E-09	.4707E-12	.4707E-12	.4707E-12
17 Ni(OH)2	.8407E-12	.8407E-15	.8407E-15	.8407E-15
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1330E+06	.1330E+06	.1330E+06	.1330E+06
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2136E-10	.2136E-13	.2136E-13	.2136E-13
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.5559E-11	.5559E-14	.5559E-14	.5559E-14
22 RhO2	.2124E-11	.2124E-14	.2124E-14	.2124E-14
79 RuO2	.1996E-09	.1996E-12	.1996E-12	.1996E-12
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8755	.8755	.8755	.8755
111 SiO2	.2927E-07	.2927E-10	.2927E-10	.2927E-10
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1911E-10	.1911E-13	.1911E-13	.1911E-13
10 Sr(NO3)2	.2241E-16	.2241E-19	.2241E-19	.2241E-19
127 Sr(OH)2	.1520E-13	.1520E-16	.1520E-16	.1520E-16
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.8715E-10	.8715E-13	.8715E-13	.8715E-13
107 TiO2	.4890E-09	.4890E-12	.4890E-12	.4890E-12
119 Tritium	.1765E-09	.1765E-09	.1765E-09	.1765E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.6088E-09	.6088E-12	.6088E-12	.6088E-12
16 UO2(OH)2	.5970E-12	.5970E-15	.5970E-15	.5970E-15
27 Y(COOH)3	.1310E-10	.1310E-13	.1310E-13	.1310E-13
11 Y(NO3)3	.1591E-16	.1591E-19	.1591E-19	.1591E-19
128 Y(OH)3	.9502E-14	.9502E-17	.9502E-17	.9502E-17
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAMS(CONT'D)-

STREAM NAME

	131	132	133	134
	Inlet Gas to	Sand Filter	Fan Exhaust	Stack
	Sand Filter	Exhaust	to Stack	Exhaust
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.5571E-09	.5571E-12	.5571E-12	.5571E-12
44 Zn(COOH)2	.6919E-10	.6919E-13	.6919E-13	.6919E-13
54 Zn(OH)2	.5139E-13	.5139E-16	.5139E-16	.5139E-16
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2445E-09	.2445E-12	.2445E-12	.2445E-12
TOTAL FLOW, LB/HR	582804.67	582804.66	582804.66	582804.66
VAPOR FLOW, CFM	138778.96	142291.08	139719.90	139719.90
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0700	.0683	.0695	.0695
TEMPERATURE, DEG C	35.17	35.17	39.58	39.58
PRESSURE, ATM	.99	.97	1.00	1.00
PRESSURE, PSIG	-.11	-.47	.00	.00
PRESSURE, MM HG	754.88	735.76		
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-29973031.75	-29975321.50	-29860552.50	-29860552.50

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	185 50 Wt% NaOH to DWT	136 DWT Liquid to RCT	137 Steam to DWT Coil	138 Steam Condensate fr DWT
COMPONENT FLOWS, LB/HR				
1 H2O	1.546	910.5	.0000	.0000
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.1211E-01	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	185 50 Wt% NaOH to DWT	136 DWT Liquid to RCT	137 Steam to DWT Coil	138 Steam Conden sate fr DWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
183 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
181 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.1970	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
182 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.1734	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.8276E-02	.0000	.0000
148 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.2836E-03	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.7906E-01	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	135 50 Wt% NaOH to DWT	136 DWT Liquid to RCT	137 Steam to DWT Coil	138 Steam Condensate fr DWT
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	3.175	.0000	.0000
4 NaOH	1.546	.5000E-02	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.1890E-02	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
8S SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	135 50 Wt% NaOH to DWT	136 DWT Liquid to RCT	137 Steam to DWT Coil	138 Steam Condens sate fr DWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	3.09	814.19	.00	.00
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.62		
DESIGN FLOW,				
DENSITY, LBS/FT3	84.9613	62.8380	.0000	.0000
TEMPERATURE, DEG C	25.00	50.00	160.00	60.00
PRESSURE, ATM	1.00	.93	6.10	1.00
PRESSURE, PSIG	.00	-1.08	74.99	.00
PRESSURE, MM HG		708.99		
PHASE	LIQUID	LIQUID	N/A	N/A
ENTHALPY, PCU/HR	51.74	15940.75	.00	.00

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	139 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO ₃ Wash to MAWT	142 Frit Slurry to SFHT
COMPONENT FLOWS, LB/HR				
1 H ₂ O	.8735	.7463	.2201	131.1
45 Ag	.0000	.0000	.0000	.0000
116 Ag ₂ O	.0000	.0000	.0000	.0000
134 AgNO ₃	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH) ₃	.0000	.0000	.0000	.0000
77 Al ₂ O ₃	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B ₂ O ₃	.0000	.0000	.0000	6.616
9 Ba(NO ₃) ₂	.0000	.0000	.0000	.0000
95 BaCl ₂	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO ₄	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO ₂	.0000	.0000	.0000	.0000
142 CO ₂ (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH) ₂	.0000	.0000	.0000	.0000
120 Ca(OH) ₂	.0000	.0000	.0000	.0000
113 Ca ₃ (PO ₄) ₂	.0000	.0000	.0000	.0000
20 CaC ₂ O ₄	.0000	.0000	.0000	.0000
18 CaCO ₃	.0000	.0000	.0000	.0000
78 CaF ₂	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO ₄	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH) ₂	.0000	.0000	.0000	.0000
121 Co(OH) ₂	.0000	.0000	.0000	.0000
53 Co(OH) ₃	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH) ₃	.0000	.0000	.0000	.0000
98 Cr ₂ O ₃	.0000	.0000	.0000	.0000
42 Cs ₂ O	.0000	.0000	.0000	.0000
137 Cs ₂ O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO ₃	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH) ₂	.0000	.0000	.0000	.0000
52 Cu(OH) ₂	.0000	.0000	.0000	.0000
58 Cu ₂ O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH) ₃	.0000	.0000	.0000	.0000
80 Fe ₂ O ₃	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
SLUDGE-ONLY FEED

STREAMS (CONT'D)~ STREAM NAME	139 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO3 Wash to MAWT	142 Frit Slurry to SFHT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.4206
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.8001E-01	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
113 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.2250
108 Li2O	.0000	.0000	.0000	2.566
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.9002
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	17.07	34.12	.0000	.2825E-02
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	7.967
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	139 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO3 Wash to MAWT	142 Frit Slurry to SFHT
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	5.158	10.31	.0000	.1679E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	26.06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.4501
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	139 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO3 Wash to MAWT	142 Frit Slurry to SFHT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.2250
TOTAL FLOW, LB/HR	22.61	45.17	.25	226.56
VAPOR FLOW, CFM	5.84	10.67		
LIQUID FLOW, GPM			.00	.40
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	65.0373	70.1600
TEMPERATURE, DEG C	85.00	85.00	25.00	80.00
PRESSURE, ATM	1.00	1.00	1.00	.97
PRESSURE, PSIG	.00	.00	.00	-.51
PRESSURE, MM HG				783.86
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-1164.14	-2326.09	5.79	6021.94

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	143 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWT	146 Liquid Spray to PLEEN#1
COMPONENT FLOWS, LB/HR				
1 H2O	18.52	.1610E-02	.0000	1999.
45 Ag	.1517E-07	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.6386E-09	.0000	.0000	.4911E-03
74 Al(OH)3	.5799E-06	.0000	.0000	.5241
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2201E-05	.0000	.0000	.9015
9 Ba(NO3)2	.7609E-14	.0000	.0000	.4117E-03
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6877E-08	.0000	.0000	.3715E-02
66 CO	.4689E-04	.0000	.0000	.2281E-03
37 CO2	5.383	.0000	.0000	.1228E-01
142 CO2 (C14)	.1072E-09	.0000	.0000	.2054E-26
63 Ca(COOH)2	.2383E-06	.0000	.0000	.1289
120 Ca(OH)2	.1600E-09	.0000	.0000	.0000
113 Ca3(PO4)2	.1714E-07	.0000	.0000	.9256E-02
20 CaC2O4	.1854E-07	.0000	.0000	.1001E-01
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4634E-08	.0000	.0000	.2503E-02
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2177E-07	.0000	.0000	.1176E-01
29 Carbon	.4634E-08	.0000	.0000	.2503E-02
26 Co(COOH)2	.8762E-08	.0000	.0000	.2035E-02
121 Co(OH)2	.2768E-11	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1762E-07	.0000	.0000	.9515E-02
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.9015E-13	.0000	.0000	.3791E-07
137 Cs2O Semi Vol	.0000	.0000	.0000	.7274E-05
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2919E-11	.0000	.0000	.1418E-07
136 CsCl Semi Vol	.0000	.0000	.0000	.1287E-02
8 CsNO3	.4881E-09	.0000	.0000	.2640E-03
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8037E-08	.0000	.0000	.4346E-02
52 Cu(OH)2	.6022E-11	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1404E-05	.0000	.0000	1.269
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	143 FAVC Vent to PVVS	144 Air Sparge to MWT	145 HNO ₃ Sumps to DWT	146 Liquid Spray to PWDBF#1
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.4281E-01
102 GroupA	.1300E-07	.0000	.0000	.6916E-02
103 GroupB	.4119E-07	.0000	.0000	.2225E-01
25 H ₂	.3156E-05	.0000	.0000	.1552E-04
133 H ₂ C ₂ O ₄	.0000	.0000	.0000	.0000
91 H ₂ C ₂	.0000	.0000	.0000	.0000
84 HCOOH	.6833E-01	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO ₃	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.1470E-03	.0000	.0000	.0000
135 HgNO ₃ 2	.0000	.0000	.0000	.0000
21 HgO	.1263E-09	.0000	.0000	.1710E-01
97 I ₂	.0000	.0000	.0000	.0000
39 K ₂ O	.0000	.0000	.0000	.0000
131 KMnO ₄	.0000	.0000	.0000	.0000
113 KNO ₃	.2474E-08	.0000	.0000	.1526E-04
105 La ₂ O ₃	.7472E-07	.0000	.0000	.1824E-01
108 Li ₂ O	.8534E-06	.0000	.0000	.8487
65 Mg(COOH) ₂	.4536E-07	.0000	.0000	.2453E-01
55 Mg(OH) ₂	.2729E-10	.0000	.0000	.0000
83 MgO	.2993E-06	.0000	.0000	.1075
60 Mn(COOH) ₂	.4044E-06	.0000	.0000	.2188
132 Mn(NO ₃) ₂	.0000	.0000	.0000	.0000
129 Mn(OH) ₂	.2436E-08	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO ₂	.0000	.0000	.0000	.0000
81 N ₂	1227.	.7358E-01	.0000	.2144E-01
143 Na ₂ CO ₃ (C14)	.0000	.0000	.0000	.0000
35 NO	.9042E-01	.0000	.0000	.1077E-03
84 NO ₂	.6763E-02	.0000	.0000	.7889E-01
70 Na(HgO(OH))	.2905E-10	.0000	.0000	.1571E-04
94 Na ₂ B ₄ O ₇	.1088E-08	.0000	.0000	.4842
109 Na ₂ C ₂ O ₄	.9925E-09	.0000	.0000	.6121E-05
5 Na ₂ CO ₃	.0000	.0000	.0000	.0000
82 Na ₂ O	.2652E-05	.0000	.0000	1.286
71 Na ₂ PuO ₂ (OH) ₄	.1178E-14	.0000	.0000	.6373E-09
73 Na ₂ RhO ₄	.2422E-12	.0000	.0000	.1310E-06
72 Na ₂ RuO ₄	.2363E-11	.0000	.0000	.1278E-05
6 Na ₂ SO ₄	.4792E-08	.0000	.0000	.2593E-02
68 NaAlO ₂	.1178E-07	.0000	.0000	.6373E-02
114 NaBO ₂	.0000	.0000	.0000	.0000
140 NaBO ₂ Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3803E-06	.0000	.0000	.2550

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	148 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWT	146 Liquid Spray to PWD3F1
7 NaCl	.5872E-08	.0000	.0000	.2583E-02
138 NaCl Semi Vol	.0000	.0000	.0000	.4598
69 NaF	.1030E-08	.0000	.0000	.6345E-01
139 NaF Semi Vol	.0000	.0000	.0000	.8310
12 NaI	.5338E-09	.0000	.0000	.2501E-03
125 NaI Semi Vol	.0000	.0000	.0000	.3099E-01
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1922E-06	.0000	.0000	.8325E-01
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1426E-06	.0000	.0000	.7711E-01
17 Ni(OH)2	.1048E-09	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	370.7	.2223E-01	.0000	.1228E-01
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6473E-08	.0000	.0000	.3496E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1684E-08	.0000	.0000	.9098E-03
22 RhO2	.6436E-09	.0000	.0000	.3476E-03
79 RuO2	.3188E-08	.0000	.0000	.1676E-02
23 RuO2 Semi Vol	.0000	.0000	.0000	.1656E-01
88 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8969E-05	.0000	.0000	.4411E-04
111 SiO2	.8940E-05	.0000	.0000	3.796
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.5790E-08	.0000	.0000	.3131E-02
10 Sr(NO3)2	.6790E-14	.0000	.0000	.8673E-03
127 Sr(OH)2	.4676E-11	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2641E-07	.0000	.0000	.1426E-01
107 TiO2	.1494E-06	.0000	.0000	.8550E-01
119 Tritium	.5190E-10	.0000	.0000	.7893E-03
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1844E-06	.0000	.0000	.9974E-01
16 UO2(OH)2	.1837E-09	.0000	.0000	.0000
27 Y(COOH)3	.8968E-08	.0000	.0000	.2146E-02
11 Y(NO3)3	.4822E-14	.0000	.0000	.2608E-03
128 Y(OH)3	.2924E-11	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	143 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWT	146 Liquid Spray to PWDBF#1
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.1688E-06	.0000	.0000	.9117E-01
44 Zn(COOH)2	.2096E-07	.0000	.0000	.1184E-01
54 Zn(OH)2	.1581E-10	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7472E-07	.0000	.0000	.1824E-01
TOTAL FLOW, LB/HR	1621.73	.10	.00	2010.07
VAPOR FLOW, CFM	385.11	.02		
LIQUID FLOW, GPM			.00	4.00
DESIGN FLOW,				
DENSITY, LBS/FT3	.0702	.0706	.0000	62.6253
TEMPERATURE, DEG C	15.00	85.00	85.00	55.00
PRESSURE, ATM	.93	1.00	1.00	8.18
PRESSURE, PSIG	-1.08	.00	.00	82.04
PRESSURE, MM HG	703.99			
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-96059.06	-5.02	.00	112708.92

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomizg Air	150 PWDBF #1 Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	1999.	1990.	2.698	114.5
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.4911E-03	.4968E-03	.0000	.5886E-05
74 Al(OH)3	.5241	.5277	.0000	.3698E-02
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.9015	.9077	.0000	.6360E-02
9 Ba(NO3)2	.4117E-08	.4164E-08	.0000	.4857E-10
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.8715E-02	.3757E-02	.0000	.4390E-04
66 CO	.2281E-03	.1708E-03	.0000	5.59%
37 CO2	.1228E-01	.9614E-02	.0000	13.09
142 CO2 (C14)	.2054E-26	.1608E-26	.0000	.2188E-23
63 Ca(COOH)2	.1289	.1303	.0000	.1523E-02
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.9256E-02	.9362E-02	.0000	.1094E-03
20 CaC2O4	.1001E-01	.1013E-01	.0000	.1183E-03
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2503E-02	.2531E-02	.0000	.2958E-04
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1176E-01	.1189E-01	.0000	.1390E-03
29 Carbon	.2503E-02	.2531E-02	.0000	.2958E-04
26 Co(COOH)2	.2035E-02	.2058E-02	.0000	.2405E-04
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.9515E-02	.9624E-02	.0000	.1124E-03
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8791E-07	.3834E-07	.0000	.4432E-09
137 Cs2O Semi Vol	.7274E-05	.7274E-05	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1418E-07	.1446E-07	.0000	.2852E-09
136 CsCl Semi Vol	.1287E-02	.1332E-02	.0000	.5066E-04
8 CsNO3	.2640E-03	.2671E-03	.0000	.8115E-05
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.4846E-02	.4396E-02	.0000	.5136E-04
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	1.269	1.277	.0000	.8950E-02
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	147	148	149	150
	Liquid Spray to PWDBF#2	PWDBF #2 Exit Liquid	PWDBF #2 Atomzg Air	PWDBF #1 Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.4281E-01	.4420E-01	.0000	.1547E-02
102 GroupA	.6916E-02	.6996E-02	.0000	.8238E-04
103 GroupB	.2225E-01	.2250E-01	.0000	.2629E-03
25 H2	.1552E-04	.1156E-04	.0000	.8657
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1710E-01	.1779E-01	.0000	.7688E-03
97 I2	.0000	.0000	.0000	.9392E-04
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.1526E-04	.1549E-04	.0000	.2416E-06
105 La2O3	.1824E-01	.1845E-01	.0000	.2156E-03
108 Li2O	.8487	.8511	.0000	.2466E-02
65 Mg(COOH)2	.2453E-01	.2481E-01	.0000	.2899E-03
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.1075	.1088	.0000	.8643E-03
60 Mn(COOH)2	.2188	.2214	.0000	.2584E-02
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2144E-01	.2208E-01	123.1	801.6
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.1077E-03	.8167E-04	.0000	1.175
84 NO2	.7839E-01	.6584E-01	.0000	.1810
70 Na(HgO(OH))	.1571E-04	.1589E-04	.0000	.1854E-06
94 Na2B4O7	.4842	.4886	.0000	.4549E-02
109 Na2C2O4	.6121E-05	.6215E-05	.0000	.9696E-07
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	1.286	1.295	.0000	.9072E-02
71 Na2PuO2(OH)4	.6373E-09	.6445E-09	.0000	.7519E-11
73 Na2RhO4	.1310E-06	.1325E-06	.0000	.1546E-08
72 Na2RuO4	.1278E-05	.1293E-05	.0000	.1509E-07
6 Na2SO4	.2593E-02	.2622E-02	.0000	.8059E-04
68 NaAlO2	.6373E-02	.6445E-02	.0000	.7519E-04
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.2550	.2569	.0000	.1989E-02

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS (CONT'D)-
 STREAM NAME

	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomizg Air	150 PWDBF #1 Exit Gas
7 NaCl	.2583E-02	.2613E-02	.0000	.3050E-04
138 NaCl Semi Vol	.4598	.4701	.0000	.1144E-01
69 NaF	.6845E-01	.6922E-01	.0000	.7917E-03
139 NaF Semi Vol	.8610	.8691	.0000	.9010E-02
12 NaI	.2501E-03	.2529E-03	.0000	.2953E-05
125 NaI Semi Vol	.8099E-01	.8197E-01	.0000	.1098E-02
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8325E-01	.8420E-01	.0000	.9826E-03
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.7711E-01	.7799E-01	.0000	.9113E-03
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1228E-01	.1269E-01	37.19	242.1
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.8496E-02	.8536E-02	.0000	.4132E-04
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.9098E-03	.9202E-03	.0000	.1075E-04
22 RhO2	.8476E-03	.8516E-03	.0000	.4108E-05
79 RuO2	.1676E-02	.1695E-02	.0000	.2012E-04
23 RuO2 Semi Vol	.1656E-01	.1724E-01	.0000	.7563E-03
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.4411E-04	.8362E-04	.0000	.3755
111 SiO2	8.796	8.822	.0000	.2678E-01
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8131E-02	.8167E-02	.0000	.3701E-04
10 Sr(NO3)2	.8673E-08	.8715E-08	.0000	.4334E-10
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1426E-01	.1448E-01	.0000	.1686E-03
107 TiO2	.8550E-01	.8592E-01	.0000	.4312E-03
119 Tritium	.7893E-09	.7847E-09	.0000	.4515E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.9974E-01	.1009	.0000	.1179E-02
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.2146E-02	.2170E-02	.0000	.2536E-04
11 Y(NO3)3	.2608E-08	.2638E-08	.0000	.8078E-10
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

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MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomzg Air	150 PWDBF #1 Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.9117E-01	.9222E-01	.0000	.1078E-02
44 Zn(COOH)2	.1134E-01	.1147E-01	.0000	.1340E-03
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1824E-01	.1845E-01	.0000	.2156E-03
TOTAL FLOW, LB/HR	2010.07	2001.10	162.98	1179.04
VAPOR FLOW, CFM			10.52	320.46
LIQUID FLOW, GPM	4.00	8.98		
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6253	62.6278	.2583	.0613
TEMPERATURE, DEG C	55.00	52.45	40.00	53.46
PRESSURE, ATM	8.18	.95	8.72	.96
PRESSURE, PSIG	32.04	-.69	39.97	-.54
PRESSURE, MM HG		724.51		732.11
PHASE	LIQUID	LIQUID	VAPOR	VAPOR
ENTHALPY, PCU/HR	112708.92	106912.98	-8198.74	11131.37

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDEF Nozzles	154 Sand Filter Accumulation
COMPONENT FLOWS, LB/HR				
1 H2O	50.04	.0000	5824.	.0000
45 Ag	.0000	.0000	.0000	.5022E-10
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.8244E-10
51 AgOH	.4654E-13	.4650E-10	.7342E-05	.1579E-10
74 Al(OH)3	.2924E-10	.2921E-07	.4725E-02	.1912E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.5029E-10	.5024E-07	.8127E-02	.7196E-03
9 Ba(NO3)2	.8841E-18	.3837E-15	.6210E-10	.2509E-16
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.3471E-12	.3468E-09	.5601E-04	.2268E-10
66 CO	5.598	.0000	.3771E-03	.0000
87 CO2	13.09	.0000	.2358E-01	.0000
142 CO2 (C14)	.2189E-23	.0000	.3942E-26	.0000
63 Ca(COOH)2	.1204E-10	.1203E-07	.1943E-02	.7857E-09
120 Ca(OH)2	.0000	.0000	.0000	.5196E-12
118 Ca3(PO4)2	.8651E-12	.8642E-09	.1396E-03	.5651E-10
20 CaC2O4	.9356E-12	.9347E-09	.1510E-03	.6112E-10
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2339E-12	.2337E-09	.3774E-04	.1528E-10
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1099E-11	.1098E-08	.1773E-03	.7179E-10
29 Carbon	.2339E-12	.2337E-09	.3774E-04	.1528E-10
26 Co(COOH)2	.0000	.0000	.3071E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.8988E-14
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.8892E-12	.8883E-09	.1435E-03	.5808E-10
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.3505E-17	.3501E-14	.5197E-09	.2962E-15
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.1266E-10	.1265E-07	.1754E-09	.1266E-10
136 CsCl Semi Vol	.0000	.0000	.2025E-03	.0000
8 CsNO3	.2464E-13	.2461E-10	.3983E-05	.1609E-11
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.4062E-12	.4058E-09	.6553E-04	.2650E-10
52 Cu(OH)2	.0000	.0000	.0000	.1955E-13
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.7078E-10	.7071E-07	.1144E-01	.4628E-08
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDEF Nozzles	154 Sand Filter Accumulation
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.6113E-02	.0000
102 GroupA	.8875E-09	.8871E-08	.1040E-03	.4293E-02
103 GroupB	.2079E-11	.2077E-08	.8855E-03	.1058E-09
25 H2	.8657	.0000	.2518E-01	.0000
133 H2C2O4	.0000	.0000	.0000	.6600
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.5161E-13
21 HgO	.1922E-09	.1920E-06	.8071E-02	.1924E-09
97 I2	.9392E-09	.9383E-06	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1911E-14	.1909E-11	.1989E-06	.2339E-10
105 La2O3	.1705E-11	.1703E-08	.2751E-03	.2443E-09
108 Li2O	.1950E-10	.1948E-07	.8145E-02	.2790E-08
65 Mg(COOH)2	.2292E-11	.2290E-08	.8699E-03	.1496E-09
55 Mg(OH)2	.0000	.0000	.0000	.8861E-13
83 MgO	.6835E-11	.6828E-08	.1102E-02	.9784E-09
60 Mn(COOH)2	.2044E-10	.2042E-07	.8302E-02	.1333E-08
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.2142E-10
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1362.	.0000	.6836E-01	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	1.175	.0000	.1856E-03	.0000
84 NO2	.1850	.0000	.1968	.0000
70 Na(HgO(OH))	.1466E-14	.1465E-11	.2370E-06	.9578E-13
94 Na2B4O7	.8598E-10	.8594E-07	.5814E-02	.3947E-10
109 Na2C2O4	.7667E-15	.7659E-12	.7980E-07	.9386E-11
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.7174E-10	.7167E-07	.1159E-01	.8688E-08
71 Na2PuO2(OH)4	.5946E-19	.5940E-16	.9613E-11	.8884E-17
73 Na2RhO4	.1222E-16	.1221E-13	.1976E-08	.7985E-15
72 Na2RuO4	.1193E-15	.1192E-12	.1929E-07	.7792E-14
6 Na2SO4	.2419E-12	.2417E-09	.8911E-04	.1580E-10
68 NaAlO2	.5946E-12	.5940E-09	.9613E-04	.3884E-10
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1573E-10	.1572E-07	.2540E-02	.1250E-08

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDBF Nozzles	154 Sand Filter Accumulation
7 NaCl	.2860E-08	.2857E-05	.8898E-04	.2876E-08
138 NaCl Semi Vol	.0000	.0000	.4569E-01	.0000
69 NaF	.2259E-08	.2257E-05	.1009E-02	.2260E-08
139 NaF Semi Vol	.0000	.0000	.8592E-01	.0000
12 NaI	.2746E-09	.2743E-06	.8772E-05	.2761E-09
125 NaI Semi Vol	.0000	.0000	.4389E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.7770E-11	.7763E-08	.1255E-02	.9922E-09
4 NaOH	.0000	.0000	.0000	.8897E-12
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.7207E-11	.7199E-08	.1163E-02	.4702E-09
17 Ni(OH)2	.0000	.0000	.0000	.8404E-12
40 NiO	.0000	.0000	.0000	.0000
82 O2	411.4	.0000	.8963E-01	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.3267E-12	.8264E-09	.5272E-04	.2184E-10
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.8502E-13	.8494E-10	.1872E-04	.5554E-11
22 RhO2	.3249E-13	.8245E-10	.5242E-05	.2122E-11
79 RuO2	.1892E-09	.1890E-06	.2517E-04	.1994E-09
23 RuO2 Semi Vol	.0000	.0000	.2960E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.3755	.0000	.7738E-04	.0000
111 SiO2	.2117E-09	.2115E-06	.8422E-01	.2924E-07
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2926E-12	.2923E-09	.4721E-04	.1909E-10
10 Sr(NO3)2	.3427E-18	.3424E-15	.5541E-10	.2239E-16
127 Sr(OH)2	.0000	.0000	.0000	.1518E-13
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1333E-11	.1332E-08	.2151E-03	.8707E-10
107 TiO2	.3409E-11	.3406E-08	.5501E-03	.4885E-09
119 Tritium	.7856E-11	.0000	.9131E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.9321E-11	.9312E-08	.1504E-02	.6082E-09
16 UO2(OH)2	.0000	.0000	.0000	.5964E-12
27 Y(COOH)3	.2005E-12	.2003E-09	.8235E-04	.1308E-10
11 Y(NO3)3	.2434E-18	.2431E-15	.8935E-10	.1590E-16
128 Y(OH)3	.0000	.0000	.0000	.9492E-14
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

 STREAMS (CONT'D)-
 STREAM NAME

	151	152	153	154
	Exit Gas	HEPA	Liq to SWDEF	Sand Filter
	from HEPA	Accumulation	Nozzles	Accumulation
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8521E-11	.8512E-08	.1875E-02	.5566E-03
44 Zn(COOH)2	.1059E-11	.1058E-08	.1709E-03	.6912E-10
54 Zn(OH)2	.0000	.0000	.0000	.5134E-13
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1705E-11	.1703E-08	.2751E-03	.2443E-09
TOTAL FLOW, LB/HR	1844.87	.00	5824.41	.00
VAPOR FLOW, CFM	657.75	.00		
LIQUID FLOW, GPM			11.63	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0467	.1034	62.4318	.0000
TEMPERATURE, DEG C	50.00	50.00	46.47	35.17
PRESSURE, ATM	.70	.70	3.18	.99
PRESSURE, PSIG	-4.42	-4.42	32.04	-.11
PRESSURE, MM HG	531.32	531.32		754.38
PHASE	VAPOR	VAPOR	LIQUID	SOLID
ENTHALPY, PCU/HR	-73041.30	.00	276188.86	.00

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	1.047	1.047	3.733
45 Ag	.1545E-07	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.2537E-07	.0000	.0000	.0000
51 AgOH	.4843E-08	.0000	.0000	.0000
74 Al(OH)3	.5793E-06	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2199E-05	.0000	.0000	.0000
9 Ba(NO3)2	.7602E-14	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6871E-08	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.2381E-06	.0000	.0000	.0000
120 Ca(OH)2	.1599E-09	.0000	.0000	.0000
113 Ca3(PO4)2	.1712E-07	.0000	.0000	.0000
20 CaC2O4	.1852E-07	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4629E-08	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2175E-07	.0000	.0000	.0000
29 Carbon	.4629E-08	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.2766E-11	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1760E-07	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.9006E-13	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.2916E-11	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.4876E-09	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8029E-08	.0000	.0000	.0000
52 Cu(OH)2	.6016E-11	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1402E-05	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	155	156	157	158
	PVVF Accumulation	SRAT Air Inleakage	SME Air Inleakage	SMECT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1299E-07	.0000	.0000	.0000
103 GroupB	.4115E-07	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCCOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.1588E-10	.0000	.0000	.0000
21 HgO	.1310E-09	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.7197E-08	.0000	.0000	.0000
105 La2O3	.7464E-07	.0000	.0000	.0000
108 Li2O	.8526E-06	.0000	.0000	.0000
65 Mg(COOH)2	.4532E-07	.0000	.0000	.0000
55 Mg(OH)2	.2726E-10	.0000	.0000	.0000
83 MgO	.2990E-06	.0000	.0000	.0000
60 Mn(COOH)2	.4040E-06	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.6592E-08	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	47.85	47.85	170.9
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.2902E-10	.0000	.0000	.0000
94 Na2B4O7	.1087E-08	.0000	.0000	.0000
109 Na2C2O4	.2888E-08	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2650E-05	.0000	.0000	.0000
71 Na2PuO2(OH)4	.1177E-14	.0000	.0000	.0000
73 Na2RhO4	.2419E-12	.0000	.0000	.0000
72 Na2RuO4	.2361E-11	.0000	.0000	.0000
6 Na2SO4	.4788E-08	.0000	.0000	.0000
68 NaAlO2	.1177E-07	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3799E-06	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
7 NaCl	.5866E-08	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1029E-08	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.5333E-09	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8029E-06	.0000	.0000	.0000
4 NaOH	.1199E-09	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1425E-06	.0000	.0000	.0000
17 Ni(OH)2	.1047E-09	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	14.46	14.46	51.63
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6466E-08	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.1683E-08	.0000	.0000	.0000
22 RhO2	.6430E-09	.0000	.0000	.0000
79 RuO2	.3185E-08	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.8931E-05	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.5785E-08	.0000	.0000	.0000
10 Sr(NO3)2	.6783E-14	.0000	.0000	.0000
127 Sr(OH)2	.4671E-11	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2638E-07	.0000	.0000	.0000
107 TiO2	.1493E-06	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1843E-06	.0000	.0000	.0000
16 UO2(OH)2	.1835E-09	.0000	.0000	.0000
27 Y(COOH)3	.8964E-08	.0000	.0000	.0000
11 Y(NO3)3	.4817E-14	.0000	.0000	.0000
128 Y(OH)3	.2921E-11	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1686E-06	.0000	.0000	.0000
44 Zn(COOH)2	.2094E-07	.0000	.0000	.0000
54 Zn(OH)2	.1580E-10	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7464E-07	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	63.85	63.85	226.27
VAPOR FLOW, CFM		14.97	14.97	53.45
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0706	.0706	.0706
TEMPERATURE, DEG C	26.63	85.00	85.00	85.00
PRESSURE, ATM	.92	1.00	1.00	1.00
PRESSURE, PSIG	-1.23	.00	.00	.00
PRESSURE, MM HG	696.54			
PHASE	SOLID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	.00	-3262.64	-3262.64	-11652.27

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	159 MFT Air Purge	160 OGCT Air Inleakage	161 FPT Air Inleakage	162 MWWT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	3.738	1.742	1.742	.7477E-01
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	159 MFT Air Purge	160 OGCT Air Inleakage	161 FPT Air Inleakage	162 MWWT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
88 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	170.9	79.64	79.64	3.418
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	159 MFT Air Purge	160 OGCT Air Inleakage	161 FPT Air Inleakage	162 MWWT Air Purge
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	51.63	24.06	24.06	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	159 MFT Air Purge	160 OGCT Air Inleakage	161 FPT Air Inleakage	162 MWWT Air Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	226.27	105.44	105.44	4.53
VAPOR FLOW, CFM	53.45	24.91	24.91	1.07
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	35.00	35.00	35.00	35.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-11652.27	-5429.96	-5429.96	-238.05

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	163 MAWT Air Purge	165 MFT1 Air Purge	167 MFT2 Air Purge	168 MIT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.7477E-01	.7477E-01	.7477E-01	.7477E-01
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	163 MAWT Air Purge	165 MFT1 Air Purge	167 MFT2 Air Purge	168 MIT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	3.418	3.418	3.418	3.418
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(Oil))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	163 MAWT Air Purge	165 MFT1 Air Purge	167 MFT2 Air Purge	168 MHT Air Purge
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	1.033	1.033	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	163	165	167	168
	MAWT Air	MFT1 Air	MFT2 Air	MHT Air
	Purge	Purge	Purge	Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	4.53	4.53	4.53	4.53
VAPOR FLOW, CFM	1.07	1.07	1.07	1.07
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	85.00	85.00	85.00	85.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-233.05	-233.05	-233.05	-233.05

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	169 SWT Air Purge	170 DWT Air Inleakage	171 RCT Air Purge	172 FCT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.7477E-01	1.047	3.738	7.477
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
118 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	169	170	171	172
	SWT Air Purge	DWTT Air Inleakage	RCT Air Purge	FCT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	3.418	47.85	170.9	841.8
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	169 SWT Air Purge	170 DWT Air Inleakage	171 RCT Air Purge	172 FCT Air Purge
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	14.46	51.63	103.3
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)- STREAM NAME	169 SWT Air Purge	170 DWT Air Inleakage	171 RCT Air Purge	172 FCT Air Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	4.53	63.85	226.27	452.53
VAPOR FLOW, CFM	1.07	14.97	53.45	106.90
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	85.00	85.00	85.00	85.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-283.05	-3262.64	-11652.27	-23304.54

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAM NUMBERS - STREAM NAME	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnser Condensate	176 DWPF Sludge Slurry Feed
COMPONENT FLOWS, LB/HR				
1 H2O	8.733	128.0	84.06	390.6
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.1861E-06	.1862E-21	.2244E-01
74 Al(OH)3	.0000	.1169E-03	.1170E-18	14.03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.2011E-03	.2012E-18	.1748
9 Ba(NO3)2	.0000	.1536E-11	.1536E-26	.1843E-06
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1388E-05	.1389E-20	.1666
66 CO	.0000	5.598	.5738E-05	.2053E-10
37 CO2	.0000	13.09	.5125E-03	.1612E-06
142 CO2 (C11)	.0000	.2189E-23	.8570E-28	.0000
63 Ca(COOH)2	.0000	.4816E-04	.4817E-19	.0000
120 Ca(OH)2	.0000	.0000	.0000	.1295E-01
113 Ca3(PO4)2	.0000	.8460E-05	.8460E-20	.4151
20 CaC2O4	.0000	.3742E-05	.3742E-20	.4490
18 CaCO3	.0000	.0000	.0000	4.428
78 CaF2	.0000	.9855E-06	.9356E-21	.1122
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.4395E-05	.4396E-20	.5274
29 Carbon	.0000	.9355E-06	.9356E-21	.1122
26 Co(COOH)2	.0000	.7604E-06	.7606E-09	.0000
121 Co(OH)2	.0000	.0000	.0000	.2239E-03
53 Co(OH)3	.0000	.0000	.0000	.6708E-01
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.8556E-05	.8557E-20	.4267
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.1402E-10	.1402E-25	.1682E-05
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.9019E-11	.9021E-26	.1082E-05
136 CsCl Semi Vol	.0000	.5066E-05	.5066E-19	.0000
8 CsNO3	.0000	.9853E-07	.9855E-22	.1182E-01
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1624E-05	.1625E-20	.0000
52 Cu(OH)2	.0000	.0000	.0000	.1288
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.2831E-03	.2831E-18	83.96
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnser Condensate	176 DWPf Sludge Slurry Feed
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.1547E-03	.1547E-17	.0000
102 GroupA	.0000	.2605E-05	.2606E-20	.8126
103 GroupB	.0000	.8315E-05	.8317E-20	.9977
25 H2	.0000	.8657	.8662E-06	.3091E-09
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.7688E-01	.7688E-18	1.769
97 I2	.0000	.9392E-04	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.7642E-03	.7644E-23	.9170E-03
105 La2O3	.0000	.6819E-06	.6820E-20	.3219E-02
108 Li2O	.0000	.7799E-04	.7800E-19	.6757E-01
65 Mg(COOH)2	.0000	.9168E-05	.9169E-20	.0000
55 Mg(OH)2	.0000	.0000	.0000	.5612
33 MgO	.0000	.2733E-04	.2734E-19	.1998E-01
60 Mn(COOH)2	.0000	.8178E-04	.8175E-19	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.1971
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	5.688
81 N2	170.9	1004.	.1205E-02	.5976E-04
143 Na2CO3 (C14)	.0000	.0000	.0000	.2517E-09
85 NO	.0000	1.175	.3121E-05	.2608E-09
84 NO2	.0000	.1886	.7579E-02	.8871E-04
70 Na(HgO(OH))	.0000	.5864E-08	.5865E-23	.7036E-03
94 Na2B4O7	.0000	.1439E-03	.1439E-18	.4034E-03
109 Na2C2O4	.0000	.3066E-08	.3067E-23	.8679E-03
5 Na2CO3	.0000	.0000	.0000	.8666E-01
32 Na2O	.0000	.2869E-03	.2870E-18	.2490
71 Na2PuO2(OH)4	.0000	.2378E-12	.2378E-27	.2853E-07
73 Na2RhO4	.0000	.4889E-10	.4890E-25	.5866E-05
72 Na2RuO4	.0000	.4771E-09	.4772E-24	.5724E-04
6 Na2SO4	.0000	.9675E-06	.9676E-21	.1161
68 NaAlO2	.0000	.2378E-05	.2378E-20	.2853
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.6292E-04	.6293E-19	.1367E-01

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnsr Condensate	176 DWPF Sludge Slurry Feed
7 NaCl	.0000	.9645E-06	.9646E-21	.1157
188 NaCl Semi Vol	.0000	.1144E-02	.1144E-16	.0000
69 NaF	.0000	.2504E-04	.2504E-19	.6052E-03
139 NaF Semi Vol	.0000	.9010E-03	.9010E-17	.0000
12 NaI	.0000	.9340E-07	.9342E-22	.1121E-01
125 NaI Semi Vol	.0000	.1098E-03	.1098E-17	.0000
8 NaNO2	.0000	.0000	.0000	.2073
2 NaNO3	.0000	.3108E-04	.3108E-19	3.650
4 NaOH	.0000	.0000	.0000	4.197
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.2882E-04	.2883E-19	.0000
17 Ni(OH)2	.0000	.0000	.0000	2.156
40 NiO	.0000	.0000	.0000	.0000
82 O2	51.63	803.8	.7186E-03	.3447E-04
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1307E-05	.1307E-20	.1568
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.3400E-06	.3401E-21	.4080E-01
22 RhO2	.0000	.1299E-06	.1299E-21	.1559E-01
79 RuO2	.0000	.6364E-06	.6365E-21	.7636E-01
23 RuO2 Semi Vol	.0000	.7563E-04	.7563E-18	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.3755	.1358E-05	.1185E-10
111 SiO2	.0000	.8468E-03	.8470E-18	7.240
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1170E-05	.1171E-20	.0000
10 Sr(NO3)2	.0000	.1371E-11	.1371E-26	.1645E-06
127 Sr(OH)2	.0000	.0000	.0000	.3783E-03
30 SrCO3	.0000	.0000	.0000	.1162
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.5331E-05	.5332E-20	.6396
107 TiO2	.0000	.1364E-04	.1364E-19	.6210E-02
119 Tritium	.0000	.4978E-10	.1320E-10	.7334E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.8728E-04	.8729E-19	.0000
16 UO2(OH)2	.0000	.0000	.0000	8.777
27 Y(COOH)3	.0000	.8019E-06	.8021E-21	.0000
11 Y(NO3)3	.0000	.9734E-12	.9735E-27	.1168E-06
128 Y(OH)3	.0000	.0000	.0000	.2365E-03
81 Y2(CO3)3	.0000	.0000	.0000	.7657E-01

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS(CONT'D)- STREAM NAME	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnser Condensate	176 DWPF Sludge Slurry Feed
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.8408E-04	.8408E-19	4.089
44 Zn(COOH)2	.0000	.4237E-05	.4238E-20	.0000
54 Zn(OH)2	.0000	.0000	.0000	.8251
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.6819E-05	.6820E-20	.8219E-02
TOTAL FLOW, LB/HR	226.27	1456.43	84.07	485.87
VAPOR FLOW, CFM	53.45	896.81		
LIQUID FLOW, GPM			.17	.85
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0612	62.4316	71.0612
TEMPERATURE, DEG C	85.00	51.29	28.00	60.00
PRESSURE, ATM	1.00	.95	.88	1.00
PRESSURE, PSIG	.00	-.74	-1.75	.00
PRESSURE, MM HG		721.85	669.56	
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-11652.27	8296.12	2888.96	25051.29

