AIKEN EQC OFFICE
COLUMBIA, SC 29201-1708
Phn: 803-898-4302 Fax: 803-898-4215

Serving Counties: Aiken, Barnwell, Edgefield and Saluda

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Healthy People. Healthy Communities.

Wastewater System Construction

APPROVAL TO PLACE INTO OPERATION

Please file in Construction Permit No. 19,219-IW as a supplemental Record. Thanks

ISSUED TO: US DEPARTMENT OF EI
SAVANNAH RIVER SITE
BUILDING 705-3C
AIKEN SC 29808

for the operation of a wastewater treatment/collecti
Permit No. 19,219-IW, dated August 6, 2008. This
Construction Permit No. 19,164-IW, dated January
installation of three (3) waste transfer line segments

PROJECT NAME: SRS/SALT WASTE PROCESSI

COUNTY: Aiken

PROJECT DESCRIPTION: The Salt Waste Processing Facility (SWPF) is designed to extract and concentrate cesium, strontium, and actinides from salt wastes in the tank farms resulting in effluents that are acceptable for disposal at the Defense Waste Processing Facility (DWPF) and the Saltstone Production Facility (SPF). Attachment A lists the SWPF equipment.

The effluent concentrations of those constituents the wastewater treatment system is designed to remove or reduce for wastewater transferred to Tank 50 to the SPF are contained in Construction Permit No. 18,801-IW for the SPF. The solid waste from the SPF will be disposed in the Saltstone Disposal Facility (SDF) in accordance with Solid Waste Industrial Permit #025500-1603. The wastewater sent to the DWPF will be disposed as a solid waste in canisters that are transferred to the Glass Waste Storage Buildings.

PERMITTED FLOW: System Nominal Daily Flow: 35,840 gallons per day
System Design Capacity Flow: 185,736 gallons per day

WWTP: US DOE/SAVANNAH RIVER SITE Salt Waste Processing Facility (SWPF)

SPECIAL CONDITIONS:

1. The jumpers that will tie the SWPF in with the SPF and DWPF are permitted by Construction Permit No. 20,234-IW. There shall be no radioactive salt solution received from the HLW tanks for processing and transfer to the DWPF and/or the SPF until these jumpers have been installed and the Department has issued an Approval to Place into Operation for Construction Permit No. 20,234-IW.

2. The use of water, chemicals, and non-radioactive materials to support SWPF activities such as flushing, cleaning, startup testing, and demonstrations to validate performance of components and/or systems is allowed as long as the jumpers in Condition #1 have not been installed or the jumpers are physically isolated from the SWPF.

3. NPDES Permit No. SC0000175 allows the disposal of "scavenger" wastewater. If the wastewater is not scavenger wastewater, a written request shall be submitted to the Department describing this wastewater. No discharge of this wastewater may be performed without the written approval from the Department.

4. Note that Construction Permit No. 20,194-IW was issued for the Next Generation Solvent Cold Chemical Feed Facility. This facility is in addition to Construction Permit No. 19,219-IW that was issued for the SWPF.

This approval is based on the Engineer's letter of certification signed by James C. Somma, P.E., South Carolina Registration No. 14718 (Parsons).

Barry S. Mullinax

Date Issued: August 14, 2019

Barry S Mullinax, Engineer
(for) Environmental Affairs
AIKEN EA OFFICE

cc: Bureau of Water Permitting File – Construction Permit No. 19,219-IW
Bureau of Water Permitting File – Construction Permit No. 20,194-IW
Bureau of Water Permitting File – Construction Permit No. 20,234-IW
Travis Fuss, Aiken EA Office
Shawn M. Clarke, BOW – Columbia
Crystal Rippy, BOW - Columbia
Crystal Robertson, Aiken EA Office
James Somma, P.E., Parsons

Attachment A for SWPF Approval to Operate (APO)

SWPF Equipment List (Drawing No. G-P1-J-00001)

PROCESS BUILDING – PROCESS EQUIPMENT

Tank Number	Tank Name
Process Cell Area	
TK-101	Alpha Sorption Tank-A (AST-A)
TK-102	Filter Feed Tank-A (FFT-A)
TK-103	Cleaning Solution Dump Tank-A (CSDT-A)
TK-104	Sludge Solids Receipt Tank (SSRT)
TK-105	Wash Water Hold Tank (WWHT)
TK-109	Salt Solution Feed Tank (SSFT)
TK-121A/B/C	Back Pulse Tank
TK-123	Washing Filter Back Pulse Tank
TK-127	**Spent Acid Storage Tank (SAST)**
TK-205	Strip Effluent Hold Tank (SEHT)
TK-208	Solvent Drain Tank
TK-235	Lab Drain Tank
TK-505	**Backup Air Receiver**
TK-506	**Backup Air Receiver**
TK-601	Alpha Sorption Drain Tank (ASDT)
Operating Deck	
TK-122	Back Pulse Charge Tank-A
TK-128	AST-A Air Pulse Agitator Charge Tank
TK-129	FFT-A Air Pulse Agitator Charge Tank
TK-131	SSRT Air Pulse Agitator Charge Tank
TK-132	SSFT Air Pulse Agitator Charge Tank
TK-133	WWHT Air Pulse Agitator Charge Tank
CSSX Tank Cell	
TK-202	Solvent Hold Tank (SHT)
TK-203	Strip Effluent Coalescer
TK-204	Caustic Wash Tank
TK-206	Ba-137 Decay Tank (BDT)
TK-211	Decontaminated Salt Solution Stilling Tank
TK-212	Strip Effluent Stilling Tank
TK-215	Strip Effluent Pump Tank
TK-217	Solvent Strip Feed Tank

Tank Number	Tank Name
CSSX Contactor Drop Area	
TK-201	Decon. Salt Solution Coalescer
Cold Chemicals Area	
TK-106	**Filter Cleaning Acid Feed Tank**
TK-107	Filter Cleaning Caustic Tank
TK-108	Caustic Dilution Feed Tank
TK-301	Process Water Tank
TK-302	Caustic Receipt Tank
TK-303	Caustic Makeup Tank
TK-304	Nitric Acid Receipt Tank
TK-305	Process Water Pressure Tank
TK-307	Nitric Acid Scrub Makeup Tank
TK-311	MST Storage Tank
TK-312	DI Water Storage Tank
TK-313	Solvent Makeup Tank
TK-314	**DI Water Expansion Tank**
TK-317	Neutralization Tank
TK-330	Argon Tank
CSSX Contactor Area	
EXT-201A-P	Solvent Extraction Contactors
EXT-202A/B	Scrub Contactors
EXT-203A-P	Stripping Contactors
EXT-204A/B	Caustic Wash Contactors
Process Filters	
FLT-102A/B/C	Alpha Sorption Filters
FLT-104	Washing Filter
Alpha Finishing Facility	
TK-207	DSS Hold Tank (DSSHT)
TK-220	Intermediate Storage Tank (IST)
TK-221	Alpha Sorption Tank - B (AST-B)
TK-222	Filter Feed Tank - B (FFT-B)
TK-223	Cleaning Solution Dump Tank - B (CSDT-B)
TK-224	MST/Sludge Transfer Tank (MSTT)
TK-225A/B/C	**Finishing Area Back Pulse Tank**
TK-228	**Alpha Finishing Drain Tank (AFDT)**
TK-233	**Back Pulse Charge Tank B**
TK-236/237	**Lab Collection Tank**
TK-604	**Low Level Drain Tank**
FLT-222A/B/C	**Alpha Sorption Filters**

PUMPS	
North ASP Pump and Valve Gallery	
P-015A	ASP Secondary Loop Pump Water Pump
P-015B	ASP Secondary Loop Pump Water Pump
P-101A/B	Alpha Sorption Tank-A Transfer Pumps
P-102-1A/B/C	Filter Feed/Solids Trans Pumps
P-102-2 A/B/C	Filter Recirculation Pumps
P-104-1	Washing FLT Feed/Sludge Solids Trans Pump
P-104-2	Washing Filter Recirculation Pump
P-110	ASP Sump Trans Pump
South ASP Pump and Valve Gallery	
P-105A/B	Wash Water Trans Pumps
P-208A/B	Solvent Drain Tank Pumps
P-601A/B	Alpha Sorption Drain TK Transfer Pumps
CSSX Pump and Valve Gallery	
P-109A/B	Salt Solution Feed Pumps
P-202A/B	Solvent Feed Pumps
P-204A/B	Caustic Wash Tank Pumps
P-205A/B	Strip Effluent Trans Pumps
P-206A/B	Ba-137 Decay Tank Trans Pumps
P-212A/B	**Strip Effluent Coalescer Feed Pumps**
P-215A/B	Strip Effluent Pump Tank Pumps
P-217A/B	Solvent Strip Feed Pumps
P-218	CSSX Tank Cell Sump Transfer Pump
Sample Pump and Valve Gallery	
SP-101	Alpha Sorption Tank-A Sample Pump
SP-102	Filter Feed Tank-A Sample Pump
SP-103	Cleaning Solution Dump Tank-A Sample Pump
SP-104	Sludge Solids Receipt Tank Sample Pump
SP-105	Wash Water Hold Tank Sample Pump
SP-109	Salt Solution Feed Tank Sample Pump
SP-205	Strip Effluent Hold Tank Sample Pump
SP-235	Lab Drain Tank Sample Pump
Drum off/Decon Area	
P-605	Decon Area Sump Pump

PUMPS (continued)	
Cold Chemicals Area	
P-106	**Acid Transfer Pump**
P-107	Filter Cleaning Caustic Trans Pump
P-108	Caustic Dilution Trans Pump
P-300	Cold Chemicals Receiving Dock Sump Pump
P-301-1	Process Water Utility Pump
P-301-2	Flush Pump
P-302	Caustic Trans Pump
P-303	Caustic Makeup Trans Pump
P-304-1	Nitric Acid Metering Pump
P-304-2	Neutralization Metering Pump
P-305A/B	Sodium Hypochlorite Addition Pump
P-309A/B	Scrub Feed Pumps
P-310A/B	Strip Feed Pumps
P-311	MST Transfer Pump
P-311-1	MST Drum Pump
P-312-1	DI Water Trans Pump
P-312-2	Scrub Water Feed Pump
P-312-3A/B	Strip Water Feed Pumps
P-313	Solvent Makeup Trans Pump
P-313-1	Solvent Drum Pump
P-317	Neutralization Tank Discharge Pump
P-318	Caustic Sump Pump
P-319	**Acid Sump Pump**
P-320	Neutralization Sump Pump
P-321	Nitric Acid Sump Pump
P-322	Water Sump Pump
P-326	Pump Seal Make-up Water Supply Pump
Alpha Finishing Facility	
P-207A/B	**DSS Hold Tank Transfer Pumps**
P-220A/B	**Intermediate Storage Tank Transfer Pumps**
P-221A/B	**Alpha Sorption Tank B Transfer Pumps**
P-222-1A/B/C	**Filter Feed/Solids Transfer Pumps**
P-222-2A/B/C	**Filter Recirculation Pumps**
P-224	**MST/Sludge Transfer Pump**
P-228	**Alpha Finishing Drain Tank Transfer Pump**
PUMPS (continued)	

P-236	**Lab Collection Tank Pump**
P-604	**Low Level Drain Tank Transfer Pump**
P-025A/B	**AFP Secondary Cooler Loop Pump**
SP-207, SP-220 – SP-224	**Sample Pumps**
P-210, P-226, P-227, P-228-1	**AFF Sump Pumps**
P-229	**Alpha Finishing Process Filter Loop Drain Pump**
AGITATORS	
AGT-107	Filter Cleaning Caustic Tank Agitator
AGT-108	Caustic Dilution Feed Tank Agitator
AGT-303	Caustic Makeup Tank Agitator
AGT-307	Nitric Acid Scrub Makeup Tank Agitator
AGT-311	MST Storage Tank Agitator
AGT-311-1	MST Drum Agitator
AGT-313	Solvent Makeup Tank Agitator
AGT-221	**Alpha Sorption Tank B Agitator**
AGT-222	**Filter Feed Tank B Agitator**
AGT-224	**MST/Sludge Transfer Tank Agitator**
LABORATORY EQUIPMENT	
GB-001 – GB-**011, GB-014**	Glove Boxes
RH-001 – RH-017	Radio Hoods
FH-001	Fume Hood
HC-001 – HC-004	Hot Cell Windows
STS-101	Sample Transfer System
ELECTRICAL SYSTEMS	
ATS-203 – ATS-205	Automatic Transfer Switch
ATS-207	Automatic Transfer Switch
ATS-208	Automatic Transfer Switch
ATS-210	Automatic Transfer Switch
MCC-**201** – MCC-206	Motor Control Center
MCC-209 – MCC-210	**Motor Control Center**
SWGR-201 – SWGR-204	Switchgear
USX-301	Uninterruptible Power Supply

INSTRUMENTATION	
ICP-001 – ICP-013	Instrument Control Panel
ICP-014 – ICP-016	Instrument Control Panel
IR-001 – IR-014, IR-016 – IR-022, IR-024, IR-026 – IR-040	Instrument Control Rack
AIR HANDLING EQUIPMENT	
ACU-001	Wall Mounted Heat Pump
AHU-001 – AHU-006	Air Handling Units
AHU-008 – AHU-009	Air Handling Units
Filters/Fans/Coils	
CCL-401A/B	Process Vessel Vent Coolers
CCL-402A/B	Pulse Mixer Vent Coolers
FAN-401A/B	Process Vessel Vent Exhaust Fans
FAN-402A/B	Pulse Mixer Vent Exhaust Fans
FAN-001	Exhaust Fan
FAN-002	Exhaust Fan
FAN-003	Exhaust Fan on Roof
FAN-004	Exhaust Fan on Roof
FAN-007	Exhaust Fan on Roof
FAN-009	Exhaust Fan on Roof
FAN-010	Exhaust Fan on Roof
FAN-013	Exhaust Fan on Roof
FAN-014	Exhaust Fan on Roof
FAN-015	Exhaust Fan on Roof
FLT-001 – FLT-004	Exhaust Air HEPA Filters
FLT-009	Lab Exhaust Air HEPA Filter
FLT-010 – FLT-016	Cell Inlet Air HEPA Filters
FLT-017	Lab Exhaust Air HEPA Filter
FLT-020	Hot Lab Intake Filter Above Suspended Ceiling
FLT-021	Hot Cell Exhaust Air HEPA Filter
FLT-022	Hot Cell Exhaust Air HEPA Filter
FLT-023 – FLT-034	Glovebox Inlet Air HEPA Filters
FLT-240 – FLT-242	**Solvent Recovery Filters**
FLT-250	**Solvent Adjustment Filter**
FLT-301A/B	Process Water Cartridge Filter
FLT-401A/B	Process Vessel Vent Filters

AIR HANDLING EQUIPMENT (continued)	
FLT-402A/B/C/D	Pulse Mixer Vent Filters
HRC-001	Heat Recovery Coil
Scrubbers	
SCB-001	Scrubber
SCB-002	Scrubber
SCB-003	Hot Cell Scrubber
SCB-004	Hot Cell Scrubber
SCFS-001	**Scrubber Caustic Feed System**
SCFS-002	**Scrubber Caustic Feed System**
Separators	
SEP-001	Bldg Chilled Water Air Separator
SEP-003	Control Room Chilled Water Air Separator
SEP-005	Process Chilled Water Air Separator
SEP-007	Heat Recovery Air Separator
Pumps	
P-001A/B	Bldg Chilled Water Supply Pumps
P-003A/B	Control Room Chilled Water Pumps
P-005A/B	Process Chilled Water Supply Pumps
P-007A/B	Heat Recovery Water Pumps
Tanks	
TK-001	Bldg Chilled Wtr Exp Tank
TK-002	Bldg Chilled Wtr Chem Feed Tank
TK-003	Control Room Chilled Wtr Exp Tank
TK-004	Control Room Chilled Wtr Chem Feed Tank
TK-005	Process Chilled Wtr Exp Tank
TK-006	Process Chilled Wtr Chem Feed Tank
TK-007	Heat Recovery Bladder Exp Tank
TK-008	Heat Recovery Chemical Feed Tank
TK-015	Process Chilled Water Expansion Tank
TK-016	Chemical Bypass Feeder Tank
TK-025	**Process Chilled Water Expansion Tank**
Ventilators	
VLR-001	Gravity Roof Ventilator
VLR-002	Gravity Roof Ventilator

MISCELLANEOUS ITEMS	
BTR-001	DW Pressure Booster System
CMP-**504**	Back Up Air Receiver Compressor
DMST-401A/B	Process Vessel Vent Demisters
DMST-402A/B	Pulse Mixer Vent Demisters
FAN-005	**Exhaust Fan**
FAN-006	**Exhaust Fan**
FLT-007	**Exhaust Air HEPA Filter**
HTR-007	Domestic Water Heater/Tank
HTR-017A/B	**Strip Contactors Tempered Water Heaters**
HTR-203A/B	**Solvent Strip Feed Tempered Water Heaters**
HTR-310A/B	Strip Feed Heaters
HTR-401A/B	Process Vessel Vent Heaters
HTR-402A/B	Pulse Mixer Vent Heaters
HX-015	ASP Secondary Loop Cooler
HX-025	**AFP Secondary Loop Cooler**
HX-102A/B/C	Filter Recirculation Coolers
HX-104	Washing Filter Recirculation Cooler
HX-201	Salt Solution Feed Cooler
HX-202A/B	Solvent Feed Coolers
HX-203	**Strip Contactor Tempered Water Heat Exchanger**
HX-217A/B	Solvent **Strip Feed Heat Exchanger**
HX-222A/B/C	**Filter Recirculation Coolers**
HX-250	**Solvent Adjustment Heat Exchanger**
IX-312	DI Water Package Unit
SEP-015	Process Chiller Water Air Separator
SEP-025	**Process Chilled Water Separator**
VMP-001	Vibration Monitor Panel

G-P1-J-00001

DRAWING INDEX

DRAWING No	TITLE
G-P1-J-00001	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES
P-PG-J-0002	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - INDEX KEY PLAN
P-PG-J-0003	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - CENTRAL PROCESS AREA PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0004	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - COLD CHEMICALS AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0005	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - NORTHERN FACILITY SUPPORT AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0006	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - EASTERN FACILITY SUPPORT AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0007	SWPF - ALPHA FINISHING FACILITY - GENERAL ARRANGEMENT - ALPHA FINISHING FACILITY PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0008	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - CENTRAL PROCESS AREA PLAN AT ELEVATION 116'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0009	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - CENTRAL PROCESS AREA PLAN AT ELEVATION 124'-0"
P-PG-J-0010	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - CENTRAL PROCESS AREA PLAN AT ELEVATION 139'-0"
P-PG-J-0011	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0012	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0013	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0014	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0015	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS

PROCESS BUILDING - PROCESS EQUIPMENT

EQUIPMENT		CAPACITY (GALS) *	NO	DIA (FEET)	HEIGHT OR LENGTH (FEET) **
PROCESS CELL AREA					
ALPHA SORPTION TANK-A (AST-A)	TK-101	37700	1	19'-0"	16'-10"
FILTER FEED TANK-A (FFT-A)	TK-102	37700	1	19'-0"	16'-10"
CLEANING SOLUTION DUMP TANK-A (CSDT-A)	TK-103	1000	1	5'-0"	7'-3"
SLUDGE SOLIDS RECEIPT TANK (SSRT)	TK-104	6300	1	9'10 13'	23'-4"
WASH WATER HOLD TANK (WWHT)	TK-105	13700	1	12'-0"	15'-11"
SALT SOLUTION FEED TANK (SSFT)	TK-109	45000	1	21'-0"	16'-3"
BACK PULSE TANK	TK-121A/B/C	7	3	8½"	2'-6"
WASHING FILTER BACK PULSE TANK	TK-123	7	1	8½"	2'-6"
SPENT OXALIC ACID STORAGE TANK (SOAST)	TK-127	4300	1	6'-0"	20'-0"
STRIP EFFLUENT HOLD TANK (SEHT)	TK-205	19900	1	14'-0"	16'-10"
SOLVENT DRAIN TANK	TK-208	4300	1	6'-0"	20'-0"
LAB DRAIN TANK	TK-235	600	1	4'-0"	6'-8"
ALPHA SORPTION DRAIN TANK (ASDT)	TK-601	4300	1	6'-0"	20'-0"
OPERATING DECK					
BACK PULSE CHARGE TANK A	TK-122	30	1	1'-6"	2'-3"
AST-A AIR PULSE AGITATOR CHARGE TANK	TK-128	300	1	3'-0"	5'-0"
FFT-A AIR PULSE AGITATOR CHARGE TANK	TK-129	300	1	3'-0"	5'-0"
SSRT AIR PULSE AGITATOR CHARGE TANK	TK-131	300	1	3'-0"	5'-0"
SSFT AIR PULSE AGITATOR CHARGE TANK	TK-132	300	1	3'-0"	5'-0"
WWHT AIR PULSE AGITATOR CHARGE TANK	TK-133	300	1	3'-0"	5'-0"
CSSX TANK CELL					
SOLVENT HOLD TANK (SHT)	TK-202	720	1	5'-0"	5'-5"
STRIP EFFLUENT COALESCER *****	TK-203	N/A	1	1'-0"	8'-1"
CAUSTIC WASH TANK	TK-204	500	1	4'-0"	5'-9"
Ba-137 DECAY TANK (BDT)	TK-206	1700	1	7'-0"	6'-6"
DECONTAMINATED SALT SOLUTION STILLING TK	TK-211	235	1	2'-0"	10'-0"
STRIP EFFLUENT STILLING TANK	TK-212	29	1	1'-0"	5'-0"
STRIP EFFLUENT PUMP TANK	TK-215	60	1	1'-6"	4'-11"
SOLVENT STRIP FEED TANK	TK-217	60	1	1'-6"	4'-11"
CSSX CONTACTOR DROP AREA					
DECON. SALT SOLUTION COALESCER *****	TK-201	N/A	1	3'-0"	14'-8"
COLD CHEMICALS AREA					
OXALIC ACID FEED TANK ****	TK-106	4100	1	7'-0"	15'-0"
FILTER CLEANING CAUSTIC TANK ****	TK-107	1100	1	6'-0"	6'-0"
CAUSTIC DILUTION FEED TANK ****	TK-108	9600	1	11'-0"	15'-0"
PROCESS WATER TANK ****	TK-301	9600	1	11'-0"	15'-0"
CAUSTIC RECEIPT TANK ****	TK-302	9600	1	11'-0"	15'-0"
CAUSTIC MAKEUP TANK ****	TK-303	2500	1	7'-0"	10'-0"
NITRIC ACID RECEIPT TANK ****	TK-304	2500	1	7'-0"	10'-0"
PROCESS WATER PRESSURE TANK	TK-305	400	1	4'-0"	5'-0"
NITRIC ACID SCRUB MAKE-UP TANK ****	TK-307	2500	1	7'-0"	10'-0"
MST STORAGE TANK ****	TK-311	1000	1	5'-0"	7'-0"
DI WATER STORAGE TANK ****	TK-312	7200	1	9'-0"	16'-0"
SOLVENT MAKE-UP TANK *****	TK-313	70	1	2'-0"	3'-0"
NEUTRALIZATION TANK ****	TK-317	500	1	4'-0"	7'-0"
ARGON TANK ***	TK-330	3000	1	8'-0"	8'-0"
CSSX CONTACTOR AREA					
SOLVENT EXTRACTION CONTACTORS	EXT-201 A-P	16	CENTRIFUGAL SEPARATOR		
SCRUB CONTACTORS	EXT-202 A/B	2			
STRIPPING CONTACTORS	EXT-203 A-P	16			
CAUSTIC WASH CONTACTORS	EXT-204 A/B	2			
PROCESS FILTERS		SIZE	NO	DIA (FEET)	HEIGHT (FEET)
ALPHA SORPTION FILTERS	FLT-102A/B/C	225 ft²	3	2'-2"	15'-0"
WASHING FILTER	FLT-104	225 ft²	1	2'-2"	15'-0"

* THE CAPACITY IN GALLONS ON THE EQUIPMENT DATA IS MEASURED TO OVERFLOW UNLESS NOTED OTHERWISE.

** TANK HEIGHT OR LENGTH ON EQUIPMENT DATA IS MEASURED TANGENT TO TANGENT UNLESS NOTED OTHERWISE.

*** TANKS LOCATED AT THE EXTERIOR OF THE BUILDING.

**** TANK HEIGHT ON EQUIPMENT DATA IS MEASURED TANGENT TO BOTTOM.

***** TANK HEIGHT OR LENGTH ON EQUIPMENT DATA IS MEASURED AS OVERALL HEIGHT OR LENGTH.

PROCESS BUILDING CRANES & MONORAILS

DESCRIPTION		CAPACITY
OPERATING DECK BRIDGE CRANE	BC-101	20/7.5/1 TON
AFF BRIDGE CRANE	BC-505	5 TON
EQUIPMENT LIFT	EL-101	2 TON
TRUCK BAY MONORAIL (NOT SHOWN)	MR-116	20 TON
CSSX PUMP AND VALVE GALLERY		
MONORAIL W/HOIST (NOT SHOWN)	MR-111 - MR-115	1 TON
MONORAIL W/HOIST (NOT SHOWN)	MR-118 - MR-119	1 TON
CSSX CONTACTOR OPERATING FLOOR		
MONORAIL W/HOIST (NOT SHOWN)	MR-102	1 TON
SOUTH ASP PUMP & VALVE GALLERY		
MONORAIL W/HOIST (NOT SHOWN)	MR-105 - MR-106	1 TON
MONORAIL W/HOIST (NOT SHOWN)	MR-110	1 TON
NORTH ASP PUMP & VALVE GALLERY		
MONORAIL W/HOIST (NOT SHOWN)	MR-107 - MR-109	1 TON
WASTE TRANSFER ACCESS ROOM		
MONORAIL W/HOIST (NOT SHOWN)	MR-117	5 TON
HOT LABORATORY		
HOT CELL BRIDGE CRANE	BC-102	½ TON
CSSX TANK CELL OPERATING FLOOR		
MONORAIL W/HOIST (NOT SHOWN)	MR-103	5 TON
MONORAIL W/HOIST (NOT SHOWN)	MR-104	5 TON
COLD CHEMICALS AREA		
COLD CHEMICALS AREA MONORAIL (NOT SHOWN)	MR-301	1 TON
DOCK LEVELER	DL-102	22.5 TON
EASTERN FACILITY SUPPORT AREA		
DOCK LEVELER	DL-101	22.5 TON

SEE MATERIAL HANDLING DRAWINGS FOR MONORAIL LOCATIONS

REFERENCES

COLUMN LINE GRID DESIGNATION

CENTER LINE

FLOOR, ELEVATION LINES (ELEVATIONS & SECTIONS ONLY)

ELEVATION SYMBOL — EL 000'-00"

SECTION TITLE REFERENCE — SECTION DESIGNATOR; SECTION; SCALE; DRAWING WHERE SECTION IS SHOWN; DRAWING WHERE SECTION IS CUT

SECTION CUT — X-XX-X-XXXX

NORTH ARROW

MATERIALS

EARTH

CONCRETE

GRATING

CHECKER PLATE

SYMBOLS

EMERGENCY EXIT ONLY — EEO

CONTACTOR (EXTRACTION/WASH/SCRUB/STRIP)

PERSONNEL CONTAMINATION MONITOR — PCM

SUMP

TANKS

DRUMS

PUMPS

COALESCER

COILING STEEL OVERHEAD DOOR W/HOOD

SHOWER

SHOWER BENCH

DOOR

WELDED WIRE FABRIC DOOR

EQUIPMENT LIFT

SYMBOLS CONTINUED

EMERGENCY SHOWER AND EYE WASH STATION (ESEWS)

CEILING EMERGENCY SHOWER

LABORATORY SINK WITH INTEGRAL EYEWASH

ROOM NUMBER — R123

PRINTER

FILES

REFERENCE TABLE

DISTRIBUTION FRAME

CHAIR

CAGED LADDER

DRAWING FILES

DESK

SERVER RACK

EQUIPMENT DESIGNATIONS

PUMPS

NORTH ASP PUMP AND VALVE GALLERY
- P-101A/B ALPHA SORPTION TANK-A TRANSFER PUMPS
- P-102-1A/B/C FILTER FEED/SOLIDS TRANS PUMPS
- P-102-2A/B/C FILTER RECIRCULATION PUMPS
- P-104-1 WASHING FLT FEED/SLUDGE SOLIDS TRANS PUMP
- P-104-2 WASHING FILTER RECIRCULATION PUMP
- P-110 ASP SUMP TRANS PUMP

SOUTH ASP PUMP AND VALVE GALLERY
- P-105A/B WASH WATER TRANS PUMPS
- P-208A/B SOLVENT DRAIN TANK PUMPS
- P-601A/B ALPHA SORPTION DRAIN TK TRANSFER PUMPS

CSSX PUMP AND VALVE GALLERY
- P-109A/B SALT SOLUTION FEED PUMPS
- P-202A/B SOLVENT FEED PUMPS
- P-204A/B CAUSTIC WASH TANK PUMPS
- P-205A/B STRIP EFFLUENT TRANS PUMPS
- P-206A/B Ba-137 DECAY TANK TRANS PUMPS
- P-215A/B STRIP EFFLUENT PUMP TANK PUMPS
- P-217A/B SOLVENT STRIP FEED PUMPS
- P-218 CSSX TANK CELL SUMP TRANSFER PUMP

SAMPLE PUMP AND VALVE GALLERY
- SP-101 ALPHA SORPTION TANK-A SAMPLE PUMP
- SP-102 FILTER FEED TANK-A SAMPLE PUMP
- SP-103 CLEANING SOLUTION DUMP TANK-A SAMPLE PUMP
- SP-104 SLUDGE SOLIDS RECEIPT TANK SAMPLE PUMP
- SP-105 WASH WATER HOLD TANK SAMPLE PUMP
- SP-109 SALT SOLUTION FEED TANK SAMPLE PUMP
- SP-205 STRIP EFFLUENT HOLD TANK SAMPLE PUMP
- SP-235 LAB DRAIN TANK SAMPLE PUMP

MATERIAL STAGING AND STORAGE AREA
- P-604 LOW LEVEL DRAIN SUMP TRANSFER PUMP

DRUM OFF/DECON AREA
- P-605 DECON AREA SUMP PUMP

COLD CHEMICALS AREA
- P-106 OXALIC ACID TRANSFER PUMP
- P-107 FILTER CLEANING CAUSTIC TRANS PUMP
- P-108 CAUSTIC DILUTION TRANS PUMP
- P-300 COLD CHEMICALS RECEIVING DOCK SUMP PUMP
- P-301-1 PROCESS WATER UTILITY PUMP
- P-301-2 FLUSH PUMP
- P-302 CAUSTIC TRANS PUMP
- P-303 CAUSTIC MAKEUP TRANS PUMP
- P-304-1 NITRIC ACID METERING PUMP
- P-304-2 NEUTRALIZATION METERING PUMP
- P-305 SODIUM HYPOCHLORITE ADDITION PUMP
- P-309A/B SCRUB FEED PUMPS
- P-310A/B STRIP FEED PUMPS
- P-311 MST TRANSFER PUMP
- P-311-1 MST DRUM PUMP (NOT SHOWN)
- P-312-1 DI WATER TRANS PUMP
- P-312-2 SCRUB WATER FEED PUMP
- P-312-3A/B STRIP WATER FEED PUMPS
- P-313 SOLVENT MAKEUP TRANS PUMP
- P-313-1 SOLVENT DRUM PUMP (NOT SHOWN)
- P-317 NEUTRALIZATION TANK DISCHARGE PUMP
- P-318 CAUSTIC SUMP PUMP
- P-319 OXALIC ACID SUMP PUMP
- P-320 NEUTRALIZATION SUMP PUMP
- P-321 NITRIC ACID SUMP PUMP
- P-322 WATER SUMP PUMP
- P-326 PUMP SEAL MAKE-UP WATER SUPPLY PUMP

AGITATORS
- AGT-107 FILTER CLEANING CAUSTIC TANK AGITATOR
- AGT-108 CAUSTIC DILUTION FEED TANK AGITATOR
- AGT-303 CAUSTIC MAKEUP TANK AGITATOR
- AGT-307 NITRIC ACID SCRUB MAKEUP TANK AGITATOR
- AGT-311 MST STORAGE TANK AGITATOR
- AGT-311-1 MST DRUM AGITATOR
- AGT-313 SOLVENT MAKEUP TANK AGITATOR

LABORATORY EQUIPMENT
- GB-001 - GB-012 GLOVE BOXES
- RH-001 - RH-017 RADIO HOODS
- FH-001 FUME HOOD
- HC-001 - HC-004 HOT CELL WINDOWS
- STS-001 SAMPLE TRANSFER SYSTEM

ELECTRICAL SYSTEMS
- ATS-201 AUTOMATIC TRANSFER SWITCH
- ATS-202 AUTOMATIC TRANSFER SWITCH
- ATS-205 AUTOMATIC TRANSFER SWITCH
- MCC-203 MOTOR CONTROL CENTER
- MCC-204 MOTOR CONTROL CENTER
- MCC-205 MOTOR CONTROL CENTER
- MCC-206 MOTOR CONTROL CENTER
- SWGR-201 SWITCHGEAR
- SWGR-202 SWITCHGEAR
- SWGR-203 SWITCHGEAR
- SWGR-204 SWITCHGEAR
- USX-301 UNINTERRUPTABLE POWER SUPPLY