MATERIAL BALANCE TABLES

SLUDGE-ONLY FEED

STREAM NUMBERS - 177
 STREAM NAME MVS Vac Pump
 Exhaust

COMPONENT FLOWS, LB/HR

1 H2O	.0000
45 Ag	.0000
116 Ag2O	.0000
134 AgNO3	.0000
51 AgOH	.0000
74 Al(OH)3	.0000
77 Al2O3	.0000
75 AlOOH	.0000
106 B2O3	.0000
9 Ba(NO3)2	.0000
95 BaCl2	.0000
15 BaO	.0000
24 BaSO4	.0000
66 CO	.0000
37 CO2	.0000
142 CO2 (C14)	.0000
62 Ca(COOH)2	.0000
120 Ca(OH)2	.0000
118 Ca3(PO4)2	.0000
20 CaC2O4	.0000
18 CaCO3	.0000
78 CaF2	.0000
41 CaO	.0000
19 CaSO4	.0000
29 Carbon	.0000
26 Co(COOH)2	.0000
121 Co(OH)2	.0000
53 Co(OH)3	.0000
59 CoO	.0000
99 Cr(OH)3	.0000
98 Cr2O3	.0000
42 Cs2O	.0000
137 Cs2O Semi Vol	.0000
90 CsCOOH	.0000
96 CsCl	.0000
136 CsCl Semi Vol	.0000
8 CsNO3	.0000
88 CsResin	.0000
122 Cu(COOH)2	.0000
52 Cu(OH)2	.0000
58 Cu2O	.0000
64 CuCOOH	.0000
130 CuO	.0000
13 Fe(OH)3	.0000
80 Fe2O3	.0000

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-		177
STREAM NAME		MVS Vac Pump Exhaust
101 FeO		.0000
126 Group A Semi Vo		.0000
102 GroupA		.0000
103 GroupB		.0000
25 H2		.0000
133 H2C2O4		.0000
91 H2O2		.0000
34 HCOOH		.0000
43 HCl		.0000
85 HF		.0000
49 HNO3		.0000
86 HResin		.0000
86 Hg		.0000
135 HgNO32		.0000
21 HgO		.0000
97 I2		.0000
39 K2O		.0000
131 KMnO4		.0000
118 KNO3		.0000
105 La2O3		.0000
108 Li2O		.0000
65 Mg(COOH)2		.0000
55 Mg(OH)2		.0000
33 MgO		.0000
60 Mn(COOH)2		.0000
132 Mn(NO3)2		.0000
120 Mn(OH)2		.0000
56 MnO		.0000
14 MnO2		.0000
81 N2		.0000
143 Na2CO3 (C14)		.0000
85 NO		.0000
84 NO2		.0000
70 Na(HgO(OH))		.0000
94 Na2B4O7		.0000
109 Na2C2O4		.0000
5 Na2CO3		.0000
32 Na2O		.0000
71 Na2PuO2(OH)4		.0000
73 Na2RhO4		.0000
72 Na2RuO4		.0000
6 Na2SO4		.0000
68 NaAlO2		.0000
114 NaBO2		.0000
140 NaBO2 Semi Vol		.0000
50 NaCOOH		.0000

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-ONLY FEED

STREAMS (CONT'D)-	177
STREAM NAME	MVS Vac Pump
	Exhaust
7 NaCl	.0000
138 NaCl Semi Vol	.0000
69 NaF	.0000
139 NaF Semi Vol	.0000
12 NaI	.0000
125 NaI Semi Vol	.0000
8 NaNO ₂	.0000
2 NaNO ₃	.0000
4 NaOH	.0000
87 NaResin	.0000
61 Ni(COOH) ₂	.0000
17 Ni(OH) ₂	.0000
40 NiO	.0000
82 O ₂	.0000
67 PbO	.0000
28 PbSO ₄	.0000
124 Pd	.0000
123 Pd(OH) ₂	.0000
112 PdNO ₃ 2	.0000
110 PdO	.0000
117 Pu(COOH) ₄	.0000
76 PuO ₂	.0000
22 RhO ₂	.0000
79 RuO ₂	.0000
23 RuO ₂ Semi Vol	.0000
83 RuO ₄	.0000
88 SO ₂	.0000
111 SiO ₂	.0000
115 Silica Gel	.0000
48 Sr(COOH) ₂	.0000
10 Sr(NO ₃) ₂	.0000
127 Sr(OH) ₂	.0000
80 SrCO ₃	.0000
46 SrO	.0000
89 SrRESIN	.0000
141 Surfactant	.0000
92 ThO ₂	.0000
107 TiO ₂	.0000
119 Tritium	.0000
98 UO ₂	.0000
62 UO ₂ (COOH) ₂	.0000
16 UO ₂ (OH) ₂	.0000
27 Y(COOH) ₃	.0000
11 Y(NO ₃) ₃	.0000
128 Y(OH) ₃	.0000
81 Y ₂ (CO ₃) ₃	.0000

MATERIAL BALANCE TABLES
SLUDGE-ONLY FEED

STREAMS(CONT'D)-		177
STREAM NAME	MVS Vac Pump	
	Exhaust	
47 Y2O3		.0000
100 Zeolite		.0000
44 Zn(COOH)2		.0000
54 Zn(OH)2		.0000
57 ZnO		.0000
104 ZrO2		.0000
TOTAL FLOW, LB/HR		.00
VAPOR FLOW, CFM		.00
LIQUID FLOW, GPM		
DESIGN FLOW,		
DENSITY, LBS/FT3		.0000
TEMPERATURE, DEG C		88.00
PRESSURE, ATM		.99
PRESSURE, PSIG		-.07
PRESSURE, MM HG		756.20
PHASE		VAPOR
ENTHALPY, PCU/HR		.00

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED
 STREAMS

	DESCRIPTION	PAGE
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STREAM NUMBERS	5, 6, 7, 8	6
STREAM NUMBERS	9, 10, 11, 12	10
STREAM NUMBERS	13, 14, 15, 16	14
STREAM NUMBERS	17, 18, 19, 20	18
STREAM NUMBERS	21, 22, 23, 24	22
STREAM NUMBERS	25, 26, 27, 28	26
STREAM NUMBERS	29, 30, 31, 32	80
STREAM NUMBERS	33, 34, 35, 36	84
STREAM NUMBERS	37, 38, 39, 40	88
STREAM NUMBERS	41, 42, 43, 44	42
STREAM NUMBERS	45, 46, 47, 48	46
STREAM NUMBERS	49, 50, 51, 52	50
STREAM NUMBERS	53, 54, 55, 56	54
STREAM NUMBERS	57, 58, 59, 60	58
STREAM NUMBERS	61, 62, 63, 64	62
STREAM NUMBERS	65, 66, 67, 68	66
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STREAM NUMBERS	74, 75, 76, 78	74
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STREAM NUMBERS	155, 156, 157, 158	150
STREAM NUMBERS	159, 160, 161, 162	154
STREAM NUMBERS	163, 165, 167, 168	158
STREAM NUMBERS	169, 170, 171, 172	162
STREAM NUMBERS	173, 174, 175, 176	166
STREAM NUMBERS	177	170

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	1 Wshed Sludge fr Tank Farm	2 90 wt% Formic Acid	3 Supenate Concentrate	4 Hg From SME
COMPONENT FLOWS, LB/HR				
1 H2O	817.9	1.332	73.05	.8013E-05
45 Ag	.0000	.0000	.0000	.8004E-04
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1845E-01	.0000	.0000	.0000
74 Al(OH)3	11.49	.0000	.0000	.9341E-07
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.1979E-06
9 Ba(NO3)2	.1521E-06	.0000	.0000	.1228E-14
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1369	.0000	.0000	.1110E-08
66 CO	.0000	.0000	.0000	.1898E-82
37 CO2	.0000	.0000	.0000	.6759E-17
142 CO2 (C14)	.0000	.0000	.0000	.1930E-28
63 Ca(COOH)2	.0000	.0000	.0000	.3851E-07
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.3412	.0000	.0000	.2766E-08
20 CaC2O4	.8690	.0000	.0000	.2992E-03
18 CaCO3	8.653	.0000	.0000	.0000
78 CaF2	.9224E-01	.0000	.0000	.7480E-09
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.4334	.0000	.0000	.8514E-08
29 Carbon	.9224E-01	.0000	.0000	.2598E-08
26 Co(COOH)2	.0000	.0000	.0000	.6080E-09
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.5535E-01	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.8507	.0000	.0000	.2848E-08
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.1679E-13
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.2139	.1727E-08
96 CsCl	.0000	.0000	.0000	.1798E-12
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.9754E-02	.0000	.0000	.7874E-10
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.1299E-08
52 Cu(OH)2	.1018	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	27.82	.0000	.0000	.2261E-06
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	1	2	8	4
	Wshed Sludge	90 wt%	Supernate	Hg From
	fr Tank Farm	Formic Acid	Concentrate	SME
101 FeO	.0000	.0000	.0000	.0000
120 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2504	.0000	.0000	.2096E-08
108 GroupB	.8200	.0000	.0000	.6649E-08
25 H2	.0000	.0000	.0000	.4580E-31
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	12.26	9.566	.1228E-07
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.5407E-02
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	1.457	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.7531E-11
105 La2O3	.0000	.0000	.0000	.6715E-08
108 Li2O	.0000	.0000	.0000	.7672E-07
65 Mg(COOH)2	.0000	.0000	.0000	.7830E-08
55 Mg(OH)2	.4612	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.2691E-07
60 Mn(COOH)2	.0000	.0000	.0000	.6575E-07
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	4.698	.0000	.0000	.0000
81 N2	.0000	.0000	.0000	.2145E-10
143 Na2CO3 (C14)	.2076E-09	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.4931E-22
84 NO2	.0000	.0000	.0000	.5046E-16
70 Na(HgO(OH))	.5805E-08	.0000	.0000	.4686E-11
94 Na2B4O7	.0000	.0000	.0000	.8911E-11
109 Na2C2O4	.0000	.0000	.0000	.3022E-11
5 Na2CO3	.7150E-01	.0000	.0000	.0000
82 Na2O	.0000	.0000	.0000	.2385E-06
71 Na2PuO2(OH)4	.2854E-07	.0000	.0000	.1900E-15
73 Na2RhO4	.4840E-05	.0000	.0000	.3907E-13
72 Na2RuO4	.4728E-04	.0000	.0000	.8812E-12
6 Na2SO4	.9577E-01	.0000	.0000	.7731E-09
68 NaAlO2	.2354	.0000	.0000	.1900E-08
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	13.82	.1746E-06

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	1	2	3	4
	Wshed Sludge	90 wt%	Supernate	Hg From
	fr Tank Farm	Formic Acid	Concentrate	SME
7 NaCl	.9514E-01	.0000	.0000	.7706E-09
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1872E-03	.0000	.0000	.4076E-11
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.9225E-02	.0000	.0000	.7469E-10
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.1711	.0000	.0000	.0000
2 NaNO3	3.000	.0000	.0000	.2433E-07
4 NaOH	8.456	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.2304E-07
17 Ni(OH)2	1.772	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	.0000	.1200E-10
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1288	.0000	.0000	.1045E-08
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.1327E-03	.1071E-11
76 PuO2	.3353E-01	.0000	.0000	.2719E-09
22 RhO2	.1281E-01	.0000	.0000	.1039E-09
79 RuO2	.6040E-01	.0000	.0000	.5121E-09
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.8307E-32
111 SiO2	5.366	.0000	.0000	.8382E-06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.2675E-03	.9379E-09
10 Sr(NO3)2	.1357E-06	.0000	.0000	.1095E-14
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.9590E-01	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.5256	.0000	.0000	.4262E-08
107 TiO2	.0000	.0000	.0000	.1843E-07
119 Tritium	.6023E-09	.0000	.1464E-09	.8248E-17
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.2981E-07
16 UO2(OH)2	8.104	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.6412E-09
11 Y(NO3)3	.9636E-07	.0000	.0000	.7778E-15
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.6318E-01	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	1	2	3	4
	Wshed Sludge	90 wt%	Supenate	Hg From
	fr Tank Farm	Formic Acid	Concentrate	SME
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	3.360	.0000	.0000	.2725E-07
44 Zn(COOH)2	.0000	.0000	.0000	.8388E-08
54 Zn(OH)2	.2672	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.6715E-08
TOTAL FLOW, LB/HR	892.49	13.59	96.65	.01
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.69	.02	.18	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	71.0773	74.5439	68.4865	834.7486
TEMPERATURE, DEG C	60.00	25.00	88.50	50.00
PRESSURE, ATM	1.00	1.00	1.00	.97
PRESSURE, PSIG	.00	.00	.00	-.51
PRESSURE, MM HG				738.86
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	20223.71	190.98	3191.03	.01

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	5	6	7	8
	Hg from SRAT to MWWT	SRAT Cond Vent to FAVC	SRAT Trans fer to SME	Rinse Water to Can Decon
COMPONENT FLOWS, LB/HR				
1 H2O	.8863E-02	7.722	399.7	70.04
45 Ag	.1585E-01	.1585E-09	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.4109E-08	.1853E-11	.1853E-03	.0000
74 Al(OH)3	.2566E-03	.1157E-06	11.57	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.8664E-05	.1652E-08	.1652	.0000
9 Ba(NO3)2	.8372E-11	.1521E-14	.1521E-06	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.3049E-05	.1375E-08	.1375	.0000
66 CO	.4880E-20	.2072E-10	.1976E-15	.0000
37 CO2	.1108E-07	4.426	.4998E-03	.0000
142 CO2 (C14)	.2215E-18	.8845E-10	.9988E-14	.0000
63 Ca(COOH)2	.1058E-03	.4771E-07	4.771	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.7599E-05	.8427E-08	.3427	.0000
20 CaC2O4	.8218E-05	.8707E-08	.3706	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2055E-05	.9266E-09	.9266E-01	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.9653E-05	.4354E-08	.4354	.0000
29 Carbon	.2073E-05	.9350E-09	.9350E-01	.0000
26 Co(COOH)2	.1670E-05	.7533E-09	.7533E-01	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
58 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.7811E-05	.8523E-08	.3523	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.4613E-10	.2081E-13	.2081E-05	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.4743E-05	.2139E-08	.2139	.0000
96 CsCl	.4939E-09	.2227E-12	.2227E-04	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2163E-06	.9754E-10	.9754E-02	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8568E-05	.1609E-08	.1609	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.6210E-03	.2801E-06	28.01	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D) - STREAM NAME	5	6	7	8
	Hg from SRAT to MWWT	SRAT Cond Vent to FAVC	SRAT Trans fer to SME	Rinse Water to Can Decon
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 Group A	.5758E-05	.2597E-08	.2597	.0000
103 Group B	.1826E-04	.8237E-08	.8237	.0000
25 H ₂	.8615E-19	.8594E-09	.8886E-14	.0000
133 H ₂ C ₂ O ₄	.0000	.0000	.0000	.0000
91 H ₂ O ₂	.0000	.0000	.0000	.0000
84 HCOOH	.4978E-04	.8897E-01	2.245	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO ₃	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	1.838	.1512E-07	.0000	.0000
135 HgNO ₃ 2	.0000	.0000	.0000	.0000
21 HgO	.3237E-06	.1460E-09	.1460E-01	.0000
97 I ₂	.0000	.0000	.0000	.0000
39 K ₂ O	.0000	.0000	.0000	.0000
131 KMnO ₄	.0000	.0000	.0000	.0000
118 KNO ₃	.2069E-07	.9330E-11	.9329E-03	.0000
105 La ₂ O ₃	.8304E-07	.8745E-10	.8745E-02	.0000
108 Li ₂ O	.1418E-05	.6393E-09	.6393E-01	.0000
65 Mg(COOH) ₂	.2014E-04	.9081E-08	.9081	.0000
55 Mg(OH) ₂	.0000	.0000	.0000	.0000
83 MgO	.4740E-06	.2138E-09	.2138E-01	.0000
60 Mn(COOH) ₂	.1806E-03	.8146E-07	8.146	.0000
132 Mn(NO ₃) ₂	.0000	.0000	.0000	.0000
129 Mn(OH) ₂	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO ₂	.0000	.0000	.0000	.0000
81 N ₂	.2480E-08	64.93	.1096E-03	.0000
148 Na ₂ CO ₃ (C14)	.0000	.0000	.0000	.0000
85 NO	.2941E-10	.7439E-01	.1326E-05	.0000
84 NO ₂	.2140E-10	.2564E-04	.9653E-06	.0000
70 Na(HgO(OH))	.1287E-07	.5805E-11	.5805E-03	.0000
94 Na ₂ B ₄ O ₇	.1074E-07	.4845E-11	.4845E-03	.0000
109 Na ₂ C ₂ O ₄	.8300E-08	.3743E-11	.3743E-03	.0000
5 Na ₂ CO ₃	.0000	.0000	.0000	.0000
32 Na ₂ O	.5246E-05	.2366E-03	.2366	.0000
71 Na ₂ PuO ₂ (OH) ₄	.5220E-12	.2354E-15	.2354E-07	.0000
73 Na ₂ RhO ₄	.1073E-09	.4840E-13	.4840E-05	.0000
72 Na ₂ RuO ₄	.1047E-08	.4723E-12	.4723E-04	.0000
6 Na ₂ SO ₄	.2124E-05	.9578E-09	.9578E-01	.0000
68 NaAlO ₂	.5220E-05	.2354E-03	.2354	.0000
114 NaBO ₂	.0000	.0000	.0000	.0000
140 NaBO ₂ Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.4430E-03	.1998E-06	19.98	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	5	6	7	8
	Hg from	SRAT Cond	SRAT Trans	Rinse Water
	SRAT to MWWT	Vent to FAVC	fer to SME	to Can Decon
7 NaCl	.2117E-05	.9547E-09	.9547E-01	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1120E-07	.5049E-11	.5049E-03	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2052E-06	.9253E-10	.9253E-02	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6684E-04	.8015E-07	8.015	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.6330E-04	.2855E-07	2.855	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1321E-08	19.61	.5958E-04	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2870E-05	.1294E-08	.1294	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2942E-08	.1327E-11	.1327E-03	.0000
76 PuO2	.7468E-06	.3368E-09	.3368E-01	.0000
22 RhO2	.2854E-06	.1287E-09	.1287E-01	.0000
79 RuO2	.1407E-05	.6344E-09	.6344E-01	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8397E-20	.7275E-11	.1532E-15	.0000
111 SiO2	.1345E-03	.6066E-07	6.066	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2576E-05	.1162E-08	.1162	.0000
10 Sr(NO3)2	.8009E-11	.1357E-14	.1357E-06	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1171E-04	.5280E-08	.5280	.0000
107 TiO2	.1661E-06	.7490E-10	.7490E-02	.0000
119 Tritium	.1635E-13	.1422E-10	.7575E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.8188E-04	.8698E-07	3.693	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.1761E-05	.7944E-09	.7944E-01	.0000
11 Y(NO3)3	.2137E-11	.9636E-15	.9636E-07	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	5	6	7	8
	Hg from	SRAT Cond	SRAT Trans	Rinse Water
	SRAT to MWWT	Vent to FAVC	fer to SNE	to Can Decon
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.7484E-04	.8376E-07	8.376	.0000
44 Zn(COOH)2	.9806E-05	.4197E-08	.4197	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8304E-07	.8745E-10	.8745E-02	.0000
TOTAL FLOW, LB/HR	1.87	96.80	500.08	70.04
VAPOR FLOW, CFM		25.32		
LIQUID FLOW, GPM	.00		.89	.14
DESIGN FLOW,				
DENSITY, LBS/FT3	773.7672	.0637	70.8035	62.4300
TEMPERATURE, DEG C	50.00	50.00	50.00	80.00
PRESSURE, ATM	1.00	.97	1.00	137.09
PRESSURE, PSIG	.00	-.51	.00	1999.98
PRESSURE, MM HG		733.86		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	2.74	113.58	21293.16	2183.73

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
COMPONENT FLOWS, LB/HR				
1 H2O	116.8	18.93	6.967	178.3
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	6.616	.1757E-05	.8911E-06	6.616
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
118 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D) - STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 Group A	.0000	.0000	.0000	.0000
103 Group B	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.4504	.2977E-01	.1460E-01	.4060
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.2250	.5976E-07	.8031E-07	.2250
108 Li2O	2.566	.6812E-06	.8455E-06	2.566
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.9002	.2390E-03	.1212E-06	.9002
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	375.9	188.0	.2780E-02
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	7.967	.2115E-05	.1078E-05	7.967
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	113.6	56.78	.1652E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	26.06	.6920E-05	.3510E-05	26.06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.4501	.1195E-06	.6062E-07	.4501
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	9 Frit Slurry to Can Decon	10 FCT Vent to FAVC	11 SFHT Vent to FAVC	12 Decon Frit Slurry to SME
47 Y2O3	.0000	.0000	.0000	.0000
109 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2250	.5976E-07	.8031E-07	.2250
TOTAL FLOW, LB/HR	162.25	503.44	251.74	223.69
VAPOR FLOW, CFM		121.94	60.98	
LIQUID FLOW, GPM	.27			.40
DESIGN FLOW,				
DENSITY, LBS/FT3	73.7839	.0688	.0688	70.2707
TEMPERATURE, DEG C	80.00	29.99	29.99	80.00
PRESSURE, ATM	5.08	.97	.97	.97
PRESSURE, PSIG	59.96	-.51	-.51	-.51
PRESSURE, MM HG		733.86	733.86	733.86
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	504.57	-22733.39	-11368.04	5934.74

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	13 Waste Sand	14 Fresh Frit Slurry to SME	15 SME Condens ate to SMECT	16 SME Cndnsate to RCT
COMPONENT FLOWS, LB/HR				
1 H2O	22.93	80.45	287.3	865.3
45 Ag	.0000	.0000	.1020E-07	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.5190E-09
74 Al(OH)3	.0000	.0000	.7372E-03	.7377E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	17.78	.1561E-02	.1564E-02
9 Ba(NO3)2	.0000	.0000	.9688E-11	.9694E-11
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.8761E-05	.8766E-05
66 CO	.0000	.0000	.1976E-15	.1808E-14
37 CO2	.0000	.0000	.3498E-02	.2710E-05
142 CO2 (C14)	.0000	.0000	.9986E-14	.9964E-17
63 Ca(COOH)2	.0000	.0000	.8039E-03	.3041E-03
120 Ca(OH)2	.0000	.0000	.0000	.1689E-09
113 Ca3(PO4)2	.0000	.0000	.2183E-04	.2185E-04
20 CaC2O4	.0000	.0000	.2361E-04	.2363E-04
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.5903E-05	.5907E-05
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.2773E-04	.2775E-04
29 Carbon	.2284	.0000	.2051E-04	.2052E-04
26 Co(COOH)2	.0000	.0000	.4799E-05	.4802E-05
121 Co(OH)2	.0000	.0000	.0000	.2922E-11
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.2244E-04	.2245E-04
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.1325E-09	.1327E-09
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.1363E-04	.1364E-04
96 CsCl	.0000	.0000	.1419E-08	.1485E-08
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.6214E-06	.6218E-06
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1025E-04	.1026E-04
52 Cu(OH)2	.0000	.0000	.0000	.6355E-11
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.1784E-02	.1785E-02
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	18 Waste Sand	14 Fresh Frit Slrry to SME	15 Condens ate to SMECT	16 SME Cndnsate to RCT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.1654E-04	.1655E-04
103 GroupB	.0000	.0000	.5247E-04	.5250E-04
25 H2	.0000	.0000	.8885E-14	.1014E-15
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	1.207	1.128	1.828
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.2704E-02	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.1184E-09
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.5943E-07	.6165E-07
105 La2O3	.0000	.6031	.5299E-04	.5307E-04
108 Li2O	.0000	6.875	.6055E-03	.6063E-03
65 Mg(COOH)2	.0000	.0000	.5785E-04	.5789E-04
55 Mg(OH)2	.0000	.0000	.0000	.2880E-10
83 MgO	.0000	2.412	.2124E-03	.2127E-03
60 Mn(COOH)2	.0000	.0000	.5189E-03	.5192E-03
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.2223E-08
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.0000	17.08	.4359E-02
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.1326E-05	.1010E-09
84 NO2	.0000	.0000	.9406E-06	.8172E-04
70 Na(HgO(OH))	.0000	.0000	.8698E-07	.8700E-07
94 Na2B4O7	.0000	.0000	.8086E-07	.8231E-07
109 Na2C2O4	.0000	.0000	.2385E-07	.2474E-07
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	21.35	.1883E-02	.1885E-02
71 Na2PuO2(OH)4	.0000	.0000	.1500E-11	.1501E-11
73 Na2RhO4	.0000	.0000	.8083E-09	.8085E-09
72 Na2RuO4	.0000	.0000	.8009E-08	.8011E-08
6 Na2SO4	.0000	.0000	.6101E-05	.6105E-05
68 NaAlO2	.0000	.0000	.1500E-04	.1501E-04
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.1378E-02	.1379E-02

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	13 Waste Sand	14 Fresh Frit Slurry to SME	15 SME Condens ato to SMECT	16 SME Cndnsate to RCT
7 NaCl	.0000	.0000	.6082E-05	.6082E-05
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.8217E-07	.8312E-07
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.5894E-06	.5899E-06
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.1920E-03	.1922E-03
4 NaOH	.9712	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.1819E-03	.1820E-03
17 Ni(OH)2	.0000	.0000	.0000	.1106E-09
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	5.159	.2514E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.8245E-05	.8251E-05
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.8453E-03	.8459E-03
76 PuO2	.0000	.0000	.2146E-05	.2147E-05
22 RhO2	.0000	.0000	.8198E-06	.8204E-06
79 RuO2	.0000	.0000	.4041E-05	.4044E-05
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.1532E-15	.1809E-14
111 SiO2	1.882	69.84	.6615E-02	.6624E-02
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.7402E-05	.7407E-05
10 Sr(NO3)2	.0000	.0000	.8644E-11	.8650E-11
127 Sr(OH)2	.0000	.0000	.0000	.4946E-11
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.9364E-04	.9366E-04
107 TiO2	.0000	1.206	.1060E-03	.1061E-03
119 Tritium	.0000	.0000	.8106E-09	.8286E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.2352E-03	.2354E-03
16 UO2(OH)2	.0000	.0000	.0000	.1938E-09
27 Y(COOH)3	.0000	.0000	.5060E-05	.5064E-05
11 Y(NO3)3	.0000	.0000	.6139E-11	.6142E-11
128 Y(OH)3	.0000	.0000	.0000	.3085E-11
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	13 Waste Sand	14 Fresh Frit Slurry to SME	15 SME Condens ate to SMECT	16 SME Cndnsate to RCT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.2150E-03	.2152E-03
44 Zn(COOH)2	.0000	.0000	.2674E-04	.2675E-04
54 Zn(OH)2	.0000	.0000	.0000	.1669E-10
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.6031	.5299E-04	.5307E-04
TOTAL FLOW, LB/HR	26.01	202.27	810.74	366.69
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.05	.27	.63	.73
DESIGN FLOW,				
DENSITY, LBS/FT3	66.8118	93.2861	61.7883	62.4723
TEMPERATURE, DEG C	88.00	80.00	50.00	50.00
PRESSURE, ATM	1.00	1.84	.97	.97
PRESSURE, PSIG	.00	5.00	-.51	-.51
PRESSURE, MM HG			733.86	733.86
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	924.37	3803.02	16124.35	18699.16

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	17 SMECT Hg to MWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.2097E-04	874.4	856.9	.3304
45 Ag	.2627E-07	.8004E-04	.8004E-04	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.2973E-16	.1849E-01	.1849E-01	.0000
74 Al(OH)3	.4231E-10	11.57	11.57	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.8974E-10	24.51	24.51	.0000
9 Ba(NO3)2	.5561E-18	.1521E-06	.1521E-06	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5031E-12	.1375	.1375	.0000
66 CO	.7503E-22	.2351E-24	.6740E-29	.0000
37 CO2	.1553E-12	.8373E-09	.6032E-12	.0000
142 CO2 (C14)	.5713E-24	.2390E-20	.1722E-23	.0000
63 Ca(COOH)2	.1743E-10	4.770	4.770	.0000
120 Ca(OH)2	.9693E-17	.0000	.0000	.0000
113 Ca3(PO4)2	.1251E-11	.8427	.8427	.0000
20 CaC2O4	.1353E-11	.8706	.8706	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.8390E-12	.9266E-01	.9266E-01	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1593E-11	.4853	.4853	.0000
29 Carbon	.1178E-11	.8219	.8219	.0000
26 Co(COOH)2	.2756E-12	.7532E-01	.7532E-01	.0000
121 Co(OH)2	.1677E-18	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1289E-11	.8522	.8522	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7613E-17	.2080E-05	.2080E-05	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.7823E-12	.2139	.2139	.0000
96 CsCl	.8523E-16	.2227E-04	.2227E-04	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.8569E-13	.9754E-02	.9754E-02	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.5886E-12	.1609	.1609	.0000
52 Cu(OH)2	.8647E-18	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1025E-09	28.01	28.01	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	17 SMECT Hg to MWWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.9501E-12	.2597	.2597	.0000
103 GroupB	.8018E-11	.8286	.8286	.0000
25 H2	.5819E-23	.5674E-23	.1676E-27	.0000
138 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.7620E-07	1.464	1.386	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.2859E-02	.5407E-02	.5407E-02	.0000
135 HgNO22	.0000	.0000	.0000	.0000
21 HgO	.6510E-17	.2141E-04	.2141E-04	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.8538E-14	.9329E-03	.9329E-03	.0000
105 La2O3	.3046E-11	.8318	.8318	.0000
103 Li2O	.8480E-10	9.504	9.504	.0000
65 Mg(COOH)2	.3322E-11	.9081	.9081	.0000
55 Mg(OH)2	.1653E-17	.0000	.0000	.0000
33 MgO	.1221E-10	8.334	8.334	.0000
60 Mn(COOH)2	.2980E-10	8.145	8.145	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1276E-15	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2501E-09	.2674E-02	.4258E-02	15.11
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.5796E-17	.6108E-14	.4040E-18	.0000
84 NO2	.4690E-11	.8537E-04	.9533E-05	.0000
70 Na(HgO(OH))	.2124E-14	.5805E-03	.5805E-03	.0000
94 Na2B4O7	.1854E-14	.4844E-03	.4844E-03	.0000
109 Na2C2O4	.1420E-14	.3743E-03	.3743E-03	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1082E-09	29.55	29.55	.0000
71 Na2PuO2(OH)4	.8613E-19	.2354E-07	.2354E-07	.0000
73 Na2RhO4	.1771E-16	.4840E-05	.4840E-05	.0000
72 Na2RuO4	.1728E-15	.4723E-04	.4723E-04	.0000
6 Na2SO4	.8504E-12	.9577E-01	.9577E-01	.0000
68 NaAlO2	.8613E-12	.2354	.2354	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.7914E-10	21.72	21.72	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	17 SMECT Hg to MWWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purg.
7 NaCl	.8493E-12	.9546E-01	.9546E-01	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1901E-14	.5049E-03	.5049E-03	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.8386E-13	.9252E-02	.9252E-02	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1103E-10	3.079	3.079	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1044E-10	2.855	2.855	.0000
17 Ni(OH)2	.6350E-17	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1443E-09	.1496E-02	.2456E-02	4.563
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.4735E-12	.1294	.1294	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.4855E-15	.1327E-03	.1327E-03	.0000
76 PuO2	.1232E-12	.3368E-01	.3368E-01	.0000
22 RhO2	.4708E-13	.1287E-01	.1287E-01	.0000
79 RuO2	.2321E-12	.6348E-01	.6348E-01	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1038E-21	.1029E-23	.8810E-28	.0000
111 SiO2	.3802E-09	103.8	103.8	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4251E-12	.1162	.1162	.0000
10 Sr(NO3)2	.4964E-18	.1357E-06	.1357E-06	.0000
127 Sr(OH)2	.2839E-18	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1932E-11	.5280	.5280	.0000
107 TiO2	.6091E-11	1.664	1.664	.0000
119 Tritium	.1886E-16	.4024E-09	.3794E-09	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1351E-10	3.692	3.692	.0000
16 UO2(OH)2	.1113E-16	.0000	.0000	.0000
27 Y(COOH)3	.2906E-12	.7948E-01	.7948E-01	.0000
11 Y(NO3)3	.3525E-18	.9636E-07	.9636E-07	.0000
128 Y(OH)3	.1771E-18	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	17 SMECT Hg to MWT	18 SME Concent rate to MFT	19 Melter Feed	20 Melter Seal Pot Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1235E-10	8.375	8.875	.0000
44 Zn(COOH)2	.1535E-11	.4197	.4197	.0000
54 Zn(OH)2	.9577E-18	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8046E-11	.8318	.8318	.0000
TOTAL FLOW, LB/HR	.00	648.47	625.89	20.00
VAPOR FLOW, CFM				4.72
LIQUID FLOW, GPM	.00	.99	.95	
DESIGN FLOW,				
DENSITY, LBS/FT3	774.6994	81.8287	82.0182	.0706
TEMPERATURE, DEG C	50.00	49.97	50.00	85.00
PRESSURE, ATM	.97	1.00	.97	1.00
PRESSURE, PSIG	-.51	.00	-.51	.00
PRESSURE, MM HG	783.86		783.86	
PHASE	LIQUID	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	.01	23071.93	22190.85	-1029.96

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
COMPONENT FLOWS, LB/HR				
1 H2O	.6600	.8304	869.9	.0000
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.1707E-01
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.1849E-03	.0000
74 Al(OH)3	.0000	.0000	.1157	.0000
77 Al2O3	.0000	.0000	.0000	7.632
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.2451	21.14
9 Ba(NO3)2	.0000	.0000	.1521E-08	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.8944E-01
24 BaSO4	.0000	.0000	.1375E-02	.0000
66 CO	.0000	.0000	7.614	.0000
87 CO2	.0000	.0000	16.57	.0000
142 CO2 (C14)	.0000	.0000	.1722E-23	.0000
63 Ca(COOH)2	.0000	.0000	.4770E-01	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
118 Ca3(PO4)2	.0000	.0000	.3427E-02	.3393
20 CaC2O4	.0000	.0000	.3706E-02	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.9266E-03	.0000
41 CaO	.0000	.0000	.0000	2.489
19 CaSO4	.0000	.0000	.4353E-02	.0000
29 Carbon	.0000	.0000	.8219E-02	.0000
26 Co(COOH)2	.0000	.0000	.7532E-03	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.3751E-01
99 Cr(OH)3	.0000	.0000	.8522E-02	.0000
98 Cr2O3	.0000	.0000	.0000	.2566
42 Cs2O	.0000	.0000	.2080E-07	.1659
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.2139E-02	.0000
96 CsCl	.0000	.0000	.2227E-06	.0000
186 CsCl Semi Vol	.0000	.0000	.1046E-01	.0000
8 CsNO3	.0000	.0000	.9754E-04	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1609E-02	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.8251E-01
18 Fe(OH)3	.0000	.0000	.2801	.0000
80 Fe2O3	.0000	.0000	.0000	13.88

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	28 Melter Off-Gas	24 Waste Glass
101 FeO	.0000	.0000	.0000	6.152
126 Group A Semi Vo	.0000	.0000	.1285E-01	.0000
102 GroupA	.0000	.0000	.2597E-02	.2442
103 GroupB	.0000	.0000	.8286E-02	.8154
25 H2	.0000	.0000	.5827	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.1181E-01	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.6345E-02	.0000
97 I2	.0000	.0000	.7755E-04	.0000
39 K2O	.0000	.0000	.0000	.4302E-03
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.9329E-05	.0000
105 La2O3	.0000	.0000	.8318E-02	.8235
108 Li2O	.0000	.0000	.9504E-01	9.409
65 Mg(COOH)2	.0000	.0000	.9081E-02	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.0000	.0000	.8334E-01	8.617
60 Mn(COOH)2	.0000	.0000	.8145E-01	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	8.945
14 MnO2	.0000	.0000	.0000	.0000
81 N2	80.21	15.11	60.48	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.9700	.0000
84 NO2	.0000	.0000	.1653	.0000
70 Na(HgO(OH))	.0000	.0000	.5805E-05	.0000
94 Na2B4O7	.0000	.0000	.1753	.4796E-03
109 Na2C2O4	.0000	.0000	.8743E-05	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.8697	40.11
71 Na2PuO2(OH)4	.0000	.0000	.2354E-09	.0000
73 Na2RhO4	.0000	.0000	.4840E-07	.0000
72 Na2RuO4	.0000	.0000	.4723E-06	.0000
6 Na2SO4	.0000	.0000	.9577E-03	.0000
68 NaAlO2	.0000	.0000	.2354E-02	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.2172	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	23 Melter Off-Gas	24 Waste Glass
7 NaCl	.0000	.0000	.9546E-03	.0000
138 NaCl Semi Vol	.0000	.0000	.9088E-01	.0000
69 NaF	.0000	.0000	.5049E-05	.0000
139 NaF Semi Vol	.0000	.0000	.7439E-01	.0000
12 NaI	.0000	.0000	.9252E-04	.0000
125 NaI Semi Vol	.0000	.0000	.9068E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.3079E-01	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.2855E-01	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	1.419
82 O2	9.127	4.563	18.20	.0000
67 PbO	.0000	.0000	.0000	.9420E-01
28 PbSO4	.0000	.0000	.1294E-02	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.1327E-05	.0000
76 PuO2	.0000	.0000	.8368E-03	.3342E-01
22 RhO2	.0000	.0000	.1287E-03	.1274E-01
79 RuO2	.0000	.0000	.6843E-03	.5654E-01
23 RuO2 Semi Vol	.0000	.0000	.6283E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.3100	.0000
111 SiO2	.0000	.0000	1.038	102.8
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.1162E-02	.0000
10 Sr(NO3)2	.0000	.0000	.1357E-03	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.6710E-01
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.5280E-02	.5227
107 TiO2	.0000	.0000	.1664E-01	1.647
119 Tritium	.0000	.0000	.3794E-09	.0000
93 UO2	.0000	.0000	.0000	2.742
62 UO2(COOH)2	.0000	.0000	.8692E-01	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.7943E-03	.0000
11 Y(NO3)3	.0000	.0000	.9636E-09	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	21 Melter CCTV Lens Purges	22 Melter Air In Leakage	28 Melter Off-Gas	24 Waste Glass
47 Y2O3	.0000	.0000	.0000	.8964E-01
100 Zeolite	.0000	.0000	.8375E-01	8.842
44 Zn(COOH)2	.0000	.0000	.4197E-02	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.2176
104 ZrO2	.0000	.0000	.8318E-02	.8235
TOTAL FLOW, LB/HR	40.00	20.00	477.88	228.02
VAPOR FLOW, CFM	9.45	4.72	426.80	
LIQUID FLOW, GPM				.19
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0187	150.8417
TEMPERATURE, DEG C	85.00	85.00	520.00	1050.00
PRESSURE, ATM	1.00	1.00	.99	.99
PRESSURE, PSIG	.00	.00	-.18	-.18
PRESSURE, MM HG			750.88	750.88
PHASE	VAPOR	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	-2059.93	-1029.96	829917.62	78800.89

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
COMPONENT FLOWS, LB/HR				
1 H2O	46.06	416.0	4.180	420.1
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.1849E-03	.0000	.1849E-03
74 Al(OH)3	.0000	.1157	.0000	.1157
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.2451	.0000	.2451
9 Ba(NO3)2	.0000	.1521E-08	.0000	.1521E-08
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1375E-02	.0000	.1375E-02
66 CO	.0000	7.614	.0000	7.614
87 CO2	.0000	16.57	.0000	16.57
142 CO2 (C14)	.0000	.1722E-23	.0000	.1722E-23
63 Ca(COOH)2	.0000	.4770E-01	.0000	.4770E-01
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.8427E-02	.0000	.8427E-02
20 CaC2O4	.0000	.8706E-02	.0000	.8706E-02
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.9266E-03	.0000	.9266E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.4353E-02	.0000	.4353E-02
29 Carbon	.0000	.8219E-02	.0000	.8219E-02
26 Co(COOH)2	.0000	.7532E-03	.0000	.7532E-03
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.8522E-02	.0000	.8522E-02
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.2080E-07	.0000	.2080E-07
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.2139E-02	.0000	.2139E-02
96 CsCl	.0000	.2227E-06	.0000	.2227E-06
136 CsCl Semi Vol	.0000	.1046E-01	.0000	.1046E-01
8 CsNO3	.0000	.9754E-04	.0000	.9754E-04
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1609E-02	.0000	.1609E-02
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.2801	.0000	.2801
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.1285E-01	.0000	.1285E-01
102 GroupA	.0000	.2597E-02	.0000	.2597E-02
103 GroupB	.0000	.8236E-02	.0000	.8236E-02
25 H2	.0000	.5827	.0000	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.6345E-02	.0000	.6345E-02
97 I2	.0000	.7755E-04	.0000	.7755E-04
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.9329E-05	.0000	.9329E-05
105 La2O3	.0000	.8318E-02	.0000	.8318E-02
108 Li2O	.0000	.9504E-01	.0000	.9504E-01
65 Mg(COOH)2	.0000	.9081E-02	.0000	.9081E-02
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.8334E-01	.0000	.8334E-01
60 Mn(COOH)2	.0000	.8145E-01	.0000	.8145E-01
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	60.43	191.1	251.5
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.9700	.0000	.9700
84 NO2	.0000	.1653	.0000	.1653
70 Na(HgO(OH))	.0000	.5805E-05	.0000	.5805E-05
94 Na2B4O7	.0000	.1753	.0000	.1753
109 Na2C2O4	.0000	.8743E-05	.0000	.8743E-05
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.8514	.0000	.8514
71 Na2PuO2(OH)4	.0000	.2354E-09	.0000	.2354E-09
73 Na2RhO4	.0000	.4840E-07	.0000	.4840E-07
72 Na2RuO4	.0000	.4723E-06	.0000	.4723E-06
6 Na2SO4	.0000	.9577E-03	.0000	.9577E-03
68 NaAlO2	.0000	.2354E-02	.0000	.2354E-02
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.2172	.0000	.2172

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	25 Off-Gas Spray Water	26 Cooled Off-Gas	27 Melter Con trol Air	28 Inlet Gas to Quencher
7 NaCl	.0000	.9546E-03	.0000	.9546E-03
138 NaCl Semi Vol	.0000	.9088E-01	.0000	.9088E-01
69 NaF	.0000	.2480E-01	.0000	.2480E-01
139 NaF Semi Vol	.0000	.7439E-01	.0000	.7439E-01
12 NaI	.0000	.9252E-04	.0000	.9252E-04
125 NaI Semi Vol	.0000	.9068E-02	.0000	.9068E-02
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.8079E-01	.0000	.8079E-01
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.2855E-01	.0000	.2855E-01
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	18.20	57.73	75.93
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1294E-02	.0000	.1294E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.1327E-05	.0000	.1327E-05
76 PuO2	.0000	.8368E-03	.0000	.8368E-03
22 RhO2	.0000	.1287E-03	.0000	.1287E-03
79 RuO2	.0000	.6843E-03	.0000	.6843E-03
23 RuO2 Semi Vol	.0000	.6283E-02	.0000	.6283E-02
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.3100	.0000	.3100
111 SiO2	.0000	1.038	.0000	1.038
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1162E-02	.0000	.1162E-02
10 Sr(NO3)2	.0000	.1357E-08	.0000	.1357E-08
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.5280E-02	.0000	.5280E-02
107 TiO2	.0000	.1664E-01	.0000	.1664E-01
119 Tritium	.0000	.8794E-09	.0000	.8794E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.3692E-01	.0000	.3692E-01
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.7943E-03	.0000	.7943E-03
11 Y(NO3)3	.0000	.9636E-09	.0000	.9636E-09
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	25	26	27	28
	Off-Gas	Cooled	Melter Con	Inlet Gas
	Spray Water	Off-Gas	trol Air	to Quencher
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.8375E-01	.0000	.8375E-01
44 Zn(COOH)2	.0000	.4197E-02	.0000	.4197E-02
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.8318E-02	.0000	.8318E-02
TOTAL FLOW, LB/HR	46.06	528.93	258.01	776.95
VAPOR FLOW, CFM		887.06	59.77	464.61
LIQUID FLOW, GPM	.09			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4300	.0226	.0706	.0279
TEMPERATURE, DEG C	40.00	875.00	35.00	808.63
PRESSURE, ATM	1.84	.98	1.00	.98
PRESSURE, PSIG	5.00	-.26	.00	-.84
PRESSURE, MM HG		746.55		742.44
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	1876.28	832576.94	-18029.66	319547.29

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	29 Liquid to Quencher	30 Dilution Air	31 Quencher Exit	32 Off-Gas to PWDBF
COMPONENT FLOWS, LB/HR				
1 H2O	.2766E+05	12.54	.2808E+05	150.6
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.6401E-02	.0000	.6412E-02	.1541E-03
74 Al(OH)3	5.660	.0000	5.672	.9643E-01
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	11.97	.0000	12.00	.2043
9 Ba(NO3)2	.5193E-07	.0000	.5201E-07	.1267E-03
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.4688E-01	.0000	.4695E-01	.1146E-02
66 CO	.8020E-02	.0000	7.617	7.614
87 CO2	.1514	.0000	16.72	16.56
142 CO2 (C14)	.1574E-25	.0000	.1738E-23	.1721E-23
63 Ca(COOH)2	1.626	.0000	1.629	.3975E-01
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1168	.0000	.1170	.2856E-02
20 CaC2O4	.1264	.0000	.1265	.3089E-02
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.8150E-01	.0000	.8164E-01	.7721E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1484	.0000	.1486	.3628E-02
29 Carbon	.9297E-01	.0000	.9309E-01	.2632E-02
26 Co(COOH)2	.2568E-01	.0000	.2572E-01	.6277E-03
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1201	.0000	.1203	.2935E-02
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7527E-06	.0000	.7540E-06	.1734E-07
137 Cs2O Semi Vol	.1239E-03	.0000	.1243E-03	.0000
90 CsCOOH	.7261E-01	.0000	.7272E-01	.1782E-02
96 CsCl	.4358E-05	.0000	.4359E-05	.1856E-06
136 CsCl Semi Vol	.3596	.0000	.3585	.1046E-01
8 CsNO3	.8331E-02	.0000	.8336E-02	.8128E-04
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.5485E-01	.0000	.5494E-01	.1341E-02
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	13.70	.0000	13.73	.2334
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	29	80	81	82
	Liquid to	Dilution	Quencher	Off-Gas to
	Quencher	Air	Exit	PWDBF
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.5836	.0000	.5826	.1285E-01
102 GroupA	.8784E-01	.0000	.8798E-01	.2164E-02
103 GroupB	.2808	.0000	.2812	.6868E-02
25 H2	.2408E-03	.0000	.5829	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.2177	.0000	.2170	.6345E-02
97 I2	.0000	.0000	.0000	.7755E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2176E-03	.0000	.2177E-03	.7774E-05
105 La2O3	.2833	.0000	.2837	.6982E-02
108 Li2O	4.636	.0000	4.646	.7920E-01
65 Mg(COOH)2	.3096	.0000	.3101	.7567E-02
55 Mg(OH)2	.0000	.0000	.0000	.0000
38 MgO	1.570	.0000	1.573	.2778E-01
60 Mn(COOH)2	2.780	.0000	2.784	.6788E-01
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2970	573.8	251.8	965.8
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.8665E-03	.0000	.9709	.9700
84 NO2	.6041	.0000	.7698	.1498
70 Na(HgO(OH))	.1982E-03	.0000	.1985E-03	.4837E-05
94 Na2B4O7	7.608	.0000	7.622	.1461
109 Na2C2O4	.8730E-04	.0000	.8786E-04	.8119E-05
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	17.17	.0000	17.21	.2929
71 Na2PuO2(OH)4	.8039E-08	.0000	.8052E-08	.1962E-09
73 Na2RhO4	.1653E-05	.0000	.1655E-05	.4083E-07
72 Na2RuO4	.1613E-04	.0000	.1615E-04	.8986E-06
6 Na2SO4	.8271E-01	.0000	.8276E-01	.7981E-03
68 NaAlO2	.8039E-01	.0000	.8052E-01	.1962E-02
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	9.169	.0000	9.186	.1810

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	29 Liquid to Quencher	80 Dilution Air	81 Quencher Exit	82 Off-Gas to PWDBF
7 NaCl	.8250E-01	.0000	.8264E-01	.7955E-03
188 NaCl Semi Vol	4.969	.0000	4.965	.9088E-01
69 NaF	.8653	.0000	.8663	.2067E-01
189 NaF Semi Vol	4.045	.0000	4.042	.7439E-01
12 NaI	.8157E-02	.0000	.8162E-02	.7710E-04
125 NaI Semi Vol	.4223	.0000	.4222	.9068E-02
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	1.052	.0000	1.053	.2566E-01
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.9732	.0000	.9747	.2379E-01
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1701	173.2	76.10	291.6
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.4412E-01	.0000	.4419E-01	.1079E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.4505E-04	.0000	.4512E-04	.1106E-05
76 PuO2	.1143E-01	.0000	.1150E-01	.2807E-03
22 RhO2	.4887E-02	.0000	.4894E-02	.1072E-03
79 RuO2	.2127E-01	.0000	.2130E-01	.5286E-03
28 RuO2 Semi Vol	.2120	.0000	.2113	.6283E-02
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8546E-03	.0000	.8103	.8100
111 SiO2	50.73	.0000	50.84	.8653
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8961E-01	.0000	.8967E-01	.9682E-03
10 Sr(NO3)2	.4634E-07	.0000	.4641E-07	.1131E-08
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1800	.0000	.1803	.4400E-02
107 TiO2	.5665	.0000	.5674	.1386E-01
119 Tritium	.1077E-07	.0000	.1111E-07	.5865E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	1.259	.0000	1.261	.8077E-01
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.2708E-01	.0000	.2712E-01	.6619E-03
11 Y(NO3)3	.8291E-07	.0000	.8296E-07	.8030E-09
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	29 Liquid to Quencher	80 Dilution Air	81 Quencher Exit	82 Off-Gas to PWDBF
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	1.151	.0000	1.153	.2813E-01
44 Zn(COOH)2	.1431	.0000	.1433	.3497E-02
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2833	.0000	.2837	.6982E-02
TOTAL FLOW, LB/HR	27811.62	759.04	28585.74	1436.29
VAPOR FLOW, CFM		179.80		885.06
LIQUID FLOW, GPM	55.88		57.04	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6167	.0706	62.4843	.0622
TEMPERATURE, DEG C	55.00	85.00	64.05	54.96
PRESSURE, ATM	8.72	1.00	.99	.99
PRESSURE, PSIG	89.97	.00	-.14	-.21
PRESSURE, MM HG			752.78	748.90
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	1559709.72	-89088.97	1878711.92	22427.22

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	88 Liq to PWDBF Nozzles	84 PWDBF #1 Atomzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	5659.	8.811	2821.	179.1
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1309E-02	.0000	.8039E-03	.1541E-06
74 Al(OH)3	1.153	.0000	.6723	.9644E-04
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	2.449	.0000	1.423	.2043E-03
9 Ba(NO3)2	.1062E-07	.0000	.6538E-03	.1267E-11
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.9589E-02	.0000	.5904E-02	.1146E-05
66 CO	.6173E-03	.0000	.2673E-03	7.614
87 CO2	.8097E-01	.0000	.1376E-01	16.57
142 CO2 (C14)	.8219E-26	.0000	.1430E-26	.1722E-23
63 Ca(COOH)2	.8327	.0000	.2048	.3976E-04
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.2390E-01	.0000	.1471E-01	.2856E-03
20 CaC2O4	.2585E-01	.0000	.1591E-01	.3089E-05
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.6461E-02	.0000	.8978E-02	.7723E-06
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.8036E-01	.0000	.1869E-01	.3628E-05
29 Carbon	.1902E-01	.0000	.1211E-01	.2683E-03
26 Co(COOH)2	.5253E-02	.0000	.8234E-02	.6278E-05
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2456E-01	.0000	.1512E-01	.2936E-05
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1540E-06	.0000	.9377E-07	.1734E-10
137 Cs2O Semi Vol	.2535E-04	.0000	.1267E-04	.0000
90 CsCOOH	.1485E-01	.0000	.9152E-02	.1783E-05
96 CsCl	.8913E-06	.0000	.6254E-06	.1856E-09
136 CsCl Semi Vol	.7856E-01	.0000	.4619E-01	.1046E-03
8 CsNO3	.6813E-03	.0000	.4194E-03	.8129E-07
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1122E-01	.0000	.6908E-02	.1341E-05
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	2.863	.0000	1.627	.2334E-03
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	83 Liq to PWDBF Nozzles	84 PWDBF #1 Atomzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.1194	.0000	.7125E-01	.1285E-03
102 GroupA	.1797E-01	.0000	.1108E-01	.2164E-05
103 GroupB	.5743E-01	.0000	.8536E-01	.6865E-05
25 H2	.4925E-04	.0000	.2123E-04	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.4453E-01	.0000	.2797E-01	.6345E-04
97 I2	.0000	.0000	.0000	.7755E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.4450E-04	.0000	.2978E-04	.7775E-08
105 La2O3	.5794E-01	.0000	.8568E-01	.6933E-05
108 Li2O	.9483	.0000	.5508	.7921E-04
65 Mg(COOH)2	.6332E-01	.0000	.8899E-01	.7568E-05
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.8211	.0000	.1875	.2779E-04
60 Mn(COOH)2	.5686	.0000	.8500	.6789E-04
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.6076E-01	174.2	.8120E-01	1314.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.1772E-03	.0000	.7724E-04	.9700
84 NO2	.1236	.0000	.5864E-01	.1593
70 Na(HgO(OH))	.4055E-04	.0000	.2496E-04	.4838E-08
94 Na2B4O7	1.556	.0000	.9196	.1461E-03
109 Na2C2O4	.1786E-04	.0000	.1195E-04	.3120E-08
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	8.518	.0000	2.040	.2929E-03
71 Na2PuO2(OH)4	.1644E-08	.0000	.1012E-08	.1962E-12
73 Na2RhO4	.8381E-06	.0000	.2081E-06	.4034E-10
72 Na2RuO4	.8299E-05	.0000	.2081E-05	.8936E-09
6 Na2SO4	.6690E-02	.0000	.4118E-02	.7982E-06
68 NaAlO2	.1644E-01	.0000	.1012E-01	.1962E-05
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	1.875	.0000	1.118	.1810E-03

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	88 Liq to PWDBF Nozzles	84 PWDBF #1 Atonzg Air	85 PWDBF #1 Exit Liquid	86 PWDBF #2 Exit Gas
7 NaCl	.6663E-02	.0000	.4103E-02	.7956E-03
188 NaCl Semi Vol	1.013	.0000	.5900	.9088E-03
69 NaF	.1763	.0000	.1085	.2067E-04
139 NaF Semi Vol	.8275	.0000	.4807	.7439E-03
12 NaI	.6457E-03	.0000	.3975E-03	.7712E-07
125 NaI Semi Vol	.8649E-01	.0000	.5141E-01	.9068E-04
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2151	.0000	.1324	.2566E-04
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1991	.0000	.1226	.2379E-04
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.8480E-01	52.63	.1791E-01	396.8
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.9025E-02	.0000	.5557E-02	.1079E-05
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.9214E-05	.0000	.5678E-05	.1106E-03
76 PuO2	.2349E-02	.0000	.1446E-02	.2807E-06
22 RhO2	.8974E-03	.0000	.5526E-03	.1073E-06
79 RuO2	.4851E-02	.0000	.2687E-02	.5287E-06
23 RuO2 Semi Vol	.4837E-01	.0000	.2734E-01	.6283E-04
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.7254E-04	.0000	.8172E-04	.8100
111 SiO2	10.88	.0000	6.026	.8655E-03
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8102E-02	.0000	.4989E-02	.9684E-06
10 Sr(NO3)2	.9478E-08	.0000	.5884E-08	.1131E-11
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.8682E-01	.0000	.2267E-01	.4401E-05
107 TiO2	.1159	.0000	.7137E-01	.1387E-04
119 Tritium	.2204E-08	.0000	.1097E-08	.6965E-10
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2575	.0000	.1585	.3078E-04
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.5539E-02	.0000	.3411E-02	.6620E-06
11 Y(NO3)3	.6731E-08	.0000	.4143E-08	.8031E-12
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	83	84	85	86
	Liq to PWDBF	PWDBF #1	PWDBF #1	PWDBF #2
	Nozzles	Atomzg Air	Exit Liquid	Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2854	.0000	.1449	.2813E-04
44 Zn(COOH)2	.2927E-01	.0000	.1802E-01	.3498E-05
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.5794E-01	.0000	.3568E-01	.6933E-05
TOTAL FLOW, LB/HR	5688.85	280.66	2838.83	1915.84
VAPOR FLOW, CFM		14.89		525.25
LIQUID FLOW, GPM	11.83		5.65	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6167	.2588	62.6490	.0608
TEMPERATURE, DEG C	55.00	40.00	53.46	52.45
PRESSURE, ATM	8.18	8.72	.97	.95
PRESSURE, PSIG	82.04	89.97	-.51	-.72
PRESSURE, MM HG			788.70	722.76
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	819037.90	-11603.55	154562.97	12229.78

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	37 FPT Liquid to OGCT	88 Canister Air Inleakage	89 Inlet Air to Ejector	40 Liquid Feed to Ejector
COMPONENT FLOWS, LB/HR				
1 H2O	140.4	.6654	1.821	.8847E+05
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1082E-06	.0000	.0000	.2047E-01
74 Al(OH)3	.6683E-04	.0000	.0000	18.10
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1402E-03	.0000	.0000	38.29
9 Ba(NO3)2	.8703E-12	.0000	.0000	.1661E-03
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.7857E-06	.0000	.0000	.1499
66 CO	.8870E-03	.0000	.0000	.9659E-02
87 CO2	.5137E-03	.0000	.0000	.4842
142 CO2 (C14)	.5339E-28	.0000	.0000	.5033E-25
68 Ca(COOH)2	.2723E-04	.0000	.0000	5.201
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1953E-05	.0000	.0000	.3736
20 CaC2O4	.2113E-05	.0000	.0000	.4041
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.5294E-06	.0000	.0000	.1010
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2487E-05	.0000	.0000	.4746
29 Carbon	.1825E-05	.0000	.0000	.2973
26 Co(COOH)2	.4303E-06	.0000	.0000	.8212E-01
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2013E-05	.0000	.0000	.3840
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1236E-10	.0000	.0000	.2407E-05
137 Cs2O Semi Vol	.0000	.0000	.0000	.3963E-03
90 CsCOOH	.1214E-05	.0000	.0000	.2322
96 CsCl	.6965E-10	.0000	.0000	.1393E-04
136 CsCl Semi Vol	.7035E-04	.0000	.0000	1.150
8 CsNO3	.5584E-07	.0000	.0000	.1065E-01
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.9192E-06	.0000	.0000	.1754
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1606E-03	.0000	.0000	43.81
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	87	88	89	40
	FPT Liquid	Canister Air	Inlet Air	Liquid Feed
	to OGCT	Inleakage	to Ejector	to Ejector
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.8629E-04	.0000	.0000	1.866
102 GroupA	.1469E-05	.0000	.0000	.2809
103 GroupB	.4706E-05	.0000	.0000	.8979
25 H2	.6944E-06	.0000	.0000	.7699E-03
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.4800E-04	.0000	.0000	.6962
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.8197E-08	.0000	.0000	.6958E-03
105 La2O3	.4745E-05	.0000	.0000	.9058
108 Li2O	.5418E-04	.0000	.0000	14.82
65 Mg(COOH)2	.5188E-05	.0000	.0000	.9900
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.1900E-04	.0000	.0000	5.020
60 Mn(COOH)2	.4661E-04	.0000	.0000	8.889
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1643E-02	30.42	60.84	.9498
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2648E-05	.0000	.0000	.2771E-02
84 NO2	.2841E-02	.0000	.0000	1.932
70 Na(HgO(OH))	.3323E-08	.0000	.0000	.6339E-03
94 Na2B4O7	.1003E-03	.0000	.0000	24.83
109 Na2C2O4	.1283E-08	.0000	.0000	.2792E-03
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2010E-03	.0000	.0000	54.92
71 Na2PuO2(OH)4	.1348E-12	.0000	.0000	.2571E-07
73 Na2RhO4	.2771E-10	.0000	.0000	.5285E-05
72 Na2RuO4	.2704E-09	.0000	.0000	.5158E-04
6 Na2SO4	.5483E-06	.0000	.0000	.1046
68 NaAlO2	.1348E-05	.0000	.0000	.2571
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1235E-03	.0000	.0000	29.32

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	87 FPT Liquid to OGCT	38 Canister Air Inleakage	39 Inlet Air to Ejector	40 Liquid Feed to Ejector
7 NaCl	.5453E-06	.0000	.0000	.1042
138 NaCl Semi Vol	.6163E-03	.0000	.0000	15.89
69 NaF	.1413E-04	.0000	.0000	2.766
139 NaF Semi Vol	.5083E-03	.0000	.0000	12.94
12 NaI	.5292E-07	.0000	.0000	.1009E-01
125 NaI Semi Vol	.6153E-04	.0000	.0000	1.352
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1762E-04	.0000	.0000	3.363
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1631E-04	.0000	.0000	3.112
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.9521E-03	9.189	18.38	.5441
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.7393E-06	.0000	.0000	.1411
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.7529E-09	.0000	.0000	.1440E-03
76 PuO2	.1921E-06	.0000	.0000	.3672E-01
22 RhO2	.7353E-07	.0000	.0000	.1403E-01
79 RuO2	.3553E-06	.0000	.0000	.6801E-01
23 RuO2 Semi Vol	.4174E-04	.0000	.0000	.6780
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1103E-05	.0000	.0000	.1134E-02
111 SiO2	.5938E-03	.0000	.0000	162.2
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.6638E-06	.0000	.0000	.1267
10 Sr(NO3)2	.7763E-12	.0000	.0000	.1482E-06
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.3017E-05	.0000	.0000	.5756
107 TiO2	.9489E-05	.0000	.0000	1.812
119 Tritium	.2026E-10	.0000	.0000	.3446E-07
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2110E-04	.0000	.0000	4.026
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.4538E-06	.0000	.0000	.8660E-01
11 Y(NO3)3	.5516E-12	.0000	.0000	.1052E-06
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	87	88	89	40
	FPT Liquid	Canister Air	Inlet Air	Liquid Feed
	to OGCT	Inleakage	to Ejector	to Ejector
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1928E-04	.0000	.0000	8.680
44 Zn(COOH)2	.2398E-05	.0000	.0000	.4575
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.4745E-05	.0000	.0000	.9053
TOTAL FLOW, LB/HR	140.87	40.28	80.55	88937.76
VAPOR FLOW, CFM		9.88	20.70	
LIQUID FLOW, GPM	.28			177.08
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4311	.0680	.0648	62.6167
TEMPERATURE, DEG C	46.81	85.00	84.98	55.00
PRESSURE, ATM	.99	.96	.92	8.72
PRESSURE, PSIG	-.21	-.54	-1.19	89.97
PRESSURE, MM HG	748.90	732.03	698.44	
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	6707.14	-2074.10	-4148.21	4987738.25

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	41 Ejector Exit Vapor	42 Ejector Exit Liquid	43 Liquid Spray to SWDBF #1	44 Atomizg Air SWDBF #1
COMPONENT FLOWS, LB/HR				
1 H2O	9.050	.8846E+05	4088.	5.495
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.2040E-01	.8153E-05	.0000
74 Al(OH)3	.0000	18.08	.1932E-02	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	88.24	.4083E-02	.0000
9 Ba(NO3)2	.0000	.1655E-06	.2536E-10	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1494	.2288E-04	.0000
66 CO	.9460E-02	.1992E-03	.2584E-03	.0000
87 CO2	.8259	.1583	.1496E-01	.0000
142 CO2 (C14)	.8387E-25	.1646E-25	.1555E-26	.0000
63 Ca(COOH)2	.0000	5.183	.7939E-03	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.3723	.5703E-04	.0000
20 CaC2O4	.0000	.4027	.6168E-04	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.1007	.1542E-04	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.4730	.7245E-04	.0000
29 Carbon	.0000	.2960	.5325E-04	.0000
26 Co(COOH)2	.0000	.8184E-01	.1255E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.3827	.5862E-04	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.2400E-05	.3599E-09	.0000
187 Cs2O Semi Vol	.0000	.3976E-03	.0000	.0000
90 CsCOOH	.0000	.2314	.3535E-04	.0000
96 CsCl	.0000	.1382E-04	.2029E-08	.0000
186 CsCl Semi Vol	.0000	1.146	.2049E-02	.0000
8 CsNO3	.0000	.1062E-01	.1626E-05	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1748	.2678E-04	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	43.76	.4677E-02	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	41	42	43	44
	Ejector	Ejector	Liquid Spray	Atomzg Air
	Exit Vapor	Exit Liquid	to SWDBF #1	SWDBF #1
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	1.863	.2513E-02	.0000
102 GroupA	.0000	.2800	.4280E-04	.0000
103 GroupB	.0000	.8949	.1871E-03	.0000
25 H2	.7534E-03	.1652E-04	.2022E-04	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.6939	.1252E-02	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.6913E-03	.9311E-07	.0000
105 La2O3	.0000	.9028	.1382E-03	.0000
108 Li2O	.0000	14.81	.1578E-02	.0000
65 Mg(COOH)2	.0000	.9867	.1511E-03	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	5.013	.5535E-03	.0000
60 Mn(COOH)2	.0000	8.860	.1358E-02	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	60.80	.9933	.4786E-01	251.2
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2645E-02	.1255E-03	.7713E-04	.0000
84 NO2	.8961E-02	1.923	.8274E-01	.0000
70 Na(HgO(OH))	.0000	.6318E-03	.9680E-07	.0000
94 Na2B4O7	.0000	24.28	.2921E-02	.0000
109 Na2C2O4	.0000	.2774E-03	.3736E-07	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	54.85	.5854E-02	.0000
71 Na2PuO2(OH)4	.0000	.2562E-07	.3926E-11	.0000
73 Na2RhO4	.0000	.5268E-05	.8071E-09	.0000
72 Na2RuO4	.0000	.5140E-04	.7875E-08	.0000
6 Na2SO4	.0000	.1042	.1597E-04	.0000
68 NaAlO2	.0000	.2562	.3926E-04	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	29.26	.3597E-02	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	41 Ejector Exit Vapor	42 Ejector Exit Liquid	43 Liquid Spray to SWDBF #1	44 Atomizg Air SWDBF #1
7 NaCl	.0000	.1039	.1590E-04	.0000
138 NaCl Semi Vol	.0000	15.88	.1796E-01	.0000
69 NaF	.0000	2.757	.4122E-03	.0000
189 NaF Semi Vol	.0000	12.93	.1467E-01	.0000
12 NaI	.0000	.1006E-01	.1541E-05	.0000
125 NaI Semi Vol	.0000	1.350	.1792E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	8.351	.5133E-03	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	8.102	.4751E-03	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	18.85	.5688	.2773E-01	75.88
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1406	.2154E-04	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.1436E-03	.2193E-07	.0000
76 PuO2	.0000	.8660E-01	.5605E-05	.0000
22 RhO2	.0000	.1398E-01	.2142E-05	.0000
79 RuO2	.0000	.6778E-01	.1035E-04	.0000
23 RuO2 Semi Vol	.0000	.6757	.1216E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.1069E-02	.6496E-04	.3212E-04	.0000
111 SiO2	.0000	162.0	.1730E-01	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1262	.1934E-04	.0000
10 Sr(NO3)2	.0000	.1477E-06	.2263E-10	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.5737	.8787E-04	.0000
107 TiO2	.0000	1.806	.2764E-03	.0000
119 Tritium	.3512E-11	.3433E-07	.5901E-09	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	4.012	.6145E-03	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.8631E-01	.1322E-04	.0000
11 Y(NO3)3	.0000	.1049E-06	.1607E-10	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	41	42	43	44
	Ejector	Ejector	Liquid Spray	Atomzng Air
	Exit Vapor	Exit Liquid	to SWDBF #1	SWDBF #1
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	8.668	.5617E-03	.0000
44 Zn(COOH)2	.0000	.4560	.6984E-04	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.9028	.1882E-03	.0000
TOTAL FLOW, LB/HR	88.55	88929.22	4088.68	332.55
VAPOR FLOW, CFM	23.67			21.46
LIQUID FLOW, GPM		177.07	8.17	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0623	62.6164	62.4311	.2583
TEMPERATURE, DEG C	54.95	54.95	46.81	40.00
PRESSURE, ATM	.99	.99	8.18	8.72
PRESSURE, PSIG	-.21	-.21	82.04	89.97
PRESSURE, MM HG	748.90	748.90		
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	1066.56	4982517.44	195360.44	-16728.95

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	45 SWDBF #1 Exit Liquid	46 SWDBF #1 Exit Gas	47 Liquid Spray to SWDBF #2	48 SWDBF #2 Atomizing Air
COMPONENT FLOWS, LB/HR				
1 H2O	4095.	179.4	4088.	5.495
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.8302E-05	.4874E-08	.3153E-05	.0000
74 Al(OH)3	.2025E-02	.3050E-05	.1932E-02	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4281E-02	.6461E-05	.4083E-02	.0000
9 Ba(NO3)2	.2653E-10	.4008E-13	.2536E-10	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2390E-04	.3625E-07	.2288E-04	.0000
66 CO	.2763E-03	7.614	.2584E-03	.0000
37 CO2	.1563E-01	16.57	.1496E-01	.0000
142 CO2 (C1)	.1630E-26	.1722E-23	.1555E-26	.0000
63 Ca(COOH)2	.8324E-03	.1257E-05	.7939E-03	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.5979E-04	.9033E-07	.5703E-04	.0000
20 CaC2O4	.6467E-04	.9769E-07	.6168E-04	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1617E-04	.2442E-07	.1542E-04	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7593E-04	.1148E-06	.7245E-04	.0000
29 Carbon	.5585E-04	.8484E-07	.5325E-04	.0000
26 Co(COOH)2	.1315E-04	.1985E-07	.1255E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.6146E-04	.9285E-07	.5862E-04	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8767E-09	.5484E-12	.3599E-09	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.8708E-04	.5638E-07	.8535E-04	.0000
96 CsCl	.2203E-08	.5871E-11	.2029E-08	.0000
136 CsCl Semi Vol	.2143E-02	.1046E-04	.2049E-02	.0000
8 CsNO3	.1705E-05	.2571E-08	.1626E-05	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2807E-04	.4241E-07	.2678E-04	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.4903E-02	.7382E-05	.4677E-02	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	45	46	47	48
	SWDBF #1	SWDBF #1	Liquid Spray	SWDBF #2
	Exit Liquid	Exit Gas	to SWDBF #2	Atomzg Air
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.2629E-02	.1285E-04	.2518E-02	.0000
102 GroupA	.4490E-04	.6845E-07	.4280E-04	.0000
103 GroupB	.1437E-03	.2171E-06	.1371E-03	.0000
25 H2	.2173E-04	.5S27	.2022E-04	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCCOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1310E-02	.6845E-05	.1252E-02	.0000
97 I2	.0000	.7755E-04	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1006E-06	.2459E-09	.9311E-07	.0000
105 La2O3	.1449E-03	.2193E-06	.1382E-03	.0000
108 Li2O	.1655E-02	.2505E-05	.1578E-02	.0000
65 Mg(COOH)2	.1584E-03	.2394E-06	.1511E-03	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.5804E-03	.8787E-06	.5535E-03	.0000
60 Mn(COOH)2	.1428E-02	.2147E-05	.1358E-02	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4759E-01	1645.	.4786E-01	251.2
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.8215E-04	.9700	.7713E-04	.0000
84 NO2	.8215E-01	.1598	.8274E-01	.0000
70 Na(HgO(OH))	.1015E-06	.1530E-09	.9680E-07	.0000
94 Na2B4O7	.8062E-02	.4622E-05	.2921E-02	.0000
109 Na2C2O4	.4038E-07	.9866E-10	.3736E-07	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.6138E-02	.9264E-05	.5854E-02	.0000
71 Na2PuO2(OH)4	.4116E-11	.6205E-14	.8926E-11	.0000
78 Na2RhO4	.8461E-09	.1276E-11	.8071E-09	.0000
72 Na2RuO4	.8257E-08	.1245E-10	.7875E-08	.0000
6 Na2SO4	.1674E-04	.2524E-07	.1597E-04	.0000
68 NaAlO2	.4116E-04	.6205E-07	.8926E-04	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.8772E-02	.5724E-05	.8597E-02	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	45 SWDBF #1 Exit Liquid	46 SWDBF #1 Exit Gas	47 Liquid Spray to SWDBF #2	48 SWDBF #2 Atomzg Air
7 NaCl	.1667E-04	.2516E-07	.1590E-04	.0000
138 NaCl Semi Vol	.1878E-01	.9088E-04	.1796E-01	.0000
69 NaF	.4322E-03	.6537E-06	.4122E-03	.0000
139 NaF Semi Vol	.1534E-01	.7439E-04	.1467E-01	.0000
12 NaI	.1616E-05	.2439E-08	.1541E-05	.0000
125 NaI Semi Vol	.1874E-02	.9068E-05	.1792E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.5382E-03	.8116E-06	.5133E-03	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.4981E-03	.7525E-06	.4751E-03	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.2752E-01	496.7	.2773E-01	75.88
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2253E-04	.8412E-07	.2154E-04	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2300E-07	.8498E-10	.2193E-07	.0000
76 PuO2	.5877E-05	.8878E-08	.5605E-05	.0000
22 RhO2	.2245E-05	.8392E-08	.2142E-05	.0000
79 RuO2	.1083E-04	.1672E-07	.1035E-04	.0000
23 RuO2 Semi Vol	.1272E-02	.6283E-05	.1216E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8412E-04	.8100	.8212E-04	.0000
111 SiO2	.1813E-01	.2737E-04	.1730E-01	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2027E-04	.8063E-07	.1934E-04	.0000
10 Sr(NO3)2	.2372E-10	.8577E-13	.2263E-10	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.9213E-04	.1392E-06	.8787E-04	.0000
107 TiO2	.2898E-03	.4385E-06	.2764E-03	.0000
119 Tritium	.6321E-09	.2768E-10	.5901E-09	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.6443E-03	.9733E-06	.6145E-03	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.1386E-04	.2094E-07	.1322E-04	.0000
11 Y(NO3)3	.1685E-10	.2540E-13	.1607E-10	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	45	46	47	48
	SWDBF #1 Exit Liquid	SWDBF #1 Exit Gas	Liquid Spray to SWDBF #2	SWDBF #2 Atomzg Air
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.5890E-03	.8897E-06	.5617E-03	.0000
44 Zn(COOH)2	.7223E-04	.1106E-06	.6984E-04	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1449E-03	.2193E-06	.1382E-03	.0000
TOTAL FLOW, LB/HR	4095.62	2346.89	4088.68	832.53
VAPOR FLOW, CFM		644.53		21.46
LIQUID FLOW, GPM	8.18		8.17	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4311	.0607	62.4311	.2583
TEMPERATURE, DEG C	48.03	48.03	46.81	40.00
PRESSURE, ATM	.93	.93	8.18	8.72
PRESSURE, PSIG	-1.01	-1.06	82.04	89.97
PRESSURE, MM HG	707.56	705.03		
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	200847.45	-15419.49	195360.44	-16728.95

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	49 SWDBF #2 Exit Liquid	50 SWDBF #2 Exit Gas	51 Ru Adsorber Gas Feed	52 I2 Adsorber Frcchter Feed
COMPONENT FLOWS, LB/HR				
1 H2O	4084.	189.7	69.63	69.63
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.8157E-05	.1541E-09	.1541E-09	.7707E-10
74 Al(OH)3	.1985E-02	.9646E-07	.9646E-07	.4823E-07
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4089E-02	.2043E-06	.2043E-06	.1022E-06
9 Ba(NO3)2	.2540E-10	.1268E-14	.1268E-14	.6338E-15
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2292E-04	.1146E-08	.1146E-08	.5732E-09
66 CO	.2408E-03	7.614	7.614	7.614
37 CO2	.1408E-01	16.57	16.57	16.57
142 CO2 (C14)	.1464E-26	.1722E-23	.1722E-23	.1722E-23
63 Ca(COOH)2	.7951E-03	.3977E-07	.3977E-07	.1988E-07
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.5712E-04	.2857E-08	.2857E-08	.1425E-08
20 CaC2O4	.6177E-04	.3090E-08	.3090E-08	.1545E-08
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1544E-04	.7724E-09	.7724E-09	.3862E-09
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7256E-04	.8629E-08	.8629E-08	.1815E-08
29 Carbon	.5333E-04	.2683E-08	.2683E-08	.1342E-08
26 Co(COOH)2	.1257E-04	.6279E-09	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.5871E-04	.2936E-08	.2936E-08	.1468E-08
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8604E-09	.1784E-13	.1784E-13	.8672E-14
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.8541E-04	.1783E-08	.1783E-08	.8915E-09
96 CsCl	.2034E-08	.1857E-12	.1046E-05	.5229E-06
136 CsCl Semi Vol	.2058E-02	.1046E-05	.0000	.0000
8 CsNO3	.1629E-05	.8131E-10	.8131E-10	.4065E-10
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2682E-04	.1341E-08	.1341E-08	.6706E-09
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.4684E-02	.2335E-06	.2335E-06	.1167E-06
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	49	50	51	52
	SWDBF #2	SWDBF #2	Ru Adsorber	I2 Adsorber
	Exit Liquid	Exit Gas	Gas Feed	Prehter Feed
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.2525E-02	.1285E-05	.0000	.0000
102 GroupA	.4287E-04	.2165E-08	.1288E-05	.6438E-06
103 GroupB	.1373E-03	.6866E-08	.6866E-08	.8433E-08
25 H2	.1882E-04	.5827	.5827	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1258E-02	.6345E-06	.6345E-06	.3172E-06
97 I2	.0000	.7755E-04	.7755E-04	.7755E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.9335E-07	.7777E-11	.7777E-11	.8888E-11
105 La2O3	.1384E-03	.6934E-03	.6934E-03	.8467E-03
108 Li2O	.1581E-02	.7923E-07	.7923E-07	.8961E-07
65 Mg(COOH)2	.1513E-03	.7570E-03	.7570E-03	.8785E-03
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.5543E-03	.2779E-07	.2779E-07	.1390E-07
60 Mn(COOH)2	.1360E-02	.6790E-07	.6790E-07	.8395E-07
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4804E-01	1896.	1896.	1896.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.7209E-04	.9700	.9700	.9700
84 NO2	.7952E-01	.1631	.1565	.1565
70 Na(H2O(OH))	.9695E-07	.4839E-11	.4839E-11	.2419E-11
94 Na2B4O7	.2925E-02	.1462E-06	.1462E-06	.7308E-07
109 Na2C2O4	.8746E-07	.3120E-11	.3120E-11	.1560E-11
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.5863E-02	.2930E-06	.2930E-06	.1465E-06
71 Na2PuO2(OH)4	.8932E-11	.1962E-15	.1962E-15	.9812E-16
73 Na2RhO4	.8083E-09	.4034E-13	.4034E-13	.2017E-13
72 Na2RuO4	.7888E-08	.8937E-12	.8937E-12	.1968E-12
6 Na2SO4	.1599E-04	.7984E-09	.7984E-09	.8992E-09
68 NaAlO2	.3932E-04	.1962E-08	.1962E-08	.9812E-09
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3602E-02	.1810E-06	.1810E-06	.9051E-07

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	49 SWDBF #2 Exit Liquid	50 SWDBF #2 Exit Gas	51 Ru Adsorber Gas Feed	52 I2 Adsorber Prehter Feed
7 NaCl	.1592E-04	.7958E-09	.9089E-05	.4545E-05
188 NaCl Semi Vol	.1804E-01	.9088E-05	.0000	.0000
69 NaF	.4128E-03	.2067E-07	.7459E-05	.3730E-05
139 NaF Semi Vol	.1473E-01	.7439E-05	.0000	.0000
12 NaI	.1544E-05	.7718E-10	.9069E-06	.4535E-06
125 NaI Semi Vol	.1800E-02	.9068E-06	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.5141E-03	.2567E-07	.2567E-07	.1283E-07
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.4758E-03	.2380E-07	.2380E-07	.1190E-07
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.2786E-01	572.6	572.6	572.6
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2157E-04	.1079E-08	.1079E-08	.5395E-09
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2196E-07	.1106E-11	.1106E-11	.5531E-12
76 PuO2	.5614E-05	.2808E-09	.2808E-09	.1404E-09
22 RhO2	.2145E-05	.1073E-09	.1073E-09	.5364E-10
79 RuO2	.1036E-04	.5288E-09	.6288E-06	.3144E-06
23 RuO2 Semi Vol	.1222E-02	.6283E-06	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.8006E-04	.3100	.3100	.3100
111 SiO2	.1732E-01	.8656E-06	.8656E-06	.4328E-06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1937E-04	.9686E-09	.9686E-09	.4843E-09
10 Sr(NO3)2	.2266E-10	.1181E-14	.1131E-14	.5656E-15
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.8800E-04	.4401E-08	.4401E-08	.2201E-08
107 TiO2	.2768E-03	.1387E-07	.1387E-07	.6934E-08
119 Tritium	.5904E-09	.2743E-10	.1007E-10	.1007E-10
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.6154E-03	.8078E-07	.8078E-07	.1539E-07
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.1324E-04	.6622E-09	.6622E-09	.3311E-09
11 Y(NO3)3	.1609E-10	.8032E-15	.8032E-15	.4016E-15
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	49	50	51	52
	SWDBF #2	SWDBF #2	Ru Adsorber	I2 Adsorber
	Exit Liquid	Exit Gas	Gas Feed	Prehter Feed
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.5626E-03	.2814E-07	.2814E-07	.1407E-07
44 Zn(COOH)2	.6995E-04	.3499E-08	.3499E-08	.1749E-08
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1384E-03	.6934E-08	.6934E-08	.3467E-08
TOTAL FLOW, LB/HR	4083.80	2684.32	2564.20	2564.20
VAPOR FLOW, CFM		740.59	800.09	878.73
LIQUID FLOW, GPM	8.16			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4311	.0604	.0534	.0486
TEMPERATURE, DEG C	46.29	46.27	80.00	80.00
PRESSURE, ATM	.92	.92	.87	.80
PRESSURE, PSIG	-1.21	-1.24	-1.85	-3.00
PRESSURE, MM HG	697.45	695.70	664.09	604.66
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	192903.54	-29695.83	-82953.74	-82953.74