MISCELLANEOUS ITEMS
- BTR-001 DW PRESSURE BOOSTER SYSTEM
- DMST-401A/B PROCESS VESSEL VENT DEMISTERS
- DMST-402A/B PULSE MIXER VENT DEMISTERS
- DT-311 MST DRUM TUMBLER
- HTR-007 DOMESTIC WATER HEATER/TANK
- HTR-217A/B SOLVENT HEATERS
- HTR-310A/B STRIP FEED HEATERS
- HTR-401A/B PROCESS VESSEL VENT HEATERS
- HTR-402A/B PULSE MIXER VENT HEATERS
- HX-102A/B/C FILTER RECIRCULATION COOLERS
- HX-104 WASHING FILTER RECIRCULATION COOLER
- HX-201A/B SALT SOLUTION FEED COOLERS
- HX-202A/B SOLVENT FEED COOLERS
- IX-312 DI WATER PACKAGE UNIT
- SI-210 STEAM FLASH/TANK
- VMP-01 VIBRATION MONITOR PANEL

AIR HANDLING EQUIPMENT
- ACU-001 WALL MOUNTED HEAT PUMP
- AHU-001-AHU-005 AIR HANDLING UNITS
- AHU-008-AHU-009 AIR HANDLING UNITS

FILTERS/FANS/COILS
- CCL-401A/B PROCESS VESSEL VENT COOLERS
- CCL-402A/B PULSE MIXER VENT COOLERS
- FAN-401A/B PROCESS VESSEL VENT EXHAUST FANS
- FAN-402A/B PULSE MIXER VENT EXHAUST FANS
- FAN-001 EXHAUST FAN
- FAN-002 EXHAUST FAN
- FAN-003 EXHAUST FAN ON ROOF
- FAN-004 EXHAUST FAN ON ROOF
- FAN-005 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-006 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-007 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-009 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-010 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-013 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-014 EXHAUST FAN ON ROOF (NOT SHOWN)
- FAN-015 EXHAUST FAN ON ROOF (NOT SHOWN)
- FLT-001-FLT-004 EXHAUST AIR HEPA FILTERS
- FLT-007 EXHAUST AIR HEPA FILTERS
- FLT-009 LAB EXHAUST AIR HEPA FILTER
- FLT-010-FLT-016 CELL INLET AIR HEPA FILTERS
- FLT-017 LAB EXHAUST AIR HEPA FILTER
- FLT-020 HOT LAB INTAKE FILTER (NOT SHOWN) ABOVE SUSPENDED CEILING
- FLT-021 HOT CELL EXHAUST AIR HEPA FILTER
- FLT-022 HOT CELL EXHAUST AIR HEPA FILTER
- FLT-023-FLT-034 GLOVEBOX INLET AIR HEPA FILTERS (NOT SHOWN)
- FLT-301 PROCESS WATER CARTRIDGE FILTER
- FLT-401A/B PROCESS VESSEL VENT FILTERS
- FLT-402A/B/C/D PULSE MIXER VENT FILTERS
- HRC-001 HEAT RECOVERY COIL

SCRUBBERS
- SCB-001 SCRUBBER
- SCB-002 SCRUBBER
- SCB-003 HOT CELL SCRUBBER
- SCB-004 HOT CELL SCRUBBER

SEPARATORS
- SEP-001 BLDG CHILLED WATER AIR SEPARATOR
- SEP-003 CONTROL ROOM CHILLED WATER AIR SEPARATOR
- SEP-005 PROCESS CHILLED WATER AIR SEPARATOR
- SEP-007 HEAT RECOVERY AIR SEPARATOR

PUMPS
- P-001A/B BLDG CHILLED WATER SUPPLY PUMPS
- P-003A/B CONTROL ROOM CHILLED WATER PUMPS
- P-005A/B PROCESS CHILLED WATER SUPPLY PUMPS
- P-007A/B HEAT RECOVERY WATER PUMPS

TANKS
- TK-001 BLDG CHILLED WTR EXP TANK
- TK-002 BLDG CHILLED WTR CHEM FEED TANK
- TK-003 CONTROL ROOM CHILLED WTR EXP TANK
- TK-004 CONTROL ROOM CHILLED WTR CHEM FEED TANK
- TK-005 PROCESS CHILLED WTR EXP TANK
- TK-006 PROCESS CHILLED WTR CHEM FEED TANK
- TK-007 HEAT RECOVERY BLADDER EXP TANK
- TK-008 HEAT RECOVERY CHEMICAL FEED TANK

VENTILATORS
- VLR-001 GRAVITY ROOF VENTILATOR
- VLR-002 GRAVITY ROOF VENTILATOR (NOT SHOWN)

MISCELLANEOUS
- # NUMBER
- & AND
- ' FEET
- " INCHES

ABBREVIATIONS

ACU	AIR CONDITIONING PACKAGE UNIT
AFF	ALPHA FINISHING FACILITY
AGT	AGITATOR
ARM	AREA RADIATION MONITOR
ASDT	ALPHA SORPTION DRAIN TANK
ASP	ALPHA SORPTION PROCESS
AST	ALPHA SORPTION TANK
ATS	AUTOMATIC TRANSFER SWITCH
AHU	AIR HANDLING UNIT
Ba	BARIUM
BATT	BATTERY
BC	BRIDGE CRANE
BLDG	BUILDING
BTR	PRESSURE BOOSTER PUMP

ABBREVIATIONS CONTINUED

CAM	CONTINUOUS AIR MONITOR
CCL	COOLING COIL
CCTV	CLOSED CIRCUIT TELEVISION
CHW	CHILLED WATER
CONC	CONCRETE
CSDT	CLEANING SOLUTION DUMP TANK
CSSX	CAUSTIC SIDE SOLVENT EXTRACTION
DECON	DECONTAMINATION
DL	DOCK LEVELER
DMST	DEMISTER
DOE	DEPARTMENT OF ENERGY
DSSHT	DECONTAMINATED SALT SOLUTION HOLD TANK
DT	DRUM TUMBLER
DWPF	DEFENSE WASTE PROCESSING FACILITY
EEO	EMERGENCY EXIT ONLY
EL	ELEVATION OR EQUIPMENT LIFT
ESEWS	EMERGENCY SHOWER AND EYEWASH STATION
EXP	EXPANSION
EXT	EXTRACTION
FD	FLOOR DRAIN
FFT	FILTER FEED TANK
FH	FUME HOOD
FL	FORKLIFT
FLT	FILTER
FP	FIRE PROTECTION
GB	GLOVE BOX
GPM	GALLONS PER MINUTE
GWB	GYPSUM WALL BOARD
HC	HOT CELL
HD	HUB DRAIN
HEPA	HIGH EFFICIENCY PARTICULATE AIR
HLW	HIGH-LEVEL WASTE
HP	HIGH POINT
HR	HOUR
HRC	HEAT RECOVERY COIL
HTR	HEATER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HX	HEAT EXCHANGER
ICD	INTERFACE CONTROL DOCUMENT
ICP	INSTRUMENT CONTROL PANEL
ICR	INSTRUMENT CONTROL RACK
IR	INSTRUMENT RACK
IST	INTERMEDIATE STORAGE TANK
IT	INFORMATION TECHNOLOGY
IX	ION EXCHANGER
LDT	LAB DRAIN TANK
LLW	LOW LEVEL WASTE
LP	LOW POINT
M	MOLAR
M&O	MANAGEMENT & OPERATING (CONTRACTOR)
MAINT	MAINTENANCE
MCC	MOTOR CONTROL CENTER
MGAL	MILLION GALLONS
MR	MONORAIL
MSL	MEAN SEA LEVEL
MST	MONOSODIUM TITANATE
MW	MIXED WASTE
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
NaOH	SODIUM HYDROXIDE
Na+	SODIUM ION
O TO A	ORGANIC TO AQUEOUS
OH	OVERHEAD
OPER	OPERATOR
P	PUMP
PBVS	PROCESS BUILDING VENTILATION SYSTEM
PCM	PERSONNEL CONTAMINATION MONITOR
PLCS	PLACES
PMVS	PULSE MIXER VENT SYSTEM
PNL	PANEL
PVVS	PROCESS VESSEL VENT SYSTEM
RAD/CON	RADIOLOGICAL CONTROL
RBA	RADIOLOGICAL BUFFER AREA
RH	RADIO HOOD
RWP	RADIOLOGICAL WORK PERMIT
SCB	SCRUBBER
SCFM	STANDARD CUBIC FEET PER MINUTE
SDG	STAND-BY DIESEL GENERATOR
SDT	SOLVENT DRAIN TANK
SEHT	STRIP EFFLUENT HOLD TANK
SEP	SEPARATOR
SH	SHEET
SI	SPECIALTY ITEM
SOAST	SPENT OXALIC ACID STORAGE TANK
SP	SAMPLE PUMP
SSFT	SALT SOLUTION FEED TANK
SSP	SAFE SHUTDOWN PANEL
SSRT	SLUDGE SOLIDS RECEIPT TANK
SST	STAINLESS STEEL
STS	SAMPLE TRANSFER SYSTEM
SWGR	SWITCHGEAR
SWPF	SALT WASTE PROCESSING FACILITY
TBD	TO BE DETERMINED
TBV	TO BE VERIFIED
TDH	TOTAL DYNAMIC HEAD
TERM	TERMINATION CABINET
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TF	TANK FARM
TK	TANK
TRANS	TRANSFER
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
USX	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE
VLR	VENTILATOR
VMP	VIBRATION MONITOR PANEL
WAC	WASTE ACCEPTANCE CRITERIA
WTR	WATER
WWHT	WASH WATER HOLD TANK

GENERAL NOTES

1. PROCESS BUILDING REFERENCE FLOOR ELEVATION 100'-0". SEE CIVIL DRAWINGS FOR GEODETIC ELEVATIONS
2. THE REFERENCED FLOOR ELEVATIONS ARE AT HIGH POINT OF FLOOR.
3. FIRE WATER CONTAINMENT WILL BE PROVIDED PER NFPA 801 REQUIREMENTS

   BASED ON THE FIRE PROTECTION DESIGN BASIS THE FOLLOWING AREAS SHALL BE DESIGNED TO MEET THE ABOVE REQUIREMENTS:

   A. ELEVATION 92'-0"
      (1) WASTE TRANSFER ENCLOSURE

   B. ELEVATION 100'-0"
      (1) NORTH ASP PUMP AND VALVE GALLERY
      (2) SOUTH ASP PUMP AND VALVE GALLERY
      (3) CSSX PUMP AND VALVE GALLERY
      (4) DRUM OFF/DECON AREA
      (5) WASTE STORAGE AREAS

   C. ELEVATION 108'-0"
      (1) WASTE TRANSFER ENCLOSURE ACCESS ROOM

   D. ELEVATION 116'-0"
      (1) WASTE TRANSFER ENCLOSURE ACCESS ROOM
      (2) PROCESS BUILDING EXHAUST HEPA FILTER ROOM
      (3) CSSX CONTACTOR SUPPORT FLOOR
      (4) CSSX CONTACTOR DROP AREA
      (5) CELL INLET AIR HEPA FILTER ROOM #2

   E. ELEVATION 124'-0"
      (1) CONTACTOR OPERATING DECK
      (2) CSSX TANK CELL OPERATING DECK
      (3) CSSX CONTACTOR DROP AREA DECK

   F. ELEVATION 139'-0"
      (1) CELL INLET AIR HEPA FILTER ROOM #1
      (2) PVVS/PMVS AND LABORATORY VENT ROOM
      (3) SWPF ANALYTICAL LABORATORY (WHICH INCLUDES OTHER FUNCTIONAL AREAS)

   NOTE: AREAS LISTED HERE WHICH ALREADY HAVE SUMPS FOR RAD WASTE SPILLAGE WILL ALSO COLLECT THE RELEASE OF ANY FIRE WATER. THESE SUMPS DRAIN INTO THE ASDT TANK (TK-601) OR SOLVENT DRAIN TANK (TK-208) WITH NO SEPARATION OF FLUIDS.
4. NOT ALL EQUIPMENT SHOWN FOR CLARITY (EXAMPLE: FANS, VFDS, CAMS, ETC).
5. FOR THE ALPHA FINISHING FACILITY PROCESS EQUIPMENT DATA AND DESIGNATIONS SEE DRAWING P-PG-J-0007.
6. OCCUPANCY FOR PROCESS BUILDING IS BASED ON ACTUAL OCCUPANTS RATHER THAN 100 SF PER OCCUPANT OVER GROSS FLOOR AREA. FOR EXITING AND OTHER CODE COMPLIANCES, OCCUPANCY SET AT 60 PERSONS ACTUAL PER PRIMARY SHIFT PLUS ALLOWANCE FOR 15 DOE PERSONNEL. TOTAL PROCESS BUILDING OCCUPANCY FOR PRIMARY SHIFT = 75 OCCUPANTS.
7. CAMS AND ARMS SHALL BE PHYSICALLY LOCATED ON DETAIL DRAWINGS.
8. REFERENCE ARCHITECTURAL RADIATION ZONE DRAWINGS A-AD-J-0007, A-AD-J-0008SH1, A-AD-J-0008SH2 AND A-AD-J-0009 FOR RADIATION ZONE LOCATIONS.
9. ACCESS AND INSPECTION PORTS ON OPERATING DECKS MUST BE LOCKED OR SECURED IN THE INSTALLED POSITION.
10. IN ACCORDANCE WITH DOE-STD-1021-93 AND SPECIFIC PROJECT REQUIREMENTS; PERFORMANCE CATEGORIES FOR THE SWPF PROCESS BUILDING STRUCTURES ARE AS FOLLOWS:

    CENTRAL PROCESS AREA (CPA): PC-3
    COLD CHEMICALS AREA (CCA): PC-1
    ALPHA FINISHING FACILITY (AFF): PC-1
    NORTHERN FACILITY SUPPORT AREA (NFSA): PC-1
    EASTERN FACILITY SUPPORT AREA (EFSA): PC-1
11. REFERENCE DRAWING P-PG-J-0007 FOR AFF EQUIPMENT.

REVISION NOTE:
INCORPORATED FORMAL REVIEW COMMENTS RECEIVED FROM REVISION OE. INCORPORATED DCN-07-0038. PER PP-EN-5014, CHANGES MADE SINCE LAST ISSUE ARE TOO NUMEROUS TO PRACTICALLY CONVEY.

G P1 J 00001 — LATEST REVISION 1

PROJ.	REV. NO.	DATE	REVISION	PRPD	CHKD	LEAD ENG	APRVD	PM APRVD	DOC
744910	0	05/24/06	ISSUED CERTIFIED FOR CONSTRUCTION	JTO	REB	LPC	SA	JR	TLM
745253	1	08/13/07	ISSUED FOR CONSTRUCTION	ETA	JC	LPC	JS	DBA	TLM

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	G-P1-J-00001	1 OF 1	1

SWPFE30.BDR

RECEIVED APR 04 2008 WATER FACILITIES PERMITTING DIVISION

S.C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

WW-1498-19

Page A2

Attachment B. Process Flow Drawings

1. G-M1-J-00001, *SWPF Process Flow Drawing Index (U)*
2. G-M1-J-00002P, *SWPF Process Flow Legend Sheet (U)*
3. M-M5-J-0001P, *SWPF Simplified Process Flow Schematic (U)*
4. M-M5-J-0002P, *SWPF Feed Receipt, Alpha Sorption Tank-A, Filter Feed Tank-A, and Cleaning Solution Dump Tank-A PFD (U)*
5. M-M5-J-0003P, *SWPF Alpha Sorption Filters FLT-102A/B/C PFD (U)*
6. M-M5-J-0004P, *SWPF Sludge Solids Washing Filter, Sludge Solids Receipt Tank and Wash Water Hold Tank PFD (U)*
7. M-M5-J-0005P, *SWPF Cold Chemical Makeup for Filter Cleaning and Feed Adjustment PFD (U)*
8. M-M5-J-0006P, *SWPF Salt Solution Feed Tank and Solvent Drain Tank PFD (U)*
9. M-M5-J-0007P, *SWPF Solvent Extraction and Acid Scrub PFD (U)*
10. M-M5-J-0008P, *SWPF Solvent Stripping and Caustic Wash PFD (U)*
11. M-M5-J-0009P, *SWPF DSS Coalescer, DSS Hold Tank and Transfer Pumps PFD (U)*
12. M-M5-J-0010P, *SWPF Cold Chemical Makeup and Process Water Tank PFD (U)*
13. M-M5-J-0011P, *SWPF Cold Chemical Makeup Tank PFD (U)*
14. M-M5-J-0012P, *SWPF Solvent Extraction Strip and Scrub Feed Pumps PFD (U)*
15. M-M5-J-0013P, *SWPF Solvent Makeup Tank PFD (U)*
16. M-M5-J-0014P, *SWPF Process Vessel Vent System PFD (U)*
17. M-M5-J-0015P, *SWPF Intermediate Storage Tank, Alpha Sorption Tank-B, Filter Feed Tank-B, and Cleaning Solution Dump Tank-B PFD (U)*
18. M-M5-J-0016P, *SWPF Alpha Sorption Filters FLT-222A/B/C PFD (U)*
19. M-M5-J-0018P, *SWPF Lab Drain Tank, Alpha Sorption Drain Tank and Spent Oxalic Acid Storage Tank PFD (U)*

S.C. DEPT. OF HEALTH AND ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY
APPEAR IN THE CONSTRUCTION PERMIT.)

FINAL WRITTEN APPROVAL FOR OPERATION MUST
BE OBTAINED FROM THIS OFFICE AFTER COM-
PLETION OF CONSTRUCTION.

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

DRAWING INDEX

G-MI-J-0001P

DRAWING No	TITLE
G-MI-J-00001	PROCESS FLOW - DRAWING INDEX
G-MI-J-00002	PROCESS FLOW - LEGEND SHEET
M-M5-J-0001	SIMPLIFIED PROCESS - FLOW SCHEMATIC
M-M5-J-0002	FEED RECEIPT, ALPHA SORPTION TANK-A, FILTER FEED TANK-A, AND CLEANING SOLUTION DUMP TANK-A PFD
M-M5-J-0003	ALPHA SORPTION FILTERS - FLT-102A/B/C PFD
M-M5-J-0004	SLUDGE SOLIDS WASHING FILTER, SLUDGE SOLIDS RECEIPT TANK AND WASH WATER HOLD TANK PFD
M-M5-J-0005	COLD CHEMICAL MAKEUP FOR FILTER CLEANING AND FEED ADJUSTMENT PFD
M-M5-J-0006	SALT SOLUTION FEED TANK AND SOLVENT DRAIN TANK PFD
M-M5-J-0007	SOLVENT EXTRACTION AND ACID SCRUB PFD
M-M5-J-0008	SOLVENT STRIPPING AND CAUSTIC WASH PFD
M-M5-J-0009	DSS COALESCER, DSS HOLD TANK AND TRANSFER PUMPS PFD
M-M5-J-0010	COLD CHEMICAL MAKEUP AND PROCESS WATER TANK PFD
M-M5-J-0011	COLD CHEMICAL MAKEUP TANK PFD
M-M5-J-0012	SOLVENT EXTRACTION STRIP AND SCRUB FEED PUMPS PFD
M-M5-J-0013	SOLVENT MAKEUP TANK PFD
M-M5-J-0014	PROCESS VESSEL VENT SYSTEM PFD
M-M5-J-0015	INTERMEDIATE STORAGE TANK, ALPHA SORPTION TANK-B, FILTER FEED TANK-B, AND CLEANING SOLUTION DUMP TANK-B PFD
M-M5-J-0016	ALPHA SORPTION FILTERS FLT-222A/B/C PFD
M-M5-J-0017	DELETED
M-M5-J-0018	LAB DRAIN TANK, ALPHA SORPTION DRAIN TANK AND SPENT OXALIC ACID STORAGE TANK PFD

NOTES

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
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FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

G MI J 0001P — LATEST REVISION 0A

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	COE
744510	0	03/07/06	CERTIFIED FOR CONSTRUCTION	MJO	DMT	CC	KEB	CMT	TLM
745253	0A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	MDO					

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

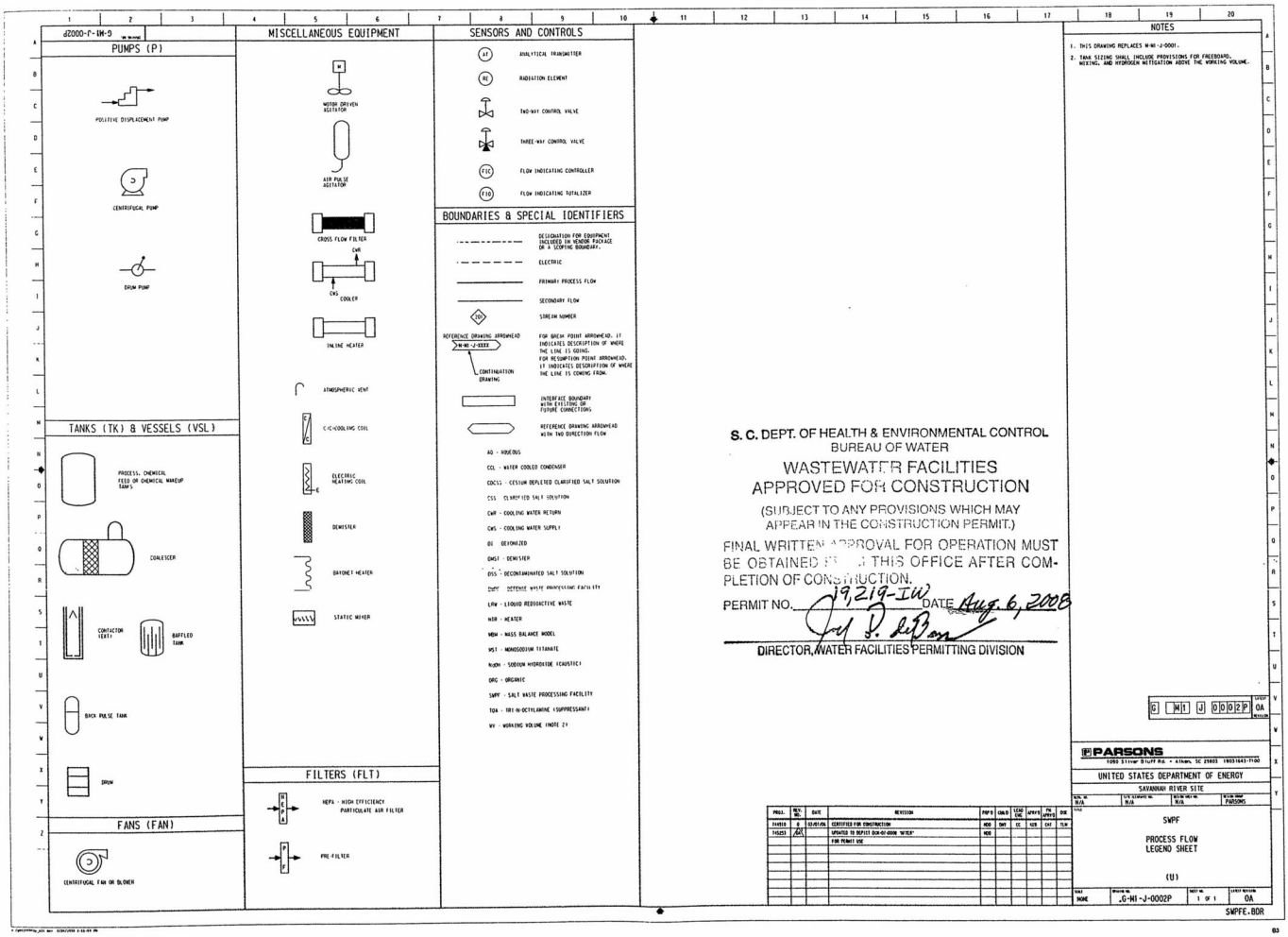
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

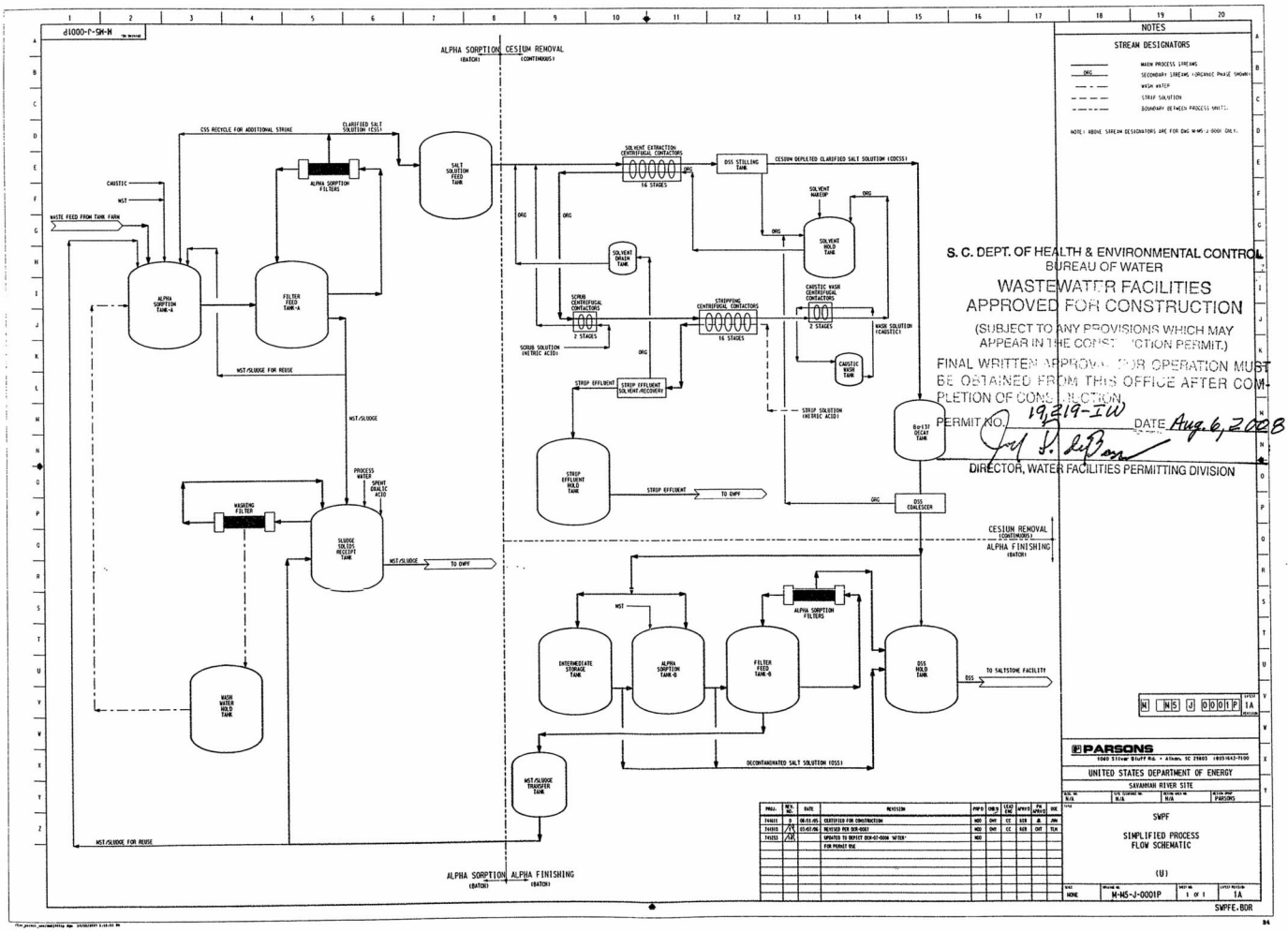
BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
PROCESS FLOW
DRAWING INDEX
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	G-MI-J-0001P	1 OF 1	0A

SWPFE.BDR


PUMPS (P)
POSITIVE DISPLACEMENT PUMP
CENTRIFUGAL PUMP
DRUM PUMP
TANKS (TK) & VESSELS (VSL)
PROCESS, CHEMICAL FEED OR CHEMICAL MAKEUP TANKS
COALESCER
CONTACTOR (JET)
BAFFLED TANK
BACK PULSE TANK
DRUM
FANS (FAN)
CENTRIFUGAL FAN OR BLOWER
MISCELLANEOUS EQUIPMENT
MOTOR DRIVEN AGITATOR
AIR PULSE AGITATOR
CROSS FLOW FILTER
CWR
CWS
COOLER
INLINE HEATER
ATMOSPHERIC VENT
C/C-COOLING COIL
ELECTRIC HEATING COIL
DEMISTER
BAYONET HEATER
STATIC MIXER
FILTERS (FLT)
HEPA - HIGH EFFICIENCY PARTICULATE AIR FILTER
PRE-FILTER
SENSORS AND CONTROLS
AT ANALYTICAL TRANSMITTER
RE RADIATION ELEMENT
TWO-WAY CONTROL VALVE
THREE-WAY CONTROL VALVE
FIC FLOW INDICATING CONTROLLER
FIT FLOW INDICATING TOTALIZER
BOUNDARIES & SPECIAL IDENTIFIERS
DESIGNATION FOR EQUIPMENT INCLUDED IN VENDOR PACKAGE OR A SCOPING BOUNDARY.
ELECTRIC
PRIMARY PROCESS FLOW
SECONDARY FLOW
STREAM NUMBER
REFERENCE DRAWING ARROWHEAD
M-MI-J-0333
CONTINUATION DRAWING
FOR BREAK POINT ARROWHEAD, IT INDICATES DESCRIPTION OF WHERE THE LINE IS GOING. FOR RESUMPTION POINT ARROWHEAD, IT INDICATES DESCRIPTION OF WHERE THE LINE IS COMING FROM.
INTERFACE BOUNDARY WITH EXISTING OR FUTURE CONNECTIONS
REFERENCE DRAWING ARROWHEAD WITH TWO DIRECTION FLOW
AQ - AQUEOUS
CCL - WATER COOLED CONDENSER
CDCSS - CESIUM DEPLETED CLARIFIED SALT SOLUTION
CSS - CLARIFIED SALT SOLUTION
CWR - COOLING WATER RETURN
CWS - COOLING WATER SUPPLY
DI DEIONIZED
DMST - DEMISTER
DSS - DECONTAMINATED SALT SOLUTION
DWPF DEFENSE WASTE PROCESSING FACILITY
LRW - LIQUID RADIOACTIVE WASTE
HTR - HEATER
MBM - MASS BALANCE MODEL
MST - MONOSODIUM TITANATE
NaOH - SODIUM HYDROXIDE (CAUSTIC)
ORG - ORGANIC
SWPF - SALT WASTE PROCESSING FACILITY
TOA - TRI-N-OCTYLAMINE (SUPPRESSANT)
WV - WORKING VOLUME (NOTE 2)
NOTES
1. THIS DRAWING REPLACES M-MI-J-0001.
2. TANK SIZING SHALL INCLUDE PROVISIONS FOR FREEBOARD, MIXING, AND HYDROGEN MITIGATION ABOVE THE WORKING VOLUME.
S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. 19,219-IW DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
PROCESS FLOW LEGEND SHEET
(U)
JC-MI-J-0002P
SWPF-BDR