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	53 I2 Adsorber Gas Feed	54 Off-Gas Cool er Gas Feed	55 HEPA Gas Feed	56 Off-Gas Exh Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	69.63	69.63	69.63	69.63
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.7707E-10	.8853E-10	.8853E-10	.8853E-13
74 Al(OH)3	.4823E-07	.2412E-07	.2412E-07	.2412E-10
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1022E-06	.5108E-07	.5108E-07	.5108E-10
9 Ba(NO3)2	.6383E-15	.8169E-15	.8169E-15	.8169E-13
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5782E-09	.2866E-09	.2866E-09	.2866E-12
66 CO	7.614	7.614	7.614	7.614
37 CO2	16.57	16.57	16.57	16.57
142 CO2 (C14)	.1722E-23	.1722E-23	.1722E-23	.1722E-23
68 Ca(COOH)2	.1988E-07	.9942E-08	.9942E-08	.9942E-11
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1423E-08	.7142E-09	.7142E-09	.7142E-12
20 CaC2O4	.1545E-08	.7724E-09	.7724E-09	.7724E-12
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.8862E-09	.1931E-09	.1931E-09	.1931E-12
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1815E-08	.9073E-09	.9073E-09	.9073E-12
29 Carbon	.1842E-08	.6708E-09	.6708E-09	.6708E-12
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1468E-08	.7341E-09	.7341E-09	.7341E-12
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.8672E-14	.4336E-14	.4336E-14	.4336E-17
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.8915E-09	.4458E-09	.4458E-09	.4458E-12
96 CsCl	.5229E-06	.2614E-06	.2614E-06	.2614E-09
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.4065E-10	.2033E-10	.2033E-10	.2033E-13
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.6706E-09	.8353E-09	.8353E-09	.8353E-12
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.1167E-06	.5837E-07	.5837E-07	.5837E-10
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	53 I2 Adsorber Gas Feed	54 Off-Gas Cooler Gas Feed	55 HEPA Gas Feed	56 Off-Gas Exh Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 GroupA	.6488E-06	.8219E-06	.8219E-06	.8219E-09
103 GroupB	.8483E-08	.1716E-08	.1716E-08	.1716E-11
25 H2	.5827	.5827	.5827	.5827
183 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
125 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.3172E-06	.1586E-06	.1586E-06	.1586E-09
97 I2	.7755E-04	.7755E-06	.7755E-06	.7755E-09
89 K2O	.0000	.0000	.0000	.0000
121 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.3888E-11	.1944E-11	.1944E-11	.1944E-14
105 La2O3	.8467E-08	.1734E-08	.1734E-08	.1734E-11
103 Li2O	.8961E-07	.1981E-07	.1981E-07	.1981E-10
65 Mg(COOH)2	.3785E-08	.1892E-08	.1892E-08	.1892E-11
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.1390E-07	.6948E-08	.6948E-08	.6948E-11
60 Mn(COOH)2	.3395E-07	.1698E-07	.1698E-07	.1698E-10
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1896.	1896.	1896.	1896.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.9700	.9700	.9700	.9700
84 NO2	.1565	.1565	.1565	.1565
70 Na(HgO(OH))	.2419E-11	.1210E-11	.1210E-11	.1210E-14
94 Na2B4O7	.7308E-07	.3654E-07	.3654E-07	.3654E-10
109 Na2C2O4	.1560E-11	.7801E-12	.7801E-12	.7801E-15
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.1465E-06	.7324E-07	.7324E-07	.7324E-10
71 Na2PuO2(OH)4	.9812E-16	.4906E-16	.4906E-16	.4906E-19
73 Na2RhO4	.2017E-13	.1009E-13	.1009E-13	.1009E-16
72 Na2RuO4	.1968E-12	.9842E-13	.9842E-13	.9842E-16
6 Na2SO4	.3992E-09	.1996E-09	.1996E-09	.1996E-12
68 NaAlO2	.9812E-09	.4906E-09	.4906E-09	.4906E-12
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.9051E-07	.4526E-07	.4526E-07	.4526E-10

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	53 I2 Adsorber Gas Feed	54 Off-Gas Cool er Gas Feed	55 HEPA Gas Feed	56 Off-Gas Exh Exit Gas
7 NaCl	.4545E-05	.2272E-05	.2272E-05	.2272E-03
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8780E-05	.1865E-05	.1865E-05	.1865E-03
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.4535E-06	.2267E-06	.2267E-06	.2267E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1283E-07	.6417E-08	.6417E-08	.6417E-11
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1190E-07	.5949E-08	.5949E-08	.5949E-11
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	572.6	572.6	572.6	572.6
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.5395E-09	.2697E-09	.2697E-09	.2697E-12
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.5531E-12	.2765E-12	.2765E-12	.2765E-15
76 PuO2	.1404E-09	.7019E-10	.7019E-10	.7019E-13
22 RhO2	.5364E-10	.2682E-10	.2682E-10	.2682E-13
79 RuO2	.3144E-06	.1572E-06	.1572E-06	.1572E-09
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
88 RuO4	.0000	.0000	.0000	.0000
88 SO2	.3100	.3100	.3100	.3100
111 SiO2	.4323E-06	.2164E-06	.2164E-06	.2164E-09
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4843E-09	.2421E-09	.2421E-09	.2421E-12
10 Sr(NO3)2	.5656E-15	.2828E-15	.2828E-15	.2828E-18
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2201E-08	.1100E-08	.1100E-08	.1100E-11
107 TiO2	.6934E-08	.3467E-08	.3467E-08	.3467E-11
119 Tritium	.1007E-10	.1007E-10	.1007E-10	.1007E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1539E-07	.7695E-08	.7695E-08	.7695E-11
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.8311E-09	.1655E-09	.1655E-09	.1655E-12
11 Y(NO3)3	.4016E-15	.2008E-15	.2008E-15	.2008E-18
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	53	54	55	56
	12 Adsorber	Off-Gas Cool	HEPA	Off-Gas Exh
	Gas Feed	er Gas Feed	Gas Feed	Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1407E-07	.7034E-08	.7034E-08	.7034E-11
44 Zn(COOH)2	.1749E-08	.8746E-09	.8746E-09	.8746E-12
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.8467E-08	.1734E-08	.1734E-08	.1734E-11
TOTAL FLOW, LB/HR	2564.20	2564.20	2564.20	2564.20
VAPOR FLOW, CFM	1061.44	1136.31	901.41	723.73
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0403	.0376	.0474	.0591
TEMPERATURE, DEG C	150.00	150.00	50.00	89.80
PRESSURE, ATM	.79	.74	.71	.99
PRESSURE, PSIG	-3.10	-3.86	-4.27	-.11
PRESSURE, MM HG	599.79	560.27	539.37	754.53
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-39081.13	-39081.13	-101618.11	-76833.60

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVII	60 PVVII Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	404.8	21.61	24.99	24.99
45 Ag	.0000	.1919E-14	.1638E-07	.1638E-07
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.2571E-07	.2571E-07
51 AgOH	.9367E-04	.3791E-16	.4613E-08	.4613E-08
74 Al(OH)3	.8282E-01	.5388E-10	.4721E-06	.4721E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1752	.1142E-09	.2202E-05	.2202E-05
9 Ba(NO3)2	.7598E-09	.7080E-18	.6200E-14	.6200E-14
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6860E-03	.6403E-12	.5607E-08	.5607E-08
66 CO	.4420E-04	.4457E-10	.4493E-04	.4493E-04
87 CO2	.2216E-02	.3672E-02	10.00	10.00
142 CO2 (C14)	.2303E-27	.1350E-13	.8846E-10	.8846E-10
63 Ca(COOH)2	.2380E-01	.2221E-10	.1943E-06	.1943E-06
120 Ca(OH)2	.0000	.1234E-16	.1479E-09	.1479E-09
118 Ca3(PO4)2	.1709E-02	.1596E-11	.1397E-07	.1397E-07
20 CaC2O4	.1849E-02	.1726E-11	.1511E-07	.1511E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4622E-03	.4314E-12	.3778E-08	.3778E-08
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2172E-02	.2027E-11	.1775E-07	.1775E-07
29 Carbon	.1360E-02	.1499E-11	.1197E-07	.1197E-07
26 Co(COOH)2	.3757E-03	.3507E-12	.3067E-03	.3067E-03
121 Co(OH)2	.0000	.2134E-18	.2559E-11	.2559E-11
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1757E-02	.1640E-11	.1436E-07	.1436E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1101E-07	.9691E-17	.1099E-12	.1099E-12
137 Cs2O Semi Vol	.1813E-05	.0000	.0000	.0000
90 CsCOOH	.1062E-02	.9959E-12	.8721E-03	.8721E-03
96 CsCl	.6376E-07	.1085E-15	.5772E-10	.5772E-10
136 CsCl Semi Vol	.5262E-02	.0000	.0000	.0000
8 CsNO3	.4874E-04	.4541E-13	.3977E-09	.3977E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.8026E-03	.7491E-12	.6552E-03	.6552E-03
52 Cu(OH)2	.0000	.4641E-18	.5566E-11	.5566E-11
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2005	.1804E-09	.1143E-05	.1143E-05
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	57 OGCT Liquid to RCT	58 SMECT Vent to FAVC	59 Total Vessel Vent to PVVH	60 PVVH Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.8539E-02	.0000	.0000	.0000
102 GroupA	.1285E-02	.1209E-11	.1069E-07	.1069E-07
103 GroupB	.4109E-02	.3835E-11	.3358E-07	.3358E-07
25 H2	.8523E-05	.8354E-11	.3583E-05	.3583E-05
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.7388E-01	.4669E-01	.4669E-01
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.2921E-07	.8793E-03	.8793E-03
135 HgNO32	.0000	.0000	.1608E-10	.1608E-10
21 HgO	.3185E-02	.8284E-17	.1180E-09	.1130E-09
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.3184E-05	.4503E-14	.7148E-08	.7148E-08
105 La2O3	.4145E-02	.3876E-11	.7479E-07	.7479E-07
103 Li2O	.6783E-01	.4429E-10	.8537E-06	.8537E-06
65 Mg(COOH)2	.4530E-02	.4228E-11	.8698E-07	.8698E-07
55 Mg(OH)2	.0000	.2104E-17	.2523E-10	.2523E-10
33 MgO	.2297E-01	.1553E-10	.2995E-06	.2995E-06
60 Mn(COOH)2	.4067E-01	.3793E-10	.3317E-06	.3317E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.1624E-15	.6528E-08	.6528E-08
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4346E-02	188.0	1292.	1292.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.1268E-04	.1491E-05	1.243	1.243
84 NO2	.8839E-02	.2168E-03	.1882E-01	.1382E-01
70 Na(HgO(OH))	.2901E-05	.2703E-14	.2367E-10	.2367E-10
94 Na2B4O7	.1113	.2360E-14	.1256E-08	.1256E-08
109 Na2C2O4	.1277E-05	.1807E-14	.2868E-08	.2868E-08
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2513	.1377E-09	.2653E-05	.2653E-05
71 Na2PuO2(OH)4	.1176E-09	.1096E-18	.9599E-15	.9599E-15
73 Na2RhO4	.2418E-07	.2253E-16	.1973E-12	.1973E-12
72 Na2RuO4	.2360E-06	.2199E-15	.1926E-11	.1926E-11
6 Na2SO4	.4786E-03	.4459E-12	.3905E-08	.3905E-08
68 NaAlO2	.1176E-02	.1096E-11	.9599E-08	.9599E-08
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1342	.1007E-09	.9346E-06	.9346E-06

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	57	58	59	60
	OGCT Liquid	SMECT Vent	Total Vessel	PVVH Exit
	to RCT	to FAVC	Vent to PVVH	Gas
7 NaCl	.4768E-03	.4445E-12	.4723E-03	.4723E-03
138 NaCl Semi Vol	.7271E-01	.0000	.0000	.0000
69 NaF	.1266E-01	.2419E-14	.8311E-09	.8311E-09
139 NaF Semi Vol	.5919E-01	.0000	.0000	.0000
12 NaI	.4619E-04	.4309E-13	.4489E-09	.4489E-09
125 NaI Semi Vol	.6187E-02	.0000	.0000	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1539E-01	.1404E-10	.2771E-06	.2771E-06
4 NaOH	.0000	.0000	.1200E-09	.1200E-09
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1424E-01	.1329E-10	.1162E-06	.1162E-06
17 Ni(OH)2	.0000	.8081E-17	.9690E-10	.9690E-10
40 NiO	.0000	.0000	.0000	.0000
82 O2	.2490E-02	56.78	390.3	390.3
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6456E-03	.6026E-12	.5277E-03	.5277E-03
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.6591E-06	.6178E-15	.5403E-11	.5403E-11
76 PuO2	.1680E-03	.1568E-12	.1373E-08	.1373E-08
22 RhO2	.6420E-04	.5992E-13	.5247E-09	.5247E-09
79 RuO2	.8112E-03	.2954E-12	.2620E-08	.2620E-08
23 RuO2 Semi Vol	.8102E-02	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.5189E-05	.2064E-10	.5283E-05	.5283E-05
111 SiO2	.7423	.4838E-09	.8960E-05	.8960E-05
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.5796E-03	.5410E-12	.4731E-08	.4731E-08
10 Sr(NO3)2	.6780E-09	.6318E-18	.5533E-14	.5533E-14
127 Sr(OH)2	.0000	.8613E-18	.4332E-11	.4332E-11
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2634E-02	.2458E-11	.2153E-07	.2153E-07
107 TiO2	.8290E-02	.7752E-11	.1496E-06	.1496E-06
119 Tritium	.1577E-09	.1944E-10	.5189E-10	.5189E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1842E-01	.1719E-10	.1504E-06	.1504E-06
16 UO2(OH)2	.0000	.1416E-16	.1698E-09	.1698E-09
27 Y(COOH)3	.8962E-03	.8698E-12	.8234E-08	.8234E-08
11 Y(NO3)3	.4815E-09	.4486E-18	.3929E-14	.3929E-14
128 Y(OH)3	.0000	.2254E-18	.2702E-11	.2702E-11
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	57	58	59	60
	OGCT Liquid	SMECT Vent	Total Vessel	PVVH Exit
	to RCT	to FAVC	Vent to PVVH	Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1684E-01	.1572E-10	.1376E-06	.1376E-06
44 Zn(COOH)2	.2094E-02	.1954E-11	.1709E-07	.1709E-07
54 Zn(OH)2	.0000	.1219E-17	.1462E-10	.1462E-10
57 ZnO	.0000	.0000	.0000	.0000
104 ZnO2	.4145E-02	.3876E-11	.7479E-07	.7479E-07
TOTAL FLOW, LB/HR	406.95	266.45	1718.58	1718.58
VAPOR FLOW, CFM		70.85	418.02	429.56
LIQUID FLOW, GPM	.81			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6167	.0627	.0694	.0667
TEMPERATURE, DEG C	55.00	50.00	16.63	26.63
PRESSURE, ATM	.97	.97	.92	.92
PRESSURE, PSIG	-.51	-.51	-1.16	-1.23
PRESSURE, MM HG	733.40	733.86	700.26	696.54
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	22822.05	-1065.56	-97201.42	-93118.86

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	61 PVVF Exit Gas	62 HNO3 Rinse to MVS	63 Water Rinse to MVS	64 MVS Rinses to SWT
COMPONENT FLOWS, LB/HR				
1 H2O	24.99	.8866E-01	.2738	.8573
45 Ag	.1638E-10	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.2571E-10	.0000	.0000	.2482E-05
51 AgOH	.4613E-11	.0000	.0000	.3841E-13
74 Al(OH)3	.4721E-09	.0000	.0000	.8515E-11
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2202E-08	.0000	.0000	.1281E-12
9 Ba(NO3)2	.6200E-17	.0000	.0000	.1119E-18
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5607E-11	.0000	.0000	.1012E-12
66 CO	.4493E-04	.0000	.0000	.0000
87 CO2	10.00	.0000	.0000	.1380E-32
142 CO2 (C14)	.8846E-10	.0000	.0000	.0000
63 Ca(COOH)2	.1943E-09	.0000	.0000	.2510E-11
120 Ca(OH)2	.1479E-12	.0000	.0000	.3216E-24
113 Ca3(PO4)2	.1897E-10	.0000	.0000	.2522E-12
20 CaC2O4	.1511E-10	.0000	.0000	.2727E-12
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.8778E-11	.0000	.0000	.6818E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1775E-10	.0000	.0000	.8204E-12
29 Carbon	.1197E-10	.0000	.0000	.6386E-13
26 Co(COOH)2	.8067E-08	.0000	.0000	.5548E-13
121 Co(OH)2	.2559E-14	.0000	.0000	.5563E-26
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1436E-10	.0000	.0000	.2592E-12
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1099E-15	.0000	.0000	.1531E-17
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.8721E-11	.0000	.0000	.1574E-12
96 CsCl	.5772E-13	.0000	.0000	.1639E-16
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.3977E-12	.0000	.0000	.7177E-14
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.6552E-11	.0000	.0000	.1184E-12
52 Cu(OH)2	.5566E-14	.0000	.0000	.1210E-25
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.1143E-08	.0000	.0000	.2061E-10
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	61	62	63	64
	PVVF Exit	HNO3 Rinse	Water Rinse	MVS Rinses
	Gas	to MVS	to MVS	to SWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1069E-10	.0000	.0000	.1911E-12
103 GroupB	.3358E-10	.0000	.0000	.6061E-12
25 H2	.8588E-05	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.4669E-01	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.1141E-01	.0000	.1140E-01
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.8793E-08	.0000	.0000	.0000
135 HgNO32	.1608E-13	.0000	.0000	.1288E-05
21 HgO	.1130E-12	.0000	.0000	.1078E-13
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.7148E-11	.0000	.0000	.6865E-15
105 La2O3	.7479E-10	.0000	.0000	.2978E-14
108 Li2O	.8537E-09	.0000	.0000	.4957E-13
65 Mg(COOH)2	.3698E-10	.0000	.0000	.6682E-12
55 Mg(OH)2	.2523E-13	.0000	.0000	.5484E-25
33 MgO	.2995E-09	.0000	.0000	.1662E-13
60 Mn(COOH)2	.3317E-09	.0000	.0000	.5994E-11
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.6528E-11	.0000	.0000	.4233E-23
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1292.	.0000	.0000	.7651E-17
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	1.243	.0000	.0000	.0000
84 NO2	.1382E-01	.0000	.0000	.1023E-05
70 Na(HgO(OH))	.2367E-13	.0000	.0000	.4272E-15
94 Na2B4O7	.1256E-11	.0000	.0000	.8565E-15
109 Na2C2O4	.2868E-11	.0000	.0000	.2754E-15
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2653E-08	.0000	.0000	.1820E-12
71 Na2PuO2(OH)4	.9599E-18	.0000	.0000	.1732E-19
73 Na2RhO4	.1973E-15	.0000	.0000	.3561E-17
72 Na2RuO4	.1926E-14	.0000	.0000	.8475E-16
6 Na2SO4	.3905E-11	.0000	.0000	.7047E-13
68 NaAlO2	.9599E-11	.0000	.0000	.1732E-12
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.9846E-09	.0000	.0000	.1470E-10

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	61 PVVF Exit Gas	62 HNO3 Rinse to MVS	63 Water Rinse to MVS	64 MVS Rinses to SWT
7 NaCl	.4723E-11	.0000	.0000	.7025E-13
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8311E-12	.0000	.0000	.3715E-15
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.4489E-12	.0000	.0000	.6809E-14
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2771E-09	.0000	.0000	.2572E-11
4 NaOH	.1200E-12	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1162E-09	.0000	.0000	.2101E-11
17 Ni(OH)2	.9690E-13	.0000	.0000	.2106E-24
40 NiO	.0000	.0000	.0000	.0000
82 O2	390.3	.0000	.0000	.7456E-17
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.5277E-11	.0000	.0000	.9524E-13
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.5403E-14	.0000	.0000	.9764E-16
76 PuO2	.1373E-11	.0000	.0000	.2478E-13
22 RhO2	.5247E-12	.0000	.0000	.9470E-14
79 RuO2	.2620E-11	.0000	.0000	.4668E-13
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.5283E-05	.0000	.0000	.0000
111 SiO2	.8960E-08	.0000	.0000	.4490E-11
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4731E-11	.0000	.0000	.8550E-13
10 Sr(NO3)2	.5533E-17	.0000	.0000	.9985E-19
127 Sr(OH)2	.4332E-14	.0000	.0000	.9417E-26
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2153E-10	.0000	.0000	.3885E-12
107 TiO2	.1496E-09	.0000	.0000	.5955E-14
119 Tritium	.5189E-10	.0000	.0000	.2155E-26
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1504E-09	.0000	.0000	.2717E-11
16 UO2(OH)2	.1698E-12	.0000	.0000	.8691E-24
27 Y(COOH)3	.8234E-11	.0000	.0000	.5845E-13
11 Y(NO3)3	.8929E-17	.0000	.0000	.7090E-19
128 Y(OH)3	.2702E-14	.0000	.0000	.5874E-26
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	61	62	63	64
	PVVF Exit	HNO3 Rinse	Water Rinse	MVS Rinses
	Gas	to MVS	to MVS	to SWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1376E-09	.0000	.0000	.2484E-11
44 Zn(COOH)2	.1709E-10	.0000	.0000	.8088E-12
51 Zn(OH)2	.1462E-13	.0000	.0000	.8177E-25
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7479E-10	.0000	.0000	.2978E-14
TOTAL FLOW, LB/HR	1718.58	.10	.27	.27
VAPOR FLOW, CFM	436.56			
LIQUID FLOW, GPM		.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	.0656	65.0373	62.4300	63.0822
TEMPERATURE, DEG C	26.63	25.00	25.00	88.00
PRESSURE, ATM	.90	1.00	1.00	1.00
PRESSURE, PSIG	-1.44	.00	.00	.00
PRESSURE, MM HG	685.37			
PHASE	VAPOR	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	-93118.86	2.20	6.94	13.94

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT #1
COMPONENT FLOWS, LB/HR				
1 H2O	.7876E-04	.2493	.0000	.9553E-02
45 Ag	.1591E-07	.2862E-09	.0000	.1593E-03
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.5470E-09	.2571E-07	.0000	.1464E-02
51 AgOH	.8405E-17	.4092E-08	.0000	.1459E-10
74 Al(OH)3	.1877E-14	.1942E-10	.0000	.9113E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2824E-16	.2921E-12	.0000	.1571E-07
9 Ba(NO3)2	.2466E-22	.2551E-18	.0000	.1193E-13
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2230E-16	.2307E-12	.0000	.1083E-07
66 CO	.0000	.8498E-27	.0000	.3060E-34
87 CO2	.8042E-36	.1276E-05	.0000	.3501E-11
142 CO2 (C14)	.0000	.4372E-24	.0000	.1199E-29
63 Ca(COOH)2	.7737E-15	.8004E-11	.0000	.3757E-06
120 Ca(OH)2	.7083E-28	.7332E-24	.0000	.3441E-19
113 Ca3(PO4)2	.5553E-16	.5750E-12	.0000	.2699E-07
20 CaC2O4	.6011E-16	.6219E-12	.0000	.2919E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1503E-16	.1555E-12	.0000	.7297E-03
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7061E-16	.7305E-12	.0000	.3428E-07
29 Carbon	.1513E-16	.1570E-12	.0000	.7369E-08
26 Co(COOH)2	.1222E-16	.1264E-12	.0000	.5932E-08
121 Co(OH)2	.1226E-29	.1268E-25	.0000	.5953E-21
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.5713E-16	.5910E-12	.0000	.2774E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.3375E-21	.3491E-17	.0000	.1638E-12
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.3469E-16	.3589E-12	.0000	.1684E-07
96 CsCl	.3612E-20	.3737E-16	.0000	.1754E-11
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1582E-17	.1637E-13	.0000	.7681E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2610E-16	.2700E-12	.0000	.1267E-07
52 Cu(OH)2	.2667E-29	.2759E-25	.0000	.1295E-20
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.4543E-14	.4699E-10	.0000	.2206E-05
80 Fe2O3	.0000	.0000	.0000	.0000

AIM

Association for Information and Image Management

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9 of 10

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT #1
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.4212E-16	.4357E-12	.0000	.2045E-07
103 GroupB	.1336E-15	.1882E-11	.0000	.6486E-07
25 H2	.0000	.6968E-26	.0000	.6105E-33
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.2513E-05	.4115E-02	.0000	.1237E-03
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.1093E-01	.2250E-03	.0000	1.357
135 HgNO32	.2729E-09	.1608E-10	.0000	.9116E-06
21 HgO	.2376E-17	.4761E-11	.0000	.1149E-03
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1513E-18	.1565E-14	.0000	.7347E-10
105 La2O3	.6563E-18	.6790E-14	.0000	.3187E-09
108 Li2O	.1093E-16	.1130E-12	.0000	.5305E-08
65 Mg(COOH)2	.1473E-15	.1524E-11	.0000	.7151E-07
55 Mg(OH)2	.1209E-28	.1250E-24	.0000	.5869E-20
33 MgO	.8663E-17	.3789E-13	.0000	.1778E-08
60 Mn(COOH)2	.1321E-14	.1367E-10	.0000	.6415E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.9330E-27	.9652E-23	.0000	.4530E-18
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1686E-20	17.15	.0000	.2520E-06
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.5327E-17	.0000	.1143E-23
84 NO2	.2254E-09	.6770E-02	.0000	.1332E-04
70 Na(HgO(OH))	.9415E-19	.9740E-15	.0000	.4571E-10
94 Na2B4O7	.7858E-19	.8129E-15	.0000	.3815E-10
109 Na2C2O4	.6071E-19	.6280E-15	.0000	.2948E-10
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.4011E-16	.4149E-12	.0000	.1947E-07
71 Na2PuO2(OH)4	.3818E-23	.3950E-19	.0000	.1854E-14
73 Na2RhO4	.7850E-21	.8121E-17	.0000	.3811E-12
72 Na2RuO4	.7660E-20	.7924E-16	.0000	.3719E-11
6 Na2SO4	.1553E-16	.1607E-12	.0000	.7542E-08
68 NaAlO2	.3818E-16	.3950E-12	.0000	.1854E-07
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3241E-14	.3352E-10	.0000	.1573E-05

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	65 MVS Bottoms to MAWT	66 MVC Vent to PVVS	67 MVS Vent to Vacuum Pump	68 MAWT Hg to MFT #1
7 NaCl	.1548E-16	.1602E-12	.0000	.7518E-08
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8189E-19	.8472E-15	.0000	.3976E-10
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1501E-17	.1552E-18	.0000	.7287E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.5663E-15	.3786E-07	.0000	.2374E-06
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.4630E-15	.4790E-11	.0000	.2248E-06
17 Ni(OH)2	.4643E-28	.4808E-24	.0000	.2254E-19
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1644E-20	5.181	.0000	.1479E-06
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2099E-16	.2172E-12	.0000	.1019E-07
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2152E-19	.2226E-15	.0000	.1045E-10
76 PuO2	.5463E-17	.5651E-13	.0000	.2652E-08
22 RhO2	.2087E-17	.2159E-13	.0000	.1013E-08
79 RuO2	.1029E-16	.1064E-12	.0000	.4995E-08
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.8208E-27	.0000	.2342E-33
111 SiO2	.9896E-15	.1024E-10	.0000	.4805E-06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1885E-16	.1950E-12	.0000	.9150E-08
10 Sr(NO3)2	.2201E-22	.2277E-18	.0000	.1069E-13
127 Sr(OH)2	.2076E-29	.2147E-25	.0000	.1008E-20
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.8564E-16	.8859E-12	.0000	.4158E-07
107 TiO2	.1313E-17	.1358E-13	.0000	.6373E-09
119 Tritium	.4751E-30	.1741E-15	.0000	.1491E-16
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.5989E-15	.6196E-11	.0000	.2908E-06
16 UO2(OH)2	.8185E-28	.8415E-24	.0000	.3950E-19
27 Y(COOH)3	.1288E-16	.1333E-12	.0000	.6255E-08
11 Y(NO3)3	.1563E-22	.1617E-18	.0000	.7588E-14
128 Y(OH)3	.1295E-29	.1339E-25	.0000	.6287E-21
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	65	66	67	68
	MVS Bottoms	MVC Vent	MVS Vent to	MAWT Hg
	to MAWT	to PVVS	Vacuum Pump	to MFT #1
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.5475E-15	.5664E-11	.0000	.2658E-06
44 Zn(COOH)2	.6807E-16	.7042E-12	.0000	.8305E-07
54 Zn(OH)2	.7003E-29	.7244E-25	.0000	.3400E-20
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.6563E-18	.6790E-14	.0000	.3187E-09
TOTAL FLOW, LB/HR	.01	22.59	.00	1.37
VAPOR FLOW, CFM		5.12	.00	
LIQUID FLOW, GPM	.00			.00
DESIGN FLOW,				
DENSITY, LBS/FT3	774.7558	.0785	.0000	775.3479
TEMPERATURE, DEG C	88.00	15.00	88.00	88.00
PRESSURE, ATM	1.00	.97	.02	.99
PRESSURE, PSIG	.00	-.43	-14.42	-.07
PRESSURE, MM HG		737.58	14.37	756.20
PHASE	LIQUID	VAPOR	VAPOR	LIQUID
ENTHALPY, PCU/HR	.02	-1852.22	.00	2.08

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	69 Hg Feed to MASC	71 HNO3 Wash to MASC	72 HNO3 Wash from MASC	73 NaOH to SWT
COMPONENT FLOWS, LB/HR				
1 H2O	.2542	.1831	.4863	.8027E-01
45 Ag	.1593E-03	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.1464E-02	.0000	.1707E-02	.0000
51 AgOH	.4110E-08	.0000	.4101E-08	.0000
74 Al(OH)3	.9113E-06	.0000	.9093E-06	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1871E-07	.0000	.1368E-07	.0000
9 Ba(NO3)2	.1198E-18	.0000	.1195E-13	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1083E-07	.0000	.1081E-07	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.9410E-15	.0000	.9389E-15	.0000
142 CO2 (C14)	.3253E-33	.0000	.3245E-33	.0000
63 Ca(COOH)2	.3757E-06	.0000	.3749E-06	.0000
120 Ca(OH)2	.8441E-19	.0000	.8434E-19	.0000
113 Ca3(PO4)2	.2699E-07	.0000	.2693E-07	.0000
20 CaC2O4	.2919E-07	.0000	.2912E-07	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.7297E-08	.0000	.7281E-08	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.8428E-07	.0000	.8421E-07	.0000
29 Carbon	.7870E-08	.0000	.7853E-08	.0000
26 Co(COOH)2	.5932E-08	.0000	.5919E-08	.0000
121 Co(OH)2	.5953E-21	.0000	.5940E-21	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2774E-07	.0000	.2768E-07	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1638E-12	.0000	.1635E-12	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.1684E-07	.0000	.1681E-07	.0000
96 CsCl	.1754E-11	.0000	.1750E-11	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.7681E-09	.0000	.7665E-09	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1267E-07	.0000	.1264E-07	.0000
52 Cu(OH)2	.1295E-20	.0000	.1292E-20	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2206E-05	.0000	.2201E-05	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	69 Hg Feed to MASC	71 HNO ₃ Wash to MASC	72 HNO ₃ Wash from MASC	78 NaOH to SWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2045E-07	.0000	.2041E-07	.0000
103 GroupB	.6486E-07	.0000	.6472E-07	.0000
25 H ₂	.4490E-38	.0000	.4490E-38	.0000
133 H ₂ C ₂ O ₄	.0000	.0000	.0000	.0000
91 H ₂ O ₂	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO ₃	.2933E-03	.2497E-01	.2501E-01	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	1.857	.0000	.0000	.0000
135 HgNO ₃ 2	.9116E-06	.0000	.1625E-04	.0000
21 HgO	.1154E-08	.0000	.1151E-08	.0000
97 I ₂	.0000	.0000	.0000	.0000
39 K ₂ O	.0000	.0000	.0000	.0000
131 KMnO ₄	.0000	.0000	.0000	.0000
118 KNO ₃	.7847E-10	.0000	.7831E-10	.0000
105 La ₂ O ₃	.3187E-09	.0000	.3180E-09	.0000
108 Li ₂ O	.5305E-08	.0000	.5294E-08	.0000
65 Mg(COOH) ₂	.7151E-07	.0000	.7186E-07	.0000
55 Mg(OH) ₂	.5869E-20	.0000	.5856E-20	.0000
23 MgO	.1778E-08	.0000	.1774E-08	.0000
60 Mn(COOH) ₂	.6415E-06	.0000	.6401E-06	.0000
132 Mn(NO ₃) ₂	.0000	.0000	.0000	.0000
129 Mn(OH) ₂	.4530E-18	.0000	.4520E-18	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO ₂	.0000	.0000	.0000	.0000
81 N ₂	.5600E-05	.0000	.5588E-05	.0000
143 Na ₂ CO ₃ (C14)	.0000	.0000	.0000	.0000
85 NO	.1884E-28	.0000	.1879E-28	.0000
84 NO ₂	.5162E-05	.0000	.7661E-04	.0000
70 Na(HgO(OH))	.4571E-10	.0000	.4561E-10	.0000
94 Na ₂ B ₄ O ₇	.3815E-10	.0000	.3807E-10	.0000
109 Na ₂ C ₂ O ₄	.2948E-10	.0000	.2941E-10	.0000
5 Na ₂ CO ₃	.0000	.0000	.0000	.0000
32 Na ₂ O	.1947E-07	.0000	.1943E-07	.0000
71 Na ₂ PuO ₂ (OH) ₄	.1854E-14	.0000	.1850E-14	.0000
73 Na ₂ RhO ₄	.3811E-12	.0000	.3803E-12	.0000
72 Na ₂ RuO ₄	.3719E-11	.0000	.3711E-11	.0000
6 Na ₂ SO ₄	.7542E-08	.0000	.7526E-08	.0000
68 NaAlO ₂	.1854E-07	.0000	.1850E-07	.0000
114 NaBO ₂	.0000	.0000	.0000	.0000
140 NaBO ₂ Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1573E-05	.0000	.1570E-05	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	69 Hg Feed to MASC	71 HNO ₃ Wash to MASC	72 HNO ₃ Wash from MASC	73 NaCl to SWT
7 NaCl	.7518E-08	.0000	.7501E-08	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8976E-10	.0000	.3968E-10	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.7287E-09	.0000	.7271E-09	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO ₂	.0000	.0000	.0000	.0000
2 NaNO ₃	.2752E-06	.0000	.2746E-06	.0000
4 NaOH	.0000	.0000	.0000	.8027E-01
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH) ₂	.2248E-06	.0000	.2243E-06	.0000
17 Ni(OH) ₂	.2254E-19	.0000	.2249E-19	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O ₂	.3287E-05	.0000	.3280E-05	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO ₄	.1019E-07	.0000	.1017E-07	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH) ₂	.0000	.0000	.0000	.0000
112 PdNO ₃ 2	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH) ₄	.1045E-10	.0000	.1043E-10	.0000
76 PuO ₂	.2652E-08	.0000	.2647E-08	.0000
22 RhO ₂	.1013E-08	.0000	.1011E-08	.0000
79 RuO ₂	.4996E-08	.0000	.4985E-08	.0000
23 RuO ₂ Semi Vol	.0000	.0000	.0000	.0000
83 RuO ₄	.0000	.0000	.0000	.0000
38 SO ₂	.0000	.0000	.0000	.0000
111 SiO ₂	.4805E-06	.0000	.4795E-06	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH) ₂	.9150E-08	.0000	.9120E-08	.0000
10 Sr(NO ₃) ₂	.1069E-13	.0000	.1066E-13	.0000
127 Sr(OH) ₂	.1008E-20	.0000	.1006E-20	.0000
80 SrCO ₃	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO ₂	.4158E-07	.0000	.4149E-07	.0000
107 TiO ₂	.6373E-09	.0000	.6359E-09	.0000
119 Tritium	.5324E-16	.0000	.5313E-16	.0000
93 UO ₂	.0000	.0000	.0000	.0000
62 UO ₂ (COOH) ₂	.2908E-06	.0000	.2902E-06	.0000
16 UO ₂ (OH) ₂	.8950E-19	.0000	.8941E-19	.0000
27 Y(COOH) ₃	.6256E-08	.0000	.6242E-08	.0000
11 Y(NO ₃) ₃	.7588E-14	.0000	.7572E-14	.0000
128 Y(OH) ₃	.6287E-21	.0000	.6273E-21	.0000
81 Y ₂ (CO ₃) ₃	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	69	71	72	73
	Hg Feed to	HNO3 Wash	HNO3 Wash	NaOH to
	MASC	to MASC	from MASC	SWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2658E-06	.0000	.2652E-06	.0000
44 Zn(COOH)2	.8305E-07	.0000	.8298E-07	.0000
54 Zn(OH)2	.3400E-20	.0000	.8393E-20	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.3187E-09	.0000	.3180E-09	.0000
TOTAL FLOW, LB/HR	1.61	.21	.46	.16
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	283.7800	65.0373	63.7668	84.9613
TEMPERATURE, DEG C	88.00	25.00	88.00	25.00
PRESSURE, ATM	2.36	1.34	1.00	1.00
PRESSURE, PSIG	19.99	5.00	.00	.00
PRESSURE, MM HG				
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	11.54	4.82	17.16	2.69

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MWWC	78 Water Wash to MWWC
COMPONENT FLOWS, LB/HR				
1 H2O	1.150	.9609E-03	.8480E-01	.1997
45 Ag	.0000	.1593E-05	.1593E-05	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.8759E-05	.8759E-05	.0030
51 AgOH	.1844E-01	.9031E-11	.9031E-11	.0000
74 Al(OH)3	.1537E-04	.2002E-08	.2002E-08	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2312E-06	.8013E-10	.8013E-10	.0000
9 Ba(NO3)2	.2020E-12	.2631E-16	.2631E-16	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1826E-06	.2380E-10	.2380E-10	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.1030E-13	.2068E-17	.5511E-22	.0000
142 CO2 (C14)	.8530E-32	.7147E-36	.0000	.0000
63 Ca(COOH)2	.6386E-05	.8255E-09	.8255E-09	.0000
120 Ca(OH)2	.5804E-18	.7562E-22	.7562E-22	.0000
113 Ca3(PO4)2	.4551E-06	.5930E-10	.5930E-10	.0000
20 CaC2O4	.4922E-06	.6414E-10	.6413E-10	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1231E-06	.1603E-10	.1603E-10	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.5782E-06	.7533E-10	.7533E-10	.0000
29 Carbon	.1243E-06	.1619E-10	.1619E-10	.0000
26 Co(COOH)2	.1000E-06	.1303E-10	.1303E-10	.0000
121 Co(OH)2	.1004E-19	.1308E-23	.1308E-23	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.4678E-06	.6095E-10	.6095E-10	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2763E-11	.3600E-15	.8600E-15	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.2841E-06	.8701E-10	.8701E-10	.0000
96 CsCl	.2958E-10	.8854E-14	.8854E-14	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1295E-07	.1688E-11	.1688E-11	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2137E-06	.2784E-10	.2784E-10	.0000
52 Cu(OH)2	.2184E-19	.2845E-23	.2845E-23	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.8720E-04	.4847E-08	.4846E-08	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MWWC	78 Water Wash to MWWC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.8449E-06	.4494E-10	.4494E-10	.0000
103 GroupB	.1094E-05	.1425E-09	.1425E-09	.0000
25 H2	.5740E-37	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.5507E-04	.1216E-04	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	1.857	1.857	.0000
135 HgNO32	.0000	.8578E-07	.8578E-07	.0000
21 HgO	.2136E-04	.2535E-11	.2535E-11	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1239E-08	.1614E-12	.1614E-12	.0000
105 Ln2O3	.5374E-08	.7002E-12	.7002E-12	.0000
108 Li2O	.8947E-07	.1166E-10	.1166E-10	.0000
65 Mg(COOH)2	.1206E-05	.1571E-09	.1571E-09	.0000
55 Mg(OH)2	.9897E-19	.1290E-22	.1290E-22	.0000
33 MgO	.2999E-07	.8908E-11	.8908E-11	.0000
60 Mn(COOH)2	.1082E-04	.1410E-03	.1410E-08	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.7640E-17	.9954E-21	.9954E-21	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1675E-04	.1230E-07	.2405E-05	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.2633E-27	.4139E-81	.8631E-37	.0000
84 NO2	.8516E-04	.1687E-06	.8291E-08	.0000
70 Na(HgO(OH))	.7709E-09	.1004E-12	.1004E-12	.0000
94 Na2B4O7	.6434E-09	.8383E-13	.8383E-13	.0000
109 Na2C2O4	.4971E-09	.6477E-13	.6477E-13	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.8284E-06	.4279E-10	.4279E-10	.0000
71 Na2PuO2(OH)4	.8127E-13	.4074E-17	.4074E-17	.0000
73 Na2RhO4	.6428E-11	.8375E-15	.8375E-15	.0000
72 Na2RuO4	.6272E-10	.8172E-14	.8172E-14	.0000
6 Na2SO4	.1272E-06	.1657E-10	.1657E-10	.0000
68 NaAlO2	.8127E-06	.4074E-10	.4074E-10	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.2654E-04	.8457E-03	.8457E-08	.0000

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	74 Neut Hg Wash to SME	75 Washed Hg from MASC	76 Hg Feed to MWWC	78 Water Wash to MWWC
7 NaCl	.1263E-06	.1652E-10	.1652E-10	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.6703E-09	.8737E-13	.8737E-13	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1229E-07	.1601E-11	.1601E-11	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6483E-01	.6047E-09	.6047E-09	.0000
4 NaOH	.4993E-01	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.8791E-05	.4940E-09	.4940E-09	.0000
17 Ni(OH)2	.8802E-18	.4954E-22	.4954E-22	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.9830E-05	.7223E-08	.1412E-05	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1719E-06	.2240E-10	.2240E-10	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.1762E-09	.2296E-18	.2296E-13	.0000
76 PuO2	.4473E-07	.5828E-11	.5828E-11	.0000
22 RhO2	.1709E-07	.2227E-11	.2227E-11	.0000
79 RuO2	.8425E-07	.1098E-10	.1098E-10	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.8104E-05	.1056E-08	.1056E-03	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1543E-06	.2011E-10	.2011E-10	.0000
10 Sr(NO3)2	.1802E-12	.2348E-16	.2348E-16	.0000
127 Sr(OH)2	.1700E-19	.2215E-23	.2214E-23	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.7012E-06	.9137E-10	.9137E-10	.0000
107 TiO2	.1075E-07	.1400E-11	.1400E-11	.0000
119 Tritium	.2479E-15	.1170E-18	.5376E-19	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.4904E-05	.6390E-09	.6390E-09	.0000
16 UO2(OH)2	.6661E-18	.8679E-22	.8679E-22	.0000
27 Y(COOH)3	.1053E-06	.1375E-10	.1375E-10	.0000
11 Y(NO3)3	.1280E-12	.1667E-16	.1667E-16	.0000
128 Y(OH)3	.1060E-19	.1381E-23	.1381E-23	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	74	75	76	78
	Neut Hg Wash	Washed Hg	Hg Feed	Water Wash
	to SME	from MASC	to MWWC	to MWWC
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.4483E-05	.5841E-09	.5841E-09	.0000
44 Zn(COOH)2	.5574E-06	.7262E-10	.7262E-10	.0000
54 Zn(OH)2	.5734E-19	.7471E-23	.7471E-28	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.5374E-08	.7002E-12	.7002E-12	.0000
TOTAL FLOW, LB/HR	1.28	1.83	1.89	.20
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	66.4258	887.9642	648.6918	62.4300
TEMPERATURE, DEG C	88.00	88.00	88.00	25.00
PRESSURE, ATM	.99	1.00	2.86	1.84
PRESSURE, PSIG	-.07	.00	19.99	5.00
PRESSURE, MM HG	756.20			
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	46.25	1.74	8.05	5.06

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	79 Water Wash from MWWC	80 Washed Hg from MWWC	81 Washed Hg to MVS	82 Purified Hg
COMPONENT FLOWS, LB/HR				
1 H2O	.2385	.9988E-03	.9983E-03	.9982E-03
45 Ag	.0000	.1593E-05	.1593E-05	.1593E-08
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.3743E-05	.1600E-07	.1600E-07	.1600E-10
51 AgOH	.8993E-11	.3845E-13	.3845E-13	.3845E-16
74 Al(OH)3	.1994E-08	.8525E-11	.8525E-11	.8525E-14
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.3000E-10	.1283E-12	.1283E-12	.1283E-15
9 Ba(NO3)2	.2620E-16	.1120E-18	.1120E-18	.1120E-21
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2869E-10	.1013E-12	.1013E-12	.1013E-15
66 CO	.0000	.0000	.0000	.0000
87 CO2	.5487E-22	.2346E-24	.2346E-24	.2346E-24
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.8220E-09	.3515E-11	.3515E-11	.3515E-14
120 Ca(OH)2	.7580E-22	.3220E-24	.3220E-24	.3220E-27
113 Ca8(PO4)2	.5905E-10	.2525E-12	.2525E-12	.2525E-15
20 CaC2O4	.6383E-10	.2731E-12	.2731E-12	.2731E-15
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1597E-10	.6827E-13	.6827E-13	.6827E-16
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.7501E-10	.3207E-12	.3207E-12	.3207E-15
29 Carbon	.1612E-10	.6894E-13	.6894E-13	.6894E-16
26 Co(COOH)2	.1293E-10	.5549E-13	.5549E-13	.5549E-16
121 Co(OH)2	.1803E-23	.5569E-26	.5569E-26	.5569E-29
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.6069E-10	.2595E-12	.2595E-12	.2595E-15
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.3585E-15	.1533E-17	.1533E-17	.1533E-20
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.3686E-10	.1576E-12	.1576E-12	.1576E-15
96 CsCl	.3838E-14	.1641E-16	.1641E-16	.1641E-19
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1681E-11	.7186E-14	.7186E-14	.7186E-17
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2772E-10	.1185E-12	.1185E-12	.1185E-15
52 Cu(OH)2	.2883E-23	.1211E-25	.1211E-25	.1211E-28
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.4826E-08	.2063E-10	.2063E-10	.2063E-13
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	79 Water Wash from MWWC	80 Washed Hg from MWWC	81 Washed Hg to MVS	82 Purified Hg
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.4474E-10	.1913E-12	.1913E-12	.1913E-15
103 GroupB	.1419E-09	.6068E-12	.6068E-12	.6068E-15
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.1210E-04	.5176E-07	.5176E-07	.5176E-07
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	1.357	1.357	1.346
135 HgNO32	.8563E-07	.1523E-09	.1523E-09	.1523E-12
21 HgO	.2524E-11	.1079E-13	.1079E-13	.1079E-16
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1607E-12	.6873E-15	.6873E-15	.6873E-18
105 La2O3	.6972E-12	.2981E-14	.2981E-14	.2981E-17
108 Li2O	.1161E-10	.4963E-13	.4963E-13	.4963E-16
65 Mg(COOH)2	.1565E-09	.6690E-12	.6690E-12	.6690E-15
55 Mg(OH)2	.1284E-22	.5490E-25	.5490E-25	.5490E-28
83 MgO	.3891E-11	.1664E-13	.1664E-13	.1664E-16
60 Mn(COOH)2	.1404E-08	.6001E-11	.6001E-11	.6001E-14
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.9912E-21	.4238E-23	.4238E-23	.4238E-26
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.2395E-05	.1024E-07	.1024E-07	.1024E-07
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.8631E-37	.0000	.0000	.0000
84 NO2	.3277E-08	.1401E-10	.1401E-10	.1401E-10
70 Na(HgO(OH))	.1000E-12	.4277E-15	.4277E-15	.4277E-18
94 Na2B4O7	.8347E-13	.8569E-15	.8569E-15	.8569E-18
109 Na2C2O4	.6449E-13	.2758E-15	.2758E-15	.2758E-18
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.4261E-10	.1822E-12	.1822E-12	.1822E-15
71 Na2PuO2(OH)4	.4056E-17	.1734E-19	.1734E-19	.1734E-22
78 Na2RhO4	.8339E-15	.8566E-17	.8566E-17	.8566E-20
72 Na2RuO4	.8138E-14	.8480E-16	.8480E-16	.8480E-19
6 Na2SO4	.1650E-10	.7056E-13	.7056E-13	.7056E-16
68 NaAlO2	.4056E-10	.1734E-12	.1734E-12	.1734E-15
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3443E-08	.1472E-10	.1472E-10	.1472E-13

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	79	80	81	82
	Water Wash	Washed Hg	Washed Hg	Purified Hg
	from MWWC	from MWWC	to MVS	
7 NaCl	.1645E-10	.7033E-18	.7033E-18	.7033E-16
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8700E-18	.8720E-15	.8720E-15	.3720E-18
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.1594E-11	.6817E-14	.6817E-14	.6817E-17
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6022E-09	.2575E-11	.2575E-11	.2575E-14
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.4919E-09	.2103E-11	.2103E-11	.2103E-14
17 Ni(OH)2	.4982E-22	.2109E-24	.2109E-24	.2109E-27
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1406E-05	.6012E-08	.6012E-08	.6012E-08
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2230E-10	.9536E-13	.9536E-13	.9536E-16
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2286E-13	.9776E-16	.9776E-16	.9776E-19
76 PuO2	.5803E-11	.2481E-13	.2481E-13	.2481E-16
22 RhO2	.2217E-11	.9481E-14	.9481E-14	.9481E-17
79 RuO2	.1093E-10	.4674E-13	.4674E-13	.4674E-16
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.1051E-08	.4495E-11	.4495E-11	.4495E-14
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2002E-10	.8560E-13	.8560E-13	.8560E-16
10 Sr(NO3)2	.2388E-16	.9997E-19	.9997E-19	.9997E-22
127 Sr(OH)2	.2205E-23	.9429E-26	.9429E-26	.9429E-29
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.9098E-10	.3890E-12	.3890E-12	.3890E-15
107 TiO2	.1394E-11	.5963E-14	.5963E-14	.5963E-17
119 Tritium	.5853E-19	.2289E-21	.2289E-21	.2289E-21
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.6362E-09	.2720E-11	.2720E-11	.2720E-14
16 UO2(OH)2	.8642E-22	.3695E-24	.3695E-24	.3695E-27
27 Y(COOH)3	.1869E-10	.5852E-13	.5852E-13	.5852E-16
11 Y(NO3)3	.1660E-16	.7099E-19	.7099E-19	.7099E-22
128 Y(OH)3	.1376E-23	.5882E-26	.5882E-26	.5882E-29
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	79	80	81	82
	Water Wash	Washed Hg	Washed Hg	Purified Hg
	from MWWC	from MWWC	to MVS	
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.5816E-09	.2487E-11	.2487E-11	.2487E-14
44 Zn(COOH)2	.7231E-10	.8092E-12	.8092E-12	.3092E-15
54 Zn(OH)2	.7439E-23	.8181E-25	.8181E-25	.8181E-28
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.6972E-12	.2981E-14	.2981E-14	.2981E-17
TOTAL FLOW, LB/HR	.23	1.86	1.86	1.85
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.00	.00	.00
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4318	837.9511	837.9511	837.8893
TEMPERATURE, DEG C	28.68	28.68	38.00	38.00
PRESSURE, ATM	1.34	1.34	.99	1.00
PRESSURE, PSIG	5.00	5.00	-.07	.00
PRESSURE, MM HG			756.20	
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
ENTHALPY, PCU/HR	6.80	1.81	1.74	1.72

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	83 Purified Hg	84 PVVF Exhaust to Ex Tunnel	85 Sand Filter Condensate	86 Fan House Condensate
COMPONENT FLOWS, LB/HR				
1 H2O	.9983E-03	24.99	13.80	13.80
45 Ag	.1593E-03	.1638E-10	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.1600E-10	.2571E-10	.0000	.0000
51 AgOH	.8845E-16	.4613E-11	.0000	.0000
74 Al(OH)3	.8525E-14	.4721E-09	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1283E-15	.2202E-08	.0000	.0000
9 Ba(NO3)2	.1120E-21	.6200E-17	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1013E-15	.5607E-11	.0000	.0000
66 CO	.0000	.4493E-04	.0000	.0000
87 CO2	.2843E-24	10.00	.0000	.0000
142 CO2 (C14)	.0000	.8846E-10	.0000	.0000
68 Ca(COOH)2	.8515E-14	.1943E-09	.0000	.0000
120 Ca(OH)2	.8220E-27	.1479E-12	.0000	.0000
113 Ca3(PO4)2	.2525E-15	.1397E-10	.0000	.0000
20 CaC2O4	.2781E-15	.1511E-10	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.6827E-16	.3778E-11	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.3207E-15	.1775E-10	.0000	.0000
29 Carbon	.6894E-16	.1197E-10	.0000	.0000
26 Co(COOH)2	.5540E-16	.3067E-08	.0000	.0000
121 Co(OH)2	.5560E-29	.2559E-14	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2595E-15	.1436E-10	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1533E-20	.1099E-15	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.1576E-15	.8721E-11	.0000	.0000
96 CsCl	.1641E-19	.5772E-13	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.7183E-17	.3977E-12	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1185E-15	.6552E-11	.0000	.0000
52 Cu(OH)2	.1211E-28	.5566E-14	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2063E-13	.1143E-08	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	83 Purified Hg	84 PVVF Exhaust to Ex Tunnel	85 Sand Filter Condensate	86 Fan House Condensate
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1913E-15	.1069E-10	.0000	.0000
103 GroupB	.6068E-15	.3358E-10	.0000	.0000
25 H2	.0000	.3583E-05	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.4669E-01	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.5176E-07	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	1.846	.8793E-03	.0000	.0000
135 HgNO32	.1523E-12	.1608E-13	.0000	.0000
21 HgO	.1079E-16	.1130E-12	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.6873E-18	.7148E-11	.0000	.0000
105 La2O3	.2981E-17	.7479E-10	.0000	.0000
108 Li2O	.4963E-16	.8537E-09	.0000	.0000
65 Mg(COOH)2	.6690E-15	.8698E-10	.0000	.0000
55 Mg(OH)2	.5490E-28	.2523E-13	.0000	.0000
33 MgO	.1664E-16	.2995E-09	.0000	.0000
60 Mn(COOH)2	.6001E-14	.8317E-09	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.4238E-26	.6528E-11	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1024E-07	1292.	.0000	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	1.243	.0000	.0000
84 NO2	.1401E-10	.1382E-01	.0000	.0000
70 Na(HgO(OH))	.4277E-18	.2367E-13	.0000	.0000
94 Na2B4O7	.3569E-18	.1256E-11	.0000	.0000
109 Na2C2O4	.2758E-18	.2868E-11	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1822E-15	.2653E-03	.0000	.0000
71 Na2PuO2(OH)4	.1784E-22	.9599E-13	.0000	.0000
73 Na2RhO4	.8566E-20	.1973E-15	.0000	.0000
72 Na2RuO4	.8480E-19	.1926E-14	.0000	.0000
6 Na2SO4	.7056E-16	.8905E-11	.0000	.0000
68 NaAlO2	.1734E-15	.9599E-11	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1472E-18	.9346E-09	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	88	84	85	86
	Purified Hg	PVVF Exhaust to Ex Tunnel	Sand Filter Condensate	Fan House Condensate
7 NaCl	.7083E-16	.4728E-11	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8720E-18	.8311E-12	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.6817E-17	.4489E-12	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2575E-14	.2771E-09	.0000	.0000
4 NaOH	.0000	.1200E-12	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2103E-14	.1162E-09	.0000	.0000
17 Ni(OH)2	.2109E-27	.9690E-13	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.6012E-08	890.8	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.9536E-16	.5277E-11	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.9776E-19	.5408E-14	.0000	.0000
76 PuO2	.2481E-16	.1373E-11	.0000	.0000
22 RhO2	.9481E-17	.5247E-12	.0000	.0000
79 RuO2	.4674E-16	.2620E-11	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.5283E-05	.0000	.0000
111 SiO2	.4495E-14	.8960E-08	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8560E-16	.4731E-11	.0000	.0000
10 Sr(NO3)2	.9997E-22	.5533E-17	.0000	.0000
127 Sr(OH)2	.9429E-29	.4832E-14	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.3890E-15	.2153E-10	.0000	.0000
107 TiO2	.5963E-17	.1496E-09	.0000	.0000
119 Tritium	.2289E-21	.5189E-10	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2720E-14	.1504E-09	.0000	.0000
16 UO2(OH)2	.8695E-27	.1698E-12	.0000	.0000
27 Y(COOH)3	.5852E-16	.8284E-11	.0000	.0000
11 Y(NO3)3	.7099E-22	.8929E-17	.0000	.0000
128 Y(OH)3	.5882E-29	.2702E-14	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	83	84	85	86
	Purified Hg	PVVF Exhaust to Ex Tunnel	Sand Filter Condensate	Fan House Condensate
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2487E-14	.1376E-09	.0000	.0000
44 Zn(COOH)2	.8092E-15	.1709E-10	.0000	.0000
54 Zn(OH)2	.8181E-28	.1462E-13	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2981E-17	.7479E-10	.0000	.0000
TOTAL FLOW, LB/HR	1.85	1718.58	13.80	13.80
VAPOR FLOW, CFM		412.97		
LIQUID FLOW, GPM	.00		.08	.03
DESIGN FLOW,				
DENSITY, LBS/FTS	837.8893	.0694	62.4800	62.4800
TEMPERATURE, DEG C	88.00	89.05	25.00	25.00
PRESSURE, ATM	1.00	.99	1.00	1.00
PRESSURE, PSIG	.00	-.11	.00	.00
PRESSURE, MM HG		754.58		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	1.72	-88043.79	849.84	849.84

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	87 Decon Waste to DWIT	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
COMPONENT FLOWS, LB/HR				
1 H2O	812.0	.7477E-01	.0000	2.827
45 Ag	.0000	.8427E-11	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.8467E-13	.0000	.0000
51 AgOH	.0000	.2034E-18	.0000	.0000
74 Al(OH)3	.0000	.4510E-16	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.6786E-18	.0000	.0000
9 Ba(NO3)2	.0000	.5927E-24	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.5360E-18	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.1241E-29	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.1859E-16	.0000	.0000
120 Ca(OH)2	.0000	.1703E-29	.0000	.0000
113 Ca3(PO4)2	.0000	.1336E-17	.0000	.0000
20 CaC2O4	.0000	.1445E-17	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.8612E-18	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.1697E-17	.0000	.0000
29 Carbon	.0000	.8648E-18	.0000	.0000
26 Co(COOH)2	.0000	.2936E-18	.0000	.0000
121 Co(OH)2	.0000	.2947E-31	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.1373E-17	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.8110E-23	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.8337E-18	.0000	.0000
96 CsCl	.0000	.8682E-22	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.3802E-19	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.6271E-18	.0000	.0000
52 Cu(OH)2	.0000	.6409E-31	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.1092E-15	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	87 Decon Waste to DWTT	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 GroupA	.0000	.1012E-17	.0000	.0000
103 GroupB	.0000	.8210E-17	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	5.750	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	4.930	.2788E-12	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.7180E-05	.0000	.0000
135 HgNO32	.0000	.8060E-15	.0000	.0000
21 HgO	.0000	.5711E-19	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.8080	.0000	.0000	.0000
118 KNO3	.0000	.8636E-20	.0000	.0000
105 La2O3	.0000	.1577E-19	.0000	.0000
108 Li2O	.0000	.2626E-18	.0000	.0000
65 Mg(COOH)2	.0000	.8540E-17	.0000	.0000
55 Mg(OH)2	.0000	.2905E-30	.0000	.0000
83 MgO	.0000	.8802E-19	.0000	.0000
60 Mn(COOH)2	.0000	.8175E-16	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.2242E-28	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	8.418	.0000	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.7412E-16	.0000	.0000
70 Na(HgO(OH))	.0000	.2263E-20	.0000	.0000
94 Na2B4O7	.0000	.1888E-20	.0000	.0000
109 Na2C2O4	.0000	.1459E-20	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.9638E-18	.0000	.0000
71 Na2PuO2(OH)4	.0000	.9176E-25	.0000	.0000
73 Na2RhO4	.0000	.1886E-22	.0000	.0000
72 Na2RuO4	.0000	.1841E-21	.0000	.0000
6 Na2SO4	.0000	.8733E-18	.0000	.0000
68 NaAlO2	.0000	.9176E-18	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.7788E-16	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	87 Decon Waste to DWTI	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 EO Wt % NaOH to RCT
7 NaCl	.0000	.8721E-18	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.1968E-20	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.8607E-19	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.1362E-16	.0000	.0000
4 NaOH	.0000	.0000	.0000	2.827
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1118E-16	.0000	.0000
17 Ni(OH)2	.0000	.1116E-29	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	1.033	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.5045E-18	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO82	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.5172E-21	.0000	.0000
76 PuO2	.0000	.1313E-18	.0000	.0000
22 RhO2	.0000	.5016E-19	.0000	.0000
79 RuO2	.0000	.2473E-18	.0000	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.2378E-16	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.4529E-18	.0000	.0000
10 Sr(NO3)2	.0000	.5289E-24	.0000	.0000
127 Sr(OH)2	.0000	.4988E-81	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.2058E-17	.0000	.0000
107 TiO2	.0000	.8155E-19	.0000	.0000
119 Tritium	.0000	.1211E-26	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1439E-16	.0000	.0000
16 UO2(OH)2	.0000	.1955E-29	.0000	.0000
27 Y(COOH)3	.0000	.8096E-18	.0000	.0000
11 Y(NO3)3	.0000	.8756E-24	.0000	.0000
128 Y(OH)3	.0000	.8112E-81	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME	87 Decon Waste to DWTT	88 MHT Vent to MVC	89 Misc Sumps to RCT	90 50 Wt % NaOH to RCT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.1316E-16	.0000	.0000
44 Zn(COOH)2	.0000	.1636E-17	.0000	.0000
54 Zn(OH)2	.0000	.1683E-80	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.1577E-19	.0000	.0000
TOTAL FLOW, LB/HR	322.99	4.53	.00	5.65
VAPOR FLOW, CFM		1.07		
LIQUID FLOW, GPM	.64		.00	.01
DESIGN FLOW,				
DENSITY, LBS/FT3	63.2352	.0702	.0000	84.9613
TEMPERATURE, DEG C	25.00	34.93	35.00	25.00
PRESSURE, ATM	1.00	.99	1.00	1.00
PRESSURE, PSIG	.00	-.07	.00	.00
PRESSURE, MM HG		756.20		
PHASE	LIQUID	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	7984.71	-233.05	.00	94.64

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MTW Vent to MVC
COMPONENT FLOWS, LB/HR				
1 H2O	1096.	22.70	.1943	.1284
45 Ag	.0000	.2434E-11	.0000	.2402E-09
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.2203E-08
51 AgOH	.9367E-04	.0000	.8184E-08	.6199E-14
74 Al(OH)3	.8353E-01	.1760E-06	.6820E-11	.1374E-11
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1768	.8728E-06	.1026E-12	.2068E-13
9 Ba(NO3)2	.7695E-09	.2313E-14	.8963E-19	.1806E-19
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6947E-03	.2091E-08	.8105E-13	.1633E-13
66 CO	.4272E-08	.3076E-20	.4855E-33	.1349E-33
87 CO2	.8471E-04	.6460E-06	.5553E-10	.1517E-10
142 CO2 (C14)	.2413E-19	.1844E-17	.1902E-28	.5242E-29
63 Ca(COOH)2	.0000	.7255E-07	.2812E-11	.5666E-12
120 Ca(OH)2	.1872E-01	.0000	.2576E-24	.5190E-25
113 Ca3(PO4)2	.1731E-02	.5211E-08	.2020E-12	.4070E-13
20 CaC2O4	.1872E-02	.5636E-08	.2185E-12	.4402E-13
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4681E-03	.1409E-08	.5461E-13	.1100E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2190E-02	.6621E-08	.2566E-12	.5171E-13
29 Carbon	.1881E-02	.4895E-08	.5516E-13	.1111E-13
26 Co(COOH)2	.0000	.1145E-08	.4440E-13	.8946E-14
121 Co(OH)2	.2371E-03	.0000	.4456E-26	.8978E-27
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1780E-02	.5357E-08	.2076E-12	.4184E-13
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1821E-05	.8164E-13	.1226E-17	.2471E-18
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.1073E-02	.8253E-08	.1261E-12	.2540E-13
96 CsCl	.5262E-02	.8387E-12	.1313E-16	.2645E-17
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.4933E-04	.1483E-09	.5749E-14	.1165E-14
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.2447E-08	.9483E-13	.1911E-13
52 Cu(OH)2	.5164E-03	.0000	.9691E-26	.1953E-26
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2023	.4259E-06	.1651E-10	.8326E-11
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT#1 Vent to MVC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.9841E-02	.3949E-08	.1531E-12	.3084E-13
103 GroupB	.4161E-02	.1253E-07	.4855E-12	.9782E-18
25 H2	.8507E-09	.6855E-19	.9685E-32	.2266E-32
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.8786E-01	.0000	.0000
43 HC1	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.4448E-03
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.2158E-06	.0000	.9473E-04
135 HgNO32	.0000	.0000	.0000	.1375E-11
21 HgO	.3185E-02	.0000	.9481E-11	.1740E-14
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1970	.1419E-10	.5499E-15	.1108E-15
105 La2O3	.4198E-02	.1265E-07	.2385E-14	.4806E-15
108 Li2O	.6844E-01	.1445E-05	.3971E-18	.8001E-14
65 Mg(COOH)2	.0000	.1381E-07	.5352E-12	.1079E-12
55 Mg(OH)2	.2341E-02	.0000	.4392E-25	.8851E-26
33 MgO	.2318E-01	.5070E-07	.1331E-13	.2682E-14
60 Mn(COOH)2	.0000	.1239E-03	.4801E-11	.9674E-12
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1986	.0000	.8391E-23	.6832E-24
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.1305E-01	47.85	8.418	8.418
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.5490E-07	.3866E-10	.1814E-22	.8880E-23
84 NO2	.4946E-02	.1847E-07	.2539E-03	.1114E-03
70 Na(HgO(OH))	.2938E-05	.8828E-11	.8421E-15	.6894E-16
94 Na2B4O7	.1113	.7367E-11	.2855E-15	.5754E-16
109 Na2C2O4	.7906E-01	.5692E-11	.2206E-15	.4446E-16
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.2532	.4494E-06	.1457E-12	.2937E-13
71 Na2PuO2(OH)4	.1191E-09	.8580E-15	.1388E-19	.2796E-20
78 Na2RhO4	.2449E-07	.7360E-13	.2853E-17	.5748E-18
72 Na2RuO4	.2390E-06	.7182E-12	.2784E-16	.5609E-17
6 Na2SO4	.4847E-03	.1456E-03	.5645E-13	.1137E-13
68 NaAlO2	.1191E-02	.8580E-03	.1388E-12	.2796E-13
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	2.190	.3290E-03	.1178E-10	.2373E-11

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	91	92	93	94
	Neutr Waste	SME Condensr	SWT Vent	MFT#1 Vent
	to Tank Farm	Vent to FAVC	to MVC	to MVC
7 NaCl	.7319E-01	.1452E-08	.5627E-13	.1134E-13
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.7185E-01	.7678E-11	.2976E-15	.5997E-16
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.6234E-02	.1407E-09	.5454E-14	.1099E-14
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	8.190	.4584E-07	.2856E-07	.4151E-12
4 NaOH	1.624	.0000	.2219E-07	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.4341E-07	.1683E-11	.3391E-12
17 Ni(OH)2	.8991E-02	.0000	.1687E-24	.3400E-25
40 NiO	.0000	.0000	.0000	.0000
32 O2	.7529E-02	14.45	1.033	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6539E-03	.1968E-08	.7629E-13	.1537E-13
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.2018E-11	.7821E-16	.1576E-16
76 PuO2	.1706E-03	.5122E-09	.1985E-13	.4000E-14
22 RhO2	.6502E-04	.1957E-09	.7585E-14	.1528E-14
79 RuO2	.8418E-02	.9647E-09	.8739E-13	.7534E-14
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.1497E-08	.5278E-20	.3715E-32	.1191E-32
111 SiO2	.7489	.1579E-05	.3596E-11	.7247E-12
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.1767E-08	.6849E-13	.1380E-13
10 Sr(NO3)2	.6867E-09	.2064E-14	.7998E-19	.1612E-19
127 Sr(OH)2	.4019E-03	.0000	.7543E-26	.1520E-26
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2668E-02	.8030E-08	.3112E-12	.6271E-13
107 TiO2	.8396E-02	.2530E-07	.4770E-14	.9612E-15
119 Tritium	.4776E-09	.2448E-10	.4187E-16	.2690E-16
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.5615E-07	.2176E-11	.4386E-12
16 UO2(OH)2	.1575E-01	.0000	.2956E-24	.5957E-25
27 Y(COOH)3	.0000	.1208E-08	.4682E-13	.9434E-14
11 Y(NO3)3	.4876E-09	.1465E-14	.5679E-19	.1144E-19
128 Y(OH)3	.2507E-03	.0000	.4705E-26	.9481E-27
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME	91 Neutr Waste to Tank Farm	92 SME Condensr Vent to FAVC	93 SWT Vent to MVC	94 MFT#1 Vent to MVC
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.1705E-01	.5133E-07	.1990E-11	.4009E-12
44 Zn(COOH)2	.0000	.6382E-08	.2474E-12	.4985E-13
54 Zn(OH)2	.1356E-02	.0000	.2545E-25	.5128E-26
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.4198E-02	.1265E-07	.2385E-14	.4806E-15
TOTAL FLOW, LB/HR	1105.12	85.10	4.65	4.58
VAPOR FLOW, CFM		24.98	1.13	1.11
LIQUID FLOW, GPM	2.20			
DESIGN FLOW,				
DENSITY, LBS/FT3	62.7190	.0568	.0685	.0691
TEMPERATURE, DEG C	50.00	50.00	37.99	37.99
PRESSURE, ATM	.97	.97	.99	.99
PRESSURE, PSIG	-.51	-.51	-.07	-.07
PRESSURE, MM HG	733.86	733.86	756.20	756.20
PHASE	LIQUID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	56136.54	10400.91	-156.34	-196.78

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	96 MFT#2 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
COMPONENT FLOWS, LB/HR				
1 H2O	.4093E-01	.5476	.2983	21.61
45 Ag	.6316E-11	.5724E-09	.2862E-09	.4496E-11
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.1491E-10	.5142E-07	.2571E-07	.0000
51 AgOH	.3581E-16	.8184E-08	.4092E-08	.1039E-08
74 Al(OH)3	.7940E-14	.8883E-10	.1942E-10	.6501E-06
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1195E-15	.5842E-12	.2921E-12	.1377E-05
9 Ba(NO3)2	.1043E-21	.5103E-18	.2551E-18	.8543E-14
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.9436E-16	.4615E-12	.2307E-12	.7725E-08
66 CO	.0000	.3498E-27	.6387E-34	.2351E-24
37 CO2	.2068E-17	.1276E-05	.1174E-10	.8367E-09
142 CO2 (C14)	.7147E-86	.4372E-24	.4023E-29	.2389E-20
63 Ca(COOH)2	.3273E-14	.1601E-10	.8004E-11	.2680E-06
120 Ca(OH)2	.2998E-27	.1466E-23	.7332E-24	.0000
113 Ca3(PO4)2	.2351E-15	.1150E-11	.5750E-12	.1925E-07
20 CaC2O4	.2543E-15	.1244E-11	.6219E-12	.2082E-07
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.6358E-16	.3109E-12	.1555E-12	.5205E-08
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2987E-15	.1461E-11	.7305E-12	.2446E-07
29 Carbon	.6421E-16	.3140E-12	.1570E-12	.1308E-07
26 Co(COOH)2	.5163E-16	.2523E-12	.1264E-12	.4232E-08
121 Co(OH)2	.5187E-29	.2537E-25	.1268E-25	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2417E-15	.1182E-11	.5910E-12	.1979E-07
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1428E-20	.6982E-17	.3491E-17	.1169E-12
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.1463E-15	.7178E-12	.3589E-12	.1202E-07
96 CsCl	.1528E-19	.7474E-16	.3737E-16	.1251E-11
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.6693E-17	.3273E-18	.1637E-13	.5480E-09
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1104E-15	.5399E-12	.2700E-12	.9039E-08
52 Cu(OH)2	.1128E-28	.5518E-25	.2759E-25	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1922E-13	.9399E-10	.4699E-10	.1573E-05
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	96 MFT#2 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1782E-15	.8714E-12	.4857E-12	.1459E-07
103 GroupB	.5651E-15	.2764E-11	.1882E-11	.4627E-07
25 H2	.0000	.6968E-26	.1200E-82	.5673E-23
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.7839E-01
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.4291E-04	.4730E-02	.6146E-08	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.2211E-03	.4500E-03	.2250E-03	.5646E-07
135 HgNO32	.1419E-12	.3216E-10	.1608E-10	.0000
21 HgO	.1005E-16	.9521E-11	.4761E-11	.1203E-11
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.6401E-18	.8131E-14	.1565E-14	.5241E-10
105 La2O3	.2777E-17	.1358E-13	.6790E-14	.4673E-07
103 Li2O	.4623E-16	.2261E-12	.1180E-12	.5389E-06
65 Mg(COOH)2	.6231E-15	.8047E-11	.1524E-11	.5101E-07
55 Mg(OH)2	.5113E-28	.2501E-24	.1250E-24	.0000
33 MgO	.1549E-16	.7578E-13	.3789E-13	.1873E-06
60 Mn(COOH)2	.5589E-14	.2733E-10	.1367E-10	.4576E-06
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.8947E-26	.1930E-22	.9652E-23	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	8.418	17.15	.2867E-05	188.0
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.4139E-31	.5327E-17	.2723E-23	.6108E-14
84 NO2	.1654E-06	.6873E-02	.1030E-03	.2583E-04
70 Na(HgO(OH))	.3983E-18	.1948E-14	.9740E-15	.3261E-10
94 Na2B4O7	.8324E-18	.1626E-14	.8129E-15	.2722E-10
109 Na2C2O4	.2568E-18	.1256E-14	.6280E-15	.2103E-10
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.1697E-15	.8298E-12	.4149E-12	.1660E-05
71 Na2PuO2(OH)4	.1615E-22	.7900E-19	.3950E-19	.1322E-14
73 Na2RhO4	.8321E-20	.1624E-16	.8121E-17	.2719E-12
72 Na2RuO4	.8241E-19	.1585E-15	.7924E-16	.2653E-11
6 Na2SO4	.6572E-16	.3214E-12	.1607E-12	.5380E-08
68 NaAlO2	.1615E-15	.7900E-12	.3950E-12	.1322E-07
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1371E-13	.6705E-10	.8352E-10	.1220E-05

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	96 MFT#2 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
7 NaCl	.6553E-16	.8204E-12	.1602E-12	.5363E-03
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8463E-18	.1694E-14	.8472E-15	.2836E-10
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.6849E-17	.3105E-13	.1552E-13	.5198E-09
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2393E-14	.7572E-07	.8786E-07	.1730E-06
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1953E-14	.9580E-11	.4790E-11	.1604E-06
17 Ni(OH)2	.1961E-27	.9606E-24	.4803E-24	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	5.181	.1747E-05	56.78
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.8881E-16	.4343E-12	.2172E-12	.7271E-08
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.9103E-19	.4453E-15	.2226E-15	.7455E-11
76 PuO2	.2311E-16	.1130E-12	.5651E-13	.1892E-08
22 RhO2	.8830E-17	.4319E-13	.2159E-13	.7230E-09
79 RuO2	.4853E-16	.2129E-12	.1064E-12	.3564E-08
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.8208E-27	.5909E-33	.1029E-23
111 SiO2	.4187E-14	.2048E-10	.1024E-10	.5834E-05
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.7973E-16	.3899E-12	.1950E-12	.6527E-08
10 Sr(NO3)2	.9311E-22	.4553E-18	.2277E-18	.7623E-14
127 Sr(OH)2	.8781E-29	.4295E-25	.2147E-25	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.8623E-15	.1772E-11	.8859E-12	.2966E-07
107 TiO2	.5553E-17	.2716E-13	.1358E-13	.9346E-07
119 Tritium	.6823E-19	.2392E-15	.6516E-16	.2298E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.2584E-14	.1239E-10	.6196E-11	.2074E-06
16 UO2(OH)2	.8441E-27	.1683E-23	.8415E-24	.0000
27 Y(COOH)3	.5450E-16	.2666E-12	.1333E-12	.4462E-08
11 Y(NO3)3	.6612E-22	.3234E-18	.1617E-18	.5413E-14
128 Y(OH)3	.5478E-29	.2679E-25	.1339E-25	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	96 MFT#2 Vent to MVC	98 Inlet Vapor to MVC	99 Condensate from MVC	100 MFT Vent to FAVC
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2316E-14	.1183E-10	.5664E-11	.1896E-06
44 Zn(COOH)2	.2880E-15	.1408E-11	.7042E-12	.2358E-07
54 Zn(OH)2	.2963E-28	.1449E-24	.7244E-25	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2777E-17	.1858E-13	.6790E-14	.4673E-07
TOTAL FLOW, LB/HR	4.49	22.89	.80	266.45
VAPOR FLOW, CFM	1.07	5.50		70.85
LIQUID FLOW, GPM			.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0698	.0694	62.5230	.0627
TEMPERATURE, DEG C	38.00	87.40	15.00	50.00
PRESSURE, ATM	.99	.99	.99	.97
PRESSURE, PSIG	-.07	-.07	-.07	-.51
PRESSURE, MM HG	756.20	756.20	756.20	783.86
PHASE	VAPOR	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	-250.57	-1049.02	4.53	-1066.51

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Exh to Tunnel
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	19.68	69.63	9570.
45 Ag	.0000	.0000	.0000	.3685E-10
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.5785E-10
51 AgOH	.0000	.2279E-11	.1541E-09	.1038E-10
74 Al(OH)3	.0000	.2033E-08	.9646E-07	.1062E-08
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.4301E-08	.2043E-06	.4954E-08
9 Ba(NO3)2	.0000	.1872E-16	.1268E-14	.1395E-16
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1690E-10	.1146E-08	.1262E-10
66 CO	.0000	.4419E-04	7.614	.0000
87 CO2	.0000	.1429E-01	16.57	.0000
142 CO2 (C14)	.0000	.9940E-17	.1722E-23	.1990E-09
63 Ca(COOH)2	.0000	.0000	.3977E-07	.4371E-09
120 Ca(OH)2	.0000	.8339E-09	.0000	.8328E-12
113 Ca3(PO4)2	.0000	.4212E-10	.2857E-08	.3144E-10
20 CaC2O4	.0000	.4556E-10	.8090E-08	.8400E-10
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.1139E-10	.7724E-09	.8501E-11
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.5351E-10	.3629E-08	.3994E-10
29 Carbon	.0000	.3360E-10	.2683E-08	.2694E-10
26 Co(COOH)2	.0000	.0000	.0000	.6901E-08
121 Co(OH)2	.0000	.5777E-11	.0000	.5757E-14
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.4330E-10	.2936E-08	.3232E-10
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.4439E-13	.1784E-13	.2472E-15
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.2618E-10	.1783E-08	.1962E-10
96 CsCl	.0000	.1280E-09	.1046E-05	.1299E-12
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.1201E-11	.8181E-10	.8948E-12
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.1341E-08	.1474E-10
52 Cu(OH)2	.0000	.1256E-10	.0000	.1252E-13
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.4921E-08	.2335E-06	.2571E-08
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Coll Exh to Tunnel
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.2394E-09	.1288E-05	.2404E-10
103 GroupB	.0000	.1012E-09	.6866E-08	.7556E-10
25 H2	.0000	.8528E-05	.5827	.8062E-05
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.8618E-13
21 HgO	.0000	.7750E-10	.6845E-06	.2548E-12
97 I2	.0000	.0000	.7755E-04	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.4794E-08	.7777E-11	.1608E-10
105 La2O3	.0000	.1021E-09	.6934E-08	.1683E-09
108 Li2O	.0000	.1665E-08	.7923E-07	.1921E-08
65 Mg(COOH)2	.0000	.0000	.7570E-08	.8320E-10
55 Mg(OH)2	.0000	.5695E-10	.0000	.5676E-13
33 MgO	.0000	.5641E-09	.2779E-07	.6739E-09
60 Mn(COOH)2	.0000	.0000	.6790E-07	.7463E-09
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.4833E-08	.0000	.1469E-10
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	170.9	1896.	.4375E+06
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.2462E-03	.9700	.0000
84 NO2	.0000	.8975E-02	.1565	.0000
70 Na(HgO(OH))	.0000	.7147E-13	.4839E-11	.5325E-13
94 Na2B4O7	.0000	.2708E-08	.1462E-06	.2825E-11
109 Na2C2O4	.0000	.1924E-08	.8120E-11	.6453E-11
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.6160E-08	.2930E-06	.5969E-08
71 Na2PuO2(OH)4	.0000	.2899E-17	.1962E-15	.2160E-17
73 Na2RhO4	.0000	.5959E-15	.4034E-13	.4440E-15
72 Na2RuO4	.0000	.5815E-14	.3937E-12	.4833E-14
6 Na2SO4	.0000	.1179E-10	.7984E-09	.8786E-11
68 NaAlO2	.0000	.2899E-10	.1962E-08	.2160E-10
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.5329E-07	.1810E-06	.2108E-08

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	102 Steam Cond to Creel	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Eah to Tunnel
7 NaCl	.0000	.1781E-08	.9089E-05	.1063E-10
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.1748E-08	.7459E-05	.1870E-11
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.1517E-09	.9069E-06	.1010E-11
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.7762E-07	.2567E-07	.6236E-03
4 NaOH	.0000	.8951E-07	.0000	.2701E-12
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.2380E-07	.2616E-09
17 Ni(OH)2	.0000	.2188E-09	.0000	.2180E-12
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	51.63	572.6	.1322E+06
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1591E-10	.1079E-08	.1187E-10
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.1106E-11	.1216E-13
76 PuO2	.0000	.4151E-11	.2808E-09	.3090E-11
22 RhO2	.0000	.1582E-11	.1073E-09	.1181E-11
79 RuO2	.0000	.8315E-10	.6288E-06	.5894E-11
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.5188E-05	.8100	.0000
111 SiO2	.0000	.1822E-07	.8656E-06	.2016E-07
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.9686E-09	.1065E-10
10 Sr(NO3)2	.0000	.1671E-16	.1131E-14	.1245E-16
127 Sr(OH)2	.0000	.9780E-11	.0000	.9747E-14
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.6490E-10	.4401E-08	.4844E-10
107 TiO2	.0000	.2048E-09	.1387E-07	.3366E-09
119 Tritium	.0000	.8580E-11	.1007E-10	.1168E-09
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.3078E-07	.3333E-09
16 UO2(OH)2	.0000	.3833E-09	.0000	.3820E-12
27 Y(COOH)3	.0000	.0000	.6622E-09	.7278E-11
11 Y(NO3)3	.0000	.1186E-16	.8032E-15	.8840E-17
128 Y(OH)3	.0000	.6101E-11	.0000	.6080E-14
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	102 Steam Cond to Creek	103 RCT Vent to PVVS	104 Off Gas Cond ser Exit Gas	105 Process Cell Exh to Tunnel
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.4149E-09	.2814E-07	.8097E-09
44 Zn(COOH)2	.0000	.0000	.8499E-08	.8845E-10
54 Zn(OH)2	.0000	.8299E-10	.0000	.8288E-18
57 ZnO	.0000	.0000	.0000	.0000
104 ZnO2	.0000	.1021E-09	.6984E-08	.1683E-09
TOTAL FLOW, LB/HR	.00	242.23	2564.20	579240.71
VAPOR FLOW, CFM		64.41	676.57	187816.79
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0627	.0632	.0700
TEMPERATURE, DEG C	85.00	50.00	27.99	84.98
PRESSURE, ATM	1.00	.97	.88	.99
PRESSURE, PSIG	.00	-.51	-1.75	-.11
PRESSURE, MM HG		733.86	669.56	754.53
PHASE	N/A	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	.00	-959.63	-115252.81	-29829812.75