M-N5-J-00001P
ALPHA SORPTION CESIUM REMOVAL
(BATCH) (CONTINUOUS)
CSS RECYCLE FOR ADDITIONAL STRIKE
CLARIFIED SALT SOLUTION (CSS)
CAUSTIC
WST
WASTE FEED FROM TANK FARM
ALPHA SORPTION FILTERS
SALT SOLUTION FEED TANK
ALPHA SORPTION TANK-A
FILTER FEED TANK-A
SOLVENT EXTRACTION CENTRIFUGAL CONTACTORS
16 STAGES
DSS STILLING TANK
CESIUM DEPLETED CLARIFIED SALT SOLUTION (CDCSS)
SOLVENT MAKEUP
SOLVENT HOLD TANK
SOLVENT DRAIN TANK
SCRUB CENTRIFUGAL CONTACTORS
2 STAGES
STRIPPING CENTRIFUGAL CONTACTORS
16 STAGES
CAUSTIC WASH CENTRIFUGAL CONTACTORS
2 STAGES
WASH SOLUTION (CAUSTIC)
CAUSTIC WASH TANK
SCRUB SOLUTION (NITRIC ACID)
STRIP EFFLUENT
STRIP EFFLUENT SOLVENT RECOVERY
STRIP SOLUTION (NITRIC ACID)
DECAY TANK
STRIP EFFLUENT HOLD TANK
STRIP EFFLUENT
TO DWPF
DSS COALESCER
WST/SLUDGE FOR REUSE
WST/SLUDGE
PROCESS WATER
SPENT OXALIC ACID
WASHING FILTER
SLUDGE SOLIDS RECEIPT TANK
WST/SLUDGE
TO DWPF
WASH WATER HOLD TANK
CESIUM REMOVAL (CONTINUOUS)
ALPHA FINISHING (BATCH)
ALPHA SORPTION FILTERS
WST
INTERMEDIATE STORAGE TANK
ALPHA SORPTION TANK-B
FILTER FEED TANK-B
DSS HOLD TANK
TO SALTSTONE FACILITY
DECONTAMINATED SALT SOLUTION (DSS)
WST/SLUDGE TRANSFER TANK
WST/SLUDGE FOR REUSE
ALPHA SORPTION (BATCH)
ALPHA FINISHING (BATCH)
NOTES
STREAM DESIGNATORS
MAIN PROCESS STREAMS
SECONDARY STREAMS (ORGANIC PHASE SHOWN)
WASH WATER
STRIP SOLUTION
BOUNDARY DEFINES PROCESS UNITS.
NOTE: ABOVE STREAM DESIGNATORS ARE FOR DWG M-N5-J-0001 ONLY.
S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
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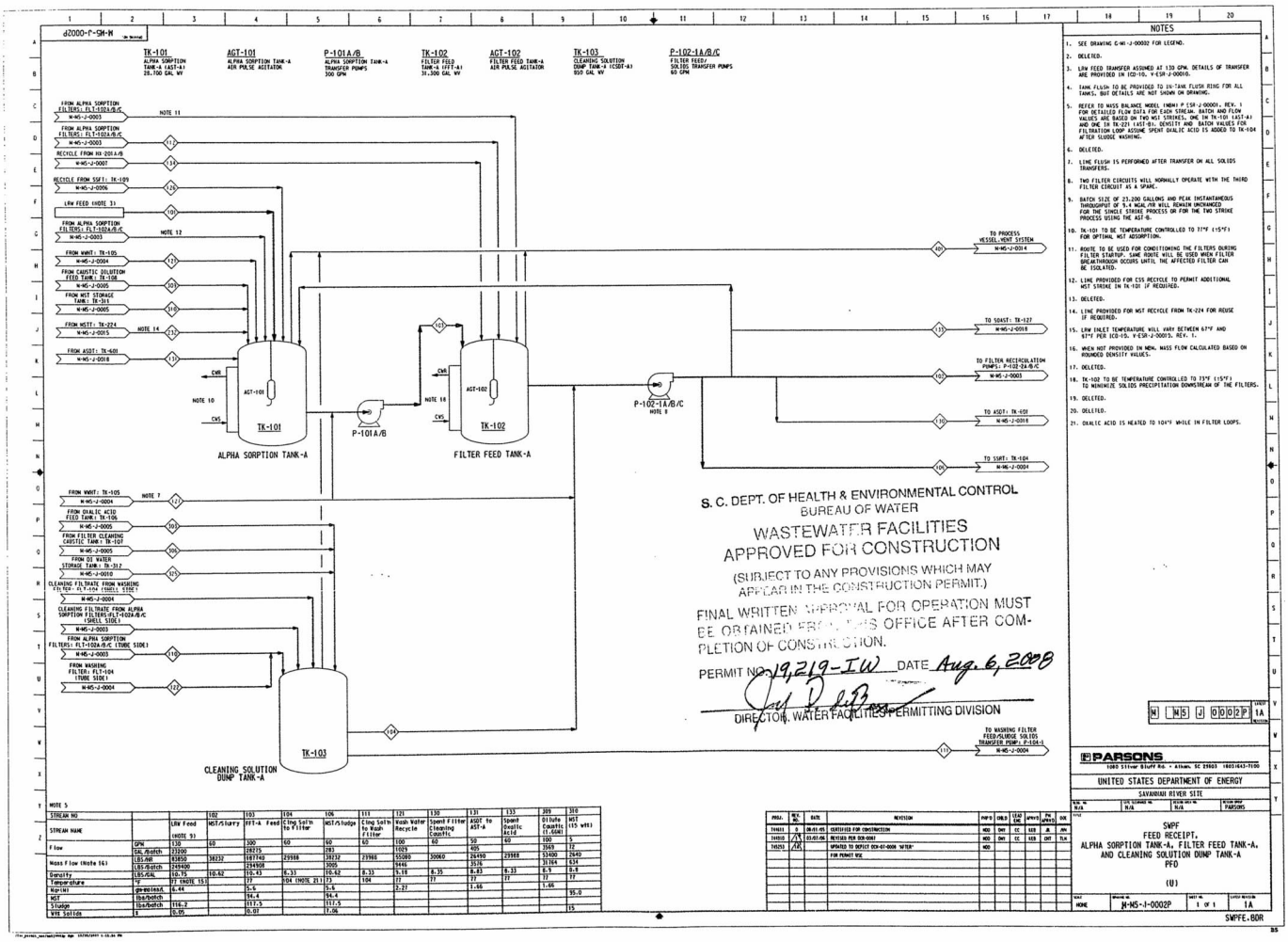
PERMIT NO. 19,219-IW
DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION
M N5 J 0001P SHEET 1A REVISION
PARSONS
1040 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
SIMPLIFIED PROCESS FLOW SCHEMATIC
(U)
SCALE NONE
M-N5-J-0001P
SHEET 1 OF 1
REVISION 1A
SWPFE.BOR

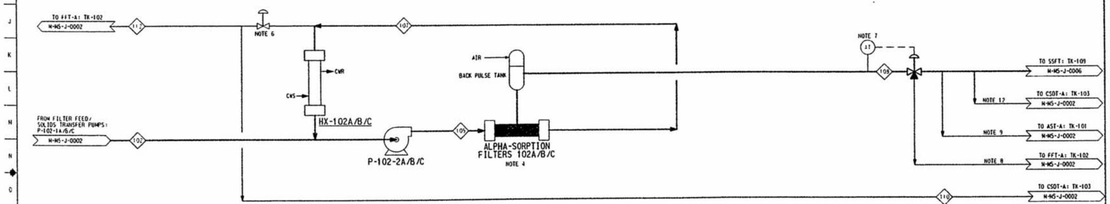


M-M5-J-0003P

HX-102-2A/B/C
FILTER RECIRCULATION COOLERS

P-102-2A/B/C
FILTER RECIRCULATION PUMPS
1300 GPM

FLT-102A/B/C
ALPHA SORPTION FILTERS
225 SQ FT



NOTES

1. SEE DRAWING G-MI-J-00002 FOR LEGEND.
2. DELETED.
3. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B). DENSITY AND BATCH VALUES FOR FILTRATION LOOP ASSUME SPENT OXALIC ACID IS ADDED TO TK-106 AFTER SLUDGE WASHING.
4. EACH FILTER WILL BE DESIGNED FOR 50% OF REQUIRED TOTAL CAPACITY. TWO FILTER CIRCUITS WILL NORMALLY OPERATE WITH THIRD FILTER CIRCUIT AS SPARE.
5. DELETED.
6. PRESSURE RESTRICTION DEVICE TO PROVIDE BACK PRESSURE ON FILTERS.
7. ON-LINE PARTICULATE ANALYZER TO DETECT FILTER BREAKTHROUGH.
8. ROUTE TO BE USED FOR CONDITIONING THE FILTERS DURING FILTER STARTUP. SAME ROUTE WILL BE USED WHEN FILTER BREAKTHROUGH OCCURS UNTIL THE AFFECTED FILTER CAN BE ISOLATED.
9. LINE PROVIDED FOR CSS RECYCLE TO PERMIT ADDITIONAL MST STRIKE IN TK-101 IF REQUIRED.
10. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
11. DELETED.
12. ROUTE TO BE USED DURING FILTER CLEANING.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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[signature]
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

M M5 J 0003P 1A

NOTE 3

STREAM NO		102	105 (Note 4)	107 (Note 4)	108	110	112
STREAM NAME		MST/ Slurry	Filter Feed	Filter Recirc	Filtrate to SSFT	Cleaning Solution Return	Sludge Return to FFT-A
Flow	GPM	60	1300	1289.22	21.56	49.22	98.44
	GAL/Batch				27992		
Mass Flow (Note 10)	LBS/HR	38232	828360	821491	13483		62726
	LBS/Batch				291677		
Density	LBS/GAL	10.62	10.62	10.62	10.42		10.62
Temperature	°F				73	104	
Na+(M)	gm-moles/L				5.6		
MST	lbs/batch						
Wt% Solids	%						

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	NDD	DNT	CC	REB	JR	JMM
744910	1	03/07/06	REVISED PER DCR-0081	NDD	DNT	CC	REB	DNT	TLH
745253	1A		UPDATED TO DEPICT DCN-01-0008 "AFTER" FOR PERMIT USE	NDD					

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

N/A | N/A | N/A | PARSONS

SWPF
ALPHA SORPTION FILTERS
FLT-102A/B/C
PFD

(U)

SCALE: NONE | DRAWING NO.: M-M5-J-0003P | SHEET NO.: 1 OF 1 | LATEST REVISION: 1A

SWPFE.BDR

M-M5-J-0004P

TK-104 SLUDGE SOLIDS RECEIPT TANK (SSRT) 5,200 GAL WV

AGT-104 SLUDGE SOLIDS RECEIPT TANK AIR PULSE AGITATOR

P-104-1 WASHING FILTER FEED/SLUDGE SOLIDS TRANSFER PUMP 150 GPM

P-104-2 WASHING FILTER RECIRCULATION PUMP 1300 GPM

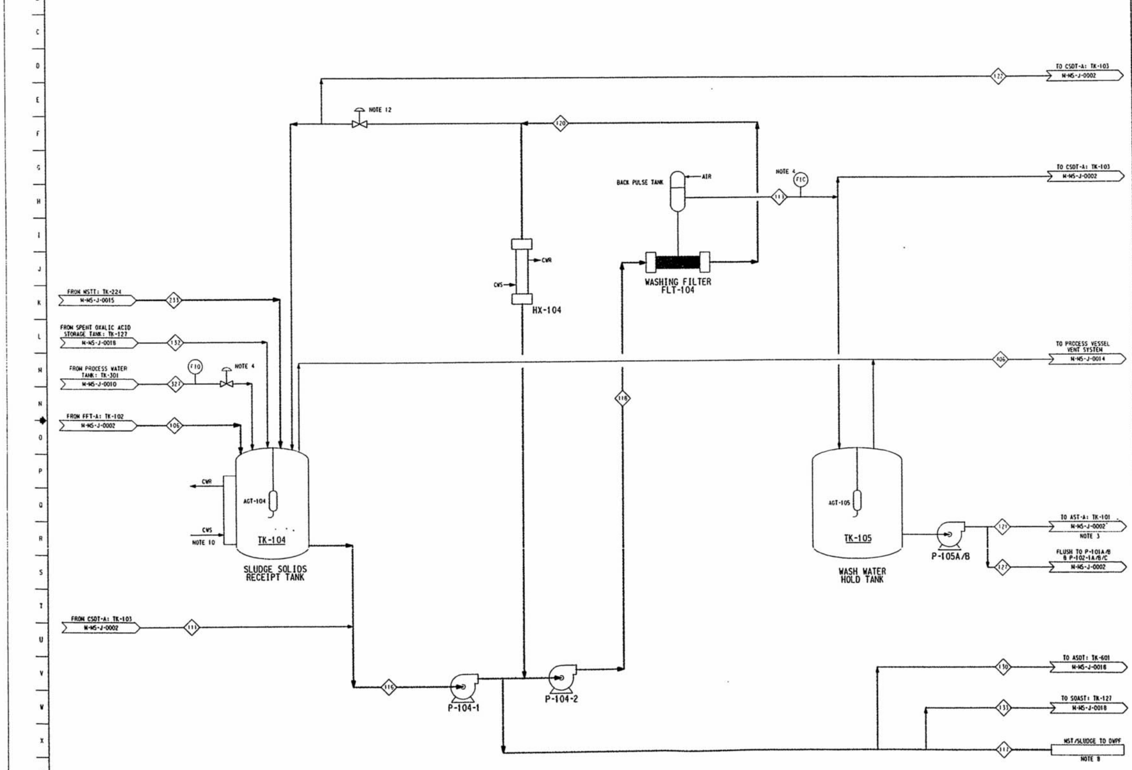
HX-104 WASHING FILTER RECIRCULATION COOLER

FLT-104 WASHING FILTER 225 SQ FT

TK-105 WASH WATER HOLD TANK (WWHT) 11,500 GAL WV

AGT-105 WASH WATER HOLD TANK AIR PULSE AGITATOR

P-105A/B WASH WATER TRANSFER PUMPS 175 GPM



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. WASH WATER RECYCLE FLOW TO TK-101 IS FOR SINGLE BATCH IN AST-A.
4. PROCESS WATER ADDITION RATE IS CONTROLLED TO MATCH WASHING FILTER FILTRATE RATE. GALLONS PER BATCH VALUE FOR THE WASHED SLUDGE SOLIDS IS FOR 7 BATCHES, ALL REQUIRING TWO MST STRIKES, ONE IN TK-101 AND ONE IN TK-221.
5. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV.1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B). DENSITY AND BATCH VALUES FOR FILTRATION LOOP ASSUME SPENT OXALIC ACID IS ADDED POST WASH.
6. DELETED.
7. DELETED.
8. TRANSFERS OF MST/SLUDGE TO DWPF WILL OCCUR IN BATCH SIZES OF APPROXIMATELY 4158 GALLONS. EXACT AMOUNT, TRANSFER RATE, AND FREQUENCY WILL VARY. DETAILS OF TRANSFER ARE PROVIDED IN ICD-10, V-ESR-J-00010.
9. DELETED.
10. TK-104 TO BE TEMPERATURE CONTROLLED TO 77°F (±5°F).
11. DELETED.
12. CONTROL VALVE TO PROVIDE BACK PRESSURE ON FILTER.
13. DELETED.
14. DELETED.
15. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
16. DELETED.
17. TANK FLUSH TO BE PROVIDED TO IN-TANK FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.

NOTE 5

STREAM NO		106	116	117	118	119	120	121	122	127	130	133	233	327
STREAM NAME		MST/Sludge	Washing Filter Circuit Feed	Washed Sludge Solids	Wash Filter Feed	Spent Wash Water	Filter Recirc	Recycle to AST-A (NOTE 3)	Filter Cleaning Return	Line Flush to AST-A and FFT-A	Spent Filter Cleaning Caustic	Spent Oxalic Acid	MST/Sludge to SSRT: TK-104	Water Process
Flow	GPM	60	60	150	1300	10.78	1289.22	100	49.22	175	60	60	60	10.78
	GAL/Batch	283		4158 (Note 4)				1029					192	1029
Mass Flow (Note 15)	LBS/HR	38232	38232	77490	828360	5938	821491	55080		96390	30060	29988	37404	5388
	LBS/Batch	3005		35800				9446					1995	8572
Density	LBS/GAL	10.62	10.62	8.61	10.62	9.18	10.62	9.18		9.18	8.35	8.33	10.39	8.33
Temperature	°F	73		77		77		77			77	77	77	77
Na+(M)	gm-moles/L	5.6		0.5		2.27		2.27					5.24	
Wt% Solids	%	7.06		6.10									5.0	

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	HOO	DNY	CC	KEB	JR	JVN
744910	1	03/07/06	REVISED PER DCR-0087	HOO	DNY	CC	KEB	CNT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0006 "AFTER"	HOO					
			FOR PERMIT USE						

M M5 J 0004P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

BLDG. NO. N/A | SITE CLEARANCE NO. N/A | TEST AREA NO. N/A | DESIGN GROUP PARSONS

SWPF
SLUDGE SOLIDS
WASHING FILTER, SLUDGE SOLIDS RECEIPT TANK AND WASH WATER HOLD TANK
PFD

(U)

SCALE NONE | DRAWING NO. JM-M5-J-0004P | SHEET NO. 1 OF 1 | LATEST REVISION 1A

SWPFE.BDR

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

M-M5-J-0005P

TK-106 OXALIC ACID FEED TANK (0.5 M OXALIC ACID) 3,400 GAL WV

P-106 OXALIC ACID TRANSFER PUMP 50 GPM

HTR-107 FILTER CLEANING CAUSTIC HEATER

TK-107 FILTER CLEANING CAUSTIC TANK (0.02 M NaOH) 850 GAL WV

AGT-107 FILTER CLEANING CAUSTIC TANK AGITATOR

P-107 FILTER CLEANING CAUSTIC TRANSFER PUMP 50 GPM

TK-108 CAUSTIC DILUTION FEED TANK (1.66 M NaOH) 8,000 GAL WV

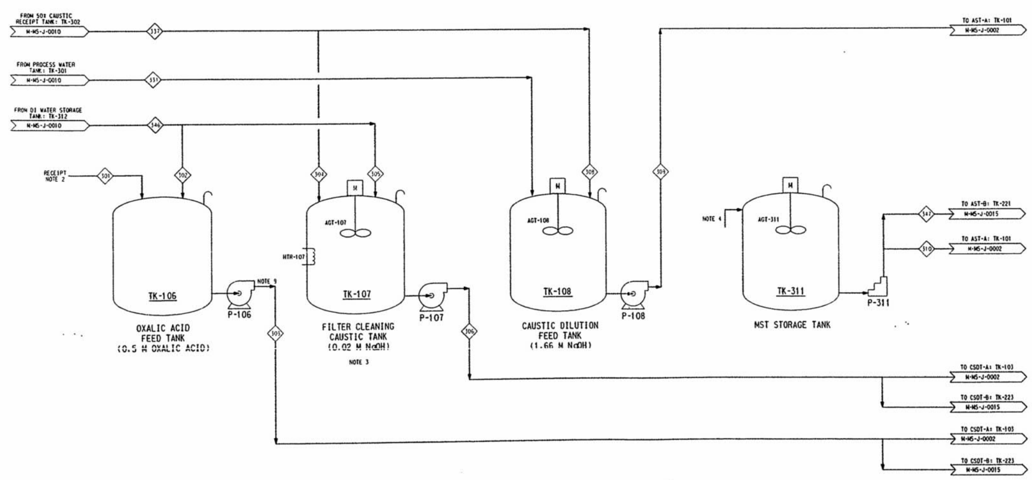
AGT-108 CAUSTIC DILUTION FEED TANK AGITATOR

P-108 CAUSTIC DILUTION TRANSFER PUMP 100 GPM

P-311 MST TRANSFER PUMP MAXIMUM CAPACITY: 5 GPM

TK-311 MST STORAGE TANK 800 GAL WV

AGT-311 MST STORAGE TANK AGITATOR



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. OXALIC ACID WILL BE UNLOADED FROM TANKER TRUCKS OR PORTABLE CONTAINERS.
3. FILTER CLEANING CAUSTIC IS MADE UP ON AS REQUIRED BASIS.
4. MST SLURRY WILL BE TRANSFERRED FROM PORTABLE DRUMS.
5. DELETED.
6. DELETED.
7. WHEN NOT PROVIDED IN MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
8. REFER TO MBM FOR DETAILED FLOW DATA FOR EACH STREAM.
9. RECIRCULATION LINE WILL BE PROVIDED TO TK-106 FOR MIXING.

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WASTEWATER FACILITIES
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PERMIT NO 19219-IW DATE Aug 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 8

STREAM NO		301	302	303	304	305	306	308	309	310	347
STREAM NAME		Oxalic Acid Receipt (0.5M)	DI Water	Oxalic Acid (0.5 M)	50 wt% Caustic	DI Water	Filter Cleaning Caustic (0.02 M)	50 wt% Caustic	Dilute Caustic (1.66 M)	MST (15 wt%)	MST (15 wt%)
Flow	GPM	25	100	50	0.5	100	50	25	100	5	5
	GAL/Batch	3400	829	850	0.89	849	850	698	3569	72	76
Mass Flow (Note 7)	LBS/HR	12750	49980	25500	383	49980	25020	19170	53400	2640	2640
	LBS/Batch	28900	6906	7225	11.35	7072	7089	8920	31764	634	669
Density	LBS/GAL	8.5	8.33	8.5	12.78	8.33	8.34	12.78	8.9	8.8	8.8
Temperature	°F	77	77	77	90	77	104	90	77	77	77
Na+ (M)	gm-moles/L						0.02		1.66		
Water	LBS/HR	12186	49980	24373	192	49980	25000	9585	50075		
MST	LBS/HR									396	396
Oxalic Acid	LBS/HR	564		1127							
NaOH	LBS/HR				192		20	9585	3325		

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744111	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MDD	DMT	CC	REB	JR	JMM
744310	1	03/07/06	REVISED PER DCN-0087	MDD	DMT	CC	REB	CMT	TLM
745253	1A		UPDATED TO DEPICT DCN-07-0006 "AFTER" FOR PERMIT USE	MDD					

M M5 J 0005P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO. N/A | SITE CLEARANCE NO. N/A | DESIGN AREA NO. N/A | DESIGN GROUP PARSONS

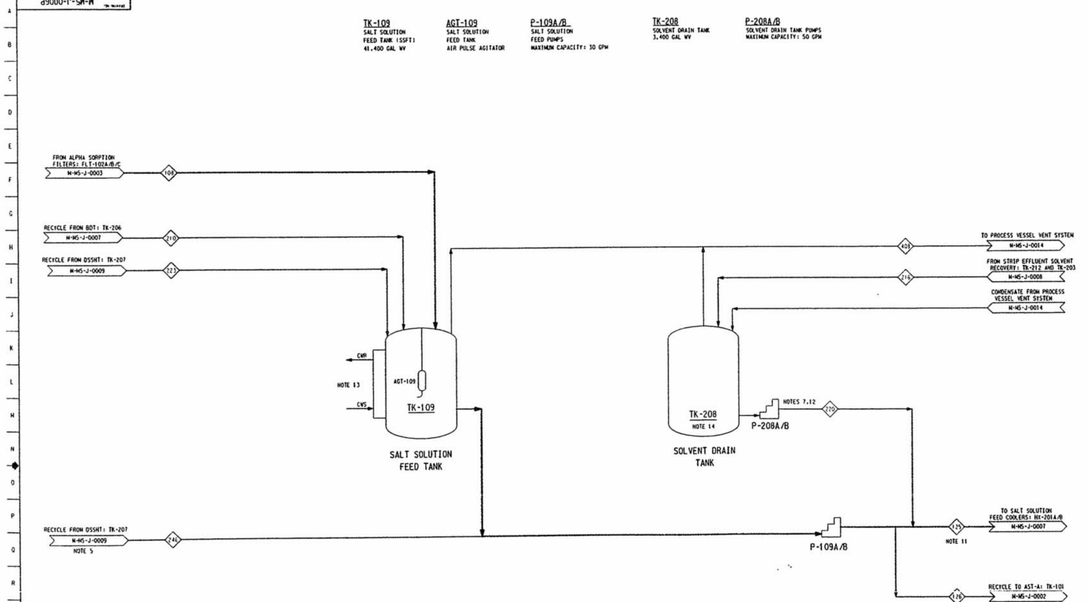
TITLE:
SWPF
COLD CHEMICAL MAKEUP
FOR FILTER CLEANING
AND FEED ADJUSTMENT
PFD
(U)

SCALE NONE | DRAWING NO. M-M5-J-0005P | SHEET NO. 1 OF 1 | LATEST REVISION 1A

SWPFE.BDR

38

M-M5-J-0006P



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES. ONE IN TK-101 (AST-A) AND ONE IN THE TK-221 (AST-B).
4. DELETED.
5. LINE PROVIDED FOR RESTART OF CSSX PROCESS WHEN REQUIRED. FEEDING DSS TO EXTRACTION CONTACTORS AT STARTUP PREVENTS CESIUM FROM FLOWING THROUGH THE CONTACTORS TO TK-207 (DSSHT).
6. DELETED.
7. SOLVENT DRAIN TANK CONTENTS ARE PUMPED TO INLET OF THE CSSX SYSTEM. THE CONTENTS IN TK-208 COULD POTENTIALLY CONTAIN HIGH CESIUM.
8. DELETED.
9. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
10. TANK FLUSH TO BE PROVIDED TO IN-TANK FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
11. TK-109 OUTLET TEMPERATURE OF 73°F ASSUMES CONTINUOUS OPERATION OF ASP AND CSSX.
12. RECIRCULATION LINE WILL BE PROVIDED TO TK-208 FOR MIXING.
13. TK-109 TO BE TEMPERATURE CONTROLLED TO 73°F (±5°F).
14. ALTERNATE FLOW PATH EXISTS TO TK-208 FROM TK-235, LAB DRAIN TANK, IF TK-235 CONTAINS SOLVENT.
15. INTERMITTENT LOW FLOW RECYCLED TO PROCESS. PUMP SIZED FOR TANK MIXING.

S.C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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PERMIT NO. 19,219-IW DATE August 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 3

STREAM NO		108	125	126	220
STREAM NAME		Filtrate to SSFT	Clarified Salt Solution	Recycle to AST-A	Recovered Solvent
Flow	GPM	21.56	21.56	30	0.5 (Note 15)
Mass Flow (Note 9)	LBS/HR	13483	13483	18756	
Density	LBS/GAL	10.42	10.42	10.42	
Temperature	°F	73	73	73	
Na+(M)	gm-moles/L	5.6	5.6	5.6	

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOC
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	NDD	CMT	CC	KEE	JL	JWN
744810	1	03/07/06	REVISED PER DCR-0087	NDD	CMT	CC	KER	CMT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	NDD					

M M5 J 0006P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
SALT SOLUTION FEED TANK
AND SOLVENT DRAIN TANK
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0006P	1 OF 1	1A

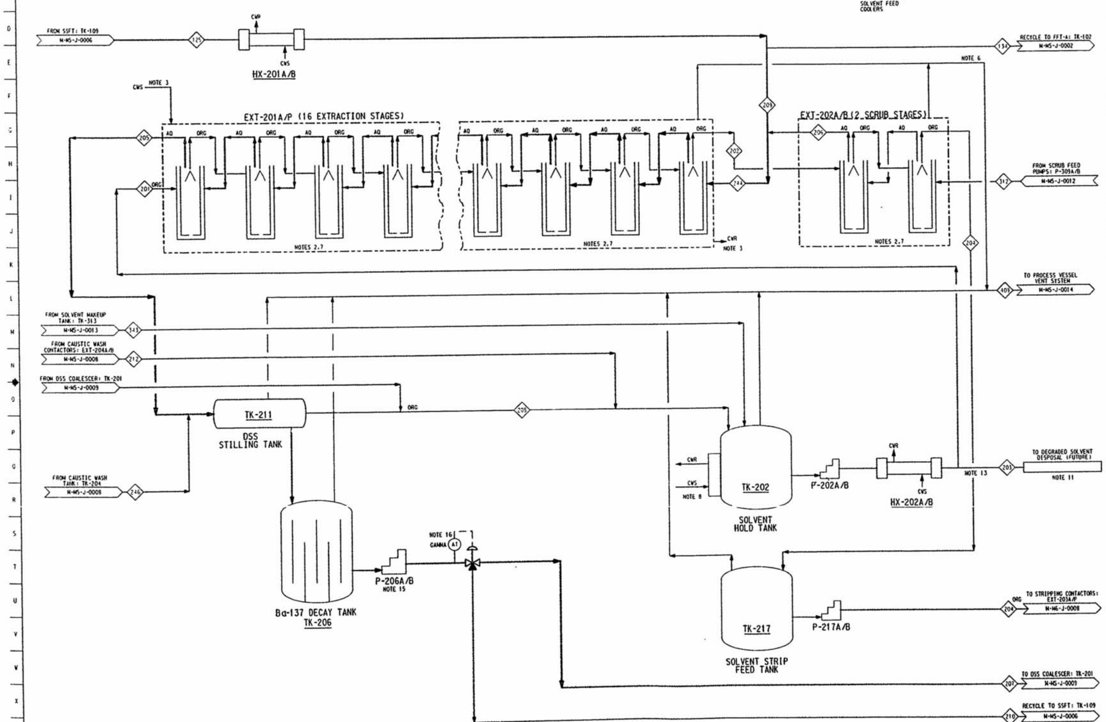
SWPFE.BDR

M-M5-J-0007P

TK-211 DSS STILLING TANK 235 GAL WV	HX-201A/B SALT SOLUTION FEED COOLERS	TK-206 Ba-137 DECAY TANK (BDT) 1,200 GAL WV	P-206A/B Ba-137 DECAY TANK TRANSFER PUMPS MAXIMUM CAPACITY: 30 GPM	EXT-201A/P SOLVENT EXTRACTION CONTACTORS 30 GPM HYDRAULIC CAPACITY	TK-202 SOLVENT HOLD TANK (SHT) 500 GAL WV	TK-217 SOLVENT STRIP FEED TANK 50 GAL WV	P-202A/B SOLVENT FEED PUMPS MAXIMUM CAPACITY: 40 GPM	P-217A/B SOLVENT STRIP FEED PUMPS MAXIMUM CAPACITY: 15 GPM

EXT-202A/B
SCRUB CONTACTORS
30 GPM HYDRAULIC CAPACITY

HX-202A/B
SOLVENT FEED COOLERS



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. CONTACTOR DRAINS NOT SHOWN.
3. SOLVENT EXTRACTION STAGES TO BE TEMPERATURE CONTROLLED TO 73°F(±5°F) FOR OPTIMAL SOLVENT EXTRACTION. COOLING WATER SUPPLY AND RETURN WILL BE PROVIDED FOR EACH CONTACTOR.
4. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALVES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
5. DELETED.
6. EACH CONTACTOR OUTLET STREAM HAS AN INDEPENDENT VENT CONNECTED TO A COMMON HEADER.
7. LINES WILL BE PROVIDED TO ALLOW FLUSHING OF CONTACTORS (NOT SHOWN).
8. TK-202 TO BE TEMPERATURE CONTROLLED TO 73°F (±5°F) FOR OPTIMUM OPERATION.
9. DELETED.
10. DELETED.
11. REFER TO ICD-5, V-ESR-J-00005, FOR DISPOSAL DETAILS.
12. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
13. RECIRCULATION LINE WILL BE PROVIDED TO TK-202 FOR MIXING.
14. TANK FLUSH TO BE PROVIDED FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWINGS.
15. PUMPS P-206A/B OPERATE TO MAINTAIN CONSTANT LEVEL IN TK-206.
16. HIGH GAMMA READING REDIRECTS THE CDCSS FLOW BACK TO SSFT (TK-109).

NOTE 4

STREAM NO.		125	134	201	202	203	204	205	206	207	208	209	210	244
STREAM NAME		Clarified Salt Solution	Recycle to FFT-A	Solvent to Extraction	Extract	Degraded Solvent (Future)	Organic Scrub Effluent	CDCSS	Aqueous Scrub Effluent	CDCSS	Recovered Solvent	Cooled Clarified Salt Soln	Ba-137 Decay Tank Recycle to SSFT	Extraction Feed
Flow	GPM	21.56	30	7.20	7.20	7.20	7.20	23.00	1.44	23.00	1.10E-03	21.56	23.00	22.99
Mass Flow (Note 12)	LBS/HR	13483	18756	3000	3000		3000	14203	719	14203	0.48	13483	14203	14202
Density	LBS/GAL	10.42	10.42	6.93	6.93		6.93	10.29	8.34	10.29	6.93	10.42	10.29	10.29
Temperature	°F	73	73	73	73		73	73	77	73	73	73	73	73
Na+(M)		5.6	5.6					5.25		5.25		5.6	5.25	5.25
Extractant, 0.007M	LBS/HR			29.01	29.01		29.01							
Modifier, 0.75M	LBS/HR			914.77	914.77		914.77							
Suppressant (TOA) 0.003M	LBS/HR			3.82	3.82		3.82							
ISOPAR	LBS/HR			2052	2052		2052							

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MDO	DMT	CC	KEB	JR	JMM
744910	1	03/07/06	REVISED PER DCR-0087	MDO	DMT	CC	KEB	CMT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	MDO					

M M5 J 0007P LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

N/A	N/A	N/A	PARSONS

SWPF
SOLVENT EXTRACTION
AND ACID SCRUB
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0007P	1 OF 1	1A

SWPFE.BDR

B10

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION
PERMIT NO. 19,214-IW DATE Aug 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

M-M5-J-0008P

TK-212 STRIP EFFLUENT STILLING TANK 29 GAL WV

TK-215 STRIP EFFLUENT PUMP TANK 50 GAL WV

P-215A/B STRIP EFFLUENT PUMP TANK PUMPS MAXIMUM CAPACITY: 10 GPM

TK-203 STRIP EFFLUENT COALESCER

EXT-203A/P STRIPPING CONTACTORS 30 GPM HYDRAULIC CAPACITY

HTR-217A/B SOLVENT HEATERS

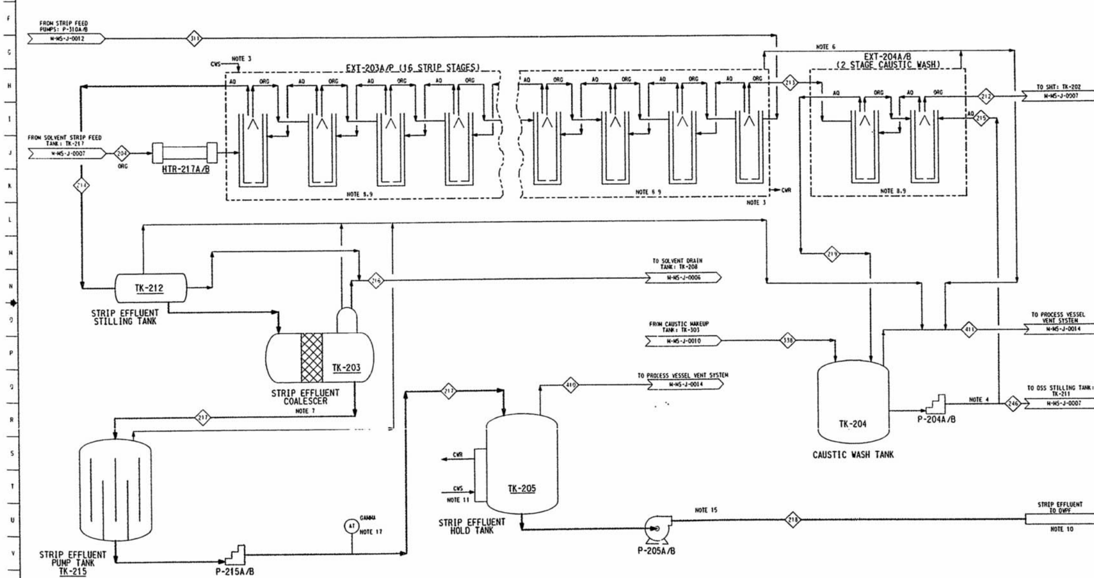
TK-205 STRIP EFFLUENT HOLD TANK (SEHT) 16,600 GAL WV

P-205A/B STRIP EFFLUENT TRANSFER PUMPS 300 GPM

EXT-204A/B CAUSTIC WASH CONTACTORS 30 GPM HYDRAULIC CAPACITY

TK-204 CAUSTIC WASH TANK 400 GAL WV

P-204A/B CAUSTIC WASH TANK PUMPS MAXIMUM CAPACITY: 10 GPM



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. VALVE POSITIONS SHOWN REPRESENT SYSTEM CONFIGURATION DURING STRIPPING OPERATION.
3. STRIP STAGES TO BE TEMPERATURE CONTROLLED TO 91°F (±5°F) FOR OPTIMAL SOLVENT STRIPPING. COOLING WATER SUPPLY AND RETURN PROVIDED FOR EACH CONTACTOR.
4. SYSTEM WILL NORMALLY RECIRCULATE. ON LOW pH INDICATION P-204A/B WILL SEND TK-204 CONTENTS TO TK-211. AFTER TRANSFER, TK-204 WILL BE REFILLED WITH CAUSTIC FROM TK-303.
5. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES. ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
6. EACH CONTACTOR OUTLET STREAM HAS AN INDEPENDENT VENT CONNECTED TO A COMMON HEADER.
7. COALESCER DESIGNED TO REMOVE SOLVENT TO 50 PPM IN AQUEOUS PHASE.
8. LINES WILL BE PROVIDED TO ALLOW FLUSHING OF CONTACTORS (NOT SHOWN).
9. CONTACTOR DRAINS NOT SHOWN.
10. TRANSFER OF STRIP EFFLUENT TO DWPF WILL OCCUR IN BATCH SIZES OF APPROXIMATELY 12,800 GALLONS. EXACT AMOUNT, TRANSFER RATE, AND FREQUENCY WILL VARY. DETAILS OF TRANSFER ARE PROVIDED IN ICD-10, V-ESR-J-00010.
11. TK-205 TO BE TEMPERATURE CONTROLLED TO 77°F (±5°F) FOR OPTIMUM OPERATION.
12. DELETED.
13. DELETED.
14. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
15. RECIRCULATION LINE WILL BE PROVIDED TO TK-205 FOR MIXING.
16. TANK FLUSH TO BE PROVIDED FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
17. HIGH CESIUM CONCENTRATION EXCEEDING SAFETY BASIS STOPS TRANSFER.

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PERMIT NO. 19,219-IW DATE Aug-6-2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 5

STREAM NO		212	213	214	215	216	217	218	219	246
STREAM NAME		Organic Wash Effluent	Organic Strip Effluent	Aqueous Strip Effluent	Aqueous Wash Feed	Recovered Solvent (trace)	Coalescer Aqueous Outlet	Strip Effluent to DWPF (Note 10)	Aqueous Wash Effluent (Note 4)	Spent Caustic Wash
Flow	GPM	1.20	7.20	1.44	1.44	7.20E-05	1.44	150	1.44	5
Mass Flow (Note 14)	LBS/HR	3000	3000	720	719	0.03	720	75150	719	2502
Density	LBS/GAL	6.93	6.93	8.35	8.34	6.93	8.35	8.35	8.34	8.34
Temperature	°F	91	91	91	77		91	77	77	77
Na+(M)					0.01					
Extractant, 0.007M	LBS/HR	29.01	29.01							
Modifier, 0.75M	LBS/HR	914.77	914.77							
SUPPRESSANT (TOA) 0.003M	LBS/HR	3.82	3.82							
ISOPAR	LBS/HR	2052	2052							

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOC
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MOO	DMY	CC	REB	JL	JMM
744910	1	03/07/06	REVISED PER DCR-0087	MOO	DMY	CC	REB	CNT	TLH
745253	1A		UPDATED TO DEPICT DCR-07-0006 "AFTER" FOR PERMIT USE	MOO					

M N5 J 0008P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

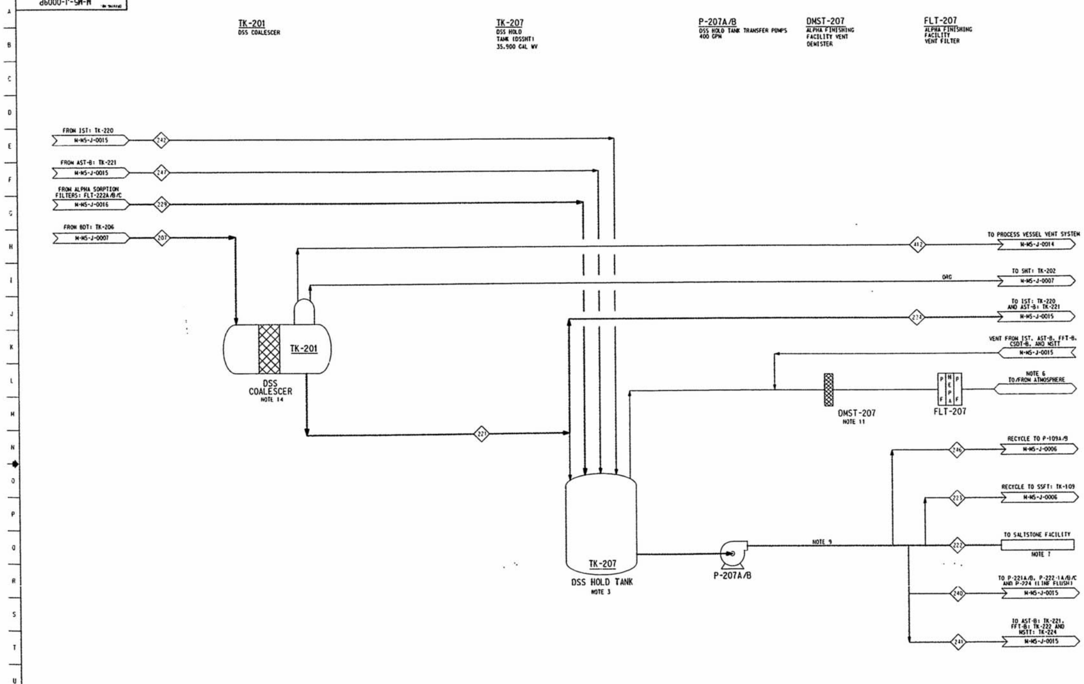
SWPF
SOLVENT STRIPPING
AND
CAUSTIC WASH
PFD

(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0008P	1 OF 1	1A

SWPFE.BDR

M-M5-J-0009P



NOTE 5

STREAM NO		207	221	222	223	224	229	240	241	246
STREAM NAME		CDCSS	CDCSS	DSS to Saltstone	DSS Hold Tank Recycle to SSFT	Ba-137 Decay Tank Effluent	To DSSHT	Line Flush To AST-B And FFT-B	Tank Flush To AST-B And FFT-B	Recycle for CSSX Startup
Flow	GPM	23.00	22.99	150	150	22.99	22.90	400	400	21.56
Mass Flow (Note 10)	LBS/HR	14203	14202	92610	92610	14202	14141			13311
Density	LBS/GAL	10.29	10.29	10.29	10.29	10.29	10.29			10.29
Temperature	°F	73	77	77	77	77	77			77
Na+(M)	gm-moles/L	5.25	5.25	5.24	5.24	5.25	5.24			5.24

NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. DSS HOLD TANK SIZED FOR 26 HOUR STORAGE.
4. DELETED
5. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
6. THE ALPHA FINISHING FACILITY IS EQUIPPED WITH A PASSIVE VENTILATION SYSTEM.
7. TRANSFER RATE CAN BE PERFORMED AT 150 GPM. FLOW TO SALTSTONE IS CONTROLLED AT SALTSTONE FACILITY TO MAINTAIN 100 GPM FLOW. TRANSFER TO SALTSTONE WILL OCCUR IN BATCH SIZES OF APPROXIMATELY 33,000 GALLONS. EXACT AMOUNT, TRANSFER RATE AND FREQUENCY WILL VARY. DETAILS OF TRANSFER ARE PROVIDED IN ICD-10, V-ESR-J-00010.
8. DELETED.
9. RECIRCULATION LINE WILL BE PROVIDED TO TK-207 FOR MIXING.
10. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
11. DRAIN PROVIDED TO ALPHA FINISHING DRAIN TANK, TK-228.
12. DELETED.
13. TANK FLUSH TO BE PROVIDED FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
14. COALESCER SIZING BASED ON 100 PPM OF SOLVENT IN AQUEOUS STREAM. COALESCER DESIGNED TO REMOVE SOLVENT TO 50 PPM IN AQUEOUS PHASE.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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FINAL WRITTEN APPROVAL FOR OPERATION MUST
BE OBTAINED FRO... 'S OFFICE AFTER COM-
PLETION OF CONSTRUCTION.
PERMIT NO. 19,219-IW DATE Aug 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

M M5 J 0009P 1A

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MOD	DHY	CC	REB	JL	JVM
744910	1	03/07/06	REVISED PER DCR-0087	MOD	DHY	CC	REB	CKT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0006 "AFTER" FOR PERMIT USE	MOD					

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

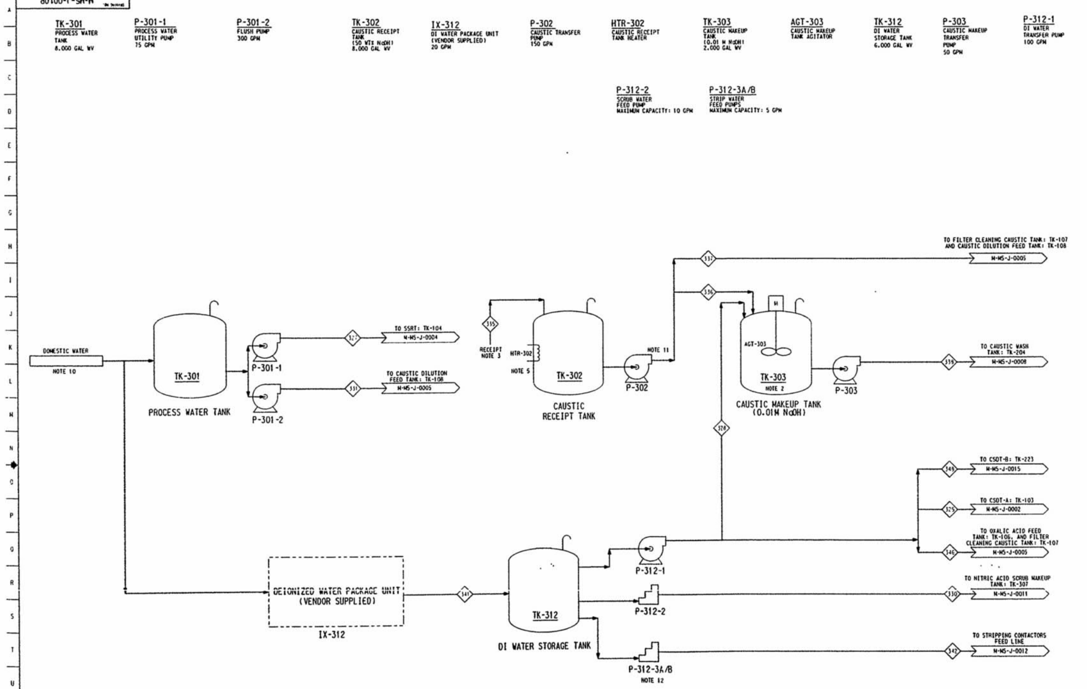
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
DSS COALESCER,
DSS HOLD TANK AND
TRANSFER PUMPS
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0009P	1 OF 1	1A

SWPFE.BDR



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. CAUSTIC MAKEUP IS A BATCH OPERATION.
3. CAUSTIC WILL BE RECEIVED IN TANKER TRUCKS OR PORTABLE CONTAINERS.
4. DELETED.
5. HEATER USED TO KEEP 50 WT% CAUSTIC AT 90°F.
6. DELETED.
7. DELETED.
8. WHEN NOT PROVIDED IN MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
9. REFER TO MBM FOR DETAILED FLOW DATA FOR EACH STREAM.
10. REFER TO ICD-2, V-ESR-J-00002, FOR DETAILS.
11. RECIRCULATION LINE WILL BE PROVIDED TO TK-302 FOR MIXING.
12. PUMP FLOW RATES CONTROLLED BY STRIP FEED CONDUCTIVITY (M-M5-J-0012).

NOTE 9

STREAM NO		325	327	328	330	331	335	336	337	338	341	342	346	348
STREAM NAME		DI Water	Process Water	DI Water	DI Water	Process Water	50 wt% Caustic Receipt	50 wt% Caustic	50 wt% Caustic	Dilute Caustic	DI Water	DI Water	DI Water	DI Water
Flow	GPM	100	10.78	100	10	300	50	0.5	25	50	20	1.41	100	100
	GAL/Batch		1029	1999		7302	8000	1.05		400				
Mass Flow (Note 8)	LBS/HR	49980	5388	49980	4998	149940	38340	383	19170	25020	9996	704	49980	49980
	LBS/Batch		8572	16652		60826	102240	13.4		3336				
Density	LBS/GAL	8.33	8.33	8.33	8.33	8.33	12.78	12.78	12.78	8.34	8.33	8.33	8.33	8.33
Temperature	°F	77	77	77	77	77	77	90	90	77	77	77	77	77
Water	LBS/HR	49980	5388	49980	4998	149940	19170	192	25010	25010	9996	704	49980	49980
NaOH	LBS/HR						19170	192	10	10				

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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PERMIT NO. 19,214-IW DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOC
744611	0	08/01/05	CERTIFIED FOR CONSTRUCTION	MDO	DMY	CC	BEB	JR	JWK
744910	1	03/07/06	REVISED PER DCR-0087	MDO	DMY	CC	BEB	CHT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	MDO					

M-M5-J-0010P LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

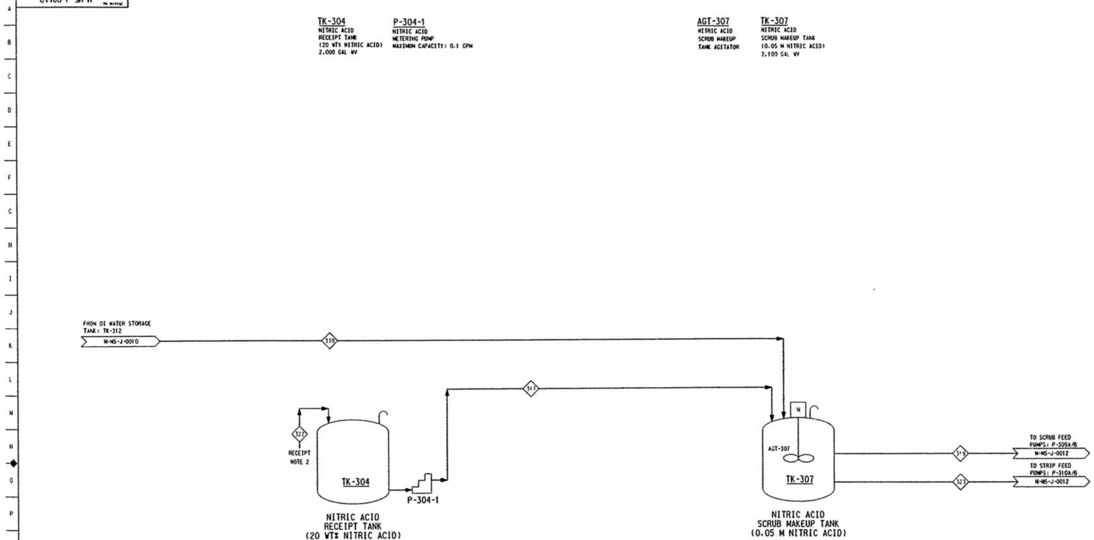
BLDG. NO. N/A | SITE CLEARANCE NO. N/A | DESIGN AREA NO. N/A | DESIGN GROUP PARSONS

SWPF
COLD CHEMICAL MAKEUP
AND
PROCESS WATER TANK
PFD
(U)

SCALE NONE | DRAWING NO. M-M5-J-0010P | SHEET NO. 1 OF 1 | LATEST REVISION 1A

SWPFE.BDR

M-M5-J-0011P



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. NITRIC ACID WILL BE UNLOADED FROM TANKER TRUCKS OR PORTABLE CONTAINERS.
3. DELETED.
4. WHEN NOT PROVIDED IN MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.

S.C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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PERMIT NO. 19219-IW DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 4

STREAM NO		317	319	322	323
STREAM NAME		Nitric Acid (20 wt%)	Nitric Acid (0.05 M)	Nitric Acid Receipt (20 wt%)	Nitric Acid (0.05 M)
Flow	GPM	0.1	1.44	25	0.029
	GAL/BATCH	24		2000	
Mass Flow (Note 4)	LBS/HR	56	719	13950	14.51
	LBS/BATCH	223		18600	
Density	LBS/GAL	9.30	8.34	9.30	8.34
Temperature	°F	77	77	77	77
Water	LBS/HR	45	716.73	11160	14.46
HNO3	LBS/HR	11	2.27	2790	0.05

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	NDO	DMT	CC	REB	JL	JWN
744910	1	03/07/06	REVISED PER DCN-0007	NDO	DMT	CC	REB	CHT	TLH
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	NDO					

M M5 J 0011P 1A

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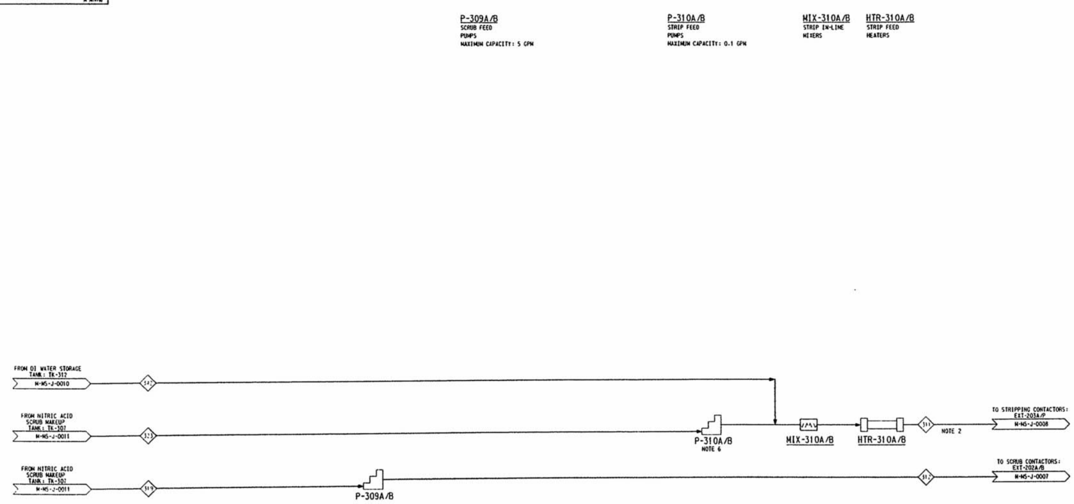
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

TITLE
SWPF
COLD CHEMICAL MAKEUP TANK
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0011P	1 OF 1	1A

SWPFE.BDR
B14



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. TEMPERATURE OF STRIP SOLUTION CONTROLLED TO 91°F (± 5°F). FOR OPTIMAL SOLVENT STRIPPING.
3. DELETED.
4. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES. ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
5. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
6. PUMP FLOW RATES CONTROLLED BY STRIP FEED CONDUCTIVITY.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
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PERMIT NO. 19,219-IW DATE Aug. 6, 2008
[signature]
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 4

STREAM NO		311	312
Stream Name		Strip Feed (0.001 M HNO3)	Scrub Feed (0.05 M HNO3)
Flow	GPM	1.44	1.44
Mass Flow (NOTE 5)	LBS/HR	719	719
Density	LBS/GAL	8.34	8.34
Temperature	°F	91	77
Water	LBS/HR	718.955	716.73
HNO3	LBS/HR	0.045	2.27

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MDO	DMT	CC	KEB	JL	JVN
744910	1	03/07/06	REVISED PER DCR-0087	MDO	DMT	CC	KEB	CMT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	MDO					

M M5 J 0012P LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

N/A | N/A | N/A | PARSONS

SWPF
SOLVENT EXTRACTION
STRIP AND SCRUB FEED PUMPS
PFD
(U)

SCALE: NONE | DRAWING NO.: M-M5-J-0012P | SHEET NO.: 1 OF 1 | LATEST REVISION: 1A

SWPFE.BDR

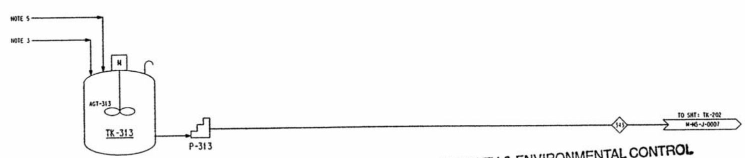
AGT-313
SOLVENT MAKEUP
TANK AGITATOR

TK-313
SOLVENT MAKEUP TANK
50 GAL WV

P-313
SOLVENT MAKEUP
TRANSFER PUMP
MAXIMUM CAPACITY: 5 GPM

NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. EXTRACTANT, SUPPRESSANT (TOA), AND MODIFIER CAN BE ADDED (IF NEEDED) IN SMALL QUANTITIES TO SOLVENT MAKEUP TANK.
4. WHEN NOT PROVIDED IN MASS BALANCE MODEL (MBM) P-ESR-J-00001 REV. 1, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
5. SOLVENT WILL BE TRANSFERRED FROM PORTABLE DRUMS.



S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
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PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 4

STREAM NO		343
STREAM NAME		Solvent
Flow	GPM	5
Mass Flow (NOTE 4)	LBS/HR	2079
Density	LBS/GAL	6.93
Temperature	°F	77

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MOO	DMT	CC	REB	JR	JWH
744910	1	03/07/06	REVISED PER DCR-0087	MOO	DMT	CC	REB	CMT	TLH
745253	1A		UPDATED TO DEPICT DCN-07-0006 "AFTER" FOR PERMIT USE	MOO					

M M5 J 0013P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
SOLVENT MAKEUP TANK
PFD

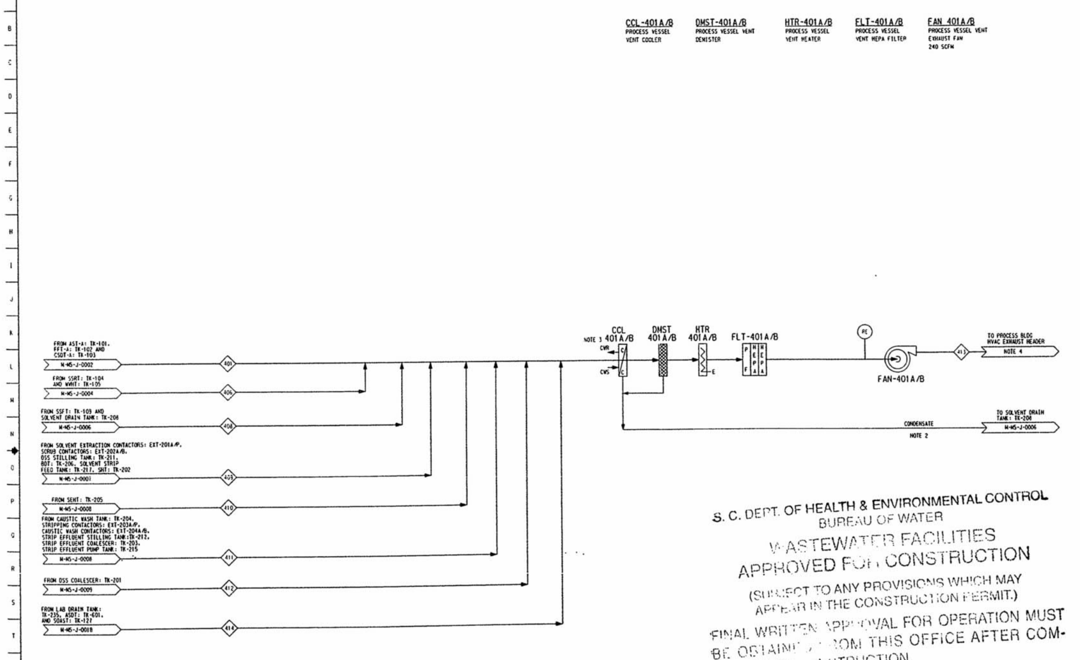
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0013P	1 OF 1	1A

SWPFE.BDR

B16

M-M5-J-0014P



NOTES

1. SEE DRAWING G-MI-J-00002 FOR LEGEND.
2. NO FLOW IS PROVIDED FOR THIS STREAM AS THE FLOW RATE OF THE CONDENSATE STREAM WILL BE VERY LOW.
3. COOLER CCL-401A/B OUTLET TEMPERATURE CONTROLLED TO 68°F AND HEATER HTR-401A/B OUTLET TEMPERATURE CONTROLLED AT 95°F TO PREVENT ANY FREE MOISTURE FROM REACHING THE HEPA FILTER.
4. THIS STREAM CORRESPONDS TO SWPF COMPOSITE AIR FLOW DIAGRAM M-MW-J-0001. THE MATCHING STREAM IS SHOWN COMING FROM P&ID M-M6-J-0199.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. 19,219-IW DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

STREAM NO		401	406	408	409	410	411	412	413	414
NOTES										
STREAM NAME										
FLOW	SCFM	75	20	30	30	10	35	5	240	35
TEMP	°F	75	75	75	75	75	75	75	95	75

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MDO	DMY	CC	REB	JR	JMM
744910	1	03/07/06	REVISED PER DCR-0087	MDO	DMY	CC	REB	CMT	TLN
745253	1A		UPDATED TO DEPICT DCR-07-0008 "AFTER" FOR PERMIT USE	MDO					

M M5 J 0014P 1A

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UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

N/A | N/A | N/A | PARSONS

SWPF
PROCESS VESSEL VENT SYSTEM
PFD

(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0014P	1 OF 1	1A

SWPFE.BDR

M-M5-J-0015P

TK-220 INTERMEDIATE STORAGE TANK (IST) 30,300 GAL WV

P-220A/B INTERMEDIATE STORAGE TRANSFER PUMPS 400 GPM

TK-221 ALPHA SORPTION TANK-B (AST-B) 30,700 GAL WV

TK-223 CLEANING SOLUTION DUMP TANK-B (CSDT-B) 850 GAL WV

TK-222 FILTER FEED TANK-B (FFT-B) 31,900 GAL WV

P-222-1A/B/C FILTER FEED/ SOLIDS TRANSFER PUMPS 60 GPM

TK-224 MST/SLUDGE TRANSFER TANK (MSTT) 1,600 GAL WV

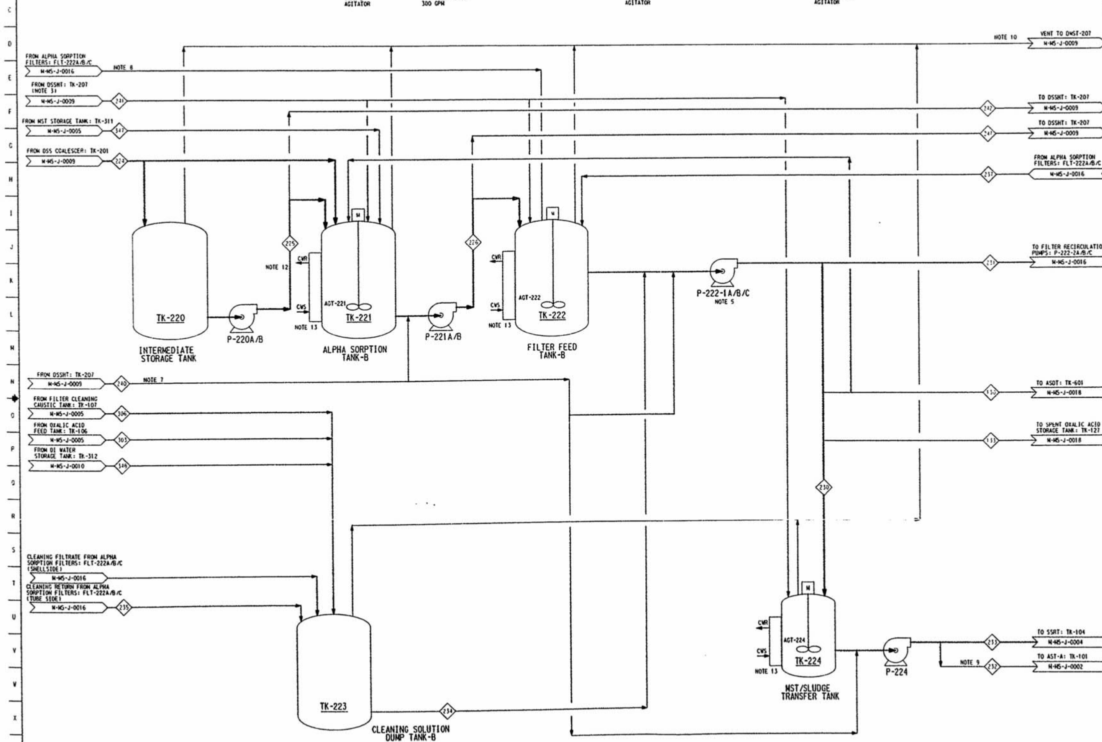
P-224 MST/SLUDGE TRANSFER PUMP 60 GPM

AGT-221 ALPHA SORPTION TANK-B AGITATOR

P-221A/B ALPHA SORPTION TANK-B TRANSFER PUMPS 300 GPM

AGT-222 FILTER FEED TANK-B AGITATOR

AGT-224 MST/SLUDGE TRANSFER TANK AGITATOR



NOTE 4

STREAM NO		130	133	224	225	226	230	231	232	233	234	242	247	347
STREAM NAME		Spent Filter Cleaning Caustic	Spent Oxalic Acid	Ba-137 Decay Tank Effluent	AST-B Feed	Feed to FFT-B	To MST/Sludge Transfer Tank	MST/ Slurry	MST/Sludge To AST-A: TK-101	MST/Sludge To SSRT: TK-104	Cleaning Solution to Filter	Sampled DSS	Sampled DSS	MST (15 wt%)
Flow	GPM	60	60	22.99	300	300	60	60	60	60	60	300	300	5
	GAL/Batch				29860	29936	192			192				76
Mass Flow (NOTE 11)	LBS/HR	30060	29988	14202	185220	185220	37404	37404	37404	37404	29988	185220	185220	2640
	LBS/Batch				307259	308041	1995			1995				669
Density	LBS/GAL	8.35	8.33	10.29	10.29	10.29	10.39	10.39	10.39	10.39	8.33	10.29	10.29	8.8
Temperature	°F	77	77	77	77	77	77		77	77	104	77	77	77
Na+(N)	gm-moles/L			5.25	5.25	5.24	5.24		5.24	5.24		5.25	5.25	
MST	lbs/batch					100	100			100				100
Wt% Solids	%					0.03	5.0			5.0				15

NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. TANK FLUSH TO BE PROVIDED TO IN-TANK FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
4. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
5. TWO FILTER CIRCUITS WILL OPERATE WITH THE THIRD FILTER CIRCUIT AS A SPARE.
6. DELETED.
7. LINE FLUSH IS PERFORMED AFTER EACH TRANSFER ON ALL SOLIDS TRANSFERS.
8. ROUTE TO BE USED FOR CONDITIONING THE FILTERS DURING FILTER STARTUP. SAME ROUTE WILL BE USED WHEN FILTER BREAKTHROUGH OCCURS UNTIL THE AFFECTED FILTER CAN BE ISOLATED.
9. LINE PROVIDED FOR MST RECYCLE TO TK-101 FOR REUSE IF REQUIRED.
10. THE ALPHA FINISHING FACILITY IS EQUIPPED WITH A PASSIVE VENTILATION SYSTEM.
11. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
12. RECIRCULATION LINE BE PROVIDED TO TK-220 FOR MIXING.
13. TK-221, TK-222, AND TK-224 TO BE TEMPERATURE CONTROLLED TO 77°F (±5°F).
14. DELETED.
15. DELETED.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION
PERMIT NO. 19,219-IW DATE Aug 6, 2008
[signature]
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