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	106 Recycle from Ru Absorber Tank Farm	107 Ru Accumulation	108 I2 Accumulation	109 Spent Wash SENT to SRAT
COMPONENT FLOWS, LB/HR				
1 H2O	8.121	.0000	.0000	.1546
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.9367E-04	.7707E-10	.8353E-10	.3863E-03
74 Al(OH)3	.8856E-01	.4823E-07	.2412E-07	.2413E-03
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.1768	.1022E-06	.5108E-07	.3630E-05
9 Ba(NO3)2	.8869E-11	.6388E-15	.3169E-15	.3171E-11
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.6947E-03	.5732E-09	.2866E-09	.2868E-05
66 CO	.2148E-10	.0000	.0000	.5493E-26
87 CO2	.1747E-06	.0000	.0000	.3435E-12
142 CO2 (C14)	.0000	.0000	.0000	.6865E-23
63 Ca(COOH)2	.0000	.1988E-07	.9942E-08	.9948E-04
120 Ca(OH)2	.1372E-01	.0000	.0000	.9113E-17
113 Ca3(PO4)2	.1781E-02	.1428E-08	.7142E-03	.7146E-05
20 CaC2O4	.1872E-02	.1545E-08	.7724E-09	.7729E-05
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.4681E-03	.8862E-09	.1931E-09	.1932E-05
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.2199E-02	.1815E-08	.9073E-09	.9078E-05
29 Carbon	.1881E-02	.1842E-08	.6708E-09	.1951E-05
26 Co(COOH)2	.0000	.0000	.0000	.1571E-05
121 Co(OH)2	.2874E-03	.0000	.0000	.1576E-18
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1780E-02	.1468E-08	.7341E-09	.7346E-05
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1824E-05	.8672E-14	.4336E-14	.4339E-10
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.5411E-05	.8915E-09	.4458E-09	.4460E-05
96 CsCl	.2646E-04	.5229E-06	.2614E-06	.4645E-09
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2482E-06	.4065E-10	.2033E-10	.2034E-06
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.6706E-09	.3353E-09	.3355E-05
52 Cu(OH)2	.5164E-03	.0000	.0000	.3429E-18
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2023	.1167E-06	.5837E-07	.5841E-03
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	106 Recycle from Tank Farm	107 Ru Absorber Accumulation	108 I2 Absorber Accumulation	109 Spent Wash MWWT to SRAT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.9841E-02	.6438E-06	.8219E-06	.5415E-05
103 GroupB	.4161E-02	.8483E-08	.1716E-08	.1718E-04
25 H2	.8507E-09	.0000	.0000	.1094E-24
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.2096E-04
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.8185E-02	.8172E-06	.1586E-06	.8048E-06
97 I2	.0000	.0000	.7677E-04	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.9908E-03	.8888E-11	.1944E-11	.1945E-07
105 La2O3	.4198E-02	.8467E-08	.1734E-08	.8488E-07
108 Li2O	.6844E-01	.8961E-07	.1981E-07	.1405E-05
65 Mg(COOH)2	.0000	.8785E-08	.1892E-08	.1894E-04
55 Mg(OH)2	.2841E-02	.0000	.0000	.1554E-17
33 MgO	.2318E-01	.1390E-07	.6948E-08	.4709E-06
60 Mn(COOH)2	.0000	.8395E-07	.1698E-07	.1699E-03
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1986	.0000	.0000	.1200E-15
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.6563E-04	.0000	.0000	.8389E-05
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.2761E-09	.0000	.0000	.8365E-16
84 NO2	.2487E-04	.0000	.0000	.4072E-12
70 Na(HgO(OH))	.1477E-07	.2419E-11	.1210E-11	.1211E-07
94 Na2B4O7	.5597E-08	.7308E-07	.8654E-07	.1010E-07
109 Na2C2O4	.8975E-03	.1560E-11	.7801E-12	.7806E-08
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.2532	.1465E-06	.7824E-07	.5156E-05
71 Na2PuO2(OH)4	.5990E-12	.9812E-16	.4906E-16	.4909E-12
73 Na2RhO4	.1232E-09	.2017E-13	.1009E-13	.1009E-09
72 Na2RuO4	.1202E-08	.1968E-12	.9842E-13	.9849E-09
6 Na2SO4	.2437E-05	.8992E-09	.1996E-09	.1997E-05
68 NaAlO2	.5990E-05	.9812E-09	.4906E-09	.4909E-05
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1101E-01	.9051E-07	.4526E-07	.4167E-03

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	106	107	108	109
	Recycle from Ru Tank Farm	Absorber Accumulation	I2 Absorber Accumulation	Spent Wash MWWT to SRAT
7 NaCl	.8680E-03	.4545E-05	.2272E-05	.1991E-05
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8613E-03	.8780E-05	.1865E-05	.1053E-07
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.8131E-04	.4535E-06	.2267E-06	.1929E-06
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1604E-01	.1283E-07	.6417E-08	.6286E-04
4 NaOH	.8163E-02	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1190E-07	.5949E-08	.5953E-04
17 Ni(OH)2	.8991E-02	.0000	.0000	.5970E-17
40 NiO	.0000	.0000	.0000	.0000
82 O2	.8780E-04	.0000	.0000	.1955E-05
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.6580E-03	.5395E-09	.2697E-09	.2699E-05
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.5531E-12	.2765E-12	.2767E-08
76 PuO2	.1706E-03	.1404E-09	.7019E-10	.7024E-06
22 RhO2	.6502E-04	.5864E-10	.2682E-10	.2684E-06
79 RuO2	.8413E-02	.8144E-06	.1572E-06	.1323E-05
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.7529E-11	.0000	.0000	.1289E-25
111 SiO2	.7489	.4328E-06	.2164E-06	.1272E-03
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.4848E-09	.2421E-09	.2428E-05
10 Sr(NO3)2	.8453E-11	.5656E-15	.2828E-15	.2830E-11
127 Sr(OH)2	.4019E-03	.0000	.0000	.2669E-18
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2668E-02	.2201E-08	.1100E-08	.1101E-04
107 TiO2	.8896E-02	.6934E-08	.8467E-08	.1688E-06
119 Tritium	.8540E-11	.0000	.0000	.6624E-14
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1539E-07	.7695E-08	.7700E-04
16 UO2(OH)2	.1575E-01	.0000	.0000	.1046E-16
27 Y(COOH)3	.0000	.8311E-09	.1655E-09	.1656E-05
11 Y(NO3)3	.2452E-11	.4016E-15	.2008E-15	.2009E-11
128 Y(OH)3	.2507E-03	.0000	.0000	.1665E-18
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	106	107	108	109
	Recycle from	Ru Absorber	I2 Absorber	Spent Wash
	Tank Farm	Accumulation	Accumulation	MWWT to SRAT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1705E-01	.1407E-07	.7034E-08	.7039E-04
44 Zn(COOH)2	.0000	.1749E-08	.8746E-09	.8752E-05
54 Zn(OH)2	.1356E-02	.0000	.0000	.9004E-18
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.4198E-02	.8467E-08	.1734E-08	.8438E-07
TOTAL FLOW, LB/HR	10.03	.00	.00	.16
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.02			.00
DESIGN FLOW,				
DENSITY, LBS/FT3	70.2685	.0000	.0000	62.8970
TEMPERATURE, DEG C	60.00	80.00	150.00	50.00
PRESSURE, ATM	1.00	.80	.74	.97
PRESSURE, PSIG	.00	-3.00	-3.86	-.51
PRESSURE, MM HG		604.63	560.27	733.86
PHASE	LIQUID	SOLID	SOLID	LIQUID
ENTHALPY, PCU/HR	583.39	.00	.00	7.92

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	110 Water Wash to MWWT	111 MWWT Vent to FAVC	112 Hg from MWWT to MAWT	113 Air Spurge to MAWT
COMPONENT FLOWS, LB/HR				
1 H2O	.2972	.2177	.9847E-02	.1325E-02
45 Ag	.0000	.8201E-07	.1593E-01	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.8259E-14	.2460E-09	.0000
74 Al(OH)3	.0000	.5159E-09	.1537E-04	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.7761E-11	.2312E-06	.0000
9 Ba(NO3)2	.0000	.6779E-17	.2020E-12	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.6131E-11	.1826E-06	.0000
66 CO	.0000	.4455E-20	.8498E-27	.0000
87 CO2	.0000	.1108E-07	.2188E-13	.0000
142 CO2 (C14)	.0000	.2214E-18	.4372E-24	.0000
63 Ca(COOH)2	.0000	.2127E-09	.6336E-05	.0000
120 Ca(OH)2	.0000	.1948E-22	.5804E-18	.0000
113 Ca3(PO4)2	.0000	.1528E-10	.4551E-06	.0000
20 CaC2O4	.0000	.1652E-10	.4922E-06	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.4131E-11	.1231E-06	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.1941E-10	.5782E-06	.0000
29 Carbon	.0000	.4172E-11	.1243E-06	.0000
26 Co(COOH)2	.0000	.8358E-11	.1000E-06	.0000
121 Co(OH)2	.0000	.8370E-24	.1004E-19	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.1570E-10	.4678E-06	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.9275E-16	.2763E-11	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.9536E-11	.2841E-06	.0000
96 CsCl	.0000	.9929E-15	.2958E-10	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.4348E-12	.1295E-07	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.7173E-11	.2137E-06	.0000
52 Cu(OH)2	.0000	.7330E-24	.2184E-19	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.1249E-08	.3720E-04	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	110 Water Wash to MWWT	111 MWWT Vent to FAVC	112 Hg from MWWT to MAWT	118 Air Sparge to MAWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.1158E-10	.3449E-06	.0000
103 GroupB	.0000	.3672E-10	.1094E-05	.0000
25 H2	.0000	.8616E-19	.6968E-26	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.2757E-04	.1335E-05	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
80 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.8034E-03	1.346	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.6505E-12	.1938E-07	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.4159E-13	.1239E-08	.0000
105 La2O3	.0000	.1804E-12	.5374E-08	.0000
108 Li2O	.0000	.3003E-11	.8947E-07	.0000
65 Mg(COOH)2	.0000	.4048E-10	.1206E-05	.0000
55 Mg(OH)2	.0000	.8322E-23	.9897E-19	.0000
33 MgO	.0000	.1007E-11	.2999E-07	.0000
60 Mn(COOH)2	.0000	.3631E-09	.1082E-04	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.2565E-21	.7640E-17	.0000
50 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	3.479	.2158E-06	.6072E-01
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.2941E-10	.5327E-17	.0000
84 NO2	.0000	.2566E-10	.2594E-13	.0000
70 Na(HgO(OH))	.0000	.2588E-13	.7709E-09	.0000
94 Na2B4O7	.0000	.2160E-13	.6434E-09	.0000
109 Na2C2O4	.0000	.1669E-13	.4971E-09	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.1102E-10	.3284E-06	.0000
71 Na2PuO2(OH)4	.0000	.1049E-17	.8127E-13	.0000
73 Na2RhO4	.0000	.2158E-15	.6428E-11	.0000
72 Na2RuO4	.0000	.2106E-14	.6272E-10	.0000
6 Na2SO4	.0000	.4270E-11	.1272E-06	.0000
68 NaAlO2	.0000	.1049E-10	.3127E-06	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.8907E-09	.2654E-04	.0000

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	110	111	112	113
	Water Wash	MWWT Vent	Hg from MWWT	Air Sparge
	to MWWT	to FAVC	to MAWT	to MAWT
7 NaCl	.0000	.4256E-11	.1268E-03	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.2251E-13	.6706E-09	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.4125E-12	.1229E-07	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
3 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.1844E-09	.4004E-05	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.1273E-09	.3791E-05	.0000
17 Ni(OH)2	.0000	.1276E-22	.3802E-13	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	1.051	.1245E-06	.1834E-01
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.5770E-11	.1719E-06	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.5916E-14	.1762E-09	.0000
76 PuO2	.0000	.1502E-11	.4473E-07	.0000
22 RhO2	.0000	.5737E-12	.1709E-07	.0000
79 RuO2	.0000	.2828E-11	.8425E-07	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.3501E-20	.8208E-27	.0000
111 SiO2	.0000	.2720E-09	.8104E-05	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.5180E-11	.1543E-06	.0000
10 Sr(NO3)2	.0000	.6049E-17	.1802E-12	.0000
127 Sr(OH)2	.0000	.5705E-24	.1700E-19	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.2354E-10	.7012E-06	.0000
107 TiO2	.0000	.3608E-12	.1075E-07	.0000
119 Tritium	.0000	.9328E-14	.4219E-15	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.1646E-09	.4904E-05	.0000
16 UO2(OH)2	.0000	.2236E-22	.6661E-18	.0000
27 Y(COOH)3	.0000	.3541E-11	.1055E-06	.0000
11 Y(NO3)3	.0000	.4296E-17	.1280E-12	.0000
128 Y(OH)3	.0000	.3559E-24	.1060E-19	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	110	111	112	113
	Water Wash	MWWT Vent	Hg from MWWT	Air Sparge
	to MWWT	to FAVC	to MAWT	to MAWT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.1505E-09	.4483E-05	.0000
44 Zn(COOH)2	.0000	.1871E-10	.5574E-06	.0000
54 Zn(OH)2	.0000	.1925E-23	.5734E-19	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.1804E-12	.5374E-08	.0000
TOTAL FLOW, LB/HR	.80	4.75	1.37	.08
VAPOR FLOW, CFM		1.24		.02
LIQUID FLOW, GPM	.00		.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	62.4800	.0639	773.1066	.0706
TEMPERATURE, DEG C	25.00	49.99	50.00	85.00
PRESSURE, ATM	1.00	.97	.97	1.00
PRESSURE, PSIG	.00	-.51	-.51	.00
PRESSURE, MM HG		733.86	733.86	
PHASE	LIQUID	VAPOR	LIQUID	VAPOR
ENTHALPY, PCU/HR	7.53	-132.88	2.78	-4.14

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
COMPONENT FLOWS, LB/HR				
1 H2O	.1092	.1515	.3735	.0000
45 Ag	.8175E-09	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.4920E-07	.2322E-01	.0000	.0000
51 AgOH	.4903E-15	.2314E-09	.0000	.0000
74 Al(OH)3	.8063E-10	.1446E-04	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4603E-12	.2175E-06	.0000	.0000
9 Ba(NO3)2	.4025E-18	.1900E-12	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.3640E-12	.1718E-06	.0000	.0000
66 CO	.8498E-27	.4855E-33	.0000	.0000
87 CO2	.1276E-05	.5553E-10	.0000	.0000
142 CO2 (C14)	.4372E-24	.1903E-28	.0000	.0000
63 Ca(COOH)2	.1263E-10	.5960E-05	.0000	.0000
120 Ca(OH)2	.1157E-23	.5460E-18	.0000	.0000
113 Ca3(PO4)2	.9071E-12	.4281E-06	.0000	.0000
20 CaC2O4	.9810E-12	.4631E-06	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.2453E-12	.1158E-06	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1152E-11	.5439E-06	.0000	.0000
29 Carbon	.2477E-12	.1169E-06	.0000	.0000
26 Co(COOH)2	.1994E-12	.9411E-07	.0000	.0000
121 Co(OH)2	.2001E-25	.9444E-20	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.9324E-12	.4401E-06	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.5507E-17	.2599E-11	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.5662E-12	.2672E-06	.0000	.0000
96 CsCl	.5895E-16	.2783E-10	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.2582E-13	.1219E-07	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.4259E-12	.2010E-06	.0000	.0000
52 Cu(OH)2	.4352E-25	.2054E-19	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.7413E-10	.3499E-04	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 GroupA	.6874E-12	.8244E-06	.0000	.0000
103 GroupB	.2180E-11	.1029E-05	.0000	.0000
25 H2	.6968E-26	.9685E-82	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.4242E-02	.1962E-02	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.1270E-03	.0000	.0000	.0000
135 HgNO32	.8064E-10	.1446E-04	.0000	.0000
21 HgO	.8862E-13	.1823E-07	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2469E-14	.1166E-03	.0000	.0000
105 La2O3	.1071E-13	.5056E-08	.0000	.0000
108 Li2O	.1783E-12	.8417E-07	.0000	.0000
65 Mg(COOH)2	.2404E-11	.1135E-05	.0000	.0000
55 Mg(OH)2	.1973E-24	.9811E-19	.0000	.0000
33 MgO	.5977E-13	.2821E-07	.0000	.0000
60 Mn(COOH)2	.2156E-10	.1018E-04	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.1523E-22	.7187E-17	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	8.479	.3997E-05	17.07	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.5327E-17	.1814E-22	.0000	.0000
84 NO2	.6508E-02	.2114E-03	.0000	.0000
70 Na(HgO(OH))	.1536E-14	.7252E-09	.0000	.0000
94 Na2B4O7	.1282E-14	.6053E-09	.0000	.0000
109 Na2C2O4	.9907E-15	.4676E-09	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.6545E-12	.8089E-06	.0000	.0000
71 Na2PuO2(OH)4	.6231E-19	.2941E-13	.0000	.0000
73 Na2RhO4	.1281E-16	.6047E-11	.0000	.0000
72 Na2RuO4	.1250E-15	.5900E-10	.0000	.0000
6 Na2SO4	.2535E-12	.1197E-06	.0000	.0000
68 NaAlO2	.6231E-12	.2941E-06	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.5289E-10	.2496E-04	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
7 NaCl	.2527E-12	.1193E-06	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1836E-14	.6308E-09	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2449E-18	.1156E-07	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.7979E-11	.8766E-05	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.7556E-11	.8567E-05	.0000	.0000
17 Ni(OH)2	.7577E-24	.8576E-18	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.051	.2846E-05	5.158	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.8426E-12	.1617E-06	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.8512E-15	.1658E-09	.0000	.0000
76 PuO2	.8915E-18	.4208E-07	.0000	.0000
22 RhO2	.8406E-18	.1608E-07	.0000	.0000
79 RuO2	.1679E-12	.7925E-07	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.8208E-27	.3715E-82	.0000	.0000
111 SiO2	.1615E-10	.7623E-05	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.8075E-12	.1452E-06	.0000	.0000
10 Sr(NO3)2	.8592E-18	.1695E-12	.0000	.0000
127 Sr(OH)2	.8387E-25	.1599E-19	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1898E-11	.6597E-06	.0000	.0000
107 TiO2	.2142E-18	.1011E-07	.0000	.0000
119 Tritium	.1704E-15	.2366E-15	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.9774E-11	.4613E-05	.0000	.0000
16 UO2(OH)2	.1828E-28	.6266E-18	.0000	.0000
27 Y(COOH)3	.2102E-12	.9924E-07	.0000	.0000
11 Y(NO3)3	.2550E-18	.1204E-12	.0000	.0000
128 Y(OH)3	.2113E-25	.9974E-20	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	114 MAWT Vent to MVC	115 HNO3 WASH from MAWT	117 Air Sparge to SME	118 Steam to SME Coil
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.8934E-11	.4217E-05	.0000	.0000
44 Zn(COOH)2	.1111E-11	.5243E-06	.0000	.0000
54 Zn(OH)2	.1143E-24	.5394E-19	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1071E-13	.5056E-08	.0000	.0000
TOTAL FLOW, LB/HR	4.65	.18	22.61	.00
VAPOR FLOW, CFM	1.12		5.84	
LIQUID FLOW, GPM		.00		
DESIGN FLOW,				
DENSITY, LBS/FT3	.0693	69.7955	.0706	.0000
TEMPERATURE, DEG C	37.99	33.00	35.00	160.00
PRESSURE, ATM	.99	.99	1.00	6.10
PRESSURE, PSIG	-.07	-.07	.00	74.99
PRESSURE, MM HG	756.20	756.20		
PHASE	VAPOR	LIQUID	VAPOR	N/A
ENTHALPY, PCU/HR	-212.29	6.04	-1164.14	.00

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	119 Steam Condensate rate fr SME	120 Steam to SRAT Coil	121 Steam Condensate rate Fr SRAT	122 Air Spargu to SRAT
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	.0000	.0000	.8735
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	119 Steam Condens rate fr SME	120 Steam to SRAT Coil	121 Steam Condens rate Fr SRAT	122 Air Sparge to SRAT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HN03	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
83 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.0000	.0000	17.07
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	119 Steam Condens rate fr SM?	120 Steam to SRAT Coil	121 Steam Condens rate Fr SRAT	122 Air Sparge to SRAT
7 NaCl	.0000	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	.0000	5.158
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
88 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)8	.0000	.0000	.0000	.0000
11 Y(NO3)8	.0000	.0000	.0000	.0000
128 Y(OH)8	.0000	.0000	.0000	.0000
81 Y2(CO3)8	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	119	120	121	122
	Steam Conden	Steam to	Steam Conden	Air Sparge
	ate fr SME	SRAT Coil	ate Fr SRAT	to SRAT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	.00	.00	22.61
VAPOR FLOW, CFM				5.84
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0000	.0000	.0706
TEMPERATURE, DEG C	60.00	160.00	60.00	35.00
PRESSURE, ATM	1.00	6.10	1.00	1.00
PRESSURE, PSIG	.00	74.99	.00	.00
PRESSURE, MM HG				
PHASE	N/A	N/A	N/A	VAPOR
ENTHALPY, PCU/HR	.00	.00	.00	-1164.14

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Spargo to MFT	126 Dump Can Air Inleakage
COMPONENT FLOWS, LB/HR				
1 H2O	114.5	95.93	.8735	.6654
45 Ag	.8218E-07	.1609E-07	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.1043E-08	.5213E-09	.0000	.0000
74 Al(OH)3	.9442E-06	.4721E-06	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.4403E-05	.2202E-05	.0000	.0000
9 Ba(NO3)2	.1240E-13	.6200E-14	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1121E-07	.5607E-08	.0000	.0000
66 CO	.4493E-04	.3551E-10	.0000	.0000
87 CO2	4.444	.1770E-03	.0000	.0000
142 CO2 (C14)	.8846E-10	.8523E-14	.0000	.0000
63 Ca(COOH)2	.8885E-06	.1942E-06	.0000	.0000
120 Ca(OH)2	.2958E-09	.1479E-09	.0000	.0000
113 Ca3(PO4)2	.2794E-07	.1397E-07	.0000	.0000
20 CaC2O4	.8022E-07	.1511E-07	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.7556E-08	.3778E-08	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.8550E-07	.1775E-07	.0000	.0000
29 Carbon	.2395E-07	.1197E-07	.0000	.0000
26 Co(COOH)2	.6134E-08	.3067E-08	.0000	.0000
121 Co(OH)2	.5118E-11	.2559E-11	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.2872E-07	.1436E-07	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.2197E-12	.1099E-12	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.1744E-07	.8721E-08	.0000	.0000
96 CsCl	.1154E-09	.5772E-10	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.7954E-09	.3977E-09	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.1310E-07	.6551E-08	.0000	.0000
52 Cu(OH)2	.1113E-10	.5566E-11	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.2285E-05	.1143E-05	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.2187E-07	.1069E-07	.0000	.0000
103 GroupB	.6716E-07	.8358E-07	.0000	.0000
25 H2	.3583E-05	.2670E-11	.0000	.0000
183 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.8280	.2748	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.8086E-03	.1548E-03	.0000	.0000
185 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.2166E-09	.1083E-09	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
181 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.4835E-08	.2418E-08	.0000	.0000
105 La2O3	.1496E-06	.7479E-07	.0000	.0000
108 Li2O	.1707E-05	.8537E-06	.0000	.0000
65 Mg(COOH)2	.7395E-07	.3697E-07	.0000	.0000
55 Mg(OH)2	.5045E-10	.2523E-10	.0000	.0000
83 MgO	.5990E-06	.2995E-06	.0000	.0000
60 Mn(COOH)2	.6633E-06	.3317E-06	.0000	.0000
182 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.4782E-08	.2366E-08	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1227.	.8878E-03	17.07	80.42
148 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.7464E-01	.1651E-06	.0000	.0000
84 NO2	.4294E-02	.2533E-03	.0000	.0000
70 Na(HgO(OH))	.4784E-10	.2367E-10	.0000	.0000
94 Na2B4O7	.2511E-08	.1256E-08	.0000	.0000
109 Na2C2O4	.1940E-08	.9701E-09	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.5306E-05	.2653E-05	.0000	.0000
71 Na2PuO2(OH)4	.1920E-14	.9598E-15	.0000	.0000
73 Na2RhO4	.8947E-12	.1973E-12	.0000	.0000
72 Na2RuO4	.8851E-11	.1926E-11	.0000	.0000
6 Na2SO4	.7810E-08	.8905E-08	.0000	.0000
68 NaAlO2	.1920E-07	.9598E-08	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.1869E-05	.9346E-06	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
7 NaCl	.9446E-08	.4728E-08	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1662E-08	.8311E-09	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.8978E-09	.4489E-09	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.8261E-06	.1631E-06	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.2325E-06	.1162E-06	.0000	.0000
17 Ni(OH)2	.1938E-09	.9690E-10	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	370.7	.5411E-03	5.158	9.189
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1055E-07	.5277E-08	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.1081E-10	.5408E-11	.0000	.0000
76 PuO2	.2746E-08	.1378E-08	.0000	.0000
22 RhO2	.1049E-08	.5247E-09	.0000	.0000
79 RuO2	.5239E-08	.2620E-08	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.5283E-05	.1646E-10	.0000	.0000
111 SiO2	.1792E-04	.8960E-05	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.9462E-08	.4731E-08	.0000	.0000
10 Sr(NO3)2	.1106E-13	.5532E-14	.0000	.0000
127 Sr(OH)2	.8664E-11	.4832E-11	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.4306E-07	.2158E-07	.0000	.0000
107 TiO2	.2992E-06	.1496E-06	.0000	.0000
119 Tritium	.8938E-10	.3744E-10	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.8007E-06	.1504E-06	.0000	.0000
16 UO2(OH)2	.8396E-09	.1698E-09	.0000	.0000
27 Y(COOH)3	.6469E-08	.3234E-08	.0000	.0000
11 Y(NO3)3	.7857E-14	.3929E-14	.0000	.0000
128 Y(OH)3	.5405E-11	.2702E-11	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	123 Inlet Vapor to FAVC	124 FAVC Condensate	125 Air Sparge to MFT	126 Dump Can Air Inleakage
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.2752E-06	.1376E-06	.0000	.0000
44 Zn(COOH)2	.8418E-07	.1709E-07	.0000	.0000
54 Zn(OH)2	.2923E-10	.1462E-10	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1496E-06	.7479E-07	.0000	.0000
TOTAL FLOW, LB/HR	1716.94	93.21	22.61	40.28
VAPOR FLOW, CFM	454.93		5.34	9.88
LIQUID FLOW, GPM		.19		
DESIGN FLOW,				
DENSITY, LBS/FT3	.0629	62.1622	.0706	.0680
TEMPERATURE, DEG C	50.00	15.00	35.00	35.00
PRESSURE, ATM	.96	.96	1.00	.96
PRESSURE, PSIG	-.58	-.58	.00	-.54
PRESSURE, MM HG	730.13	730.13		732.03
PHASE	VAPOR	LIQUID	VAPOR	VAPOR
ENTHALPY, PCU/HR	-26811.35	1457.53	-1164.14	-2074.10

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWT Vent to PVVS
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	.0000	.0000	6.222
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	5.558
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWTI Vent to PVVS
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.4731E-08
105 Ln2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.4162E-08
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.0000	.0000	47.85
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	1.168
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.1898E-08
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWT Vent to PVVS
7 NaCl	.0000	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.7622E-07
4 NaOH	.0000	.0000	.0000	.1200E-09
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.0000	.0000	14.45
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
28 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.2666E-02	.1404E-02	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	127 Control Air to Ejector	128 Surfactant to OGCT	129 Surfactant to FPT	130 DWTI Vent to PVVS
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	.00	.00	75.25
VAPOR FLOW, CFM	.00			20.85
LIQUID FLOW, GPM		.00	.00	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	66.8000	66.8000	.0616
TEMPERATURE, DEG C	85.00	25.00	25.00	50.00
PRESSURE, ATM	1.00	1.00	1.00	.93
PRESSURE, PSIG	.00	.00	.00	-1.08
PRESSURE, MM HG				708.99
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
ENTHALPY, PCU/HR	.00	.07	.04	272.00

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	181 Inlet Gas to Sand Filter	182 Sand Filter Exhaust	183 Fan Exhaust to Stack	134 Stack Exhaust
COMPONENT FLOWS, LB/HR				
1 H2O	9665.	9665.	9665.	9665.
45 Ag	.5322E-10	.5322E-13	.5322E-13	.5322E-13
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.8356E-10	.8356E-13	.8356E-13	.8356E-13
51 AgOH	.1503E-10	.1503E-13	.1503E-13	.1503E-13
74 Al(OH)3	.1559E-08	.1559E-11	.1559E-11	.1559E-11
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.7207E-08	.7207E-11	.7207E-11	.7207E-11
9 Ba(NO3)2	.2047E-16	.2047E-19	.2047E-19	.2047E-19
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.1851E-10	.1851E-13	.1851E-13	.1851E-13
66 CO	7.614	7.614	7.614	7.614
37 CO2	26.57	26.57	26.57	26.57
142 CO2 (C14)	.2875E-09	.2875E-09	.2875E-09	.2875E-09
63 Ca(COOH)2	.6413E-09	.6413E-12	.6413E-12	.6413E-12
120 Ca(OH)2	.4808E-12	.4808E-15	.4808E-15	.4808E-15
113 Ca3(PO4)2	.4613E-10	.4613E-13	.4613E-13	.4613E-13
20 CaC2O4	.4989E-10	.4989E-13	.4989E-13	.4989E-13
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1247E-10	.1247E-13	.1247E-13	.1247E-13
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.5860E-10	.5860E-13	.5860E-13	.5860E-13
29 Carbon	.3959E-10	.3959E-13	.3959E-13	.3959E-13
26 Co(COOH)2	.9968E-08	.9968E-08	.9968E-08	.9968E-08
121 Co(OH)2	.8316E-14	.8316E-17	.8316E-17	.8316E-17
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.4741E-10	.4741E-13	.4741E-13	.4741E-13
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.3614E-15	.3614E-18	.3614E-18	.3614E-18
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.2879E-10	.2879E-13	.2879E-13	.2879E-13
96 CsCl	.2616E-09	.2616E-12	.2616E-12	.2616E-12
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.1313E-11	.1313E-14	.1313E-14	.1313E-14
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.2163E-10	.2163E-13	.2163E-13	.2163E-13
52 Cu(OH)2	.1809E-13	.1809E-16	.1809E-16	.1809E-16
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.3772E-08	.3772E-11	.3772E-11	.3772E-11
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	131 Inlet Gas to Sand Filter	132 Sand Filter Exhaust	133 Fan Exhaust to Stack	134 Stack Exhaust
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.0000
102 GroupA	.8566E-09	.8566E-12	.8566E-12	.8566E-12
103 GroupB	.1109E-09	.1109E-12	.1109E-12	.1109E-12
95 H2	.5827	.5827	.5827	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.4669E-01	.4669E-01	.4669E-01	.4669E-01
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.3793E-03	.3793E-03	.3793E-03	.3793E-03
135 HgNO32	.5225E-13	.5225E-16	.5225E-16	.5225E-16
21 HgO	.1590E-09	.1590E-12	.1590E-12	.1590E-12
97 I2	.7755E-09	.7755E-09	.7755E-09	.7755E-09
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2323E-10	.2323E-13	.2323E-13	.2323E-13
105 La2O3	.2448E-09	.2448E-12	.2448E-12	.2448E-12
108 Li2O	.2794E-08	.2794E-11	.2794E-11	.2794E-11
65 Mg(COOH)2	.1221E-09	.1221E-12	.1221E-12	.1221E-12
55 Mg(OH)2	.8199E-13	.8199E-16	.8199E-16	.8199E-16
33 MgO	.9803E-09	.9803E-12	.9803E-12	.9803E-12
60 Mn(COOH)2	.1095E-08	.1095E-11	.1095E-11	.1095E-11
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.2122E-10	.2122E-13	.2122E-13	.2122E-13
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.4407E+06	.4407E+06	.4407E+06	.4407E+06
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	2.213	2.213	2.213	2.213
84 NO2	.1703	.1703	.1703	.1703
70 Na(HgO(OH))	.7813E-13	.7813E-16	.7813E-16	.7813E-16
94 Na2B4O7	.4062E-10	.4062E-13	.4062E-13	.4062E-13
109 Na2C2O4	.9322E-11	.9322E-14	.9322E-14	.9322E-14
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.8696E-08	.8696E-11	.8696E-11	.8696E-11
71 Na2PuO2(OH)4	.3169E-17	.3169E-20	.3169E-20	.3169E-20
73 Na2RhO4	.6514E-15	.6514E-18	.6514E-18	.6514E-18
72 Na2RuO4	.6357E-14	.6357E-17	.6357E-17	.6357E-17
6 Na2SO4	.1289E-10	.1289E-13	.1289E-13	.1289E-13
68 NaAlO2	.3169E-10	.3169E-13	.3169E-13	.3169E-13
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.3083E-08	.3083E-11	.3083E-11	.3083E-11

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	181 Inlet Gas to Sand Filter	132 Sand Filter Exhaust	133 Fan Exhaust to Stack	134 Stack Exhaust
7 NaCl	.2283E-08	.2288E-11	.2288E-11	.2288E-11
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.1863E-08	.1868E-11	.1868E-11	.1868E-11
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.2282E-09	.2282E-12	.2282E-12	.2282E-12
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.9071E-09	.9071E-12	.9071E-12	.9071E-12
4 NaOH	.8901E-12	.3901E-15	.3901E-15	.3901E-15
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.8837E-09	.3837E-12	.3837E-12	.3837E-12
17 Ni(OH)2	.3149E-12	.3149E-15	.3149E-15	.3149E-15
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1331E+06	.1331E+06	.1331E+06	.1331E+06
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.1742E-10	.1742E-13	.1742E-13	.1742E-13
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.1784E-13	.1784E-16	.1784E-16	.1784E-16
76 PuO2	.4533E-11	.4533E-14	.4533E-14	.4533E-14
22 RhO2	.1732E-11	.1732E-14	.1732E-14	.1732E-14
79 RuO2	.1657E-09	.1657E-12	.1657E-12	.1657E-12
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.3100	.3100	.3100	.3100
111 SiO2	.2984E-07	.2984E-10	.2984E-10	.2984E-10
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.1562E-10	.1562E-13	.1562E-13	.1562E-13
10 Sr(NO3)2	.1826E-16	.1826E-19	.1826E-19	.1826E-19
127 Sr(OH)2	.1408E-13	.1408E-16	.1408E-16	.1408E-16
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.7107E-10	.7107E-13	.7107E-13	.7107E-13
107 TiO2	.4896E-09	.4896E-12	.4896E-12	.4896E-12
119 Tritium	.1787E-09	.1787E-09	.1787E-09	.1787E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.4964E-09	.4964E-12	.4964E-12	.4964E-12
16 UO2(OH)2	.5518E-12	.5518E-15	.5518E-15	.5518E-15
27 Y(COOH)3	.1068E-10	.1068E-13	.1068E-13	.1068E-13
11 Y(NO3)3	.1297E-16	.1297E-19	.1297E-19	.1297E-19
128 Y(OH)3	.8783E-14	.8783E-17	.8783E-17	.8783E-17
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	181	182	183	184
	Inlet Gas to Sand Filter	Sand Filter Exhaust	Fan Exhaust to Stack	Stack Exhaust
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.4548E-09	.4548E-12	.4548E-12	.4543E-12
44 Zn(COOH)2	.5642E-10	.5642E-13	.5642E-13	.5642E-13
54 Zn(OH)2	.4750E-13	.4750E-16	.4750E-16	.4750E-16
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2448E-09	.2448E-12	.2448E-12	.2448E-12
TOTAL FLOW, LB/HR	583523.48	583523.48	583523.48	583523.48
VAPOR FLOW, CFM	138982.53	142490.80	139924.63	139924.63
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0700	.0682	.0695	.0695
TEMPERATURE, DEG C	85.24	85.24	89.65	89.65
PRESSURE, ATM	.99	.97	1.00	1.00
PRESSURE, PSIG	-.11	-.47	.00	.00
PRESSURE, MM HG	754.88	735.76		
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-29994690.00	-29997035.00	-29381418.75	-29381418.75

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	185 50 Wt% NaOH to DWT	186 DWT Liquid to RCT	187 Steam to DWT Coil	188 Steam Condensate fr DWT
COMPONENT FLOWS, LB/HR				
1 H2O	1.546	310.5	.0000	.0000
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.1211E-01	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	185 50 Wt% NaOH to DWT	186 DWT Liquid to RCT	187 Steam to DWT Coil	188 Steam Conden rate fr DWT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
48 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.1970	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.1784	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	.8276E-02	.0000	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.2386E-03	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.7906E-01	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
78 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	185	186	187	138
	50 Wt% NaOH	DWTT Liquid	Steam to	Steam Conden
	to DWT	to RCT	DWTT Coil	sate fr DWT
7 NaCl	.0000	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	8.175	.0000	.0000
4 NaOH	1.546	.5000E-02	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	.1890E-02	.0000	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
128 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	135 50 Wt% NaOH to DWT	136 DWT Liquid to RCT	137 Steam to DWT Coil	138 Steam Condens rate fr DWT
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZnO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	8.09	814.19	.00	.00
VAPOR FLOW, CFM				
LIQUID FLOW, GPM	.00	.62		
DESIGN FLOW,				
DENSITY, LBS/FT3	84.9618	62.8380	.0000	.0000
TEMPERATURE, DEG C	25.00	50.00	160.00	60.00
PRESSURE, ATM	1.00	.93	6.10	1.00
PRESSURE, PSIG	.00	-1.08	74.99	.00
PRESSURE, MM HG		703.99		
PHASE	LIQUID	LIQUID	N/A	N/A
ENTHALPY, PCU/HR	51.74	15940.75	.00	.00

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	189 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO ₃ Wash to MAWT	142 Frit Slurry to SFHT
COMPONENT FLOWS, LB/HR				
1 H ₂ O	.3735	.7463	.1816	131.1
45 Ag	.0000	.0000	.0000	.0000
116 Ag ₂ O	.0000	.0000	.0000	.0000
184 AgNO ₃	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH) ₃	.0000	.0000	.0000	.0000
77 Al ₂ O ₃	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B ₂ O ₃	.0000	.0000	.0000	6.616
9 Ba(NO ₃) ₂	.0000	.0000	.0000	.0000
95 BaCl ₂	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO ₄	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO ₂	.0000	.0000	.0000	.0000
142 CO ₂ (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH) ₂	.0000	.0000	.0000	.0000
120 Ca(OH) ₂	.0000	.0000	.0000	.0000
113 Ca ₃ (PO ₄) ₂	.0000	.0000	.0000	.0000
20 CaC ₂ O ₄	.0000	.0000	.0000	.0000
18 CaCO ₃	.0000	.0000	.0000	.0000
78 CaF ₂	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO ₄	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH) ₂	.0000	.0000	.0000	.0000
121 Co(OH) ₂	.0000	.0000	.0000	.0000
53 Co(OH) ₃	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH) ₃	.0000	.0000	.0000	.0000
98 Cr ₂ O ₃	.0000	.0000	.0000	.0000
42 Cs ₂ O	.0000	.0000	.0000	.0000
137 Cs ₂ O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO ₃	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH) ₂	.0000	.0000	.0000	.0000
52 Cu(OH) ₂	.0000	.0000	.0000	.0000
58 Cu ₂ O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH) ₃	.0000	.0000	.0000	.0000
80 Fe ₂ O ₃	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	139 Air Sparge to SFHT	140 Air Sparge to FCF	141 HNO3 Wash to MAWT	142 Frit Slurry to SFHT
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.4206
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.2476E-01	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KN03	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.2250
108 Li2O	.0000	.0000	.0000	2.566
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.9002
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	17.07	84.12	.0000	.2825E-02
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	7.967
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	139 Air Sparge to SFHT	140 Air Sparge to FCT	141 HNO3 Wash to MAWT	142 Frit Slurry to SFHT
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	5.158	10.31	.0000	.1679E-02
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	26.06
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.4501
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	139	140	141	142
	Air Sparge	Air Sparge	HNO3 Wash	Frit Slurry
	to SFHT	to FCT	to MAWT	to SFHT
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.2250
TOTAL FLOW, LB/HR	22.61	45.17	.21	226.56
VAPOR FLOW, CFM	5.84	10.67		
LIQUID FLOW, GPM			.00	.40
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	65.0878	70.1600
TEMPERATURE, DEG C	85.00	85.00	25.00	80.00
PRESSURE, ATM	1.00	1.00	1.00	.97
PRESSURE, PSIG	.00	.00	.00	-.51
PRESSURE, MM HG				733.86
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-1164.14	-2326.09	4.78	6021.94