M M5 J 0015P LATEST REVISION 1A

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DCE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	HDO	DMY	CC	REB	JL	JWM
744910	1	03/07/06	REVISED PER DCR-0087	HDO	DMY	CC	REB	CHT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	HDO					

PARSONS
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UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

SWPF
INTERMEDIATE STORAGE TANK, ALPHA SORPTION TANK-B, FILTER FEED TANK-B, AND CLEANING SOLUTION DUMP TANK-B
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0015P	1 OF 1	1A

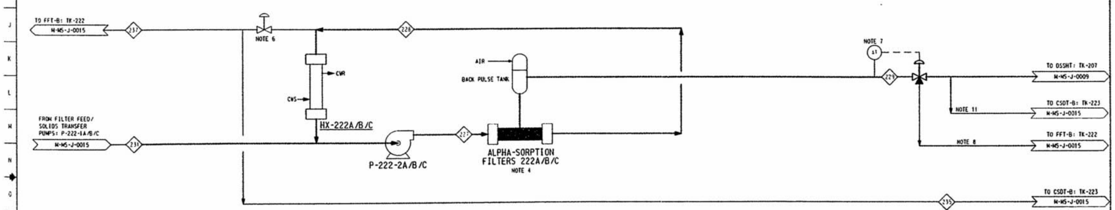
SWPFE.BOR

M-M5-J-0016P

HX-222A/B/C
FILTER RECIRCULATION COOLERS

P-222-2A/B/C
FILTER RECIRCULATION PUMPS
1300 GPM

FLT-222A/B/C
ALPHA SORPTION FILTERS
225 SQ FT



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. DELETED.
3. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND VALUES ARE BASED ON TWO MST STRIKES. ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
4. EACH FILTER WILL BE DESIGNED FOR 50% OF REQUIRED TOTAL CAPACITY. TWO FILTER CIRCUITS WILL NORMALLY OPERATE WITH THIRD FILTER CIRCUIT AS SPARE.
5. DELETED.
6. CONTROL VALVE TO PROVIDE BACK PRESSURE ON FILTERS.
7. ON-LINE PARTICULATE ANALYZER TO DETECT FILTER BREAKTHROUGH.
8. ROUTE TO BE USED FOR CONDITIONING THE FILTERS DURING FILTER STARTUP. SAME ROUTE WILL BE USED WHEN FILTER BREAKTHROUGH OCCURS UNTIL THE AFFECTED FILTER CAN BE ISOLATED.
9. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
10. DELETED.
11. ROUTE TO BE USED DURING FILTER CLEANING.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. 19,219-IW DATE: Aug. 10, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 3

STREAM NO		227 (Note 4)	228 (Note 4)	229	231	235	237
STREAM NAME		Filter Feed	Filter Recirc	To DSSHT	MST/ Slurry	Cleaning Solution Return	Sludge Return to FFT-B
Flow	GPM	1300	1288.55	22.90	60	48.55	97.10
	GAL/Batch			29743			
Mass Flow (NOTE 9)	LBS/HR	810420	803282	14141	37404		60532
	LBS/Batch			306055			
Density	LBS/GAL	10.39	10.39	10.29	10.39		10.39
Temperature	°F			77			
Na+(M)	gm-moles/L						
MST	lbs/batch						
Wt% Solids	%						

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOC
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MOO	DMT	CC	REB	JL	JVH
744910	1	03/07/06	REVISED PER DCR-0087	MOO	DMT	CC	REB	CMT	TLN
745253	1A		UPDATED TO DEPICT DCN-07-0008 "AFTER" FOR PERMIT USE	MOO					

M M5 J 0016P — LATEST REVISION 1A

PARSONS
1080 Silver Bluff Rd. • Aiken, SC 29803 (803)643-7100

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

N/A | N/A | N/A | PARSONS

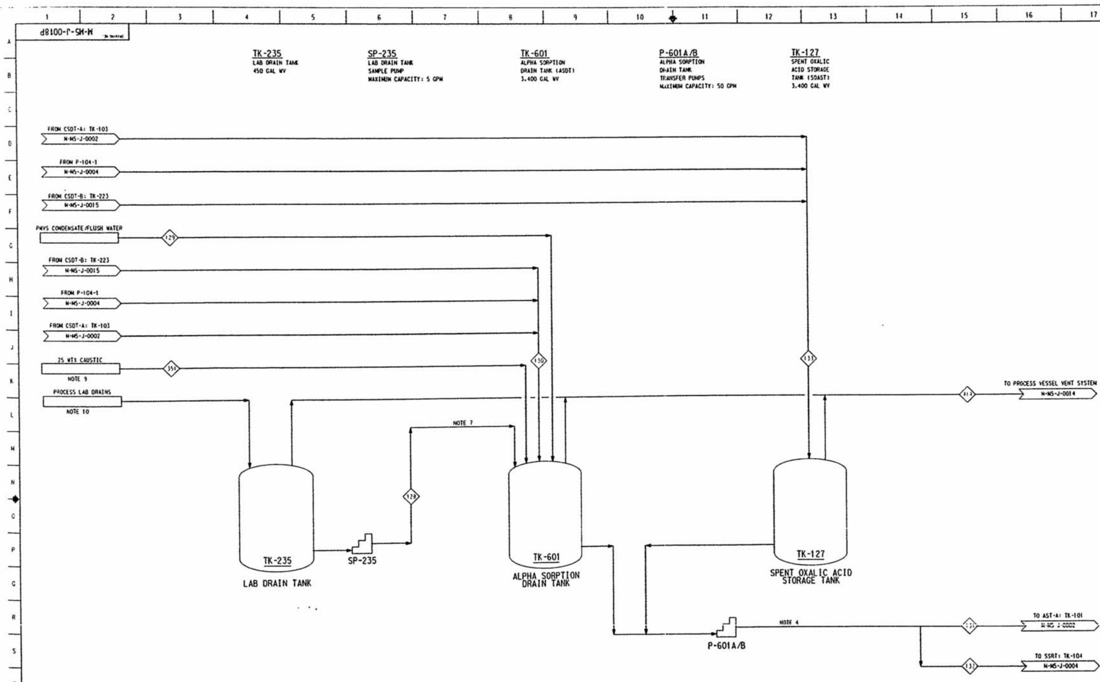
SWPF
ALPHA SORPTION FILTERS
FLT-222A/B/C
PFD

(U)

SCALE: NONE | DRAWING NO: M-M5-J-0016P | SHEET NO: 1 OF 1 | LATEST REVISION: 1A

SWPFE.BDR

B19



NOTES

1. SEE DRAWING G-M1-J-00002 FOR LEGEND.
2. REFER TO MASS BALANCE MODEL (MBM) P-ESR-J-00001, REV. 1 FOR DETAILED FLOW DATA FOR EACH STREAM. BATCH AND FLOW VALUES ARE BASED ON TWO MST STRIKES, ONE IN TK-101 (AST-A) AND ONE IN TK-221 (AST-B).
3. WHEN NOT PROVIDED IN MBM, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
4. RECIRCULATION LINES WILL BE PROVIDED TO TK-601 AND TK-127 FOR MIXING.
5. DELETED.
6. GALLONS PER BATCH VALUE FOR THE SPENT OXALIC ACID IS FOR SEVEN BATCHES.
7. ALTERNATE FLOW PATH EXISTS TO TK-208 IF SAMPLE SHOWS TANK CONTAINS SOLVENT.
8. TANK FLUSH TO BE PROVIDED TO IN-TANK FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
9. 25 WT% CAUSTIC IS FROM TK-317 (NEUTRALIZATION TANK) AND IS USED TO ADJUST THE COMPOSITION OF TK-601.
10. NON-PROCESS DRAINS HANDLED THROUGH LAB COLLECTION TANK SYSTEM.

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. [illegible] DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

NOTE 2

STREAM NO		128	129	131	132	351
STREAM NAME		Lab Drains	Condensate/ Flush Water	ASDT to AST-A	Spent Oxalic Acid to TK-104	25 wt% Caustic
Flow	GPM	5		50	50	
	GAL/BATCH	40	47	405	833 (Note 6)	82
Mass Flow (Note 3)	LBS/HR	2559		26490	24990	
	LBS/BATCH	341	392	3576	6939	875
Density	LBS/GAL	8.53	8.33	8.83	8.33	10.67
Temperature	°F	77	77	77	77	
Na+(M)	gm-moles/L	0.42		1.66		7.99

PROJ.	REV. NO.	DATE	REVISION	PRP'D	CHK'D	LEAD ENG	APRV'D	PM APRV'D	DOE
744611	0	08/11/05	CERTIFIED FOR CONSTRUCTION	MOD	DMY	CC	KEB	JL	JMH
744910	1	03/07/06	REVISED PER DCR-0081	MOD	DMY	CC	KEB	CMT	TLM
745253	1A		UPDATED TO DEPICT DCN-07-0004 "AFTER" FOR PERMIT USE	MOD					

N N5 J 0018P — LATEST REVISION 1A

PARSONS
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UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	N/A	N/A	PARSONS

TITLE:
SWPF
LAB DRAIN TANK,
ALPHA SORPTION DRAIN TANK AND
SPENT OXALIC ACID STORAGE TANK
PFD
(U)

SCALE	DRAWING NO.	SHEET NO.	LATEST REVISION
NONE	M-M5-J-0018P	1 OF 1	1A

SWPFE.BDR

B20

Please file as a record document for Construction Permit No. 19,219-IW.

dhec

WASTEWATER

FINAL APPROVAL TO PLACE INTO OPERA

ISSUED TO: US DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
BUILDING 705-3C
AIKEN SC 29808

19219-IW

for the operation of a wastewater treatment/collection system permitted under Construction Permit No. 20,234-IW, dated November 1, 2018.

PROJECT NAME: SRS/SALT WASTE PROCESSING FACILITY (SWPF) Final Tie-Ins

COUNTY: Aiken

PROJECT DESCRIPTION: The Salt Waste Processing Facility (SWPF) is designed to extract and concentrate cesium, strontium, and actinides from salt wastes in the tank farms resulting in effluents that are acceptable for treatment at the Defense Waste Processing Facility (DWPF) and the Saltstone Production Facility (SPF). Attachment A provides a list of equipment.

The effluent concentrations of those constituents the wastewater treatment system is designed to remove or reduce for wastewater transferred to Tank 50 to the SPF are contained in Construction Permit No. 18,801-IW for the SPF. The solid waste from the SPF will be disposed in the Saltstone Disposal Facility (SDF) in accordance with Solid Waste Industrial Permit #025500-1603. The wastewater sent to the DWPF will be vitrified and poured into canisters that are transferred to the Glass Waste Storage Buildings.

PERMITTED FLOW: System Nominal Daily Flow: 35,840 gallons per day
System Design Capacity Flow: 185,736 gallons per day

WWTP: US DOE/SAVANNAH RIVER SITE Salt Waste Processing Facility (SWPF)

SPECIAL CONDITIONS:

1. This permit is in addition to Construction Permit No. 19,219-IW (Salt Waste Processing Facility (SWPF)), Construction Permit No. 20,194-IW (SWPF NGS Cold Chemical Feed Facility), Construction Permit No. 18,801-IW (Saltstone Production Facility (SPF)), Construction Permit No. 17,424-IW (F-Area and H-Area Tank Farms), and Construction Permit No. 16,783, Defense Waste Processing Facility.

dhec

2. The jumpers that will tie the SWPF in with the SPF and DWPF are permitted by this construction permit. There shall be no radioactive salt solution received from the High Level Waste (HLW) tanks for processing and transfer to the DWPF and/or the SPF until these jumpers have been installed and the Department has issued the Approval to Place into Operation for this construction permit.

This approval is based on the APO request letter (SRR-ESH-2019-00118) signed by Ms. Patricia M. Allen. Note that Attachment 1 is the Engineer's letter of certification (signed by Andrew R. Redwood, P.E., South Carolina Registration No. 20525).

Barry S. Mullinax

Barry S. Mullinax, Engineer
(for) Environmental Affairs
AIKEN EA OFFICE

Date Issued: October 29, 2019

cc: Bureau of Water Permitting File – Construction Permit No. 20,234-IW
Bureau of Water Permitting File – Construction Permit No. 19,219-IW
Bureau of Water Permitting File – Construction Permit No. 20,194-IW
Bureau of Water Permitting File – Construction Permit No. 18,801-IW
Bureau of Water Permitting File – Construction Permit No. 17,424-IW
Bureau of Water Permitting File – Construction Permit No. 16,783-IW
Travis Fuss, Aiken EA Office
Crystal Robertson, Aiken EA Office
Shawn M. Clarke, BOW, Columbia Office
Crystal Rippy, BOW – Columbia Office
Andrew Redwood, P.E.,SRR

dhec

Attachment A Equipment List

The equipment included in Construction Permit No. 20,234-IW is listed below:

1. Transfer Line SDP1 and Jumper 6-7(SPP2)2 for Raw Salt Solution (RSS) Transfer Line
2. Jumper 6-7(SPP3)3 for Strip Effluent (SE) Waste Transfer Line
3. Jumper 3(SPP3)15 for Monosodium Titanate Precipitate (MSTPCP) Waste Transfer Line
4. Transfer lines DSS-0077, SSP077, and WTS-SSP4 for the Decontaminated Salt Solution to Tank 50 and the Saltstone Production Facility.

Savannah River Remediation
AECOM | BECHTEL | JACOBS | BWXT

July 25, 2019

SRR-ESH-2019-00082
RSM Track #: 10667

Mr. Travis Fuss
Area Director Midlands – Aiken and Orangeburg
South Carolina Department of Health and
Environmental Control
Midlands Region BEHS Aiken
206 Beaufort Street, NE
Aiken, South Carolina 29801

Dear Mr. Fuss,

SALT WASTE PROCESSING FACILITY PROFESSIONAL ENGINEER'S CERTIFICATION REPORT (U)

References:
1. Industrial Wastewater Treatment Facility Construction Permit Application, Engineering Report & Equipment List for the Salt Waste Processing Facility, ESH-EPG-2008-00048, April 2, 2008 & ESH-EPG-2008-00101, July 28, 2008
2. SCDHEC Industrial Wastewater Construction Permit Number: 19,219-IW, SRS/Salt Waste Processing Facility/Phase 2, August 6, 2008

On behalf of the U.S. Department of Energy (DOE) and Parsons Government Services, please find as Attachment 1 the Professional Engineer's Certification Report of Salt Waste Processing Facility (SWPF) construction completion.

The U.S. DOE and Parsons Government Services is requesting an inspection of the SWPF and associated Approval to Place into Operation (APO). Please contact Keith Liner at (803) 208-6466 to coordinate the inspection.

Should you have any questions or concerns, please feel free to contact me at (803) 208-1468

Sincerely,

Keith D. Harp
SRR-SWPF Integration Program Manager
Savannah River Remediation, LLC

Please put into file for Construction Permit No. 19,219-IW

Attachment: 1. Profession Engineer's Certification Report, Salt Waste Processing Facility, July 2019

c: M. Reece, SCDHEC, Columbia, SC
C.D. Rippy, Columbia, SC
J. Blalock, Columbia, SC
B.S. Mullinax, Columbia SC
P.A. Marks, DOE, 704-122S
S.S. Farrell, 704-122S
F. Sheppard Jr., Parsons, 992005-W
Dr. T.D. Burns, 992005-W
B. Brasel, 992005-W
C. Connor, 992005-W
R. Gurske, 221-J
D. Yarbrough, 992005-W
C. Everatt, 221-J
K.R. Wells, SRR, 766-H
C.S. Weston, 766-H
C.L. Bergren, SRNS, 730-4B
A.J. Meyer, 730-4B
T.F. Kmetz, 730-4B
V.E. Millings III, 730-4B
Records Administration, 773-52A
DOEECATS

PARSONS

1080 Silver Bluff Road | Aiken, SC 29803
Direct: +1 803.643.7100 | Fax: +1 803.643.7118 | www.parsons.com

July 17, 2019

Ref. No.: 00-700-27599

Mr. Travis R. Fuss
Area Director Midlands – Aiken and Orangeburg
South Carolina Department of Health and
Environmental Control
Midlands Region BEHS Aiken
206 Beaufort ST NE
Aiken, South Carolina 29801

Subject: Contract No. DE-AC09-02SR22210
Salt Waste Processing Facility (SWPF) Project
Professional Engineer's Certification Report

Reference: SCDHEC Construction Permit Number: 19219-IW, Salt Waste Processing Facility

Dear Mr. Fuss:

I have performed a final inspection of the Salt Waste Processing Facility (SWPF) Industrial Wastewater Treatment Facility as described in referenced Permit #19219-IW and have attached certified as-built drawings. This project has been found to be, to the best of my knowledge, built in accordance with the approved plans and specifications, with the exceptions listed in Attachment 1.

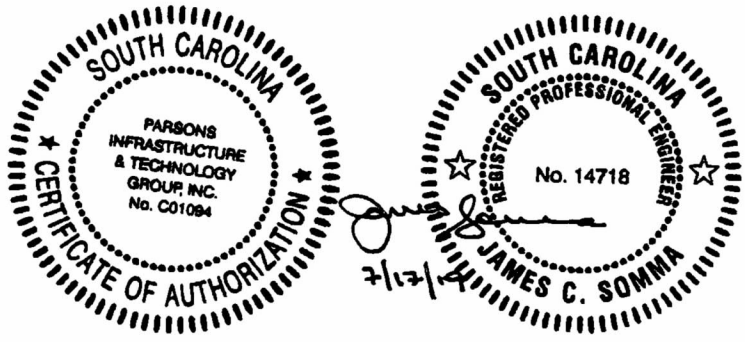
Attachment 2 contains the "as-built" drawings in support of the authorization to operate. All equipment listed in Attachment A of Permit 19219-IW has been installed.

If you have any questions, please contact me at 803-643-2300 (office) or 706-631-8572 (mobile).

Sincerely,

James C. Somma, PE
South Carolina #14718

cc: F. Sheppard Jr., SWPF
Dr. T. D. Burns, SWPF
B. Brasel, SWPF
C. Connor, SWPF
R. Gurske, SWPF
K. Liner, SRR
D. Yarbrough, SWPF
C. Everatt, SWPF
SWPFDCA
File No.: 3.4.1



Permit Drawing #	Final Drawing #	Title	Synopsis of Changes
G-M1-J-0001P	G-M1-J-00001	Process Flow Drawing Index	Added Drawing No. M-M-J-0020 with the title "Next Generation Solvent Building Cold Chemical Makeup Tanks PFD." (Reference SCDHEC Construction Permit Number 20194-IW, NGS Cold Chemical Feed Facility at SWPF, June 21, 2018).
G-M1-J-0002P	G-M1-J-00002	Process Flow Legend Sheet	No Changes.
G-P1-J-00001	G-P1-J-00001 Sh. 1 & Sh.2	SWPF Process Building General Arrangement Drawing Index, Symbols, Abbreviations, Equipment Designations, and General Notes	1. Added P-PG-J-0024 with the title "SWPF Next Generation Solvent Building General Arrangement Plan at Elevation 98'-9" and Sections" to the drawing index.
			2. In the "Process Building - Process Equipment" section:
			a.. TK-121A/B/C & TK-123: Capacity increased from 7 to 22 gal; Diameter increased from 8 $^{5}/_{8}$" to 1'- 3".
			b. TK-127 name changed from Spent Oxalic Acid Storage Tank (SOAST) to Spent Acid Storage Tank (SAST).
			c. Added TK-505/506, Back Up Air Receiver, with dimensions & capacity (3'-0" dia x 14'-11", 600 gal.).
			d. TK-206 height increased from 6' 6" to 8'; capacity increased from 1700 to 2160 gal
			e. TK-106 name changed from Oxalic Acid Feed Tank to Filter Cleaning Acid Feed Tank.
			f. TK-301 diameter decreased from 11' to 10'; height increased from 15' to 16' 9"; capacity decreased from 9600 to 9100 gal.
			g. TK-305 capacity increased from 400 to 600 gal.
			h. TK-312 diameter decreased from 9' to 8'-6"; height increased from 16' to 18'-8"; capacity increased from 7200 to 7400 gal.
			i. Added TK-314, DI water expansion tank, with dimensions & capacity (1'-8" dia x 4'-11", 57 gal.).
			3. In the Pumps category of the "equipment designations" section, added P-015A/B, ASP Secondary Loop Pump, to the North ASP Pump & Valve Gallery subsection & added P-212A/B, Strip Effluent Coalescer Feed Pump, to CSSX Pump & Valve Gallery subsection. Renamed P-106 "Acid Transfer Pump".
			4. Added FLT-250, Solvent Adjustment Filter; Added SCFS-001 & -002, Scrubber Caustic Feed System; SEP-015, Process Chilled Water Separator; Added TK-015, Process Chilled Water Expansion Tank & TK-016, Chemical Bypass Feeder Tank.
M-M5-J-0001P	M-M5-J-0001	Simplified Process Flow Schematic	No Changes.
M-M5-J-0002P	M-M5-J-0002	Feed Receipt, Alpha Sorption Tank-A, Filter Feed Tank-A, and Cleaning Solution Dump Tank-A PFD	TK-106 name & associated stream information was changed from "Oxalic Acid" to the generic "Filter Cleaning Acid".
M-M5-J-0003P	M-M5-J-0003	Alpha Sorption Filters FLT-102A/B/C PFD	No Changes.
M-M5-J-0004P	M-M5-J-0004	Sludge Solids Washing Filter, Sludge Solids Receipt Tank and Wash Water Hold Tank PFD	No Changes.
M-M5-J-0005P	M-M5-J-0005	Cold Chemical Makeup for Filter Cleaning and Feed Adjustment PFD	TK-106 name changed from "Oxalic Acid Feed Tank" to "Filter Cleaning Acid Feed Tank", added a heater to the tank, & the chemical composition changed from 0.5M Oxalic acid to 20 wt% Nitric acid. Changed the chemical compostion of TK-107 from 0.02 M to 1M NaOH.

Permit Drawing #	Final Drawing #	Title	Synopsis of Changes
M-M5-J-0006P	M-M5-J-0006	Salt Solution Feed Tank and Solvent Drain Tank PFD	No Changes.
M-M5-J-0007P	M-M5-J-0007	Solvent Extraction and Acid Scrub PFD	Added stream 708 for caustic scrub from the NGS Cold Chemical Feed Facility (Reference SCDHEC Construction Permit Number 20194-IW, NGS Cold Chemical Feed Facility at SWPF, June 21, 2018).
M-M5-J-0008P	M-M5-J-0008	Solvent Stripping and Caustic Wash PFD	Renamed HTR-217A/B to HX-217A/B. Added pumps P-212A/B. Added stream 705 & 700 for boric acid solution from the NGS Cold Chemical Feed Facility (Reference SCDHEC Construction Permit Number 20194-IW, NGS Cold Chemical Feed Facility at SWPF, June 21, 2018).
M-M5-J-0009P	M-M5-J-0009	DSS Coalexcer, DSS Hold Tank and Transfer Pumps PFD	No Changes.
M-M5-J-0010P	M-M5-J-0010	Cold Chemical Makeup and Process Water PFD	Added streams 701, 702, 707 & 708 for feeds to the NGS Cold Chemical Feed Facility (Reference SCDHEC Construction Permit Number 20194-IW, NGS Cold Chemical Feed Facility at SWPF, June 21, 2018).
M-M5-J-0011P	M-M5-J-0011	Cold Chemical Makeup Tank PFD	No Changes.
M-M5-J-0012P	M-M5-J-0012	Solvent Extraction Strip and Scrub Feed Pumps PFD	No Changes.
M-M5-J-0013P	M-M5-J-0013	Solvent Makeup Tank PFD	No Changes.
M-M5-J-0014P	M-M5-J-0014	Process Vessel Vent System PFD	Updated acronym from SOAST to SAST for TK-127.
M-M5-J-0015P	M-M5-J-0015	Intermediate Storage Tank, Alpha Sorption Tank-B. Filter Feed Tank-B, and Cleaning Solution Dump Tank-B PFD	The name for TK-106, TK-127 & associated streams was revised to reflect the generic filter cleaning acid & spent acid.
M-M5-J-0016P	M-M5-J-0016	Alpha Sorption Filters FLT-222A/B/C PFD	No Changes.
M-M5-J-0018P	M-M5-J-0018	Lab Drain Tank, Alpha Sorption Drain Tank and Spent Acid Storage Tank PFD	No Changes.
P-PG-J-0002	P-PG-J-0002	Process Building General Arrangement Index Key Plan	Added note to reference P-PG-J-0024 for NGS building general arrangement (Reference SCDHEC Construction Permit Number 20194-IW, NGS Cold Chemical Feed Facility at SWPF, June 21, 2018).
P-PG-J-0003P	P-PG-J-0003	Process Building General Arrangement Central Process Area Plan at Elevation 100'-0"	No Changes.
P-PG-J-0004	P-PG-J-0004	Process Building General Arrangement Cold Chemicals Area Plan at Elevation 100'-0"	No Changes.

ATTACHMENT 1

Permit Drawing #	Final Drawing #	Title	Synopsis of Changes
P-PG-J-0005	P-PG-J-0005	Process Building General Arrangement Northern Facility Support Area Plan at Elevation 100'-0"	No Changes.
P-PG-J-0006	P-PG-J-0006	Process Building General Arrangement Eastern Facility Support Area Plan at Elevation 100'-0"	No Changes.
P-PG-J-0007P	P-PG-J-0007	Alpha Finishing Facility General Arrangement Alpha Finishing Facility Support Area Plan at Elevation 100'-0"	1. In the Alpha Finishing Facility - Process Equipment & Equipment Designations section: a. TK-225A/B/C: Capacity increased from 7 to 22 gal; Diameter increased from 8 $^{5}/_{8}$" to 1'- 3". b. Lab Drain Tank-A (TK-236) and Tank-B (TK-237) capacity revised from 1000 gals to 1800 gals; DIA revised from 5'-0" to 5'-6"; Height revised from 7'-3" to 10'-5". c. Alpha Sorption Filters (FLT-222A/B/C)surface area decreased from 225 ft² to 216 ft². d. Added Pumps P-025A/B (AFP Secondary Loop Pump), HX-025 (AFP Secondary Loop Cooler), TK-025 (Process Chilled Water Expansion Tank), TK-026 (Process Chilled Water Chemical Bypass Tank), and SEP-025 (Process Chilled Water Separator). e. Added equipment size & capacity for TK-604 to the table.
P-PG-J-0008	P-PG-J-0008	Process Building General Arrangement Central Process Area Plan at Elevation 116'-0"	No Changes.
P-PG-J-0009	P-PG-J-0009	Process Building General Arrangement Central Process Area Plan at Elevation 124'-0"	No Changes.
P-PG-J-0010	P-PG-J-0010	Process Building General Arrangement Central Process Area Plan at Elevation 139'-0"	Added SCFS-001 & SCFS-002 (Scrubber Caustic Feed system), HX-250 (Solvent Adjustment Heat Exchanger), FLT-250 (Solvent Adjustment Filter), room numbers, glovebox & radiohood details, miscellaneous instrument racks/panels, safety showers and room numbers.

Drawing #	Drawing Title
G-M1-J-00001	Process Flow Drawing Index
G-M1-J-00002	Process Flow Legend Sheet
G-P1-J-00001 Sh. 1 & Sh.2	SWPF Process Building General Arrangement Drawing Index, Symbols, Abbreviations, Equipment Designations, and General Notes
M-M5-J-0001	Simplified Process Flow Schematic
M-M5-J-0002	Feed Receipt, Alpha Sorption Tank-A, Filter Feed Tank-A, and Cleaning Solution Dump Tank-A PFD
M-M5-J-0003	Alpha Sorption Filters FLT-102A/B/C PFD
M-M5-J-0004	Sludge Solids Washing Filter, Sludge Solids Receipt Tank and Wash Water Hold Tank PFD
M-M5-J-0005	Cold Chemical Makeup for Filter Cleaning and Feed Adjustment PFD
M-M5-J-0006	Salt Solution Feed Tank and Solvent Drain Tank PFD
M-M5-J-0007	Solvent Extraction and Acid Scrub PFD
M-M5-J-0008	Solvent Stripping and Caustic Wash PFD
M-M5-J-0009	DSS Coalexcer, DSS Hold Tank and Transfer Pumps PFD
M-M5-J-0010	Cold Chemical Makeup and Process Water PFD
M-M5-J-0011	Cold Chemical Makeup Tank PFD
M-M5-J-0012	Solvent Extraction Strip and Scrub Feed Pumps PFD
M-M5-J-0013	Solvent Makeup Tank PFD
M-M5-J-0014	Process Vessel Vent System PFD
M-M5-J-0015	Intermediate Storage Tank, Alpha Sorption Tank-B, Filter Feed Tank-B, and Cleaning Solution Dump Tank-B PFD
M-M5-J-0016	Alpha Sorption Filters FLT-222A/B/C PFD
M-M5-J-0018	Lab Drain Tank, Alpha Sorption Drain Tank and Spent Acid Storage Tank PFD
P-PG-J-0002	Process Building General Arrangement Index Key Plan
P-PG-J-0003	Process Building General Arrangement Central Process Area Plan at Elevation 100'-0"
P-PG-J-0004	Process Building General Arrangement Cold Chemicals Area Plan at Elevation 100'-0"

Drawing #	Drawing Title
P-PG-J-0005	Process Building General Arrangement Northern Facility Support Area Plan at Elevation 100'-0"
P-PG-J-0006	Process Building General Arrangement Eastern Facility Support Area Plan at Elevation 100'-0"
P-PG-J-0007	Alpha Finishing Facility General Arrangement Alpha Finishing Facility Support Area Plan at Elevation 100'-0"
P-PG-J-0008	Process Building General Arrangement Central Process Area Plan at Elevation 116'-0"
P-PG-J-0009	Process Building General Arrangement Central Process Area Plan at Elevation 124'-0"
P-PG-J-0010	Process Building General Arrangement Central Process Area Plan at Elevation 139'-0"

10000-P-M-D

DRAWING INDEX

DRAWING NO	TITLE
G-M1-J-00001	PROCESS FLOW - DRAWING INDEX
G-M1-J-00002	PROCESS FLOW - LEGEND SHEET
M-M1-J-0001	SIMPLIFIED PROCESS - FLOW SCHEMATIC
M-M1-J-0002	FEED RECEIPT, ALPHA SORPTION TANK-A, FILTER FEED TANK-A, AND CLEANING SOLUTION PUMP TANK-A PFD
M-M1-J-0003	ALPHA SORPTION FILTERS - F1-F22A/B/C PFD
M-M1-J-0004	SLURRY SOLIDS WASHING FILTER, WASTE SOLIDS RECEIPT TANK AND WASH WATER HOLD TANK PFD
M-M1-J-0005	COLD CHEMICAL MAKEUP FOR FILTER CLEANING AND FEED ADJUSTMENT PFD
M-M1-J-0006	SALT SOLUTION FEED TANK AND SOLVENT DRAIN TANK PFD
M-M1-J-0007	SOLVENT EXTRACTION AND ACID SCRUB PFD
M-M1-J-0008	SOLVENT STRIPPING AND CAUSTIC WASH PFD
M-M1-J-0009	ESS COLLECTOR, DCS HOLD TANK AND TRANSFER PUMPS PFD
M-M1-J-0010	COLD CHEMICAL MAKEUP AND PROCESS WATER TANK PFD
M-M1-J-0011	COLD CHEMICAL MAKEUP TANK PFD
M-M1-J-0012	SOLVENT EXTRACTION STRIP AND SCRUB FEED PUMPS PFD
M-M1-J-0013	SOLVENT MAKEUP TANK PFD
M-M1-J-0014	PROCESS VESSEL VENT SYSTEM PFD
M-M1-J-0015	INTERMEDIATE STORAGE TANK, ALPHA SORPTION TANK-E, FILTER FEED TANK-B, AND CLEANING SOLUTION PUMP TANK-B PFD
M-M1-J-0016	ALPHA SORPTION FILTERS F1-F22A/B/C PFD
M-M1-J-0017	DELETED
M-M1-J-0018	ESS DRAIN TANK, ALPHA SORPTION DRAIN TANK AND SPENT ACID STORAGE TANK PFD
M-M1-J-0020	NEXT GENERATION SOLVENT BUILDING COLD CHEMICAL MAKEUP TANKS PFD

DRAWING INDEX

DRAWING NO	TITLE

DRAWING INDEX

DRAWING NO	TITLE

NOTES

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01084
CERTIFICATE OF AUTHORIZATION

G M1 J 0000 3

PARSONS

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

SIZE	CODE IDENT NO	DRAWING NO
D	51661	10000-P-M-D

SWPF

PROCESS FLOW
DRAWING INDEX

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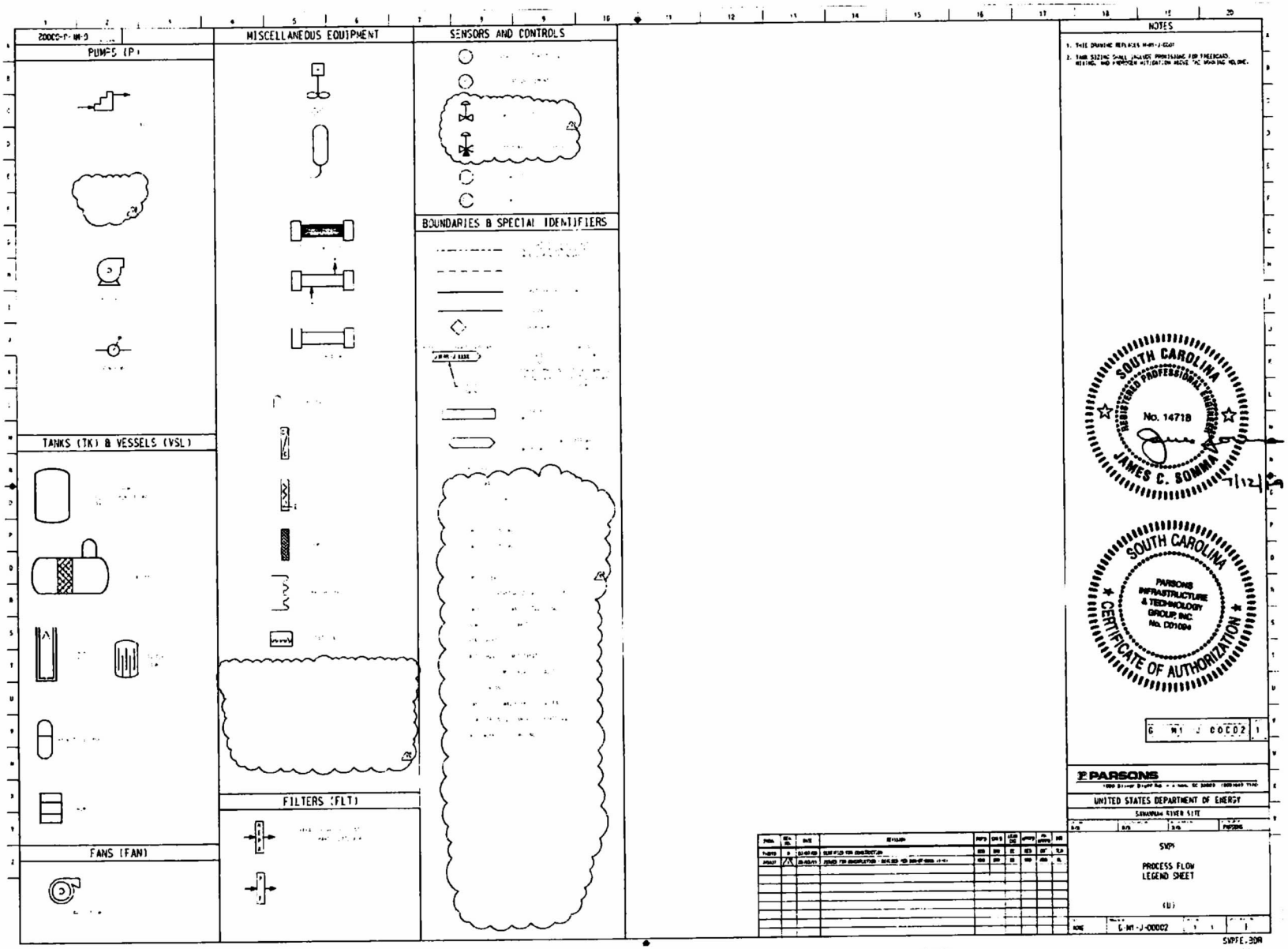
SCALE	DRAWING NO	REV
NONE	G-M1-J-00001	3

SWPF.BDR


PUMPS (P)
TANKS (TK) & VESSELS (VSL)
FANS (FAN)
MISCELLANEOUS EQUIPMENT
FILTERS (FLT)
SENSORS AND CONTROLS
BOUNDARIES & SPECIAL IDENTIFIERS
NOTES
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.
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SAVANNAH RIVER SITE
SWPF
PROCESS FLOW LEGEND SHEET
SWPFE-30A

G-PI-J-0001

DRAWING INDEX

DRAWING No	TITLE
G-PI-J-0001 SHEET 1	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES
G-PI-J-0001 SHEET 2	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES
P-PG-J-0002	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT INDEX KEY PLAN
P-PG-J-0003	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT CENTRAL PROCESS AREA PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0004	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT COLD CHEMICALS AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0005	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT NORTHERN FACILITY SUPPORT AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0006	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT EASTERN FACILITY SUPPORT AREA PLAN AT ELEVATION 100'-0"
P-PG-J-0007	SWPF - ALPHA FINISHING FACILITY - GENERAL ARRANGEMENT ALPHA FINISHING FACILITY PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0008	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT CENTRAL PROCESS AREA PLAN AT ELEVATION 115'-0" (UNLESS OTHERWISE NOTED)
P-PG-J-0009	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT CENTRAL PROCESS AREA PLAN AT ELEVATION 124'-0"
P-PG-J-0010	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT CENTRAL PROCESS AREA PLAN AT ELEVATION 139'-0"
P-PG-J-0011	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0012	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0013	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0014	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0015	SWPF - PROCESS BUILDING - GENERAL ARRANGEMENT - BUILDING SECTIONS
P-PG-J-0024	SWPF - NEXT GENERATION SOLVENT BUILDING GENERAL ARRANGEMENT PLAN AT ELEVATION 100'-0" AND SECTIONS (11)

PROCESS BUILDING - PROCESS EQUIPMENT

EQUIPMENT		APPROX CAPACITY (GALS) *	NO	DIA	HEIGHT OR LENGTH **
PROCESS CELL AREA					
ALPHA SORPTION TANK-A (AST-A)	TK-101	37700	1	19'-0"	16'-10"
FILTER FEED TANK-A (FFT-A)	TK-102	37700	1	19'-0"	20'-10"
CLEANING SOLUTION DUMP TANK-A (CSDT-A)	TK-103	1000	1	5'-6"	7'-3"
SLUDGE SOLIDS RECEIPT TANK (SSRT)	TK-104	6300	1	9'-10 1/2"	23'-10"
WASH WATER HOLD TANK (WWHT)	TK-105	13700	1	12'-0"	19'-11"
SALT SOLUTION FEED TANK (SSFT)	TK-109	45000	1	21'-0"	16'-3"
BACK PULSE TANK	TK-121A/B/C	22	3	[illegible]	2'-8"
WASHING FILTER BACK PULSE TANK	TK-123	22	1	[illegible]	2'-8"
SPENT ACID STORAGE TANK (SAST)	TK-127	6300	1	6'-6"	20'-0"
STRIP EFFLUENT HOLD TANK (SEHT)	TK-205	19900	1	14'-0"	15'-10"
SOLVENT DRAIN TANK	TK-208	4300	1	5'-6"	20'-0"
LAB DRAIN TANK	TK-235	600	1	4'-0"	6'-6"
BACK UP AIR RECEIVER	TK-505	600	1	3'-0"	10'-11"
BACK UP AIR RECEIVER	TK-506	600	1	3'-6"	10'-11"
ALPHA SORPTION DRAIN TANK (ASDT)	TK-601	4700	1	6'-0"	20'-0"
OPERATING DECK					
BACK PULSE CHARGE TANK A	TK-122	30	1	1'-6"	2'-5"
AST-A AIR PULSE AGITATOR CHARGE TANK	TK-128	300	1	3'-0"	5'-6"
FFT-A AIR PULSE AGITATOR CHARGE TANK	TK-129	300	1	3'-0"	5'-6"
SSRT AIR PULSE AGITATOR CHARGE TANK	TK-131	300	1	3'-0"	5'-6"
SSFT AIR PULSE AGITATOR CHARGE TANK	TK-132	300	1	3'-0"	5'-6"
WWHT AIR PULSE AGITATOR CHARGE TANK	TK-133	300	1	3'-0"	5'-6"
CSSX TANK CELL					
SOLVENT HOLD TANK (SHT)	TK-202	750	1	3'-0"	5'-5"
STRIP EFFLUENT COALESCER *****	TK-203	N/A	1	[illegible]	10'-2"
CAUSTIC WASH TANK	TK-206	520	1	4'-0"	3'-4"
BA-137 DECAY TANK (BDT) ****	TK-208	2100	1	7'-0"	8'-0"
DECONTAMINATED SALT SOLUTION STILLING TANK	TK-211	235	1	2'-0"	10'-0"
STRIP EFFLUENT STILLING TANK	TK-213	20	1	[illegible]	6'-0"
STRIP EFFLUENT PUMP TANK	TK-215	50	1	[illegible]	4'-11"
SOLVENT STRIP FEED TANK	TK-217	80	1	[illegible]	4'-11"
CSSX CONTACTOR DROP AREA					
DECON. SALT SOLUTION COALESCER *****	TK-201	N/A	1	3'-0"	10'-0"
COLD CHEMICALS AREA					
FILTER CLEANING ACID FEED TANK ***	TK-106	4100	1	7'-0"	15'-5"
FILTER CLEANING CAUSTIC TANK ***	TK-107	1100	1	6'-0"	6'-0"
CAUSTIC DILUTION FEED TANK ***	TK-108	9600	1	11'-0"	15'-3"
PROCESS WATER TANK ***	TK-301	9100	1	10'-0"	15'-3"
CAUSTIC RECEIPT TANK ***	TK-302	9600	1	11'-0"	15'-3"
CAUSTIC MAKEUP TANK ***	TK-303	2500	1	7'-0"	10'-2"
NITRIC ACID RECEIPT TANK ***	TK-304	2500	1	7'-0"	10'-2"
PROCESS WATER PRESSURE TANK	TK-305	600	1	4'-0"	5'-0"
NITRIC ACID SCRUB MAKE-UP TANK ***	TK-307	2500	1	7'-0"	10'-0"
MST STORAGE TANK ***	TK-311	1500	1	5'-0"	7'-0"
DI WATER STORAGE TANK	TK-312	7400	1	8'-6"	18'-0"
SOLVENT MAKE-UP TANK *****	TK-313	10	1	6'-0"	2'-0"
DI WATER EXPANSION TANK ***	TK-314	57	1	1'-8"	4'-11"
NEUTRALIZATION TANK ***	TK-317	550	1	4'-0"	7'-6"
ARGON TANK *****, ***	TK-320	3000	1	8'-0"	16'-0"
CSSX CONTACTOR AREA					
SOLVENT EXTRACTION CONTACTORS	EXT-201 A-P	16		CENTRIFUGAL SEPARATOR	
SCRUB CONTACTORS	EXT-202 A/B	2		CENTRIFUGAL SEPARATOR	
STRIPPING CONTACTORS	EXT-203 A-P	16		CENTRIFUGAL SEPARATOR	
CAUSTIC WASH CONTACTORS	EXT-204 A/B	2		CENTRIFUGAL SEPARATOR	
PROCESS FILTERS		SIZE	NO	DIA	HEIGHT
ALPHA SORPTION FILTERS	FLT-102A/B/C	316 SQ FT	3	2'-2"	15'-0"
WASHING FILTER	FLT-104	316 SQ FT	1	2'-2"	15'-0"

* THE CAPACITY IS MEASURED TO OVERFLOW OR AT FULL CAPACITY IF NO OVERFLOW IS PRESENT

** TANK HEIGHT OR LENGTH DATA IS MEASURED TANGENT TO TANGENT UNLESS NOTED OTHERWISE.

*** TANKS LOCATED AT THE EXTERIOR OF THE BUILDING.

**** TANK HEIGHT IS MEASURED TANGENT TO BOTTOM.

***** TANK HEIGHT OR LENGTH IS MEASURED AS OVERALL HEIGHT OR LENGTH.

PROCESS BUILDING CRANES & MONORAILS

DESCRIPTION		CAPACITY
OPERATING DECK BRIDGE CRANE	BC-110	25/7.5/5 TON
EQUIPMENT LIFT	EL-101	2.5 TON
TRUCK BAY MONORAIL (NOT SHOWN)	MR-410	15 TON
CSSX CONTACTOR OPERATING DECK		
MONORAIL & HOIST (NOT SHOWN)	MR-102A	1 TON
MONORAIL & HOIST (NOT SHOWN)	MR-102B	1 TON
DRUM OFF DECON AREA		
MONORAIL & HOIST (NOT SHOWN)	MR-121	1 TON
SAMPLE PUMP AND VALVE LABYRINTH		
MONORAIL & HOIST (NOT SHOWN)	MR-113	700 LB
MONORAIL & HOIST (NOT SHOWN)	MR-120	700 LB
WASTE TRANSFER ACCESS ROOM		
MONORAIL & HOIST (NOT SHOWN)	MR-513	5 TON
HOT LABORATORY		
HOT CELL BRIDGE CRANE	BC-102	1/2 TON
CSSX TANK CELL OPERATING DECK		
MONORAIL & HOIST (NOT SHOWN)	MR-103	5 TON
MONORAIL & HOIST (NOT SHOWN)	MR-104	2 TON
COLD CHEMICALS AREA		
COLD CHEMICALS AREA MONORAIL (NOT SHOWN)	MR-301	1 TON
COLD CHEMICALS AREA MONORAIL (NOT SHOWN)	MR-302	1/2 TON
DOCK LEVELER	DL-100	22.5 TON
EASTERN FACILITY SUPPORT AREA		
DOCK LEVELER	DL-101	22.5 TON

SEE MATERIAL HANDLING DRAWINGS FOR MONORAIL LOCATIONS

EQUIPMENT DESIGNATIONS

ELECTRICAL SYSTEMS

ATS-203	AUTOMATIC TRANSFER SWITCH
ATS-204	AUTOMATIC TRANSFER SWITCH
ATS-205	AUTOMATIC TRANSFER SWITCH
ATS-208	AUTOMATIC TRANSFER SWITCH
ATS-210	AUTOMATIC TRANSFER SWITCH
MCC-203	MOTOR CONTROL CENTER
MCC-204	MOTOR CONTROL CENTER
MCC-205	MOTOR CONTROL CENTER
MCC-206	MOTOR CONTROL CENTER
PNL-0010	UPS POWER DISTRIBUTION PANEL
SWGR-201	SWITCHGEAR
SWGR-202	SWITCHGEAR
SWGR-203	SWITCHGEAR
SWGR-204	SWITCHGEAR
SSMOD537	SAFETY SIGNIFICANT CONTACTOR
SSMOD637	SAFETY SIGNIFICANT CONTACTOR
SSMOD665	SAFETY SIGNIFICANT CONTACTOR
SSMOD670	SAFETY SIGNIFICANT CONTACTOR
SSMOD043	SAFETY SIGNIFICANT CONTACTOR
SSMOD040	SAFETY SIGNIFICANT CONTACTOR
SSMO1037	SAFETY SIGNIFICANT CONTACTOR
SSPS1013	SAFETY SIGNIFICANT CONTACTOR
SSPS1031	SAFETY SIGNIFICANT CONTACTOR
SSPS1020	SAFETY SIGNIFICANT CONTACTOR
SSPS2100	SAFETY SIGNIFICANT CONTACTOR
USA-301	UNINTERRUPTABLE POWER SUPPLY
VFD RACK #1	VARIABLE FREQUENCY DRIVE RACK
VFD RACK #2	VARIABLE FREQUENCY DRIVE RACK
VFD RACK #3	VARIABLE FREQUENCY DRIVE RACK
VFD RACK #4	VARIABLE FREQUENCY DRIVE RACK
STARTER RACK #5	STARTER RACK

INSTRUMENTATION SYSTEMS

ANN-001	SIS ANNUNCIATOR PANEL
CCTV-01 - CCTV-06	CLOSED CIRCUIT TELEVISION EQUIPMENT CABINETS
CNP-01 - CNP-03	CONTROL NETWORK PANELS
FOR-01, 02, 03	FIBER OPTIC REMOTE UNITS
ICP-01 - ICP-11	INSTRUMENT CONTROL PANELS
ICP-14 - ICP-16	INSTRUMENT CONTROL PANELS
IR-001 - IR-014	INSTRUMENT RACKS
IR-016 - IR-022	INSTRUMENT RACKS
IR-024	INSTRUMENT RACK
IR-026 - IR-040	INSTRUMENT RACKS
PA-AS-01	PUBLIC ADDRESS SYSTEM (MAIN RACK)
PNEB-01	PARSONS NETWORK ENCLOSURE
PCM-01, PCM-02	PERSONNEL CONTAMINATION MONITOR CABINETS
PCM-04	PERSONNEL CONTAMINATION MONITOR CABINET
SRSNET-01	SRSNET NETWORK ENCLOSURE
VCM-01, VCM-03	VIBRATION CONDITIONING MONITORING CABINETS
VCM-05, VCM-06	VIBRATION CONDITIONING MONITORING CABINETS
VCM-09	VIBRATION CONDITIONING MONITORING CABINET
VMC-05	VIBRATION MONITORING CABINET
VMP-006	VIBRATION MONITORING PANEL

EQUIPMENT DESIGNATIONS

PUMPS

NORTH ASP PUMP AND VALVE GALLERY	
P-015A	ASP SECONDARY LOOP PUMP
P-015B	ASP SECONDARY LOOP PUMP
P-101A/B	ALPHA SORPTION TANK-A TRANSFER PUMPS
P-102-1A/B/C	FILTER FEED/SOLIDS TRANS PUMPS
P-102-2A/B/C	FILTER RECIRCULATION PUMPS
P-104-1	WASHING FLT FEED/SLUDGE SOLIDS TRANS PUMP
P-104-2	WASHING FILTER RECIRCULATION PUMP
P-110	ASP SUMP TRANS PUMP
SOUTH ASP PUMP AND VALVE GALLERY	
P-105A/B	WASH WATER TRANS PUMPS
P-208A/B	SOLVENT DRAIN TANK PUMPS
P-601A/B	ALPHA SORPTION DRAIN TK TRANSFER PUMPS
CSSX PUMP AND VALVE GALLERY	
P-109A/B	SALT SOLUTION FEED PUMPS
P-202A/B	SOLVENT FEED PUMPS
P-204A/B	CAUSTIC WASH TANK PUMPS
P-205A/B	STRIP EFFLUENT TRANS PUMPS
P-206A/B	BA-137 DECAY TANK TRANS PUMPS
P-212A/B	STRIP EFFLUENT COALESCER FEED PUMP
P-215A/B	STRIP EFFLUENT PUMP TANK PUMPS
P-217A/B	SOLVENT STRIP FEED PUMPS
P-218	CSSX TANK CELL SUMP TRANSFER PUMP
SAMPLE PUMP AND VALVE GALLERY	
SP-101	ALPHA SORPTION TANK-A SAMPLE PUMP
SP-102	FILTER FEED TANK A SAMPLE PUMP
SP-103	CLEANING SOLUTION DUMP TANK-A SAMPLE PUMP
SP-104	SLUDGE SOLIDS RECEIPT TANK SAMPLE PUMP
SP-105	WASH WATER HOLD TANK SAMPLE PUMP
SP-109	SALT SOLUTION FEED TANK SAMPLE PUMP
SP-205	STRIP EFFLUENT HOLD TANK SAMPLE PUMP
SP-235	LAB DRAIN TANK SAMPLE PUMP
DRUM OFF/DECON AREA	
P-405	DECON AREA SUMP PUMP
COLD CHEMICALS AREA	
P-106	ACID TRANSFER PUMP
P-107	FILTER CLEANING CAUSTIC TRANS PUMP
P-108	CAUSTIC DILUTION TRANS PUMP
P-300	COLD CHEMICALS RECEIVING DOCK SUMP PUMP
P-301-1	PROCESS WATER UTILITY PUMP
P-301-2	FLUSH PUMP
P-302	CAUSTIC TRANS PUMP
P-303	CAUSTIC MAKEUP TRANS PUMP
P-304-1	NITRIC ACID METERING PUMP
P-304-2	NEUTRALIZATION METERING PUMP
P-305A/B	SODIUM HYPOCHLORITE ADDITION PUMP
P-309A/B	SCRUB FEED PUMPS
P-310A/B	STRIP FEED PUMPS
P-311	MST TRANSFER PUMP
P-311-1	MST DRUM PUMP
P-312-1	DI WATER TRANS PUMP
P-312-2	SCRUB WATER FEED PUMP
P-312-3A/B	STRIP WATER FEED PUMPS
P-313	SOLVENT MAKEUP TRANS PUMP
P-313-1	SOLVENT DRUM PUMP
P-317	NEUTRALIZATION TANK DISCHARGE PUMP
P-318	CAUSTIC SUMP PUMP
P-319	ACID SUMP PUMP
P-320	NEUTRALIZATION SUMP PUMP
P-321	NITRIC ACID SUMP PUMP
P-322	WATER SUMP PUMP
P-326	PUMP SEAL MAKE-UP WATER SUPPLY PUMP

AGITATORS

AGT-107	FILTER CLEANING CAUSTIC TANK AGITATOR
AGT-108	CAUSTIC DILUTION FEED TANK AGITATOR
AGT-303	CAUSTIC MAKEUP TANK AGITATOR
AGT-307	NITRIC ACID SCRUB MAKEUP TANK AGITATOR
AGT-311	MST STORAGE TANK AGITATOR
AGT-311-1	MST DRUM AGITATOR
AGT-313	SOLVENT MAKEUP TANK AGITATOR

LABORATORY EQUIPMENT

GB-001 - GB-013	GLOVE BOXES
GB-014	GLOVE BOXES
RH-001 - RH-011	RADIO HOODS
FH-001	FUME HOOD
HC-001 - HC-004	HOT CELL WINDOWS
STS-101	SAMPLE TRANSFER SYSTEM

FIRE PROTECTION EQUIPMENT

FACP-101	MAIN FIRE ALARM CONTROL PANEL
FACP-300	COMPRESSOR BUILDING FIRE ALARM CONTROL PANEL
FACP-400	NGS BUILDING FIRE ALARM CONTROL PANEL (11)
FAP-10C	FIRE ANNUNCIATOR PANEL
FAA-10CA	FIRE ALARM ANNUNCIATOR
FAA-10CB	FIRE ALARM ANNUNCIATOR
FAA-10CC	FIRE ALARM ANNUNCIATOR
FAA-10CD	FIRE ALARM ANNUNCIATOR
FAA-200	FIRE ALARM ANNUNCIATOR
FAA-400	FIRE ALARM ANNUNCIATOR
RCP-001	RELEASE CONTROL PANEL
RCP-002	RELEASE CONTROL PANEL
RCP-003	RELEASE CONTROL PANEL

AIR HANDLING EQUIPMENT

ACU-001	WALL MOUNTED HEAT PUMP
AHU-001 - AHU-005	AIR HANDLING UNITS
AHU-008 - AHU-009	AIR HANDLING UNITS
FILTERS/FANS/COILS	
CO-401A/B	PROCESS VESSEL VENT COOLERS
CO-402A/B	PULSE MIXER VENT COOLERS
FAN-401A/B/C	PROCESS VESSEL VENT EXHAUST FANS
FAN-402A/B	PULSE MIXER VENT EXHAUST FANS
FAN-001	EXHAUST FAN
FAN-002	EXHAUST FAN
FAN-003	EXHAUST FAN ON ROOF
FAN-004	EXHAUST FAN ON ROOF
FAN-007	EXHAUST FAN ON ROOF (NOT SHOWN)
FAN-009	EXHAUST FAN ON ROOF (NOT SHOWN)
FAN-010	EXHAUST FAN ON ROOF (NOT SHOWN)
FAN-013	EXHAUST FAN ON ROOF (NOT SHOWN)
FAN-014	EXHAUST FAN ON ROOF (NOT SHOWN)
FAN-015	EXHAUST FAN ON ROOF (NOT SHOWN)
FLT-001-FLT-004	EXHAUST AIR HEPA FILTERS
FLT-009	LAB EXHAUST AIR HEPA FILTER
FLT-010-FLT-016	CELL INLET AIR HEPA FILTERS
FLT-017	LAB EXHAUST AIR HEPA FILTER
FLT-020	HOT LAB INTAKE FILTER (NOT SHOWN) ABOVE SUSPENDED CEILING
FLT-021	HOT CELL EXHAUST AIR HEPA FILTER
FLT-022	HOT CELL EXHAUST AIR HEPA FILTER
FLT-023-FLT-034	GLOVEBOX INLET AIR HEPA FILTERS (NOT SHOWN)
FLT-290	SOLVENT ADJUSTMENT FILTER
FLT-300A/B	PROCESS WATER CARTRIDGE FILTER
FLT-401A/B	PROCESS VESSEL VENT FILTERS
FLT-402A/B/C/D	PULSE MIXER VENT FILTERS
HRC-001	HEAT RECOVERY COIL
SCRUBBERS	
SCB-001	SCRUBBER
SCB-002	SCRUBBER
SCB-003	HOT CELL SCRUBBER
SCB-004	HOT CELL SCRUBBER
SCFS-001	SCRUBBER CAUSTIC FEED SYSTEM
SCFS-002	SCRUBBER CAUSTIC FEED SYSTEM
SEPARATORS	
SEP-001	BLDG CHILLED WATER AIR SEPARATOR
SEP-003	CONTROL ROOM CHILLED WATER AIR SEPARATOR
SEP-005	PROCESS CHILLED WATER AIR SEPARATOR
SEP-007	HEAT RECOVERY AIR SEPARATOR
SEP-015	PROCESS CHILLED WATER AIR SEPARATOR
PUMPS	
P-002A/B	BLDG CHILLED WATER SUPPLY PUMPS
P-004A/B	CONTROL ROOM CHILLED WATER PUMPS
P-006A/B	PROCESS CHILLED WATER SUPPLY PUMPS
P-007A/B	HEAT RECOVERY WATER PUMPS
TANKS	
TK-001	BLDG CHILLED WTR EXP TANK
TK-002	BLDG CHILLED WTR CHEM FEED TANK
TK-003	CONTROL ROOM CHILLED WTR EXP TANK
TK-004	CONTROL ROOM CHILLED WTR CHEM FEED TANK
TK-005	PROCESS CHILLED WTR EXP TANK
TK-006	PROCESS CHILLED WTR CHEM FEED TANK
TK-007	HEAT RECOVERY BLADDER EXP TANK
TK-008	HEAT RECOVERY CHEMICAL FEED TANK
TK-015	PROCESS CHILLED WATER EXPANSION TANK
TK-016	CHEMICAL BYPASS FEEDER TANK
VENTILATORS	
VLR-001	GRAVITY ROOF VENTILATOR
VLR-002	GRAVITY ROOF VENTILATOR (NOT SHOWN)

MISCELLANEOUS

#	NUMBER
&	AND
'	FEET
"	INCHES

MISCELLANEOUS ITEMS

BTR 001	DW PRESSURE BOOSTER SYSTEM
CPR 001	CATHODIC PROTECTION RECTIFIER
CMP 502	PRE-ACTION COMPRESSOR
CMP 504	BACK UP AIR RECEIVER COMPRESSOR
CSTD-001	CONTACTOR TEST STAND
DAS-01	DISTRIBUTIVE ANTENNA SYSTEM
DMST-401A/B	PROCESS VESSEL VENT DEMISTERS
DMST-402A/B	PULSE MIXER VENT DEMISTERS
HTR-001	DOMESTIC WATER HEATER/TANK
HTR-017A/B	STRIP CONTACTORS TEMPERED WATER HEATER
HTR-203A/B	STRIP SOLVENT FEED TEMPERED WATER HEATER
HTR-310A/B	STRIP FEED HEATERS
HTR-401A/B	PROCESS VESSEL VENT HEATERS
HTR-402A/B	PULSE MIXER VENT HEATERS
HX-015	ASP SECONDARY LOOP COOLER
HX-102A/B/C	FILTER RECIRCULATION COOLERS
HX-104	WASHING FILTER RECIRCULATION COOLER
HX-201	SALT SOLUTION FEED COOLER
HX-202A/B	SOLVENT FEED COOLERS
HX-203	STRIP CONTACTOR TEMPERED WATER HEAT EXCHANGER
HX-217A/B	SOLVENT STRIP FEED HEAT EXCHANGER
HX-290	SOLVENT ADJUSTMENT HEAT EXCHANGER
IX-312	DI WATER PACKAGE UNIT
OV-106	CONTACTOR OVEN

GENERAL NOTES

1. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR = 100'-0". SEE CIVIL DRAWING [illegible] FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
2. THE REFERENCED FLOOR ELEVATIONS ARE AT HIGH POINT OF FLOOR.
3. SEE F-FHA-J-0001 FIRE HAZARDS ANALYSIS FOR WATER CONTAINMENT INFORMATION.
4. NOT ALL EQUIPMENT SHOWN FOR CLARITY (EXAMPLE: FANS, HEPAS, CAMS, ETC.).
5. FOR THE ALPHA FINISHING FACILITY PROCESS EQUIPMENT DATA AND DESIGNATIONS SEE DRAWING P-PG-J-0007
6. OCCUPANCY FOR PROCESS BUILDING IS BASED ON ACTUAL OCCUPANTS RATHER THAN 100 SF PER OCCUPANT (PER GROSS FLOOR AREA) FOR EXITING AND OTHER CODE COMPLIANCES. OCCUPANCY SET AT 60 PERSONS ACTUAL FOR PRIMARY SHIFT PLUS ALLOWANCE FOR 15 DOE PERSONNEL. TOTAL PROCESS BUILDING OCCUPANCY FOR PRIMARY SHIFT = 75 OCCUPANTS.
7. CAMS AND ARMS SHALL BE PHYSICALLY LOCATED ON DETAIL DRAWINGS.
8. REFERENCE ARCHITECTURAL RADIATION ZONE DRAWINGS A-AD-J-0007, A-AD-J-0008SH1, A-AD-J-0008SH2 AND A-AD-J-0009 FOR RADIATION ZONE LOCATIONS.
9. DELETED.
10. IN ACCORDANCE WITH DOE-STD-1021-93 AND SPECIFIC PROJECT REQUIREMENTS, PERFORMANCE CATEGORIES FOR THE SWPF PROCESS BUILDING STRUCTURES ARE AS FOLLOWS:

    CENTRAL PROCESS AREA (CPA): PC-3
    COLD CHEMICALS AREA (CCA): PC-3
    ALPHA FINISHING FACILITY (AFF): PC-1
    NORTHERN FACILITY SUPPORT AREA (NFSA): PC-1
    EASTERN FACILITY SUPPORT AREA (EFSA): PC-1

11. DELETED.
12. THE GENERAL ARRANGEMENT DRAWINGS SUMMARIZE INFORMATION FROM OTHER APPROVED DOCUMENTS. THE LATEST REVISION OF THE EQUIPMENT DATABASE, DATA SHEETS, SUPPLIER SUBMITTALS, AND DETAILED DESIGN DRAWINGS TAKE PRECEDENCE OVER THE SUMMARY INFORMATION CONTAINED IN THE GENERAL ARRANGEMENT DRAWINGS.
13. SEE DRAWING P-PG-J-0024 FOR NEXT GENERATION SOLVENT BUILDING GENERAL ARRANGEMENT DRAWING. (11)

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.
No. C01004
CERTIFICATE OF AUTHORIZATION

G P1 J 00001 11

PARSONS
1000 Silver Bluff Rd. • Aiken, SC 29803 (803)[illegible]

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

REV.	REV. NO.	DATE	REVISION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	11	[illegible]	ISSUED FOR USE - REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible], [illegible] AND [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible] AND [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	7	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	9	[illegible]	ISSUED FOR CONSTRUCTION, REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	10	[illegible]	ISSUED FOR USE - REVISED PER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES

(U)

NONE	G-P1-J-00001	1 of 2	11

SWPFE3D.BDR

10000-P-14-0

REFERENCES

- COLUMN LINE GRID DESIGNATION
- CENTER LINE
- FLOOR, ELEVATION LINES (ELEVATIONS & SECTIONS ONLY)
- ELEVATION SYMBOL — EL 000'-00"
- SECTION TITLE REFERENCE — SECTION DESIGNATOR; SECTION; SCALE; DRAWING WHERE SECTION IS SHOWN; DRAWING WHERE SECTION IS CUT
- SECTION CUT
- NORTH ARROW

MATERIALS

- EARTH
- CONCRETE
- GRATING
- CHECKER PLATE

SYMBOLS

- EMERGENCY EXIT ONLY — EEO
- CONTACTOR (EXTRACTION/WASH/SCRUB/STRIP)
- PERSONNEL CONTAMINATION MONITOR — PCM
- SUMP
- TANKS
- DRUMS
- PUMPS
- CONVEYOR
- COILING STEEL OVERHEAD DOOR WITH HOOD
- SHOWER
- SHOWER BENCH
- DOOR
- WELDED WIRE FABRIC DOOR
- EQUIPMENT LIFT
- FLOOR DRAIN (FD) / HUB DRAIN (HD) — FD, HD
- EMERGENCY SHOWER AND EYE WASH STATION (ESEWS)
- CEILING EMERGENCY SHOWER
- LABORATORY SINK WITH INTEGRAL EYEWASH
- ROOM NUMBER — P123
- PRINTER
- FILES
- REFERENCE TABLE
- DISTRIBUTION FRAME
- MONITOR (RES DISPLAY)
- CHAIR
- CAGED LADDER
- DRAWING FILES
- DESK
- SERVER RACK