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	143 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWTT	146 Liquid Spray to PWDBF#1
COMPONENT FLOWS, LB/HR				
1 H2O	18.52	.1828E-02	.0000	2829.
45 Ag	.1609E-07	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.5213E-09	.0000	.0000	.6547E-03
74 Al(OH)3	.4721E-06	.0000	.0000	.5789
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2202E-05	.0000	.0000	1.225
9 Ba(NO3)2	.6200E-14	.0000	.0000	.5311E-03
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5607E-08	.0000	.0000	.4795E-02
66 CO	.4493E-04	.0000	.0000	.3089E-03
87 CO2	4.443	.0000	.0000	.1549E-01
142 CO2 (C14)	.8846E-10	.0000	.0000	.1610E-26
63 Ca(COOH)2	.1942E-06	.0000	.0000	.1663
120 Ca(OH)2	.1479E-09	.0000	.0000	.0000
113 Ca3(PO4)2	.1397E-07	.0000	.0000	.1195E-01
20 CaC2O4	.1511E-07	.0000	.0000	.1292E-01
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.3778E-08	.0000	.0000	.3231E-02
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1775E-07	.0000	.0000	.1518E-01
29 Carbon	.1197E-07	.0000	.0000	.9509E-02
26 Co(COOH)2	.8067E-08	.0000	.0000	.2626E-02
121 Co(OH)2	.2559E-11	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1436E-07	.0000	.0000	.1228E-01
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1099E-12	.0000	.0000	.7699E-07
137 Cs2O Semi Vol	.0000	.0000	.0000	.1267E-04
90 CsCOOH	.8721E-08	.0000	.0000	.7426E-02
96 CsCl	.5772E-10	.0000	.0000	.4457E-06
136 CsCl Semi Vol	.0000	.0000	.0000	.3678E-01
8 CsNO3	.8977E-09	.0000	.0000	.3407E-03
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.6551E-08	.0000	.0000	.5610E-02
52 Cu(OH)2	.5566E-11	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1143E-05	.0000	.0000	1.401
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	143 FAVC Vent to PVVS	144 Air Sparge to MNWF	145 HNO3 Sumps to DWTT	146 Liquid Spray to PWDBF#1
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vol	.0000	.0000	.0000	.5969E-01
102 GroupA	.1069E-07	.0000	.0000	.8984E-02
103 GroupB	.3358E-07	.0000	.0000	.2872E-01
25 H2	.3533E-05	.0000	.0000	.2462E-04
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.4820E-01	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.1543E-03	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.1083E-09	.0000	.0000	.2226E-01
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2418E-08	.0000	.0000	.2225E-04
105 La2O3	.7479E-07	.0000	.0000	.2897E-01
108 Li2O	.8537E-06	.0000	.0000	.4741
65 Mg(COOH)2	.8697E-07	.0000	.0000	.3166E-01
55 Mg(OH)2	.2528E-10	.0000	.0000	.0000
33 MgO	.2995E-06	.0000	.0000	.1606
60 Mn(COOH)2	.8317E-06	.0000	.0000	.2843
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.2366E-08	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1227.	.6073E-01	.0000	.8038E-01
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.7464E-01	.0000	.0000	.8862E-04
84 NO2	.4041E-02	.0000	.0000	.6178E-01
70 Na(HgO(OH))	.2367E-10	.0000	.0000	.2027E-04
94 Na2B4O7	.1256E-08	.0000	.0000	.7781
109 Na2C2O4	.9701E-09	.0000	.0000	.8928E-05
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.2653E-05	.0000	.0000	1.756
71 Na2PuO2(OH)4	.9598E-15	.0000	.0000	.8222E-09
73 Na2RhO4	.1973E-12	.0000	.0000	.1690E-06
72 Na2RuO4	.1926E-11	.0000	.0000	.1649E-05
6 Na2SO4	.8905E-08	.0000	.0000	.8845E-02
68 NaAlO2	.9598E-08	.0000	.0000	.8222E-02
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.9346E-06	.0000	.0000	.9377

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	148 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWT	146 Liquid Spray to PWDRF#1
7 NaCl	.4723E-08	.0000	.0000	.3333E-02
188 NaCl Semi Vol	.0000	.0000	.0000	.50S2
69 NaF	.8311E-09	.0000	.0000	.8846E-01
139 NaF Semi Vol	.0000	.0000	.0000	.4137
12 NaI	.4489E-09	.0000	.0000	.3229E-03
125 NaI Semi Vol	.0000	.0000	.0000	.4325E-01
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1631E-06	.0000	.0000	.1075
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1162E-06	.0000	.0000	.9954E-01
17 Ni(OH)2	.9690E-10	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	370.7	.1835E-01	.0000	.1740E-01
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.5277E-08	.0000	.0000	.4513E-02
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.5403E-11	.0000	.0000	.4607E-05
76 PuO2	.1873E-08	.0000	.0000	.1174E-02
22 RhO2	.5247E-09	.0000	.0000	.4487E-03
79 RuO2	.2620E-08	.0000	.0000	.2175E-02
28 RuO2 Semi Vol	.0000	.0000	.0000	.2168E-01
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.5283E-05	.0000	.0000	.3627E-04
111 SiO2	.8960E-05	.0000	.0000	5.189
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4731E-08	.0000	.0000	.4051E-02
10 Sr(NO3)2	.5532E-14	.0000	.0000	.4739E-08
127 Sr(OH)2	.4882E-11	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 Sr-RESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2153E-07	.0000	.0000	.1841E-01
107 TiO2	.1496E-06	.0000	.0000	.5794E-01
119 Tritium	.5189E-10	.0000	.0000	.1102E-08
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1504E-06	.0000	.0000	.1287
16 UO2(OH)2	.1698E-09	.0000	.0000	.0000
27 Y(COOH)3	.3234E-08	.0000	.0000	.2770E-02
11 Y(NO3)3	.8929E-14	.0000	.0000	.3365E-08
128 Y(OH)3	.2702E-11	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	143 FAVC Vent to PVVS	144 Air Sparge to MWWT	145 HNO3 Sumps to DWTT	146 Liquid Spray to PWDBF#1
47 Y203	.0000	.0000	.0000	.0000
100 Zeolite	.1376E-06	.0000	.0000	.1177
44 Zn(COOH)2	.1709E-07	.0000	.0000	.1463E-01
54 Zn(OH)2	.1462E-10	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7479E-07	.0000	.0000	.2897E-01
TOTAL FLOW, LB/HR	1620.74	.08	.00	2844.43
VAPOR FLOW, CFM	884.96	.02		
LIQUID FLOW, GPM			.00	5.66
DESIGN FLOW,				
DENSITY, LBS/FT3	.0702	.0706	.0000	62.6167
TEMPERATURE, DEG C	15.00	35.00	35.00	55.00
PRESSURE, ATM	.93	1.00	1.00	8.18
PRESSURE, PSIG	-1.08	.00	.00	32.04
PRESSURE, MM HG	703.99			
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-96121.20	-4.14	.00	159518.95

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomzng Air	150 PWDBF #1 Exit Gas
COMPONENT FLOWS, LB/HR				
1 H2O	2829.	2817.	3.811	162.5
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.6547E-03	.6594E-03	.0000	.4873E-05
74 Al(OH)3	.5789	.5819	.0000	.3050E-02
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	1.225	1.231	.0000	.6460E-02
9 Ba(NO3)2	.5311E-08	.5350E-08	.0000	.4008E-10
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.4795E-02	.4830E-02	.0000	.3624E-04
66 CO	.3089E-03	.2316E-03	.0000	7.614
87 CO2	.1549E-01	.1214E-01	.0000	16.56
142 CO2 (C14)	.1610E-26	.1262E-26	.0000	.1722E-23
63 Ca(COOH)2	.1663	.1676	.0000	.1257E-02
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.1195E-01	.1204E-01	.0000	.9031E-04
20 CaC2O4	.1292E-01	.1302E-01	.0000	.9768E-04
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.3231E-02	.3254E-02	.0000	.2442E-04
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1518E-01	.1529E-01	.0000	.1147E-03
29 Carbon	.9509E-02	.9591E-02	.0000	.8483E-04
26 Co(COOH)2	.2626E-02	.2645E-02	.0000	.1985E-04
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1228E-01	.1237E-01	.0000	.9283E-04
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.7699E-07	.7752E-07	.0000	.5483E-09
137 Cs2O Semi Vol	.1267E-04	.1267E-04	.0000	.0000
90 CsCOOH	.7426E-02	.7481E-02	.0000	.5637E-04
96 CsCl	.4457E-06	.4514E-06	.0000	.5370E-08
136 CsCl Semi Vol	.3678E-01	.3772E-01	.0000	.1046E-02
8 CsNO3	.3407E-03	.3432E-03	.0000	.2571E-05
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.5610E-02	.5651E-02	.0000	.4240E-04
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	1.401	1.408	.0000	.7381E-02
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomzg Air	150 PWDBF #1 Exit Gas
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.5969E-01	.6084E-01	.0000	.1285E-02
102 GroupA	.8984E-02	.9051E-02	.0000	.6844E-04
103 GroupB	.2872E-01	.2893E-01	.0000	.2171E-03
25 H2	.2462E-04	.1836E-04	.0000	.5827
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.2226E-01	.2284E-01	.0000	.6345E-03
97 I2	.0000	.0000	.0000	.7755E-04
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.2225E-04	.2249E-04	.0000	.2459E-06
105 La2O3	.2897E-01	.2918E-01	.0000	.2192E-03
108 Li2O	.4741	.4766	.0000	.2505E-02
65 Mg(COOH)2	.8166E-01	.8189E-01	.0000	.2393E-03
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.1606	.1614	.0000	.8786E-03
60 Mn(COOH)2	.2843	.2864	.0000	.2147E-02
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.3038E-01	.3128E-01	174.2	1140.
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.8862E-04	.6726E-04	.0000	.9700
84 NO2	.6178E-01	.5549E-01	.0000	.1530
70 Na(HgO(OH))	.2027E-04	.2042E-04	.0000	.1530E-06
94 Na2B4O7	.7781	.7826	.0000	.4621E-02
109 Na2C2O4	.8928E-05	.9024E-05	.0000	.9864E-07
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	1.756	1.765	.0000	.9262E-02
71 Na2PuO2(OH)4	.8222E-09	.8282E-09	.0000	.6204E-11
73 Na2RhO4	.1690E-06	.1703E-06	.0000	.1275E-08
72 Na2RuO4	.1649E-05	.1662E-05	.0000	.1245E-07
6 Na2SO4	.8345E-02	.8369E-02	.0000	.2524E-04
68 NaAlO2	.8222E-02	.8282E-02	.0000	.6204E-04
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.9377	.9433	.0000	.5723E-02

INFORMATION ONLY

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	147 Liquid Spray to PWDBF#2	148 PWDBF #2 Exit Liquid	149 PWDBF #2 Atomzg Air	150 PWDBF #1 Exit Gas
7 NaCl	.8333E-02	.3357E-02	.0000	.2516E-04
188 NaCl Semi Vol	.5082	.5164	.0000	.9038E-02
69 NaF	.8846E-01	.8910E-01	.0000	.6536E-03
189 NaF Semi Vol	.4187	.4204	.0000	.7439E-02
12 NaI	.8229E-03	.8252E-03	.0000	.2438E-05
125 NaI Semi Vol	.4825E-01	.4406E-01	.0000	.9068E-03
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.1075	.1083	.0000	.8114E-03
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.9954E-01	.1008	.0000	.7523E-03
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.1740E-01	.1798E-01	52.63	844.2
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.4513E-02	.4546E-02	.0000	.3411E-04
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.4607E-05	.4641E-05	.0000	.3497E-07
76 PuO2	.1174E-02	.1183E-02	.0000	.8876E-05
22 RhO2	.4487E-03	.4520E-03	.0000	.3392E-05
79 RuO2	.2175E-02	.2191E-02	.0000	.1672E-04
23 RuO2 Semi Vol	.2168E-01	.2225E-01	.0000	.6283E-03
88 RuO4	.0000	.0000	.0000	.0000
88 SO2	.3627E-04	.2768E-04	.0000	.3100
111 SiO2	5.189	5.215	.0000	.2737E-01
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4051E-02	.4081E-02	.0000	.3062E-04
10 Sr(NO3)2	.4739E-08	.4774E-08	.0000	.3576E-10
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1841E-01	.1854E-01	.0000	.1392E-03
107 TiO2	.5794E-01	.5837E-01	.0000	.4384E-03
119 Tritium	.1102E-08	.1096E-08	.0000	.6322E-10
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1287	.1297	.0000	.9731E-03
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.2770E-02	.2790E-02	.0000	.2093E-04
11 Y(NO3)3	.3365E-08	.3390E-08	.0000	.2539E-10
128 Y(OH)3	.0000	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	147	148	149	150
	Liquid Spray	PWDBF #2	PWDBF #2	PWDBF #1
	to PWDBF#2	Exit Liquid	Atomzg Air	Exit Gas
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1177	.1186	.0000	.8896E-03
44 Zn(COOH)2	.1463E-01	.1474E-01	.0000	.1106E-03
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.2897E-01	.2918E-01	.0000	.2192E-03
TOTAL FLOW, LB/HR	2844.43	2831.81	280.66	1672.55
VAPOR FLOW, CFM			14.89	455.06
LIQUID FLOW, GPM	5.66	5.64		
DESIGN FLOW,				
DENSITY, LBS/FT3	62.6167	62.6187	.2583	.0613
TEMPERATURE, DEG C	55.00	52.48	40.00	53.46
PRESSURE, ATM	8.18	.95	8.72	.96
PRESSURE, PSIG	82.04	.69	89.97	-.54
PRESSURE, MM HG		72.51		732.11
PHASE	LIQUID	LIQUID	VAPOR	VAPOR
ENTHALPY, PCU/HR	159518.95	151881.99	-11603.55	15706.64

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDEF Nozzles	154 Sand Filter Accumulation
COMPONENT FLOWS, LB/HR				
1 H2O	69.63	.0000	8177.	.0000
45 Ag	.0000	.0000	.0000	.5317E-10
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.8348E-10
51 AgOH	.3853E-13	.3850E-10	.6305E-05	.1502E-10
74 Al(OH)3	.2412E-10	.2409E-07	.3864E-02	.1557E-08
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.5108E-10	.5103E-07	.8166E-02	.7199E-08
9 Ba(NO3)2	.8169E-18	.8166E-15	.5072E-10	.2045E-16
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.2866E-12	.2863E-09	.4577E-04	.1849E-10
66 CO	7.614	.0000	.5167E-03	.0000
87 CO2	16.57	.0000	.2992E-01	.0000
142 CO2 (C14)	.1722E-23	.0000	.8110E-26	.0000
63 Ca(COOH)2	.9942E-11	.9932E-08	.1588E-02	.6406E-09
120 Ca(OH)2	.0000	.0000	.0000	.4803E-12
113 Ca3(PO4)2	.7142E-12	.7135E-09	.1141E-03	.4608E-10
20 CaC2O4	.7724E-12	.7716E-09	.1234E-03	.4984E-10
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.1931E-12	.1929E-09	.3084E-04	.1246E-10
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.9073E-12	.9064E-09	.1449E-03	.5854E-10
29 Carbon	.6708E-12	.6701E-09	.1065E-03	.3955E-10
26 Co(COOH)2	.0000	.0000	.2509E-04	.0000
121 Co(OH)2	.0000	.0000	.0000	.8308E-14
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.7341E-12	.7334E-09	.1172E-03	.4736E-10
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.4336E-17	.4332E-14	.7198E-09	.8310E-15
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.4458E-12	.4453E-09	.7070E-04	.2876E-10
96 CsCl	.2614E-09	.2612E-06	.4057E-08	.2614E-09
136 CsCl Semi Vol	.0000	.0000	.4098E-02	.0000
8 CsNO3	.2033E-13	.2031E-10	.3253E-05	.1312E-11
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.3353E-12	.3350E-09	.5355E-04	.2161E-10
52 Cu(OH)2	.0000	.0000	.0000	.1807E-13
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
180 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.5837E-10	.5831E-07	.9853E-02	.3769E-08
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	151	152	153	154
	Exit Gas from HEPA	HEPA Accumulation	Liq to SWDDF Nozzles	Sand Filter Accumulation
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.5027E-02	.0000
102 GroupA	.8219E-09	.8216E-06	.8560E-04	.3563E-09
103 GroupB	.1716E-11	.1715E-08	.2741E-03	.1107E-09
25 H2	.5827	.0000	.4045E-04	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
86 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.5220E-13
21 HgO	.1586E-09	.1585E-06	.2505E-02	.1588E-09
97 I2	.7755E-09	.7747E-06	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.1944E-14	.1942E-11	.1862E-06	.2321E-10
105 La2O3	.1734E-11	.1732E-08	.2764E-03	.2446E-09
108 Li2O	.1981E-10	.1979E-07	.3156E-02	.2792E-08
65 Mg(COOH)2	.1892E-11	.1891E-08	.3022E-03	.1219E-09
55 Mg(OH)2	.0000	.0000	.0000	.8190E-13
33 MgO	.6948E-11	.6941E-08	.1107E-02	.9793E-09
60 Mn(COOH)2	.1698E-10	.1696E-07	.2716E-02	.1094E-08
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.2120E-10
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	1896.	.0000	.9571E-01	.0000
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.9700	.0000	.1543E-03	.0000
84 NO2	.1565	.0000	.1655	.0000
70 Na(HgO(OH))	.1210E-14	.1209E-11	.1936E-06	.7805E-13
94 Na2B4O7	.3654E-10	.3650E-07	.5841E-02	.4058E-10
109 Na2C2O4	.7801E-15	.7793E-12	.7472E-07	.9813E-11
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.7324E-10	.7317E-07	.1171E-01	.8687E-08
71 Na2PuO2(OH)4	.4906E-19	.4901E-16	.7851E-11	.3165E-17
73 Na2RhO4	.1009E-16	.1008E-13	.1614E-08	.6508E-15
72 Na2RuO4	.9842E-16	.9833E-13	.1575E-07	.6351E-14
6 Na2SO4	.1996E-12	.1994E-09	.3194E-04	.1288E-10
68 NaAlO2	.4906E-12	.4901E-09	.7851E-04	.3165E-10
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.4526E-10	.4521E-07	.7193E-02	.3080E-08

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D)-
 STREAM NAME

	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDBF Nozzles	154 Sand Filter Accumulation
7 NaCl	.2272E-08	.2270E-05	.8180E-04	.2285E-03
138 NaCl Semi Vol	.0000	.0000	.8592E-01	.0000
69 NaF	.1865E-08	.1863E-05	.8244E-03	.1866E-08
139 NaF Semi Vol	.0000	.0000	.2933E-01	.0000
12 NaI	.2267E-09	.2265E-06	.8083E-05	.2280E-09
125 NaI Semi Vol	.0000	.0000	.8584E-02	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.6417E-11	.6410E-08	.1027E-02	.9062E-09
4 NaOH	.0000	.0000	.0000	.8897E-12
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.5949E-11	.5943E-08	.9501E-03	.8834E-09
17 Ni(OH)2	.0000	.0000	.0000	.8146E-12
40 NiO	.0000	.0000	.0000	.0000
82 O2	572.6	.0000	.5546E-01	.0000
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.2697E-12	.2695E-09	.4308E-04	.1740E-10
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.2765E-15	.2768E-12	.4386E-07	.1782E-13
76 PuO2	.7019E-13	.7012E-10	.1121E-04	.4529E-11
22 RhO2	.2682E-13	.2679E-10	.4283E-05	.1730E-11
79 RuO2	.1572E-09	.1570E-06	.2070E-04	.1655E-09
23 RuO2 Semi Vol	.0000	.0000	.2432E-02	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.3100	.0000	.6424E-04	.0000
111 SiO2	.2164E-09	.2162E-06	.8459E-01	.2931E-07
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.2421E-12	.2419E-09	.3867E-04	.1560E-10
10 Sr(NO3)2	.2823E-18	.2825E-15	.4525E-10	.1825E-16
127 Sr(OH)2	.0000	.0000	.0000	.1406E-13
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.1100E-11	.1099E-08	.1757E-03	.7100E-10
107 TiO2	.8467E-11	.8464E-08	.5528E-03	.4891E-09
119 Tritium	.1007E-10	.0000	.1180E-08	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.7695E-11	.7688E-08	.1229E-02	.4959E-09
16 UO2(OH)2	.0000	.0000	.0000	.5512E-12
27 Y(COOH)3	.1655E-12	.1654E-09	.2644E-04	.1067E-10
11 Y(NO3)3	.2008E-18	.2006E-15	.3214E-10	.1296E-16
128 Y(OH)3	.0000	.0000	.0000	.8774E-14
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	151 Exit Gas from HEPA	152 HEPA Accumulation	153 Liq to SWDBF Nozzles	154 Sand Filter Accumulation
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.7034E-11	.7027E-08	.1123E-02	.4539E-09
44 Zn(COOH)2	.8746E-12	.8788E-09	.1397E-03	.5636E-10
54 Zn(OH)2	.0000	.0000	.0000	.4745E-13
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.1734E-11	.1732E-08	.2764E-03	.2446E-09
TOTAL FLOW, LB/HR	2564.20	.00	8177.37	.00
VAPOR FLOW, CFM	915.07	.00		
LIQUID FLOW, GPM			16.33	
DESIGN FLOW,				
DENSITY, LBS/FT3	.0467	.1060	62.4311	.0000
TEMPERATURE, DEG C	50.00	50.00	46.81	35.24
PRESSURE, ATM	.70	.70	8.18	.99
PRESSURE, PSIG	-4.42	-4.42	32.04	-.11
PRESSURE, MM HG	531.32	531.32		754.38
PHASE	VAPOR	VAPOR	LIQUID	SOLID
ENTHALPY, PCU/HR	-101618.11	.00	390720.88	.00

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.0000	1.047	1.047	3.738
45 Ag	.1636E-07	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.2569E-07	.0000	.0000	.0000
51 AgOH	.4609E-08	.0000	.0000	.0000
74 Al(OH)3	.4717E-06	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.2200E-05	.0000	.0000	.0000
9 Ba(NO3)2	.6194E-14	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.5601E-08	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.1941E-06	.0000	.0000	.0000
120 Ca(OH)2	.1478E-09	.0000	.0000	.0000
113 Ca3(PO4)2	.1396E-07	.0000	.0000	.0000
20 CaC2O4	.1510E-07	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.3774E-08	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.1773E-07	.0000	.0000	.0000
29 Carbon	.1196E-07	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.2556E-11	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.1435E-07	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.1097E-12	.0000	.0000	.0000
187 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.8713E-08	.0000	.0000	.0000
96 CsCl	.5766E-10	.0000	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.3973E-09	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.6545E-08	.0000	.0000	.0000
52 Cu(OH)2	.5560E-11	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.1142E-05	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	155	156	157	158
	PVVF Accumulation	SRAT Air Inleakage	SME Air Inleakage	SMECT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.1068E-07	.0000	.0000	.0000
103 GroupB	.8355E-07	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
183 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.1606E-10	.0000	.0000	.0000
21 HgO	.1129E-09	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.7141E-08	.0000	.0000	.0000
105 La2O3	.7471E-07	.0000	.0000	.0000
108 Li2O	.8529E-06	.0000	.0000	.0000
65 Mg(COOH)2	.8694E-07	.0000	.0000	.0000
55 Mg(OH)2	.2520E-10	.0000	.0000	.0000
33 MgO	.2992E-06	.0000	.0000	.0000
60 Mn(COOH)2	.8313E-06	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.6522E-08	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	.0000	47.85	47.85	170.9
143 Na2CO3 (C14)	.0000	.0000	.0000	.0000
85 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.2364E-10	.0000	.0000	.0000
94 Na2B4O7	.1254E-08	.0000	.0000	.0000
109 Na2C2O4	.2865E-08	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.2650E-05	.0000	.0000	.0000
71 Na2PuO2(OH)4	.9589E-15	.0000	.0000	.0000
73 Na2RhO4	.1971E-12	.0000	.0000	.0000
72 Na2RuO4	.1924E-11	.0000	.0000	.0000
6 Na2SO4	.3901E-08	.0000	.0000	.0000
68 NaAlO2	.9589E-08	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.9237E-06	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
7 NaCl	.4718E-08	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.8303E-09	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.4485E-09	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.2769E-06	.0000	.0000	.0000
4 NaOH	.1199E-09	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.1161E-06	.0000	.0000	.0000
17 Ni(OH)2	.9680E-10	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	.0000	14.46	14.46	51.63
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.5272E-08	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.5893E-11	.0000	.0000	.0000
76 PuO2	.1872E-08	.0000	.0000	.0000
22 RhO2	.5242E-09	.0000	.0000	.0000
79 RuO2	.2617E-08	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.8951E-05	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.4727E-08	.0000	.0000	.0000
10 Sr(NO3)2	.5527E-14	.0000	.0000	.0000
127 Sr(OH)2	.4823E-11	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.2151E-07	.0000	.0000	.0000
107 TiO2	.1494E-06	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.1502E-06	.0000	.0000	.0000
16 UO2(OH)2	.1696E-09	.0000	.0000	.0000
27 Y(COOH)3	.3231E-08	.0000	.0000	.0000
11 Y(NO3)3	.3925E-14	.0000	.0000	.0000
128 Y(OH)3	.2700E-11	.0000	.0000	.0000
31 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	155 PVVF Accumulation	156 SRAT Air Inleakage	157 SME Air Inleakage	158 SMECT Air Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.1375E-06	.0000	.0000	.0000
44 Zn(COOH)2	.1707E-07	.0000	.0000	.0000
54 Zn(OH)2	.1460E-10	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.7471E-07	.0000	.0000	.0000
TOTAL FLOW, LB/HR	.00	63.85	63.85	226.27
VAPOR FLOW, CFM		14.97	14.97	58.45
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0000	.0706	.0706	.0706
TEMPERATURE, DEG C	26.63	85.00	85.00	85.00
PRESSURE, ATM	.92	1.00	1.00	1.00
PRESSURE, PSIG	-1.23	.00	.00	.00
PRESSURE, MM HG	696.54			
PHASE	SOLID	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	.00	-8262.64	-8262.64	-11652.27

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	159 MFT Air Purge	160 OGCT Air Inleakage	161 FFT Air Inleakage	162 MFT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	8.788	1.742	1.742	.7477E-01
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
184 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
118 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
18 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	159	160	161	162
	MFT Air Purge	OGCT Air Inleakage	FPT Air Inleakage	MWWT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 Group A	.0000	.0000	.0000	.0000
103 Group B	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	170.9	79.64	79.64	8.418
142 Na2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
78 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	159	160	161	162
	MFT Air	OGCT Air	FPT Air	MMWT Air
	Purge	Inleakage	Inleakage	Purge
7 NaCl	.0000	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	51.63	24.06	24.06	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
38 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
30 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	159	160	161	162
	MFT Air	OGCT Air	FPT Air	MWWT Air
	Purge	Inleakage	Inleakage	Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	226.27	105.44	105.44	4.53
VAPOR FLOW, CFM	58.45	24.91	24.91	1.07
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	85.00	85.00	85.00	85.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-11652.27	-5429.93	-5429.96	-238.05

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	163 MAWT Air Purge	165 MFT1 Air Purge	167 MFT2 Air Purge	168 MHT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.7477E-01	.7477E-01	.7477E-01	.7477E-01
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
87 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
68 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
118 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
186 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	163 MAWT Air	165 MFT1 Air	167 MFT2 Air	168 MHT Air
	Purge	Purge	Purge	Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 GroupA	.0000	.0000	.0000	.0000
103 GroupB	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
103 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
88 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	8.418	8.418	8.418	8.418
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
82 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
68 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-

STREAM NAME

	163	165	167	168
	MAWT Air	MFT1 Air	MFT2 Air	MHT Air
	Purge	Purge	Purge	Purge
7 NaCl	.0000	.0000	.0000	.0000
188 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
189 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	1.033	1.033	1.033
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	163	165	167	168
	MAWT Air	MFT1 Air	MFT2 Air	MHT Air
	Purge	Purge	Purge	Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	4.53	4.53	4.53	4.53
VAPOR FLOW, CFM	1.07	1.07	1.07	1.07
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	35.00	35.00	35.00	35.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-233.05	-233.05	-233.05	-233.05

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MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	169 SWT Air Purge	170 DWT Air Inleakage	171 RCT Air Purge	172 FCT Air Purge
COMPONENT FLOWS, LB/HR				
1 H2O	.7477E-01	1.047	3.738	7.477
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.0000	.0000	.0000
74 Al(OH)3	.0000	.0000	.0000	.0000
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.0000	.0000	.0000
9 Ba(NO3)2	.0000	.0000	.0000	.0000
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.0000	.0000	.0000
66 CO	.0000	.0000	.0000	.0000
37 CO2	.0000	.0000	.0000	.0000
142 CO2 (C14)	.0000	.0000	.0000	.0000
63 Ca(COOH)2	.0000	.0000	.0000	.0000
120 Ca(OH)2	.0000	.0000	.0000	.0000
113 Ca3(PO4)2	.0000	.0000	.0000	.0000
20 CaC2O4	.0000	.0000	.0000	.0000
18 CaCO3	.0000	.0000	.0000	.0000
78 CaF2	.0000	.0000	.0000	.0000
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.0000	.0000	.0000
29 Carbon	.0000	.0000	.0000	.0000
26 Co(COOH)2	.0000	.0000	.0000	.0000
121 Co(OH)2	.0000	.0000	.0000	.0000
53 Co(OH)3	.0000	.0000	.0000	.0000
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.0000	.0000	.0000
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.0000	.0000	.0000
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.0000	.0000	.0000
96 CsCl	.0000	.0000	.0000	.0000
136 CsCl Semi Vol	.0000	.0000	.0000	.0000
8 CsNO3	.0000	.0000	.0000	.0000
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.0000	.0000	.0000
52 Cu(OH)2	.0000	.0000	.0000	.0000
58 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.0000	.0000	.0000
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)- STREAM NAME	169 SWT Air Purge	170 DWT Air Inleakage	171 RCT Air Purge	172 FCT Air Purge
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.0000	.0000	.0000
102 Group A	.0000	.0000	.0000	.0000
103 Group B	.0000	.0000	.0000	.0000
25 H2	.0000	.0000	.0000	.0000
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
34 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
35 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.0000	.0000	.0000
97 I2	.0000	.0000	.0000	.0000
39 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.0000	.0000	.0000
105 La2O3	.0000	.0000	.0000	.0000
108 Li2O	.0000	.0000	.0000	.0000
65 Mg(COOH)2	.0000	.0000	.0000	.0000
55 Mg(OH)2	.0000	.0000	.0000	.0000
33 MgO	.0000	.0000	.0000	.0000
60 Mn(COOH)2	.0000	.0000	.0000	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.0000
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	.0000
81 N2	3.418	47.85	170.9	841.8
143 NA2CO3 (C14)	.0000	.0000	.0000	.0000
35 NO	.0000	.0000	.0000	.0000
84 NO2	.0000	.0000	.0000	.0000
70 Na(HgO(OH))	.0000	.0000	.0000	.0000
94 Na2B4O7	.0000	.0000	.0000	.0000
109 Na2C2O4	.0000	.0000	.0000	.0000
5 Na2CO3	.0000	.0000	.0000	.0000
32 Na2O	.0000	.0000	.0000	.0000
71 Na2PuO2(OH)4	.0000	.0000	.0000	.0000
73 Na2RhO4	.0000	.0000	.0000	.0000
72 Na2RuO4	.0000	.0000	.0000	.0000
6 Na2SO4	.0000	.0000	.0000	.0000
63 NaAlO2	.0000	.0000	.0000	.0000
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.0000	.0000	.0000

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MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)- STREAM NAME	169	170	171	172
	SWT Air Purge	DWTT Air Inleakage	RCT Air Purge	FCT Air Purge
7 NaCl	.0000	.0000	.0000	.0000
138 NaCl Semi Vol	.0000	.0000	.0000	.0000
69 NaF	.0000	.0000	.0000	.0000
139 NaF Semi Vol	.0000	.0000	.0000	.0000
12 NaI	.0000	.0000	.0000	.0000
125 NaI Semi Vol	.0000	.0000	.0000	.0000
8 NaNO2	.0000	.0000	.0000	.0000
2 NaNO3	.0000	.0000	.0000	.0000
4 NaOH	.0000	.0000	.0000	.0000
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.0000	.0000	.0000
17 Ni(OH)2	.0000	.0000	.0000	.0000
40 NiO	.0000	.0000	.0000	.0000
82 O2	1.033	14.46	51.63	103.8
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.0000	.0000	.0000
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.0000	.0000	.0000
76 PuO2	.0000	.0000	.0000	.0000
22 RhO2	.0000	.0000	.0000	.0000
79 RuO2	.0000	.0000	.0000	.0000
23 RuO2 Semi Vol	.0000	.0000	.0000	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.0000	.0000	.0000
111 SiO2	.0000	.0000	.0000	.0000
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.0000	.0000	.0000
10 Sr(NO3)2	.0000	.0000	.0000	.0000
127 Sr(OH)2	.0000	.0000	.0000	.0000
80 SrCO3	.0000	.0000	.0000	.0000
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.0000	.0000	.0000
107 TiO2	.0000	.0000	.0000	.0000
119 Tritium	.0000	.0000	.0000	.0000
98 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.0000	.0000	.0000
16 UO2(OH)2	.0000	.0000	.0000	.0000
27 Y(COOH)3	.0000	.0000	.0000	.0000
11 Y(NO3)3	.0000	.0000	.0000	.0000
128 Y(OH)3	.0000	.0000	.0000	.0000
81 Y2(CO3)3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES

SLUDGE-SUPERNATE FEED

STREAMS (CONT'D)-

STREAM NAME

	169	170	171	172
	SWT Air	DWTT Air	RCT Air	FCT Air
	Purge	Inleakage	Purge	Purge
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.0000	.0000	.0000
44 Zn(COOH)2	.0000	.0000	.0000	.0000
54 Zn(OH)2	.0000	.0000	.0000	.0000
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.0000	.0000	.0000
TOTAL FLOW, LB/HR	4.53	68.85	226.27	452.53
VAPOR FLOW, CFM	1.07	14.97	58.45	106.90
LIQUID FLOW, GPM				
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0706	.0706	.0706
TEMPERATURE, DEG C	35.00	35.00	35.00	35.00
PRESSURE, ATM	1.00	1.00	1.00	1.00
PRESSURE, PSIG	.00	.00	.00	.00
PRESSURE, MM HG				
PHASE	VAPOR	VAPOR	VAPOR	VAPOR
ENTHALPY, PCU/HR	-283.05	-3262.64	-11652.27	-23304.54

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAM NUMBERS - STREAM NAME	178 SFHT Air Purge	174 Off-Gas to SWDBF	175 FFT Condenser Condensate	176 DWWF Sludge Slurry Feed
COMPONENT FLOWS, LB/HR				
1 H2O	8.783	180.8	120.1	325.5
45 Ag	.0000	.0000	.0000	.0000
116 Ag2O	.0000	.0000	.0000	.0000
134 AgNO3	.0000	.0000	.0000	.0000
51 AgOH	.0000	.1541E-06	.1541E-21	.1853E-01
74 Al(OH)3	.0000	.9644E-04	.9646E-19	11.57
77 Al2O3	.0000	.0000	.0000	.0000
75 AlOOH	.0000	.0000	.0000	.0000
106 B2O3	.0000	.2043E-03	.2043E-18	.1652
9 Ba(NO3)2	.0000	.1267E-11	.1268E-26	.1521E-06
95 BaCl2	.0000	.0000	.0000	.0000
15 BaO	.0000	.0000	.0000	.0000
24 BaSO4	.0000	.1146E-05	.1146E-20	.1375
66 CO	.0000	7.614	.8014E-05	.2072E-10
37 CO2	.0000	16.57	.6601E-03	.1602E-06
142 CO2 (C14)	.0000	.1722E-23	.6924E-28	.0000
63 Ca(COOH)2	.0000	.3976E-04	.3977E-19	.0000
120 Ca(OH)2	.0000	.0000	.0000	.1225E-01
113 Ca3(PO4)2	.0000	.2856E-05	.2857E-20	.3427
20 CaC2O4	.0000	.3039E-05	.3090E-20	.8706
18 CaCO3	.0000	.0000	.0000	8.653
78 CaF2	.0000	.7723E-06	.7724E-21	.9266E-01
41 CaO	.0000	.0000	.0000	.0000
19 CaSO4	.0000	.3628E-05	.3629E-20	.4354
29 Carbon	.0000	.2683E-05	.2683E-20	.9350E-01
26 Co(COOH)2	.0000	.6278E-06	.6279E-09	.0000
121 Co(OH)2	.0000	.0000	.0000	.2119E-03
53 Co(OH)3	.0000	.0000	.0000	.5535E-01
59 CoO	.0000	.0000	.0000	.0000
99 Cr(OH)3	.0000	.2936E-05	.2936E-20	.3523
98 Cr2O3	.0000	.0000	.0000	.0000
42 Cs2O	.0000	.1734E-10	.1734E-25	.2081E-05
137 Cs2O Semi Vol	.0000	.0000	.0000	.0000
90 CsCOOH	.0000	.1783E-05	.1783E-20	.4541E-05
96 CsCl	.0000	.1856E-09	.1857E-24	.2227E-04
136 CsCl Semi Vol	.0000	.1046E-03	.1046E-17	.0000
8 CsNO3	.0000	.8129E-07	.8131E-22	.9754E-02
88 CsResin	.0000	.0000	.0000	.0000
122 Cu(COOH)2	.0000	.1341E-05	.1341E-20	.0000
52 Cu(OH)2	.0000	.0000	.0000	.1022
53 Cu2O	.0000	.0000	.0000	.0000
64 CuCOOH	.0000	.0000	.0000	.0000
130 CuO	.0000	.0000	.0000	.0000
13 Fe(OH)3	.0000	.2334E-03	.2335E-18	28.01
80 Fe2O3	.0000	.0000	.0000	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS (CONT'D) -
 STREAM NAME

	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnser Condensate	176 DWPf Sludge Slurry Feed
101 FeO	.0000	.0000	.0000	.0000
126 Group A Semi Vo	.0000	.1285E-03	.1285E-17	.0000
102 GroupA	.0000	.2164E-05	.2165E-20	.2597
103 GroupB	.0000	.6865E-05	.6866E-20	.8237
25 H2	.0000	.5827	.5990E-06	.8593E-09
133 H2C2O4	.0000	.0000	.0000	.0000
91 H2O2	.0000	.0000	.0000	.0000
84 HCOOH	.0000	.0000	.0000	.0000
43 HCl	.0000	.0000	.0000	.0000
85 HF	.0000	.0000	.0000	.0000
49 HNO3	.0000	.0000	.0000	.0000
86 HResin	.0000	.0000	.0000	.0000
36 Hg	.0000	.0000	.0000	.0000
135 HgNO32	.0000	.0000	.0000	.0000
21 HgO	.0000	.6345E-04	.6345E-18	1.460
97 I2	.0000	.7755E-04	.0000	.0000
89 K2O	.0000	.0000	.0000	.0000
131 KMnO4	.0000	.0000	.0000	.0000
118 KNO3	.0000	.7775E-08	.7777E-23	.9329E-03
105 La2O3	.0000	.6938E-05	.6934E-20	.8745E-02
108 Li2O	.0000	.7921E-04	.7923E-19	.6393E-01
65 Mg(COOH)2	.0000	.7568E-05	.7570E-20	.0000
55 Mg(OH)2	.0000	.0000	.0000	.4633
38 MgO	.0000	.2779E-04	.2779E-19	.2138E-01
60 Mn(COOH)2	.0000	.6789E-04	.6790E-19	.0000
132 Mn(NO3)2	.0000	.0000	.0000	.0000
129 Mn(OH)2	.0000	.0000	.0000	.1959
56 MnO	.0000	.0000	.0000	.0000
14 MnO2	.0000	.0000	.0000	4.693
81 N2	170.9	1893.	.1723E-02	.6225E-04
143 Na2CO3 (C14)	.0000	.0000	.0000	.2076E-09
85 NO	.0000	.9700	.2646E-05	.2621E-09
84 NO2	.0000	.1593	.6581E-02	.2390E-04
70 Na(HgO(OH))	.0000	.4838E-03	.4839E-23	.5805E-03
94 Na2B4O7	.0000	.1461E-03	.1462E-18	.4845E-03
109 Na2C2O4	.0000	.3120E-08	.3120E-23	.3743E-03
5 Na2CO3	.0000	.0000	.0000	.7150E-01
32 Na2O	.0000	.2929E-03	.2930E-18	.2366
71 Na2PuO2(OH)4	.0000	.1962E-12	.1962E-27	.2354E-07
73 Na2RhO4	.0000	.4034E-10	.4034E-25	.4840E-05
72 Na2RuO4	.0000	.3936E-09	.3937E-24	.4723E-04
6 Na2SO4	.0000	.7982E-06	.7984E-21	.9578E-01
68 NaAlO2	.0000	.1962E-05	.1962E-20	.2854
114 NaBO2	.0000	.0000	.0000	.0000
140 NaBO2 Semi Vol	.0000	.0000	.0000	.0000
50 NaCOOH	.0000	.1810E-03	.1810E-18	.1028E-01

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	173 SFHT Air Purge	174 Off-Gas to SWDBF	175 FPT Cndnser Condensate	176 DWPF Sludge Slurry Feed
7 NaCl	.0000	.7956E-06	.7958E-21	.9547E-01
138 NaCl Semi Vol	.0000	.9088E-03	.9088E-17	.0000
69 NaF	.0000	.2067E-04	.2067E-19	.5049E-03
189 NaF Semi Vol	.0000	.7439E-03	.7439E-17	.0000
12 NaI	.0000	.7712E-07	.7718E-22	.9253E-02
125 NaI Semi Vol	.0000	.9068E-04	.9068E-18	.0000
8 NaNO2	.0000	.0000	.0000	.1711
2 NaNO3	.0000	.2566E-04	.2567E-19	3.015
4 NaOH	.0000	.0000	.0000	3.464
87 NaResin	.0000	.0000	.0000	.0000
61 Ni(COOH)2	.0000	.2379E-04	.2380E-19	.0000
17 Ni(OH)2	.0000	.0000	.0000	1.780
40 NiO	.0000	.0000	.0000	.0000
82 O2	51.63	420.9	.1027E-02	.3591E-04
67 PbO	.0000	.0000	.0000	.0000
28 PbSO4	.0000	.1079E-05	.1079E-20	.1294
124 Pd	.0000	.0000	.0000	.0000
123 Pd(OH)2	.0000	.0000	.0000	.0000
112 PdNO32	.0000	.0000	.0000	.0000
110 PdO	.0000	.0000	.0000	.0000
117 Pu(COOH)4	.0000	.1106E-08	.1106E-23	.0000
76 PuO2	.0000	.2807E-06	.2808E-21	.3368E-01
22 RhO2	.0000	.1078E-06	.1078E-21	.1287E-01
79 RuO2	.0000	.5287E-06	.5288E-21	.6344E-01
23 RuO2 Semi Vol	.0000	.6283E-04	.6283E-18	.0000
83 RuO4	.0000	.0000	.0000	.0000
88 SO2	.0000	.3100	.1152E-05	.7273E-11
111 SiO2	.0000	.8655E-03	.8656E-18	6.066
115 Silica Gel	.0000	.0000	.0000	.0000
48 Sr(COOH)2	.0000	.9684E-06	.9686E-21	.0000
10 Sr(NO3)2	.0000	.1131E-11	.1131E-26	.1357E-06
127 Sr(OH)2	.0000	.0000	.0000	.3537E-03
80 SrCO3	.0000	.0000	.0000	.9590E-01
46 SrO	.0000	.0000	.0000	.0000
89 SrRESIN	.0000	.0000	.0000	.0000
141 Surfactant	.0000	.0000	.0000	.0000
92 ThO2	.0000	.4401E-05	.4401E-20	.5280
107 TiO2	.0000	.1387E-04	.1387E-19	.7490E-02
119 Tritium	.0000	.6965E-10	.1736E-10	.6055E-09
93 UO2	.0000	.0000	.0000	.0000
62 UO2(COOH)2	.0000	.3078E-04	.3078E-19	.0000
16 UO2(OH)2	.0000	.0000	.0000	3.118
27 Y(COOH)3	.0000	.6620E-06	.6622E-21	.0000
11 Y(NO3)3	.0000	.8031E-12	.8032E-27	.9636E-07
128 Y(OH)3	.0000	.0000	.0000	.2238E-03
81 Y2(CO3)3	.0000	.0000	.0000	.6318E-01