ABBREVIATIONS

ACU	AIR CONDITIONING PACKAGE UNIT
AFF	ALPHA FINISHING FACILITY
AGT	AGITATOR
ARM	AREA RADIATION MONITOR
ASDT	ALPHA SORPTION DRAIN TANK
ASP	ALPHA SORPTION PROCESS
AST	ALPHA SORPTION TANK
ATS	AUTOMATIC TRANSFER SWITCH
AHU	AIR HANDLING UNIT
BO	BARRIER
BATT	BATTERY
BC	BRIDGE CRANE
BLDG	BUILDING
BTR	PRESSURE BOOSTER PUMP
CAM	CONTINUOUS AIR MONITOR
CCL	COOLING COIL
CCTV	CLOSED CIRCUIT TELEVISION
CHW	CHILLED WATER
CMP	COMPRESSOR
CNP	CENTRAL NETWORK PANEL
CONC	CONCRETE
CSDT	CLEANING SOLUTION DUMP TANK
CSSX	CAUSTIC SIDE SOLVENT EXTRACTION
DAS	DISTRIBUTIVE ANTENNA SYSTEM
DECON	DECONTAMINATION
DL	DOCK LEVELER
DMST	DEMISTER
DOE	DEPARTMENT OF ENERGY
DSSHT	DECONTAMINATED SALT SOLUTION HOLD TANK
DT	DRUM TUMBLER
DWPF	DEFENSE WASTE PROCESSING FACILITY
EEO	EMERGENCY EXIT ONLY
EL	ELEVATION OR EQUIPMENT LIFT
ESEWS	EMERGENCY SHOWER AND EYEWASH STATION
EXP	EXPANSION
EXT	EXTRACTION
FD	FLOOR DRAIN
FFT	FILTER FEED TANK
FH	FUME HOOD
FL	FORKLIFT
FLT	FILTER
FP	FIRE PROTECTION
GB	GLOVE BOX
GPM	GALLONS PER MINUTE
GWB	GYPSUM WALL BOARD
HC	HOT CELL
HD	HUB DRAIN
HEPA	HIGH EFFICIENCY PARTICULATE AIR
HP	HIGH POINT
HR	HOUR
HRC	HEAT RECOVERY COIL
HTR	HEATER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HX	HEAT EXCHANGER
ICD	INTERFACE CONTROL DOCUMENT
ICP	INSTRUMENT CONTROL PANEL
ICR	INSTRUMENT CONTROL RACK
IR	INSTRUMENT RACK
IST	INTERMEDIATE STORAGE TANK
IT	INFORMATION TECHNOLOGY
IX	ION EXCHANGER
LDT	LAB DRAIN TANK
LLW	LOW LEVEL WASTE
LP	LOW POINT
LRW	LIQUID RADIOACTIVE WASTE
M	MOLAR
M&O	MANAGEMENT & OPERATING (CONTRACTOR)
MAINT	MAINTENANCE
MCC	MOTOR CONTROL CENTER
MGAL	MILLION GALLONS
HR	HANDRAIL
MSL	MEAN SEA LEVEL
MST	MONOSODIUM TITANATE
MW	MIXED WASTE
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
NaOH	SODIUM HYDROXIDE
Na+	SODIUM ION
O TO A	ORGANIC TO AQUEOUS
OH	OVERHEAD
OPER	OPERATOR
P	PUMP
PBVS	PROCESS BUILDING VENTILATION SYSTEM
PCM	PERSONNEL CONTAMINATION MONITOR
PLCS	PLACES
PMVS	PULSE MIXER VENT SYSTEM
PNL	PANEL
PVVS	PROCESS VESSEL VENT SYSTEM
PNCB	PARSONS NETWORK LAN CABINET
RAD/RCON	RADIOLOGICAL CONTROL
RBA	RADIOLOGICAL BUFFER AREA
RH	RADIO HOOD
RMP	RADIATION MONITORING PANEL
RWP	RADIOLOGICAL WORK PERMIT
SCB	SCRUBBER
SCFM	STANDARD CUBIC FEET PER MINUTE
SDG	STAND-BY DIESEL GENERATOR
SDT	SOLVENT DRAIN TANK
SEHT	STRIP EFFLUENT HOLD TANK
SEP	SEPARATOR
SH	SHEET
SI	SPECIALTY ITEM
SAST	SPENT ACID STORAGE TANK
SP	SAMPLE PUMP
[illegible]	SRS NETWORK LAN CABINET
SSFT	SALT SOLUTION FEED TANK
SSP	SAFE SHUTDOWN PANEL
SSRT	SLUDGE SOLIDS RECEIPT TANK
SS	STAINLESS STEEL
STS	SAMPLE TRANSFER SYSTEM
SWGR	SWITCHGEAR
SWPF	SALT WASTE PROCESSING FACILITY
TBD	TO BE DETERMINED
TBV	TO BE VERIFIED
TDH	TOTAL DYNAMIC HEAD
TERM	TERMINATION CABINET
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TF	TANK FARM
TK	TANK
TRANS	TRANSFER
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
[illegible]	UNINTERRUPTIBLE POWER SUPPLY
[illegible]	VIBRATION CONDITIONING MONITORING
VFD	VARIABLE FREQUENCY DRIVE
VLR	VENT LATER
VMC	VIBRATION MONITOR CABINET
VMP	VIBRATION MONITOR PANEL
WAC	WASTE ACCEPTANCE CRITERIA
WTR	WATER
WWHT	WASH WATER HOLD TANK

GENERAL NOTES

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14718 JAMES C. SOMMA

7/12/19

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01094

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[illegible]	[illegible]	[illegible]	ISSUED FOR CONSTRUCTION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	ISSUED FOR [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PARSONS

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

SWPF

PROCESS BUILDING

GENERAL ARRANGEMENT

DRAWING INDEX, SYMBOLS, ABBREVIATIONS, EQUIPMENT DESIGNATIONS AND GENERAL NOTES

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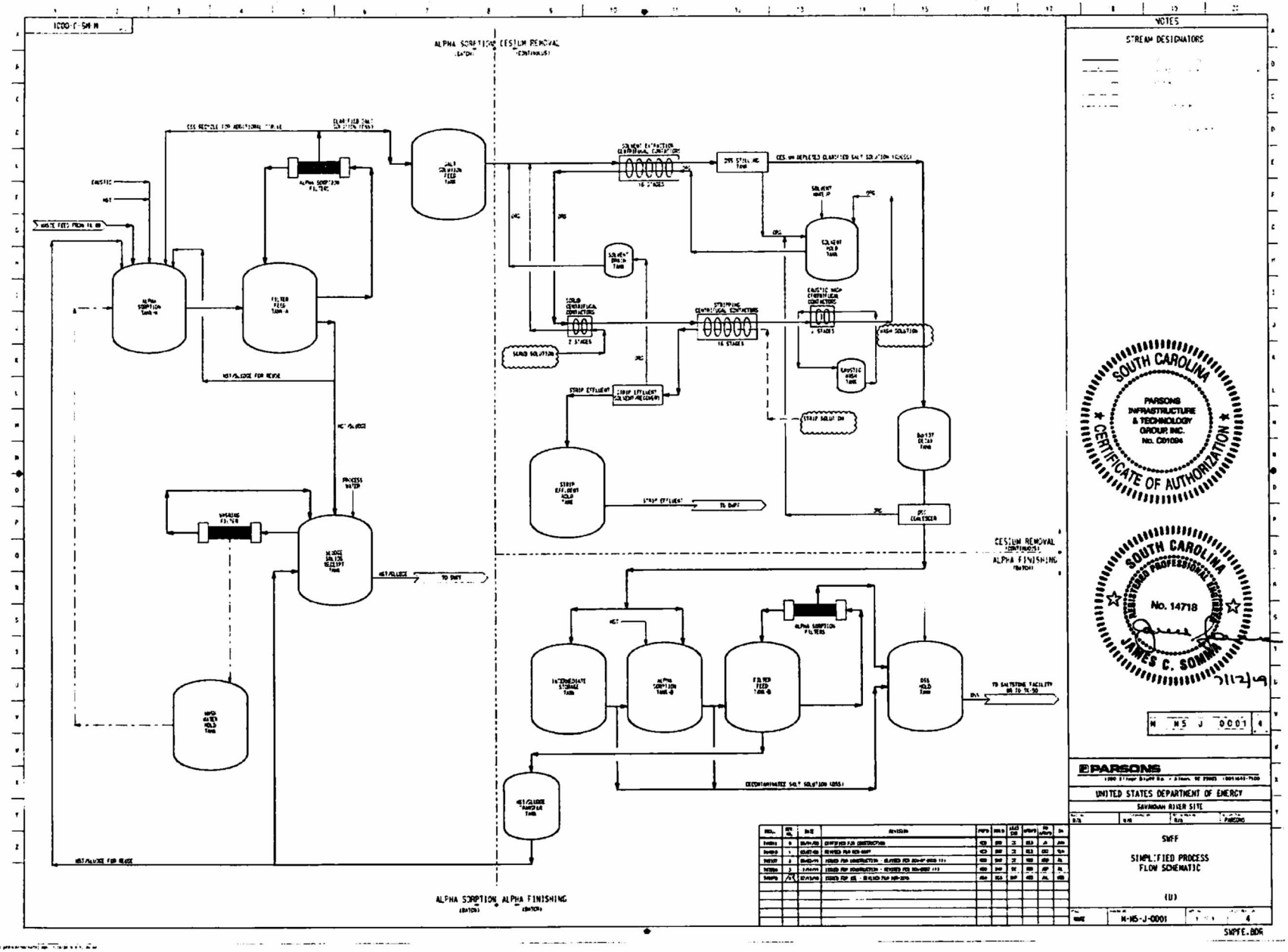
G-P1-J-00001 2

SWPFE3D.BCR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(BATCH) (CONTINUOUS)
CESIUM REMOVAL (CONTINUOUS)
ALPHA FINISHING (BATCH)
ALPHA SORPTION (BATCH)
ALPHA FINISHING (BATCH)
NOTES
STREAM DESIGNATORS
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.
No. C01004
CERTIFICATE OF AUTHORIZATION
SOUTH CAROLINA
No. 14718
JAMES C. SOMMA
PROFESSIONAL ENGINEER
3/12/09
M-HS-J-0001
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWFF
SIMPLIFIED PROCESS FLOW SCHEMATIC
(U)
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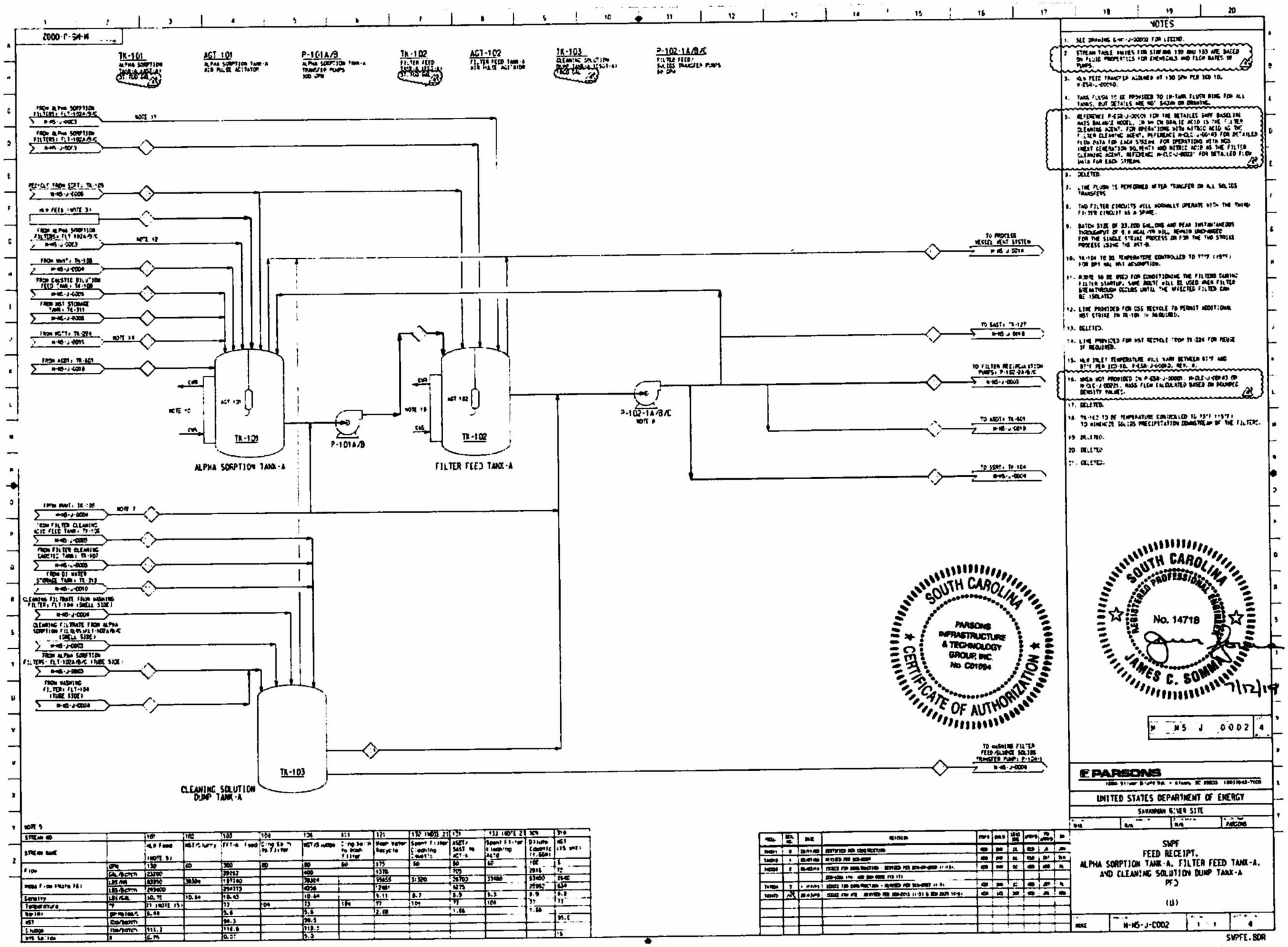
2000-F-SW-W
NOTES
TK-101
AGT-101
P-101A/B
TK-102
AGT-102
TK-103
P-102-1A/B/C
ALPHA SORPTION TANK-A
FILTER FEED TANK-A
CLEANING SOLUTION DUMP TANK-A
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01994
CERTIFICATE OF AUTHORIZATION
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
FEED RECEIPT,
ALPHA SORPTION TANK-A, FILTER FEED TANK-A,
AND CLEANING SOLUTION DUMP TANK-A
PFD
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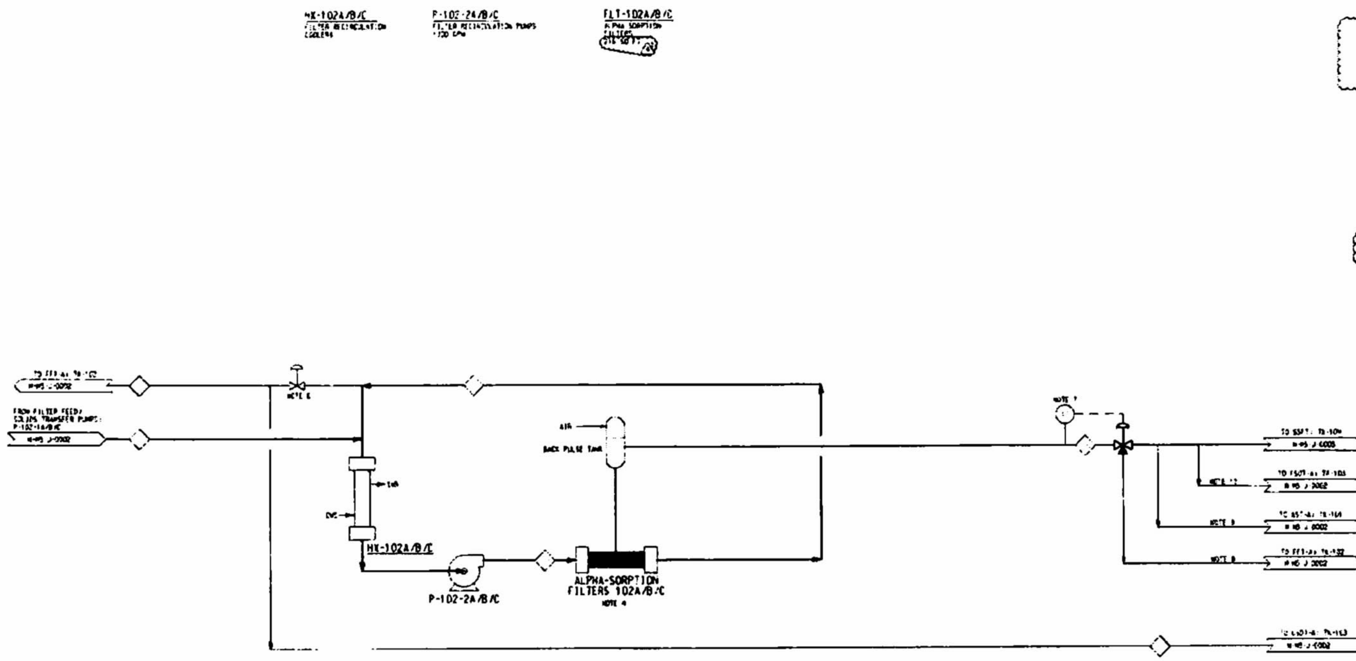
SWPFI.BDR



NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. DELETED
3. REFERENCE [illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NGS (NEXT GENERATION SOLVENT) AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
4. EACH FILTER WILL BE DESIGNED FOR 50% OF REQUIRED TOTAL CAPACITY. THE FILTER CIRCUITS WILL NORMALLY OPERATE WITH THIRD FILTER CIRCUIT AS SPARE.
5. DELETED.
6. PRESSURE RESTRICTION DEVICE TO PROVIDE BACK PRESSURE ON FILTERS.
7. ON-LINE PARTICULATE ANALYZER TO DETECT FILTER BREAKTHROUGH.
8. ROUTE TO BE USED FOR CONDITIONING THE FILTERS DURING FILTER STARTUP. SAME ROUTE WILL BE USED WHEN FILTER BREAKTHROUGH OCCURS UNTIL THE AFFECTED FILTER CAN BE ISOLATED.
9. LINE PROVIDED FOR ESS RECYCLE TO PERMIT ADDITIONAL MST STRIKE [illegible] IF REQUIRED.
10. [illegible] NOT PROVIDED IN [illegible]. MASS FLOW CALCULATED BASED ON [illegible] DENSITY VALUES.
11. DELETED.
12. ROUTE TO BE USED DURING FILTER CLEANING.

NOTE 3

STREAM NO		102	105 (NOTE 8)	107 (NOTE 8)	108	110	112
STREAM NAME		MST/ Slurry	Filter Feed	Filter Recirc	Filtrate to SSFT	Cleaning Solution Return	Sludge Return to HSI-A
Flow	GPM	60	1300	1299.2	21.5	49.3	58.5
	GAL/Batch				27002		
Mass Flow (Note 10)	LBS/HR	38324	829925	823025	13421		62842
	LBS/Batch				290601		
Density	LBS/GAL	10.64	10.64	10.64	10.43		10.64
Temperature	°F				73	104	
[illegible]	[illegible]				5.6		
MST	[illegible]/Batch						
Wt% Solids	%						

W-NS-J-0003 | 4

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SAVANNAH RIVER SITE

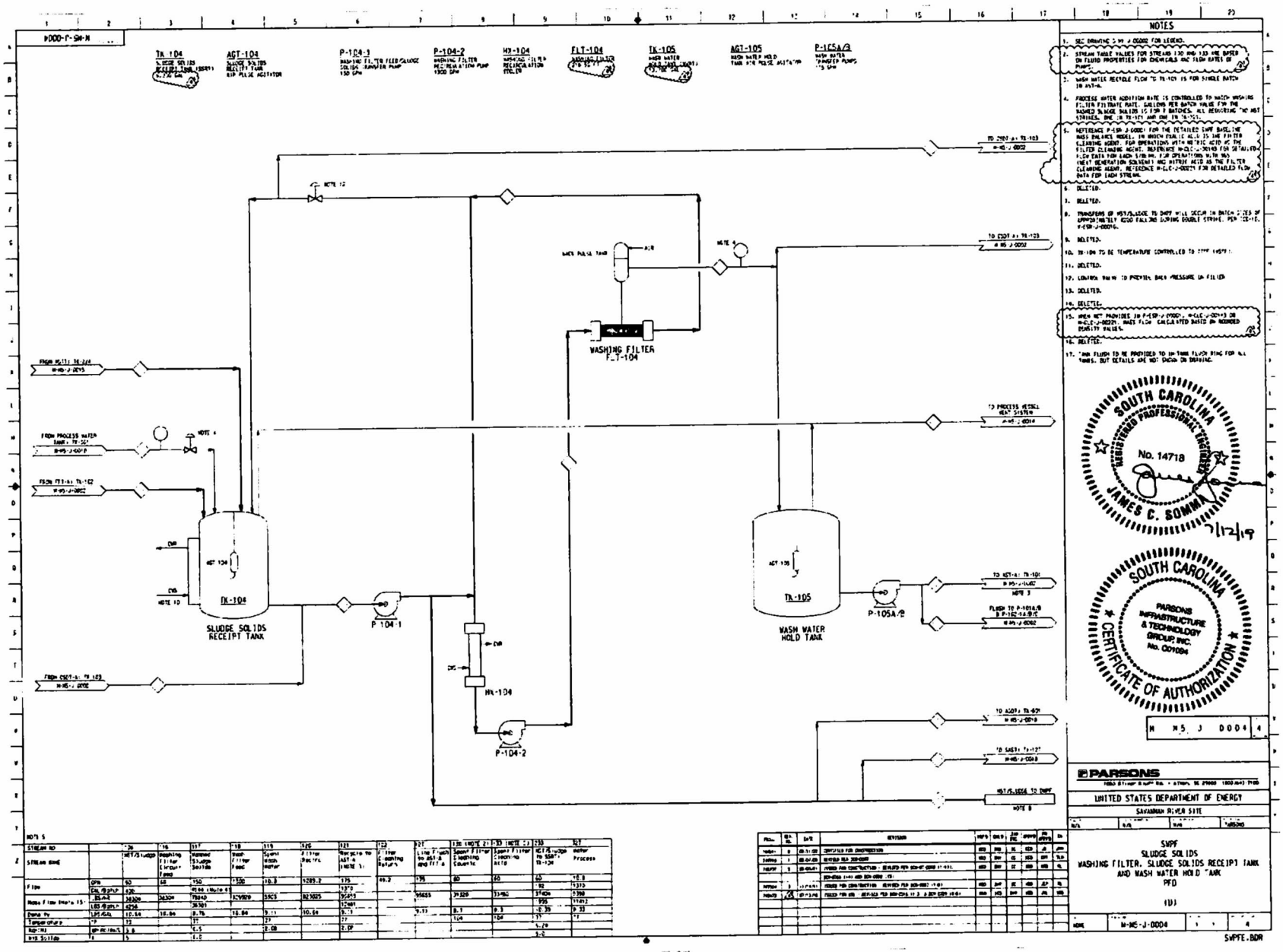
REV. NO.	DATE	REVISION
0	[illegible]	CERTIFIED FOR CONSTRUCTION
1	[illegible]	REVISED PER [illegible]
2	[illegible]	ISSUED FOR CONSTRUCTION - REVISED PER [illegible]
3	[illegible]	ISSUED FOR CONSTRUCTION - REVISED PER [illegible]
4	[illegible]	ISSUED FOR USE - REVISED PER [illegible]

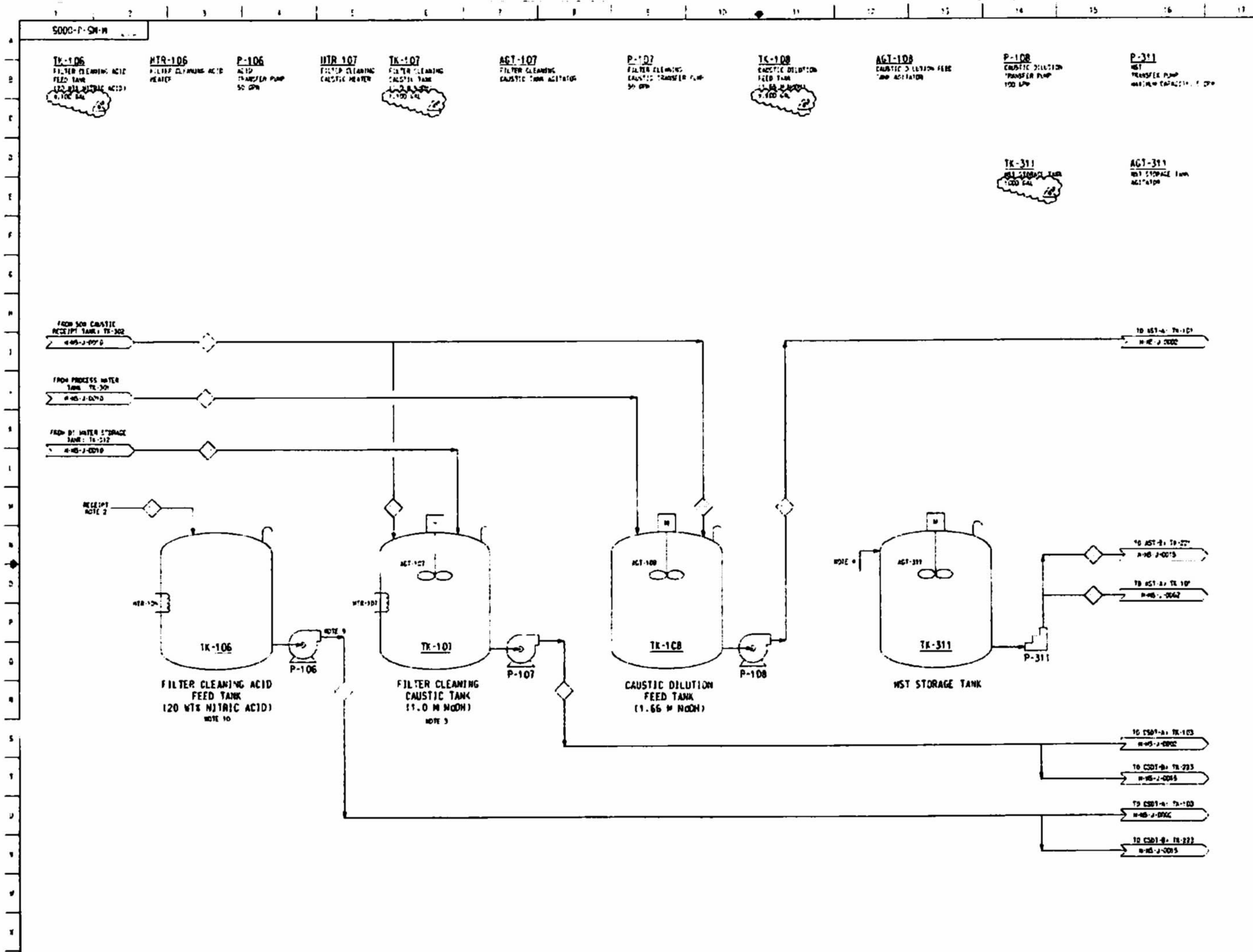
SWPF
ALPHA SORPTION FILTERS
FLT-102A/B/C
PFD

(U)

SCALE: NONE | W-NS-J-0003 | 4

SWPFE.BDR


NOTES
WASHING FILTER FLT-104
SLUDGE SOLIDS RECEIPT TANK
TK-104
WASH WATER HOLD TANK
TK-105
P-104-1
P-104-2
P-105A/B
HX-104
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01084
CERTIFICATE OF AUTHORIZATION
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
SLUDGE SOLIDS
WASHING FILTER, SLUDGE SOLIDS RECEIPT TANK AND WASH WATER HOLD TANK
PFD
(U)
M-M5-J-0004
SWPFE.BDR

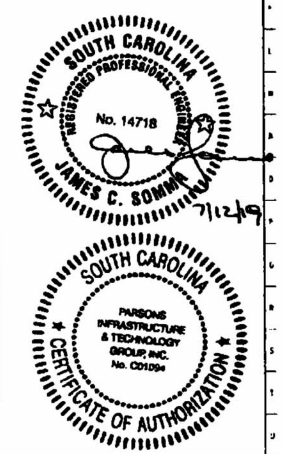


NOTES

1. SEE DRAWING S-M-J-00002 FOR LEGEND.
2. NITRIC ACID WILL BE UNLOADED FROM TANKER TRUCKS OR PORTABLE CONTAINERS.
3. FILTER CLEANING CAUSTIC IS MADE UP ON AN REQUIRED BASIS.
4. MST SLURRY WILL BE TRANSFERRED FROM PORTABLE DRUMS.
5. STREAM TABLE VALUES FOR STREAM 306 ARE BASED ON FLUID PROPERTIES FOR CHEMICALS AND FLOW RATES OF PUMPS.
6. DELETED.
7. WHEN NOT PROVIDED IN P-ESR-J-00007, M-CLC-J-00143, OR M-CLC-J-00221 MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
8. REFERENCE P-ESR-J-00007 FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00143 FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NGS (NEXT GENERATION SOLVENT) AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00221 FOR DETAILED FLOW DATA FOR EACH STREAM.
9. RECIRCULATION LINE WILL BE PROVIDED TO TK-106 FOR MIXING.
10. 0.5M OXALIC ACID MAY ALSO BE USED FOR FILTER CLEANING.

NOTE 8

STREAM NO.		301	303	304	305	306	308	309	310	311
STREAM NAME		Nitric Acid (20 wt%)	Nitric Acid (20 wt%)	50 wt% Caustic	DI Water	Filter Cleaning Caustic (1.0 M) (NOTE 5)	50 wt% Caustic	Dilute Caustic (1.66 M)	MST (15 wt%)	MST (15 wt%)
Flow	GPM	25	50	0.5	100	50	25	100	5	5
	Gal./Batch	3400	850	80	806	850	618	2916	92	75
Mass Flow (Note 7)	LBS/HR	13950	27900	383	49980	26100	19170	53400	2640	2640
	LBS/Batch	31820	7905	560	6710	7395	8329	25952	630	660
Density	LBS/GAL	9.3	9.3	12.78	8.33	8.7	12.78	8.9	8.9	8.8
Temperature	°F	77	104	90	77	104	90	77	77	77
Mol. (M)	gmoles/L					1.0		1.66		
Water	LBS/HR	11160	22320	192	49980	25030	9585	50075		
MST	LBS/HR								396	396
HNO3	LBS/HR	2790	5580							
NaOH	LBS/HR			192		1070	9585	3325		



M M5 J 0005 4

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SAVANNAH RIVER SITE

SWPF
COLD CHEMICAL MAKEUP
FOR FILTER CLEANING
AND FEED ADJUSTMENT
P&ID

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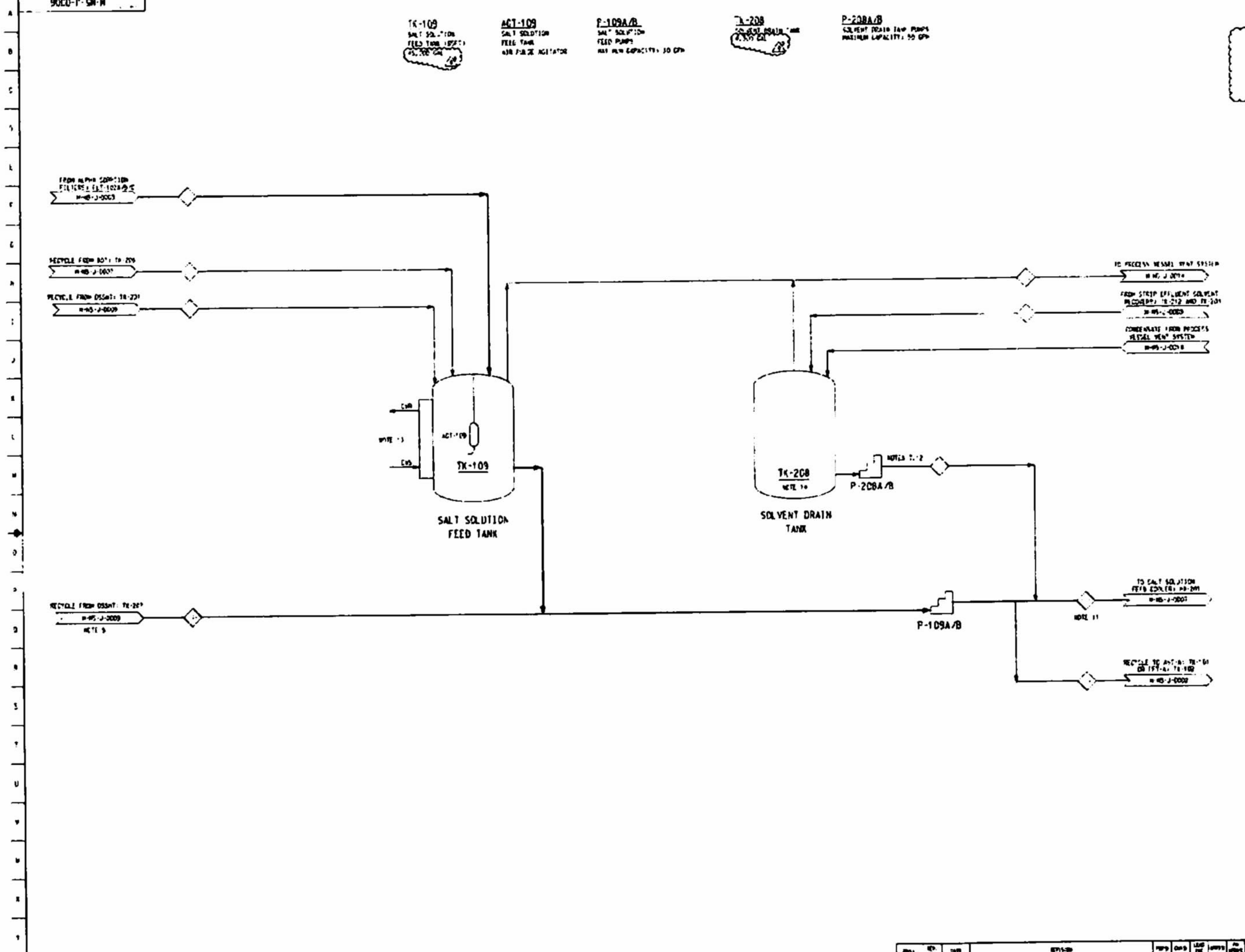
M-M5-J-0005 | 4

SWPFE.BDR



NOTE 3

STREAM NO		120	125	126	220
STREAM NAME		Filtrate to SSFT	Clarified Salt Solution	Recycle to AST ...	Recovered Solvent
Flow	GPM	21.5	21.5	30	0.5 (Note 15)
Mass Flow (Note 9)	LBS/HR	13421	13421	18770	
Density	LBS/GAL	10.43	10.43	10.43	
Temperature	°F	73	73	73	
Na+	gmol/L	5.6	5.6	5.6	

NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. DELETED.
3. REFERENCE P-[illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH [illegible] AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
4. DELETED.
5. LINE PROVIDED FOR RESTART OF CSSX PROCESS WHEN REQUIRED. FEEDING [illegible] TO EXTRACTION CONTACTORS AT STARTUP PREVENTS CESIUM FROM FLOWING THROUGH THE CONTACTORS TO TK-[illegible].
6. DELETED.
7. SOLVENT DRAIN TANK CONTENTS ARE PUMPED TO INLET OF THE CSSX SYSTEM. THE CONTENTS IN TK-208 COULD POTENTIALLY CONTAIN HIGH CESIUM.
8. DELETED.
9. WHEN NOT PROVIDED IN P-[illegible], [illegible] OR [illegible], MASS FLOW CALCULATED BASED ON SOURCED DENSITY VALUES.
10. TANK FLUSH TO BE PROVIDED TO IN-TANK FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
11. TK-109 OUTLET TEMPERATURE OF 73°F ASSUMES CONTINUOUS OPERATION OF ASP AND CSSX.
12. RECIRCULATION LINE WILL BE PROVIDED TO TK-208 FOR MIXING.
13. TK-109 TO BE TEMPERATURE CONTROLLED TO 73°F ([illegible]).
14. ALTERNATE FLOW PATH EXISTS TO TK-208 FROM TK-235, LAB DRAIN TANK, IF TK-235 CONTAINS SOLVENT.
15. INTERMITTENT LOW FLOW RECYCLED TO PROCESS. PUMP SIZED FOR TANK MIXING.