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAMS(CONT'D)-
 STREAM NAME

	178	174	175	176
	SFHT Air	Off-Gas	FPT Cndnser	DWPF Sludge
	Purge	to SWDBF	Condensate	Slurry Feed
47 Y2O3	.0000	.0000	.0000	.0000
100 Zeolite	.0000	.2813E-04	.2814E-19	8.376
44 Zn(COOH)2	.0000	.8498E-05	.8499E-20	.0000
54 Zn(OH)2	.0000	.0000	.0000	.2684
57 ZnO	.0000	.0000	.0000	.0000
104 ZrO2	.0000	.6933E-05	.6934E-20	.9745E-02
TOTAL FLOW, LB/HR	226.27	2021.28	120.12	401.89
VAPOR FLOW, CFM	58.45	552.17		
LIQUID FLOW, GPM			.24	.71
DESIGN FLOW,				
DENSITY, LBS/FT3	.0706	.0610	62.4309	71.0585
TEMPERATURE, DEG C	85.00	51.60	28.00	60.00
PRESSURE, ATM	1.00	.95	.88	1.00
PRESSURE, PSIG	.00	-.74	-1.75	.00
PRESSURE, MM HG		721.85	669.56	
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
ENTHALPY, PCU/HR	-11652.27	6799.82	8413.81	20723.92

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

 STREAM NUMBERS - 177
 STREAM NAME MVS Vac Pump
 Exhaust

COMPONENT FLOWS, LB/HR

1 H2O	.0000
45 Ag	.0000
116 Ag2O	.0000
184 AgNO3	.0000
51 AgOH	.0000
74 Al(OH)3	.0000
77 Al2O3	.0000
75 AlOOH	.0000
106 B2O3	.0000
9 Ba(NO3)2	.0000
95 BaCl2	.0000
15 BaO	.0000
24 BaSO4	.0000
66 CO	.0000
87 CO2	.0000
142 CO2 (C14)	.0000
63 Ca(COOH)2	.0000
120 Ca(OH)2	.0000
118 Ca3(PO4)2	.0000
20 CaC2O4	.0000
18 CaCO3	.0000
78 CaF2	.0000
41 CaO	.0000
19 CaSO4	.0000
29 Carbon	.0000
26 Co(COOH)2	.0000
121 Co(OH)2	.0000
53 Co(OH)3	.0000
59 CoO	.0000
99 Cr(OH)3	.0000
98 Cr2O3	.0000
42 Cs2O	.0000
187 Cs2O Semi Vol	.0000
90 CsCOOH	.0000
96 CsCl	.0000
186 CsCl Semi Vol	.0000
8 CsNO3	.0000
88 CsResin	.0000
122 Cu(COOH)2	.0000
52 Cu(OH)2	.0000
58 Cu2O	.0000
64 CuCOOH	.0000
180 CuO	.0000
18 Fe(OH)3	.0000
80 Fe2O3	.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-		177
STREAM NAME		MVS Vac Pump
		Exhaust
101 FeO		.0000
126 Group A Semi Vo		.0000
102 GroupA		.0000
103 GroupB		.0000
25 H2		.0000
133 H2C2O4		.0000
91 H2O2		.0000
84 HCOOH		.0000
43 HCl		.0000
85 HF		.0000
49 HNO3		.0000
86 HResin		.0000
36 Hg		.0000
135 HgNO32		.0000
21 HgO		.0000
97 I2		.0000
39 K2O		.0000
131 KMnO4		.0000
118 KNO3		.0000
105 La2O3		.0000
108 Li2O		.0000
65 Mg(COOH)2		.0000
55 Mg(OH)2		.0000
33 MgO		.0000
60 Mn(COOH)2		.0000
132 Mn(NO3)2		.0000
129 Mn(OH)2		.0000
56 MnO		.0000
14 MnO2		.0000
81 N2		.0000
143 Na2CO3 (C14)		.0000
35 NO		.0000
84 NO2		.0000
70 Na(HgO(OH))		.0000
94 Na2B4O7		.0000
109 Na2C2O4		.0000
5 Na2CO3		.0000
82 Na2O		.0000
71 Na2PuO2(OH)4		.0000
73 Na2RhO4		.0000
72 Na2RuO4		.0000
6 Na2SO4		.0000
68 NaAlO2		.0000
114 NaBO2		.0000
140 NaEO2 Semi Vol		.0000
50 NaCOOH		.0000

MATERIAL BALANCE TABLES
 SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-		177
STREAM NAME		MVS Vac Pump Exhaust
7 NaCl		.0000
138 NaCl Semi Vol		.0000
69 NaF		.0000
139 NaF Semi Vol		.0000
12 NaI		.0000
125 NaI Semi Vol		.0000
8 NaNO2		.0000
2 NaNO3		.0000
4 NaOH		.0000
87 NaResin		.0000
61 Ni(COOH)2		.0000
17 Ni(OH)2		.0000
40 NiO		.0000
82 O2		.0000
67 PbO		.0000
28 PbSO4		.0000
124 Pd		.0000
123 Pd(OH)2		.0000
112 PdNO32		.0000
110 PdO		.0000
117 Pu(COOH)4		.0000
76 PuO2		.0000
22 RhO2		.0000
79 RuO2		.0000
23 RuO2 Semi Vol		.0000
83 RuO4		.0000
88 SO2		.0000
111 SiO2		.0000
115 Silica Gel		.0000
48 Sr(COOH)2		.0000
10 Sr(NO3)2		.0000
127 Sr(OH)2		.0000
80 SrCO3		.0000
46 SrO		.0000
89 SrRESIN		.0000
141 Surfactant		.0000
92 ThO2		.0000
107 TiO2		.0000
119 Tritium		.0000
93 UO2		.0000
62 UO2(COOH)2		.0000
16 UO2(OH)2		.0000
27 Y(COOH)3		.0000
11 Y(NO3)3		.0000
128 Y(OH)3		.0000
81 Y2(CO3)3		.0000

MATERIAL BALANCE TABLES
SLUDGE-SUPERNATE FEED

STREAMS(CONT'D)-		177
STREAM NAME		MVS Vac Pump
		Exhaust
47 Y2O3		.0000
100 Zeolite		.0000
44 Zn(COOH)2		.0000
54 Zn(OH)2		.0000
57 ZnO		.0000
104 ZrO2		.0000
TOTAL FLOW, LB/HR		.00
VAPOR FLOW, CFM		.00
LIQUID FLOW, GPM		
DESIGN FLOW,		
DENSITY, LBS/FT3		.0000
TEMPERATURE, DEG C		88.00
PRESSURE, ATM		.99
PRESSURE, PSIG		-.07
PRESSURE, MM HG		756.20
PHASE		VAPOR
ENTHALPY, PCU/HR		.00

SLUDGE ONLY CURIE BALANCE

NEW TABLE

SUPERNATE SLUDGE CURIE BALANCE

NEW TABLE

FIGURE 21-1. EXPERIMENTAL THERMAL EXPANSION DATA
FOR SIMULATED SRP WASTE GLASS

****NEW FIGURE****

FIGURE 21-2. PROCESS SUMMARY DIAGRAM -
MELTER FEED PREPARATION

****NEW FIGURE****

INFORMATION ONLY

FIGURE 21-4. PROCESS SUMMARY DIAGRAM -
 MERCURY PURIFICATION AND PACKAGING

****NEW FIGURE****

DWTT - Decon Waste Treatment Tank
 CT - Steam Condensate Tank
 RCT - Recycle Collection Tank
 FAVC - Formic Acid Vent Condenser
 PVVS - Process Vessel Vent System
 SME - Slurry Mix Evaporator
 SRAT - Sludge Receipt Adjustment Tank

FIGURE 21-5. PROCESS SUMMARY DIAGRAM -
 DECONTAMINATION AND MISCELLANEOUS
 WASTE STREAM TREATMENT

****NEW FIGURE****

FIGURE 21-6. PROCESS SUMMARY DIAGRAM - CANISTER DECONTAMINATION, CLOSURE AND INSPECTION

****NEW FIGURE****

Canister Decay Heat

FIGURE 21-7. SLUDGE ONLY GLASS
CANISTER DECAY HEAT

****NEW FIGURE****

Canister Decay Heat

FIGURE 21-8. SLUDGE SUPERNATE GLASS
CANISTER DECAY HEAT

****NEW FIGURE****

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Appendix H
Table 21-19
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Isotopic Content of 5-year In-tank Waste

<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>
Am242	1.99E-12	Cm245	4.84E-09	Cf249	1.09E-16
Am242M	1.66E-07	Cm246	1.94E-10	Cf250	1.61E-17
Am243	3.25E-06	Cm247	7.91E-18	Cf251	4.67E-18
Cm242	1.19E-09	Cm248	1.81E-14	Cf252	8.50E-19
Cm243	1.21E-08	Bk249	1.98E-18	Cf253	8.26E-52
Cm244	2.26E-07				

Total 1.22E+00 GM/GAL

Isotopic Content of 5-year In-tank Waste

ISOTOPE	GM/GAL	ISOTOPE	GM/GAL	ISOTOPE	GM/GAL
H 8	4.26E-07	Nb 94	1.94E-08	Sn118	1.55E-04
He 8	2.82E-07	Nb 95	6.18E-11	Sn119	1.50E-04
C 14	8.89E-08	Nb 95M	8.72E-14	Sn120	1.56E-04
N 14	2.12E-11	Mo 94	2.99E-12	Sn121M	6.28E-08
V 51	6.79E-06	Mo 95	8.29E-02	Sn122	1.74E-04
Cr 51	1.14E-25	Mo 96	1.84E-04	Sn123	8.66E-09
Co 59	8.04E-08	Mo 97	8.15E-02	Sn124	2.61E-04
Co 60	1.70E-05	Mo 98	8.17E-02	Sn125	2.11E-62
Ni 59	1.93E-05	Mo100	3.46E-02	Sn126	6.03E-04
Ni 60	1.58E-05	Tc 99	8.26E-02	Sb121	1.62E-04
Ni 63	6.52E-04	Ru100	2.96E-04	Sb123	2.05E-04
Cu 63	2.16E-05	Ru101	2.83E-02	Sb124	4.64E-16
Ge 72	3.45E-07	Ru102	2.48E-02	Sb125	9.15E-05
Ge 73	1.20E-06	Ru103	7.99E-17	Sb126	2.86E-11
Ge 74	8.00E-06	Ru104	1.22E-02	Sb126M	2.18E-13
Ge 76	2.00E-05	Ru106	1.00E-04	Te122	2.46E-06
As 75	6.91E-06	Rh103	1.40E-02	Te124	1.15E-06
Se 77	3.71E-05	Rh103M	7.85E-20	Te125	2.62E-04
Se 78	9.35E-05	Rh106	9.39E-11	Te125M	1.80E-06
Se 79	2.31E-04	Pd104	8.64E-04	Te126	1.14E-05
Se 80	5.50E-04	Pd105	6.81E-03	Te127	3.87E-12
Se 82	1.11E-03	Pd106	4.35E-03	Te127M	1.11E-09
Br 81	9.34E-04	Pd107	2.10E-03	Te128	3.12E-03
Kr 82	8.99E-44	Pd108	1.23E-03	Te129	1.24E-23
Rb 85	4.73E-03	Pd110	4.18E-04	Te129M	1.34E-20
Rb 87	1.16E-02	Ag109	6.85E-04	Te130	1.18E-02
Sr 88	1.68E-02	Ag110	4.63E-15	I 127	1.29E-03
Sr 89	1.06E-13	Ag110M	3.06E-07	I 129	5.89E-03
Sr 90	2.42E-02	Cd110	5.93E-05	I 131	7.72E-72
Y 89	2.25E-02	Cd111	2.80E-04	Xe131	3.30E-10
Y 90	6.30E-06	Cd112	1.93E-04	Xe131M	3.27E-53
Y 91	4.31E-12	Cd113	1.32E-05	Xe132	2.86E-20
Zr 90	8.56E-03	Cd114	8.15E-04	Cs133	4.69E-02
Zr 91	2.83E-02	Cd115M	4.26E-18	Cs134	3.00E-04
Zr 92	2.90E-02	Cd116	1.45E-04	Cs135	5.83E-03
Zr 93	5.04E-02	In115	1.18E-04	Cs136	1.55E-47
Zr 94	3.22E-02	In115M	1.62E-24	Cs137	4.14E-02
Zr 95	5.31E-11	Sn116	2.78E-05	Ba134	1.44E-03
Zr 96	3.23E-02	Sn117	1.44E-04	Ba136	1.51E-04

Isotopic Content of 5-year In-tank Waste

<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>
Ba136M	1.30E-54	Gd152	8.67E-07	Rn219	6.16E-22
Ba137	5.74E-03	Gd154	1.86E-04	Rn220	3.75E-16
Ba137M	6.31E-09	Gd155	1.81E-04	Rn222	1.60E-17
Ba138	5.06E-02	Gd156	6.50E-04	Fr221	1.32E-22
Ba140	5.84E-46	Gd157	4.88E-06	Fr223	2.58E-20
La139	4.86E-02	Gd158	1.59E-04	Ra223	1.56E-16
La140	8.81E-47	Gd160	1.04E-05	Ra224	2.17E-12
Ce140	4.79E-02	Tb159	2.32E-05	Ra225	6.04E-19
Ce141	1.43E-19	Tb160	1.12E-14	Ra226	2.50E-12
Ce142	4.51E-02	Dy160	7.14E-07	Ra228	5.82E-18
Ce144	3.51E-04	Dy161	3.91E-06	Ac225	4.04E-19
Pr141	4.49E-02	Dy162	2.83E-06	Ac227	9.98E-14
Pr143	2.02E-43	Ti206	2.46E-30	Ac228	7.05E-22
Pr144	1.48E-08	Ti207	4.20E-20	Th227	2.31E-16
Pr144M	7.39E-11	Ti208	4.22E-16	Th228	4.24E-10
Nd142	1.59E-04	Ti209	1.24E-24	Th229	1.13E-13
Nd143	5.36E-02	Pb206	6.75E-17	Th230	6.68E-08
Nd144	4.61E-02	Pb207	7.58E-15	Th231	1.12E-14
Nd145	2.96E-02	Pb208	2.98E-10	Th232	1.73E-08
Nd146	2.40E-02	Pb209	5.08E-21	Th234	1.41E-12
Nd147	1.78E-53	Pb210	2.14E-15	Pa231	1.10E-09
Nd148	1.39E-02	Pb211	8.24E-19	Pa233	4.78E-11
Nd150	5.57E-03	Pb212	2.49E-18	Pa234	8.27E-14
Pm147	2.95E-03	Pb214	7.52E-20	U 232	2.68E-08
Pm148	4.80E-20	Bi209	1.61E-17	U 233	7.04E-09
Pm148M	5.35E-18	Bi210	1.29E-18	U 234	2.88E-04
Sm147	9.51E-03	Bi210M	9.60E-19	U 235	2.75E-03
Sm148	2.11E-03	Bi211	1.93E-20	U 236	1.99E-03
Sm149	8.23E-04	Bi212	2.86E-14	U 238	9.74E-02
Sm150	1.17E-02	Bi213	1.21E-21	Np236	1.48E-10
Sm151	1.05E-03	Bi214	5.53E-20	Np237	1.41E-03
Sm152	4.21E-03	Po210	2.82E-17	Pu236	1.32E-08
Sm154	7.48E-04	Po212	1.23E-24	Pu237	4.25E-20
Eu151	4.39E-05	Po213	1.82E-30	Pu238	4.94E-03
Eu152	2.36E-06	Po214	7.66E-27	Pu239	1.28E-02
Eu153	2.32E-03	Po215	2.71E-25	Pu240	2.21E-03
Eu154	2.60E-04	Po216	9.94E-19	Pu241	9.37E-04
Eu155	1.15E-04	Po218	8.72E-21	Pu242	1.76E-04
Eu156	1.08E-40	At217	1.46E-26	Am241	3.54E-04

Radionuclide Content of 5-year In-tank Waste

ISOTOPE	CI/GAL	ISOTOPE	CI/GAL	ISOTOPE	CI/GAL
H 3	4.12E-03	Te129M	4.07E-16	Pb212	3.46E-07
C 14	1.73E-07	I 129	9.42E-07	Pb214	2.47E-12
Cr 51	1.05E-20	Xe131M	2.72E-48	Bi210	1.61E-13
Co 60	1.98E-02	Cs134	3.89E-01	Bi210M	5.37E-22
Ni 59	1.56E-04	Cs135	6.72E-06	Bi211	7.99E-12
Ni 63	3.85E-02	Cs136	1.15E-42	Bi212	3.46E-07
Se 79	1.61E-05	Cs137	3.59E+00	Bi213	2.34E-14
Rb 87	1.02E-09	Ba136M	3.68E-48	Bi214	2.47E-12
Sr 89	3.07E-09	Ba137M	3.40E+00	Po210	1.27E-13
Sr 90	3.43E+00	Ba140	4.26E-41	Po212	2.22E-07
Y 90	3.43E+00	La140	4.91E-41	Po213	2.29E-14
Y 91	1.06E-07	Ce141	4.07E-15	Po214	2.47E-12
Zr 93	1.27E-04	Ce142	1.08E-09	Po215	8.01E-12
Zr 95	1.12E-06	Ce144	1.12E+00	Po216	3.46E-07
Nb 94	3.65E-09	Pr143	1.86E-38	Po218	2.47E-12
Nb 95	2.40E-06	Pr144	1.12E+00	At217	2.34E-14
Nb 95M	1.42E-08	Pr144M	1.34E-02	Rn219	8.01E-12
Tc 99	5.53E-04	Nd144	5.45E-14	Rn220	3.46E-07
Ru103	2.56E-12	Nd147	1.44E-48	Rn222	2.47E-12
Ru106	3.35E-01	Pm147	2.74E+00	Fr221	2.34E-14
Rh103M	2.56E-12	Pm148	7.88E-15	Fr223	9.96E-13
Rh106	3.34E-01	Pm148M	1.14E-18	Ra223	8.01E-12
Pd107	1.08E-06	Sm147	2.16E-10	Ra224	3.46E-07
Ag110	1.93E-05	Sm148	6.38E-16	Ra225	2.37E-14
Ag110M	1.45E-03	Sm149	1.98E-16	Ra226	2.48E-12
Cd115M	1.08E-13	Sm151	2.67E-02	Ra228	1.58E-15
In115	7.34E-16	Eu152	4.27E-04	Ac225	2.34E-14
In115M	9.81E-18	Eu154	7.02E-02	Ac227	7.22E-12
Sn121M	3.71E-06	Eu155	5.56E-02	Ac228	1.58E-15
Sn123	3.01E-05	Eu156	5.92E-36	Th227	7.09E-12
Sn126	1.71E-05	Gd152	7.86E-18	Th228	3.47E-07
Sb124	8.12E-12	Tb160	1.27E-10	Th229	2.40E-14
Sb125	9.60E-02	Ti206	5.37E-22	Th230	1.30E-09
Sb126	2.40E-06	Ti207	7.97E-12	Th231	5.95E-09
Sb126M	1.71E-05	Ti208	1.24E-07	Th232	1.90E-15
Te125M	2.34E-02	Ti209	5.06E-16	Th234	3.27E-08
Te127	1.02E-05	Pb209	2.34E-14	Pa231	5.17E-11
Te127M	1.04E-05	Pb210	1.64E-13	Pa233	9.91E-07
Te129	2.59E-16	Pb211	7.99E-12	Pa234	6.54E-08

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Appendix H
Table 21-20
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Radionuclide Content of 5-year In-tank Waste

<u>ISOTOPE</u>	<u>CI/GAL</u>	<u>ISOTOPE</u>	<u>CI/GAL</u>	<u>ISOTOPE</u>	<u>CI/GAL</u>
U 232	5.76E-07	Pu239	7.96E-04	Cm245	7.47E-10
U 233	6.78E-11	Pu240	5.03E-04	Cm246	5.97E-11
U 234	1.80E-06	Pu241	9.45E-02	Cm247	7.33E-17
U 235	5.94E-09	Pu242	6.70E-07	Cm248	7.66E-17
U 236	1.29E-07	Am241	1.22E-03	Bk249	3.23E-15
U 238	3.27E-08	Am242	1.61E-06	Cf249	4.46E-16
Np236	1.95E-12	Am242M	1.61E-06	Cf250	1.76E-15
Np237	9.91E-07	Am243	6.49E-07	Cf251	7.41E-18
Pu236	7.04E-06	Cm242	3.94E-06	Cf252	1.88E-16
Pu237	5.14E-16	Cm243	6.25E-07	Cf253	9.44E-48
Pu238	8.45E-02	Cm244	1.88E-05		

Total Activity	2.04E+01 CI/GAL
Decay Heat	
Total Primary	4.29E-02 WATT/GAL
Total Gammas	1.75E-02 WATT/GAL

Isotopic Content of Sludge Feed

ISOTOPE	GM/GAL	ISOTOPE	GM/GAL	ISOTOPE	GM/GAL
H 3	6.61E-09	Ru104	9.64E-02	Te125M	1.90E-05
C 14	2.96E-10	Ru106	8.08E-04	Te126	1.67E-04
Cr 51	1.66E-24	Rh103	1.07E-01	Te127	5.66E-11
Co 60	2.60E-04	Rh103M	6.03E-19	Te127M	1.62E-08
Ni 59	2.96E-02	Rh106	7.42E-10	Te128	4.56E-02
Ni 63	5.02E-03	Pd104	1.26E-02	Te129	1.81E-22
Se 77	5.41E-04	Pd105	9.90E-02	Te129M	1.96E-19
Se 78	1.36E-03	Pd106	6.82E-02	Te130	1.65E-01
Se 79	3.35E-03	Pd107	8.06E-02	I 127	1.66E-02
Se 80	7.99E-03	Pd108	1.78E-02	I 129	7.03E-02
Se 82	1.62E-02	Pd110	6.08E-03	Cs133	3.63E-02
Rb 85	7.25E-02	Ag109	1.02E-02	Cs134	2.34E-04
Rb 87	1.78E-01	Ag110M	4.73E-06	Cs135	4.58E-03
Sr 88	2.57E-01	Cd110	8.59E-04	Cs137	3.30E-02
Sr 89	3.13E-12	Cd111	4.06E-03	Ba134	2.15E-02
Sr 90	3.78E-01	Cd112	2.80E-03	Ba136	2.28E-03
Y 89	3.45E-01	Cd113	1.92E-04	Ba137	8.73E-02
Y 90	9.76E-05	Cd114	4.56E-03	Ba137M	5.03E-09
Y 91	6.73E-11	Cd115M	6.18E-17	Ba138	7.76E-01
Zr 90	5.44E-02	Cd116	2.11E-03	La139	7.36E-01
Zr 91	4.33E-01	Sn116	4.21E-04	Ce140	7.26E-01
Zr 92	4.43E-01	Sn117	2.18E-03	Ce141	2.17E-18
Zr 93	7.72E-01	Sn118	2.34E-03	Ce142	6.83E-01
Zr 94	4.93E-01	Sn119	2.23E-03	Ce144	5.31E-03
Zr 95	8.12E-10	Sn120	2.36E-03	Pr141	6.80E-01
Zr 96	4.95E-01	Sn121M	9.54E-07	Pr144	2.24E-07
Nb 94	5.01E-06	Sn122	2.64E-03	Pr144M	1.13E-09
Nb 95	9.35E-10	Sn123	5.53E-08	Nd142	2.42E-03
Nb 95M	5.67E-13	Sn124	8.95E-03	Nd143	8.12E-01
Mo 95	5.05E-01	Sn126	9.09E-03	Nd144	6.97E-01
Mo 96	2.05E-03	Sb121	2.46E-03	Nd145	4.49E-01
Mo 97	4.83E-01	Sb123	3.11E-03	Nd146	3.64E-01
Mo 98	4.88E-01	Sb124	7.03E-15	Nd148	2.11E-01
Mo100	5.33E-01	Sb125	1.39E-03	Nd150	8.44E-02
Tc 99	2.51E-01	Sb126	4.85E-11	Pm147	4.47E-02
Ru100	2.25E-03	Sb126M	3.30E-12	Pm148	7.26E-19
Ru101	2.17E-01	Te122	3.60E-05	Pm148M	8.10E-17
Ru102	1.92E-01	Te124	1.68E-05	Sm147	1.45E-01
Ru103	6.26E-16	Te125	3.82E-03	Sm148	3.20E-02

Isotopic Content of Sludge Feed

<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>	<u>ISOTOPE</u>	<u>GM/GAL</u>
Sm149	1.25E-02	Ti208	6.14E-15	Pu240	3.30E-02
Sm150	1.77E-01	Ti209	1.81E-23	Pu241	1.44E-02
Sm151	1.59E-02	U 232	6.82E-06	Pu242	2.71E-03
Sm152	6.89E-02	U 233	1.81E-06	Am241	5.41E-03
Sm154	1.13E-02	U 234	7.87E-02	Am242	3.04E-11
Eu151	6.70E-04	U 235	7.09E-01	Am242M	2.54E-06
Eu152	3.61E-05	U 236	5.16E-01	Am243	4.96E-05
Eu153	3.55E-02	U 238	2.54E+01	Cm242	1.82E-03
Eu154	3.97E-03	Np236	2.28E-09	Cm243	1.85E-07
Eu155	1.76E-03	Np237	2.16E-02	Cm244	3.46E-06
Tb159	3.52E-04	Pu236	2.00E-07	Cm245	6.63E-08
Tb160	1.71E-13	Pu237	6.44E-19	Cm246	2.96E-09
Ti206	3.57E-29	Pu238	7.52E-02	Cm247	1.21E-11
Ti207	8.81E-19	Pu239	1.95E-01	Cm248	2.76E-13

Total 4.14E+01 GM/GAL

Radionuclide Content of Sludge Feed

ISOTOPE	CI/GAL	ISOTOPE	CI/GAL	ISOTOPE	CI/GAL
H 3	6.84E-05	Sb124	1.23E-10	Eu155	8.21E-01
C 14	1.32E-09	Sb125	1.48E+00	Tb160	1.93E-09
Cr 51	1.53E-19	Sb126	8.64E-06	Tl208	1.81E-06
Co 60	2.94E-01	Sb126M	2.60E-04	U 232	1.46E-04
Ni 59	2.89E-03	Te125M	3.42E-01	U 233	1.74E-08
Ni 63	2.97E-01	Te127	1.49E-04	U 234	4.60E-04
Se 79	2.84E-04	Te127M	1.53E-04	U 235	1.53E-06
Rb 87	1.56E-08	Te129	3.80E-15	U 236	3.84E-05
Sr 89	9.09E-08	Te129M	5.91E-15	U 238	8.53E-06
Sr 90	5.17E+01	I 129	1.24E-05	Np236	3.00E-11
Y 90	5.32E+01	Cs134	3.03E-01	Np237	1.52E-05
Y 91	1.65E-06	Cs135	5.28E-06	Pu236	1.06E-04
Zr 93	1.94E-03	Cs137	2.86E+00	Pu237	7.77E-15
Zr 95	1.74E-05	Ba137M	2.70E+00	Pu238	1.29E+00
Nb 94	9.40E-07	Ce141	6.18E-14	Pu239	1.21E-02
Nb 95	3.67E-05	Ce142	1.64E-08	Pu240	7.70E-03
Nb 95M	2.15E-07	Ce144	1.69E+01	Pu241	1.45E+00
Tc 99	4.26E-03	Pr144	1.69E+01	Pu242	1.06E-05
Ru103	2.02E-11	Pr144M	2.04E-01	Am241	1.86E-02
Ru106	2.69E+00	Nd144	8.28E-13	Am242	2.45E-05
Rh103M	1.96E-11	Pm147	4.15E+01	Am242M	2.47E-05
Rh106	2.64E+00	Pm148	1.19E-13	Am243	9.89E-06
Pd107	1.57E-05	Pm148M	1.73E-12	Cm242	6.03E-05
Ag110M	2.25E-02	Sm147	3.37E-09	Cm243	9.53E-06
Cd113	6.52E-17	Sm148	9.77E-15	Cm244	2.80E-04
Cd115M	1.57E-12	Sm149	3.00E-15	Cm245	1.14E-08
Sn121M	5.13E-05	Sm151	4.19E-01	Cm246	9.10E-10
Sn123	4.55E-04	Eu152	6.37E-03	Cm247	1.12E-15
Sn126	2.58E-04	Eu154	1.07E+00	Cm248	1.17E-15

Total Activity	1.99E+02 CI/GAL
Decay Heat	
Total Primary	5.74E-01 WATT/GAL
Total Gammas	3.71E-02 WATT/GAL

RADIONUCLIDE CONTENT OF FEED TO THE SLUDGE PLANT FROM SALT PLANT

<u>ISOTOPE</u>	<u>CI/GAL</u>	<u>ISOTOPE</u>	<u>CI/GAL</u>	<u>ISOTOPE</u>	<u>CI/GAL</u>
H 3	6.03E-05	Cs137	2.37E+02	Pu239	1.23E-04
Sr 89	8.24E-10	Ba137M	2.24E+02	Pu240	7.79E-05
Sr 90	4.68E-01	Pu236	1.07E-06	Pu241	1.47E-02
Cs134	2.45E+00	Pu237	7.86E-17	Pu242	1.08E-07
Cs135	5.44E-04	Pu238	1.30E-02		
Total Activity			4.64E+02 CI/GAL		
Decay Heat					
Total Primary			2.65E-01 WATT/GAL		
Total Gammas			8.16E-01 WATT/GAL		

Radionuclide Content of Sludge-Only Glass

ISOTOPE	CI/LB	ISOTOPE	CI/LB	ISOTOPE	CI/LB
Cr 51	3.84E-20	Sb125	3.12E-01	Tb160	4.21E-10
Co 60	6.42E-02	Sb126	7.98E-07	Ti208	3.95E-07
Ni 59	5.22E-04	Sb126M	5.66E-05	U 232	3.19E-05
Ni 63	6.48E-02	Te125M	7.27E-02	U 233	3.80E-09
Se 79	4.97E-05	Te127	8.18E-05	U 234	1.00E-04
Rb 87	3.31E-09	Te127M	8.24E-05	U 235	3.34E-07
Sr 89	1.98E-08	Te129	8.07E-16	U 236	7.28E-06
Sr 90	1.13E+01	Te129M	1.26E-15	U 238	1.86E-06
Y 90	1.16E+01	Cs134	6.25E-02	Np236	6.55E-12
Y 91	3.61E-07	Cs135	1.09E-06	Np237	8.32E-06
Zr 93	4.23E-04	Cs137	5.90E-01	Pu236	2.81E-05
Zr 95	3.80E-06	Ba137M	5.58E-01	Pu237	1.69E-15
Nb 94	2.05E-07	Ce141	1.85E-14	Pu238	2.81E-01
Nb 95	8.00E-06	Ce142	3.58E-09	Pu239	2.64E-03
Nb 95M	4.69E-08	Ce144	3.70E+00	Pu240	1.68E-03
Tc 99	9.05E-04	Pr144	3.70E+00	Pu241	8.17E-01
Ru103	4.13E-12	Pr144M	4.45E-02	Pu242	2.82E-06
Ru106	5.48E-01	Nd144	1.81E-13	Am241	4.05E-03
Rh103M	4.29E-12	Pm147	9.05E+00	Am242	5.35E-06
Rh106	5.76E-01	Pm148	2.60E-14	Am242M	5.88E-06
Pd107	3.43E-06	Pm148M	3.78E-13	Am243	2.16E-05
Ag110M	4.90E-03	Sm147	7.85E-10	Cm242	1.31E-05
Cd113	1.42E-17	Sm148	2.13E-15	Cm243	2.08E-06
Cd115M	3.44E-13	Sm149	6.56E-16	Cm244	6.10E-05
Sn121M	1.12E-05	Sm151	9.15E-02	Cm245	2.49E-09
Sn123	9.92E-05	Eu152	1.39E-03	Cm246	1.99E-10
Sn126	5.63E-05	Eu154	2.34E-01	Cm247	2.44E-16
Sb124	2.68E-11	Eu155	1.79E-01	Cm248	2.55E-16

Total Activity	4.33E+01 CI/LB
Decay Heat	
Total Primary	1.25E-01 WATTS/LB
Total Gammas	7.96E-03 WATTS/LB

Radionuclide Content of Sludge-Supernate Glass

ISOTOPE	CI/LB	ISOTOPE	CI/LB	ISOTOPE	CI/LB
Cr 51	2.76E-20	Sb125	2.58E-01	Tb160	8.48E-10
Co 60	5.30E-02	Sb126	6.55E-07	Tl208	8.26E-07
Ni 59	4.31E-04	Sb126M	4.68E-05	U 232	2.64E-05
Ni 63	5.35E-02	Te125M	6.05E-02	U 233	8.14E-09
Se 79	4.18E-05	Te127	2.64E-05	U 234	8.30E-05
Rb 87	2.75E-09	Te127M	2.70E-05	U 235	2.76E-07
Sr 89	1.64E-08	Te129	6.71E-16	U 236	6.01E-06
Sr 90	9.33E+00	Te129M	1.04E-15	U 238	1.54E-06
Y 90	9.58E+00	Cs134	1.11E-01	Np236	5.41E-12
Y 91	2.98E-07	Cs135	2.47E-05	Np237	2.74E-06
Zr 93	3.50E-04	Cs137	1.07E+01	Pu236	1.91E-05
Zr 95	3.14E-06	Ba137M	1.02E+01	Pu237	1.40E-15
Nb 94	1.39E-07	Ce141	1.11E-14	Pu238	2.32E-01
Nb 95	6.61E-06	Ce142	2.95E-09	Pu239	2.19E-03
Nb 95M	8.88E-08	Ce144	3.05E+00	Pu240	1.89E-03
Tc 99	7.52E-04	Pr144	3.05E+00	Pu241	2.63E-01
Ru103	8.43E-12	Pr144M	3.68E-02	Pu242	1.92E-06
Ru106	4.56E-01	Nd144	1.49E-13	Am241	8.35E-03
Rh108M	3.54E-12	Pm147	7.48E+00	Am242	4.42E-06
Rh106	4.76E-01	Pm148	2.15E-14	Am242M	4.45E-06
Pd107	2.83E-06	Pm148M	3.12E-13	Am243	1.78E-06
Ag110M	4.05E-03	Sm147	6.07E-10	Cm242	1.09E-05
Cd113	1.18E-17	Sm148	1.76E-15	Cm243	1.72E-06
Cd115M	2.84E-13	Sm149	5.41E-16	Cm244	5.04E-05
Sn121M	9.24E-06	Sm151	7.55E-02	Cm245	2.06E-09
Sn123	8.20E-05	Eu152	1.15E-03	Cm246	1.64E-10
Sn126	4.65E-05	Eu154	1.93E-01	Cm247	2.02E-16
Sb124	2.22E-11	Eu155	1.48E-01	Cm248	2.11E-16

Total Activity	5.58E+01 CI/LB
Decay Heat	
Total Primary	1.15E-01 WATTS/LB
Total Gammas	4.15E-02 WATTS/LB

ESTIMATED ATMOSPHERIC RELEASES, SLUDGE-ONLY OPERATION

<u>ISOTOPE</u>	<u>CURIES</u>	<u>ISOTOPE</u>	<u>CURIES</u>	<u>ISOTOPE</u>	<u>CURIES</u>
H 2	6.78E+00	Sb125	8.59E-08	U 232	8.79E-12
C 14	1.88E-03	Sb126	2.18E-18	U 233	1.05E-15
Co 60	1.76E-08	Sb126M	1.56E-11	U 234	2.76E-11
Ni 59	1.43E-10	Te125M	2.18E-07	U 235	9.19E-14
Ni 63	1.78E-08	Te127	9.28E-11	U 236	2.00E-12
Se 79	1.45E-10	Te127M	9.47E-11	U 238	5.12E-13
Rb 87	9.66E-15	I 129	5.41E-07	Np236	1.80E-18
Sr 89	5.45E-15	Cs134	1.83E-07	Np237	9.14E-13
Sr 90	3.10E-06	Cs135	3.19E-12	Pu236	6.86E-12
Y 90	3.19E-06	Cs137	1.78E-06	Pu238	7.72E-08
Y 91	9.92E-14	Ba137M	1.63E-06	Pu239	7.27E-10
Zr 93	1.17E-10	Ce142	9.84E-16	Pu240	4.62E-10
Zr 95	1.05E-12	Ce144	1.02E-06	Pu241	8.73E-08
Nb 94	5.64E-14	Pr144	1.02E-06	Pu242	6.38E-13
Nb 95	2.20E-12	Pr144M	1.22E-08	Am241	1.11E-09
Nb 95M	1.29E-14	Nd144	4.97E-20	Am242	1.47E-12
Tc 99	2.64E-09	Pm147	2.49E-06	Am242M	1.48E-12
Ru103	2.42E-17	Sm147	2.02E-16	Am243	5.93E-13
Ru106	3.21E-06	Sm148	5.87E-22	Cm242	3.61E-12
Rh106	1.58E-07	Sm149	1.80E-22	Cm243	5.72E-13
Pd107	9.44E-13	Sm151	2.52E-08	Cm244	1.68E-11
Ag110M	2.48E-09	Eu152	3.82E-10	Cm245	6.85E-16
Cd113	3.91E-24	Eu154	6.43E-08	Cm246	5.46E-17
Sn121M	3.08E-12	Eu155	4.93E-08	Cm247	6.72E-23
Sn123	2.73E-11	Tb160	1.16E-16	Cm248	7.01E-23
Sn126	1.55E-11				

Total Estimated Annual Releases

Tritium	6.78E+00	CURIES
Fission Products	1.90E-03	CURIES
Uranium	3.90E-11	CURIES
Transuranics	1.67E-07	CURIES

ESTIMATED ATMOSPHERIC RELEASES, SLUDGE-SUPERNATE OPERATION

ISOTOPE	CURIES	ISOTOPE	CURIES	ISOTOPE	CURIES
H 8	6.81E+00	Sb125	7.01E-08	U 232	7.17E-12
C 14	1.55E-03	Sb126	1.78E-13	U 238	8.53E-16
Co 60	1.44E-08	Sb126M	1.27E-11	U 234	2.25E-11
Ni 59	1.17E-10	Te125M	1.76E-07	U 235	7.50E-14
Ni 63	1.45E-08	Te127	7.71E-11	U 236	1.63E-12
Se 79	1.20E-10	Te127M	7.86E-11	U 238	4.18E-13
Rb 87	8.02E-15	I 129	4.46E-07	Np286	1.47E-18
Sr 89	4.45E-15	Cm134	8.25E-07	Np287	7.45E-13
Sr 90	2.53E-06	Cm135	7.21E-11	Pu236	5.20E-12
Y 90	2.60E-06	Cm137	3.14E-05	Pu238	6.81E-08
Y 91	8.09E-14	Ba137M	2.97E-05	Pu239	5.94E-10
Zr 93	9.49E-11	Ce142	8.02E-16	Pu240	8.78E-10
Zr 95	8.53E-13	Ce144	8.29E-07	Pu241	7.18E-08
Nb 94	4.60E-17	Pr144	8.29E-07	Pu242	5.22E-13
Nb 95	1.79E-12	Pr144M	9.99E-09	Am241	9.09E-10
Nb 95M	1.05E-14	Nd144	4.05E-20	Am242	1.20E-12
Tc 99	2.19E-09	Pm147	2.03E-06	Am242M	1.21E-12
Ru103	2.01E-17	Sm147	1.65E-16	Am243	4.84E-13
Ru106	2.67E-06	Sm148	4.78E-22	Cm242	2.95E-12
Rh106	1.29E-07	Sm149	1.47E-22	Cm243	4.66E-13
Pd107	7.70E-13	Sm151	2.05E-08	Cm244	1.37E-11
Ag110M	2.26E-09	Eu152	3.12E-10	Cm245	5.58E-16
Cd113	3.19E-24	Eu154	5.24E-08	Cm246	4.45E-17
Sn121M	2.51E-12	Eu155	4.02E-08	Cm247	5.48E-23
Sn123	2.23E-11	Tb160	9.45E-17	Cm248	5.72E-23
Sn126	1.26E-11				

Total Estimated Annual Releases

Tritium	6.81E+00	CURIES
Fission Products	1.62E-03	CURIES
Uranium	3.18E-11	CURIES
Transuranics	1.36E-07	CURIES

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