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M-M5-J-0006 4

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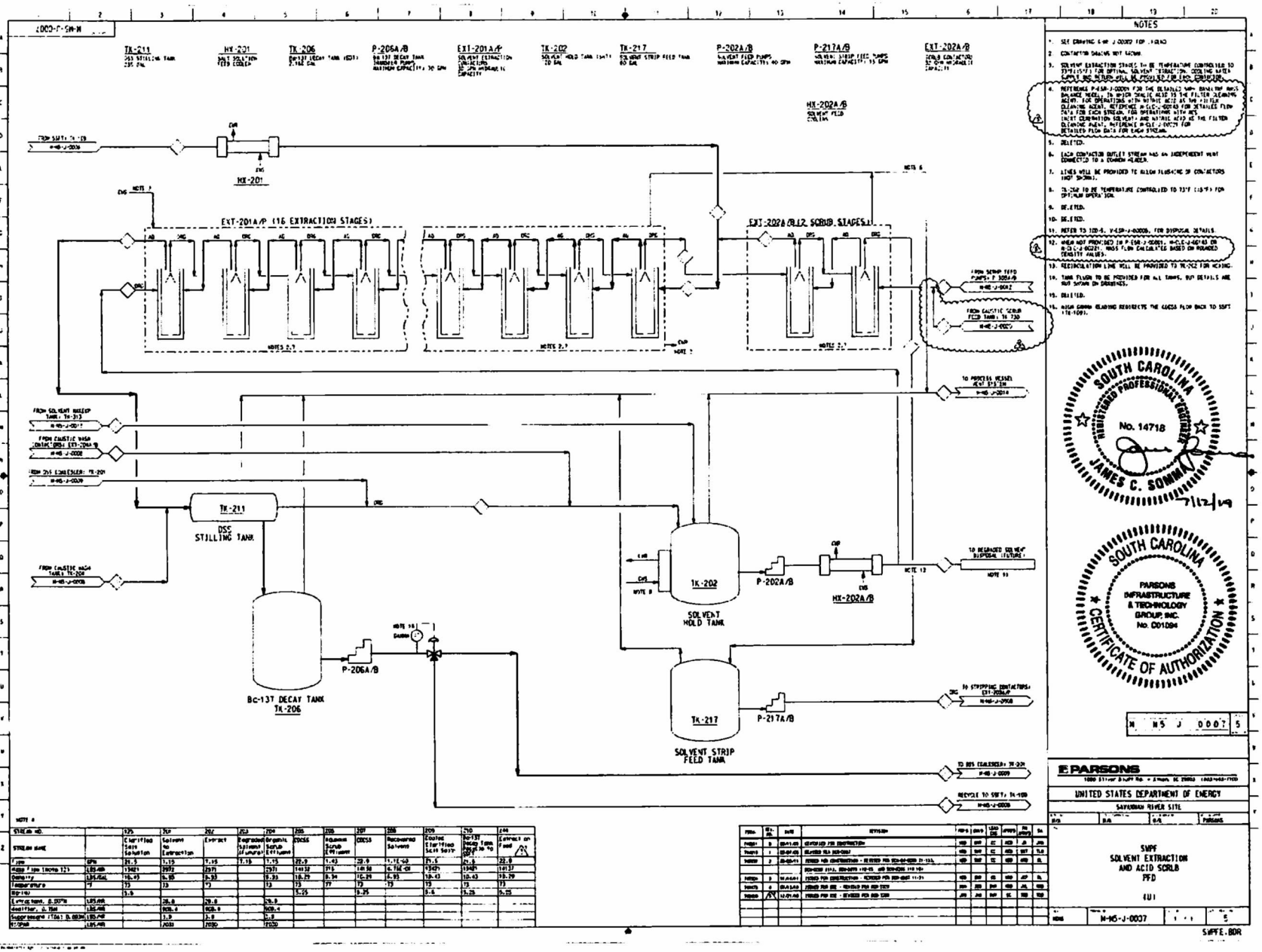
SAVANNAH RIVER SITE

SWPF
SALT SOLUTION FEED TANK
AND SOLVENT DRAIN TANK
PFD

(U)

M-M5-J-0006 4

SWPFE.BDR


TK-211
DSS STILLING TANK
TK-206
Bc-137 DECAY TANK
EXT-201A/P (16 EXTRACTION STAGES)
EXT-202A/B (2 SCRUB STAGES)
HX-201
HX-202A/B
TK-202
SOLVENT HOLD TANK
TK-217
SOLVENT STRIP FEED TANK
P-206A/B
P-202A/B
P-217A/B
NOTES
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REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION
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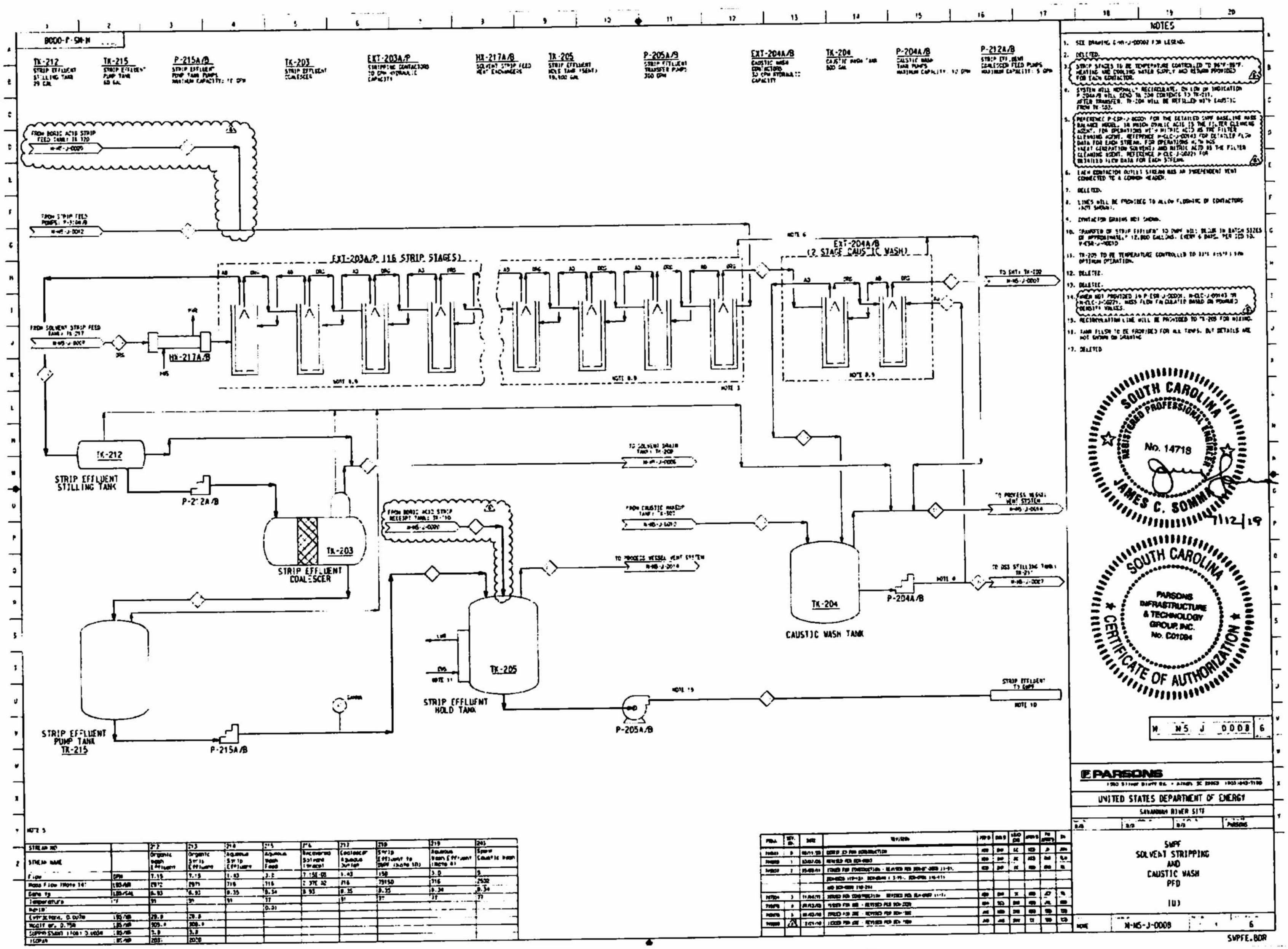
SAVANNAH RIVER SITE
SWPF
SOLVENT EXTRACTION AND ACID SCRUB PFD
M-M5-J-0007

SWPFE.BDR



NOTES
TK-212
TK-215
P-215A/B
TK-203
EXT-203A/P
HX-217A/B
TK-205
P-205A/B
EXT-204A/B
TK-204
P-204A/B
P-212A/B
EXT-203A/P (16 STRIP STAGES)
EXT-204A/B (2 STAGE CAUSTIC WASH)
STRIP EFFLUENT STILLING TANK
P-212A/B
STRIP EFFLUENT COALESCER
STRIP EFFLUENT PUMP TANK
P-215A/B
STRIP EFFLUENT HOLD TANK
P-205A/B
CAUSTIC WASH TANK
P-204A/B
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REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION
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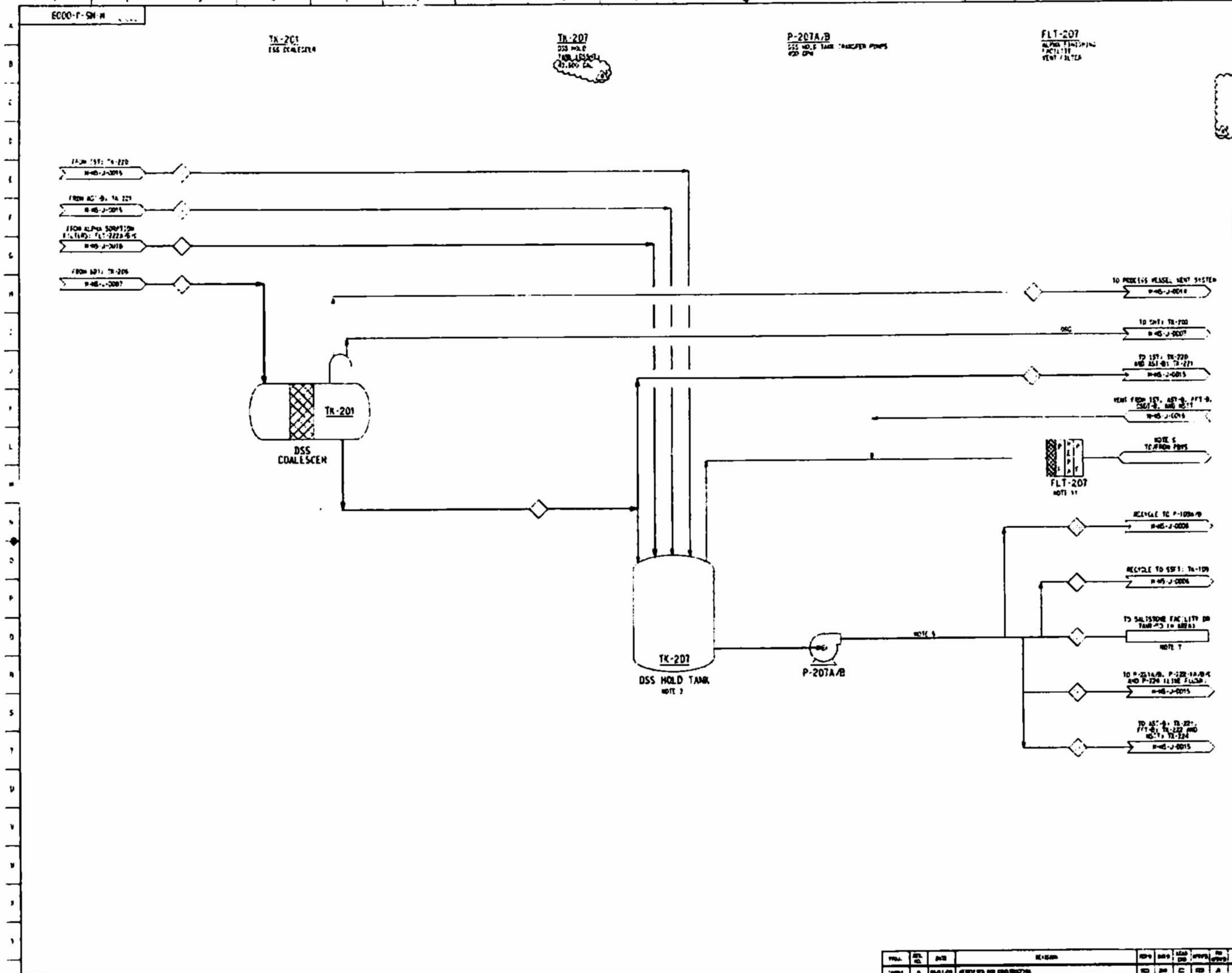
SAVANNAH RIVER SITE
SWPF
SOLVENT STRIPPING
AND
CAUSTIC WASH
PFD
(U)
M-M5-J-0008
6
SWPFE.BDR



NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. DELETED.
3. DSS HOLD TANK SIZED FOR 26 HOUR STORAGE
4. DELETED
5. REFERENCE [illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NEXT GENERATION SOLVENT AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
6. THE ALPHA FINISHING FACILITY VESSELS VENTS THROUGH THE BUILDING VENTILATION SYSTEM.
7. DSS TRANSFERS WILL OCCUR IN BATCH SIZES OF APPROXIMATELY 33,000 GALLONS EVERY 24 HOURS. PER [illegible].
8. DELETED.
9. RECIRCULATION LINE WILL BE PROVIDED TO TK-201 FOR MIXING.
10. WHEN NOT PROVIDED IN [illegible] OR [illegible], MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
11. DRAIN PROVIDED TO ALPHA FINISHING DRAIN TANK, TK-220.
12. DELETED.
13. TANK FLUSH TO BE PROVIDED FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
14. DELETED.

NOTE 5

STREAM NO		202	221	222	223	224	229	240	241	246
STREAM NAME		CDCSS	CDCSS	DSS to Saltstone or Tank-50 (Note 7)	DSS Hold Tank Recycle to SSFT	Ba-137 Decay Tank Effluent	To DSSHT	Line Flush To AST-B and FFT-B	Tank Flush To AST-B and FFT-B	Recycle for CSSX Startup
Flow	GPM	22.9	22.9	150	150	22.9	22.8	400	400	71.5
Mass Flow (Note 10)	LBS/HR	14133	14137	92510	92510	14137	14076			13274
Density	LBS/GAL	10.29	10.29	10.29	10.29	10.29	10.29			10.29
Temperature	°F	73	73	77	77	73	77			77
[illegible]	[illegible]	5.25	5.25	5.24	5.24	5.25	5.24			5.24

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SAVANNAH RIVER SITE

SWPF
DSS COALESCER,
DSS HOLD TANK AND
TRANSFER PUMPS
PFD

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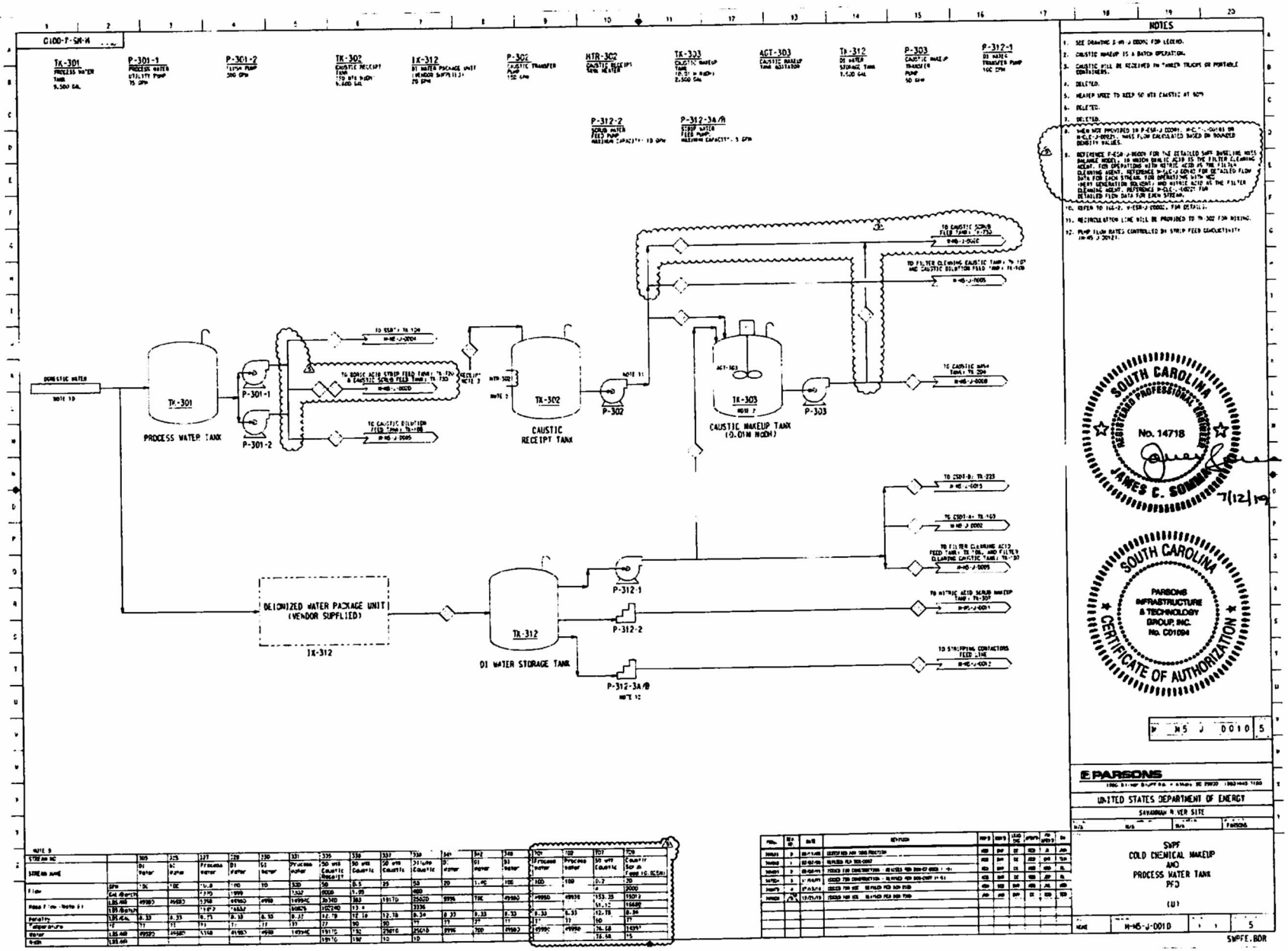
N-N5-J-0009 | 4

SWPFE.BDR


TK-301
PROCESS WATER TANK
P-301-1
P-301-2
TK-302
CAUSTIC RECEIPT TANK
P-302
TK-303
CAUSTIC MAKEUP TANK (0.01M NaOH)
P-303
DEIONIZED WATER PACKAGE UNIT (VENDOR SUPPLIED)
TK-312
DI WATER STORAGE TANK
P-312-1
P-312-2
P-312-3A/B
NOTES
1. SEE DRAWING S-M5-J-00001 FOR LEGEND.
2. CAUSTIC MAKEUP IS A BATCH OPERATION.
3. CAUSTIC WILL BE RECEIVED IN TANKER TRUCKS OR PORTABLE CONTAINERS.
4. DELETED.
5. HEATER USED TO KEEP 50 WT% CAUSTIC AT 80°F
6. DELETED.
7. DELETED.
8. WHEN NOT PROVIDED IN P-CSH-J-00001, MISC. LOADS OR M-CLC-J-00021, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
9. REFERENCE P-CSH-J-00001 FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL. IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00045 FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NEXT GENERATION REAGENT AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00021 FOR DETAILED FLOW DATA FOR EACH STREAM.
10. REFER TO M5-J-0010-2, M-CSH-J-00001, FOR DETAILS.
11. RECIRCULATION LINE WILL BE PROVIDED TO TK 302 FOR MIXING.
12. PUMP FLOW RATES CONTROLLED BY STRIP FEED CONCENTRATION IN M5-J-00021.
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SOUTH CAROLINA PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. CO1094 CERTIFICATE OF AUTHORIZATION
M5 J 0010 5
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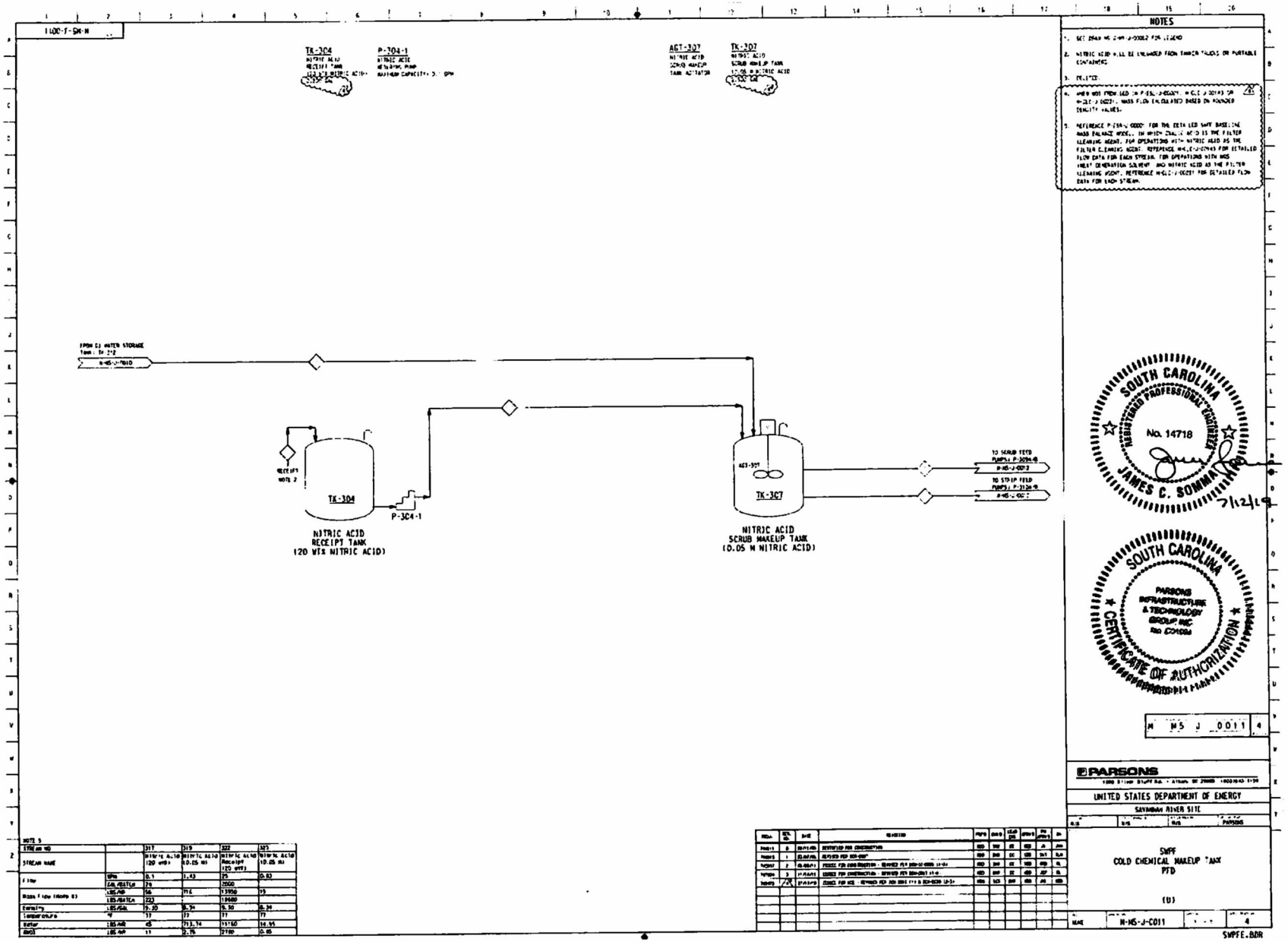
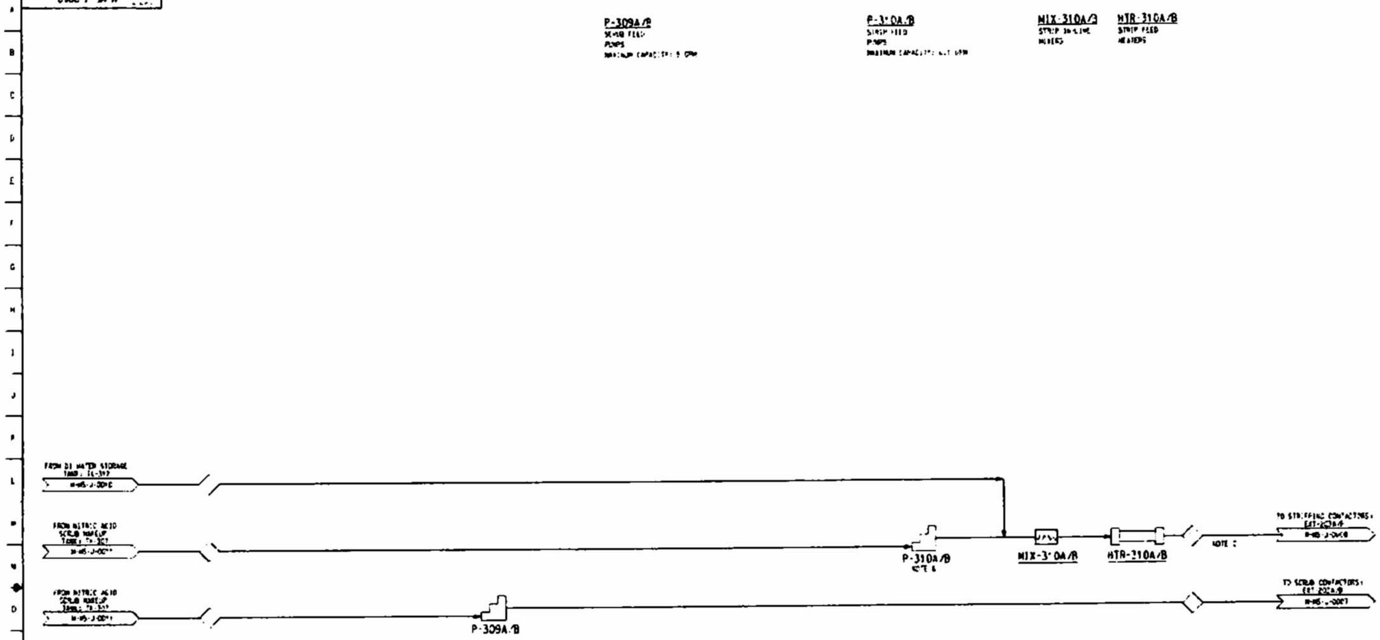
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
COLD CHEMICAL MAKEUP AND PROCESS WATER TANK PFD
(U)
M-M5-J-0010
5
SWPFE.BDR


TK-304
P-304-1
AGT-307
TK-307
NOTES
FROM DI WATER STORAGE
TK-304
P-3C4-1
AGT-307
TK-3C7
NITRIC ACID
RECEIPT TANK
(20 WIN NITRIC ACID)
NITRIC ACID
SCRUB MAKEUP TANK
(0.05 M NITRIC ACID)
TO SCRUB FEED
TO STRIP FEED
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMERVILLE
7/12/19
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC
CERTIFICATE OF AUTHORIZATION
M M5 J 0011 4
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SMPF
COLD CHEMICAL MAKEUP TANK
PFD
(U)
M-M5-J-C011
4
SMPFE.BDR



NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. TEMPERATURE OF STRIP SOLUTION CONTROLLED TO [illegible]
3. DELETED.
4. REFERENCE [illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NEXT GENERATION SOLVENT AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
5. WHEN NOT PROVIDED IN [illegible] MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
6. PUMP FLOW RATES CONTROLLED BY STRIP FEED CONDUCTIVITY.

NOTE 4

STREAM NO		311	312
Stream name		Strip Feed [illegible]	Scrub Feed [illegible]
Flow	GPM	[illegible]	[illegible]
Mass Flow (NOTE 5)	LBS/HR	[illegible]	[illegible]
Density	LBS/GAL	[illegible]	[illegible]
Temperature	°F	[illegible]	[illegible]
Water	LBS/HR	[illegible]	[illegible]
HNO3	LBS/HR	[illegible]	[illegible]

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14718 JAMES C. SOMMA

7/12/1?

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01094

M M5 J 0012 4

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UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

SWPF
SOLVENT EXTRACTION
STRIP AND SCRUB FEED PUMPS
PFD

(U)

M-M5-J-0012 | 4

SWPFE.BDR

M-M5-J-0013

ACT-313
SOLVENT MAKEUP TANK AGITATOR

TK-313
SOLVENT MAKEUP TANK

P-313
SOLVENT MAKEUP TRANSFER PUMP

NOTE 4

STREAM NO		313
STREAM NAME		Solvent
Flow	GPM	5
Mass Flow (NOTE 4)	LBS/HR	2039
Density	LBS/GAL	6.83
Temperature	°F	77

NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. REFERENCE [illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NGS (NEXT GENERATION SOLVENT) AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
3. DILUENT, SUPPRESSANT [illegible], AND MODIFIER CAN BE ADDED (IF NEEDED) IN SMALL QUANTITIES TO SOLVENT MAKEUP TANK.
4. [illegible] MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
5. SOLVENT WILL BE TRANSFERRED FROM PORTABLE DRUMS.

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REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/14

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No. C01094
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M-M5-J-0013 4

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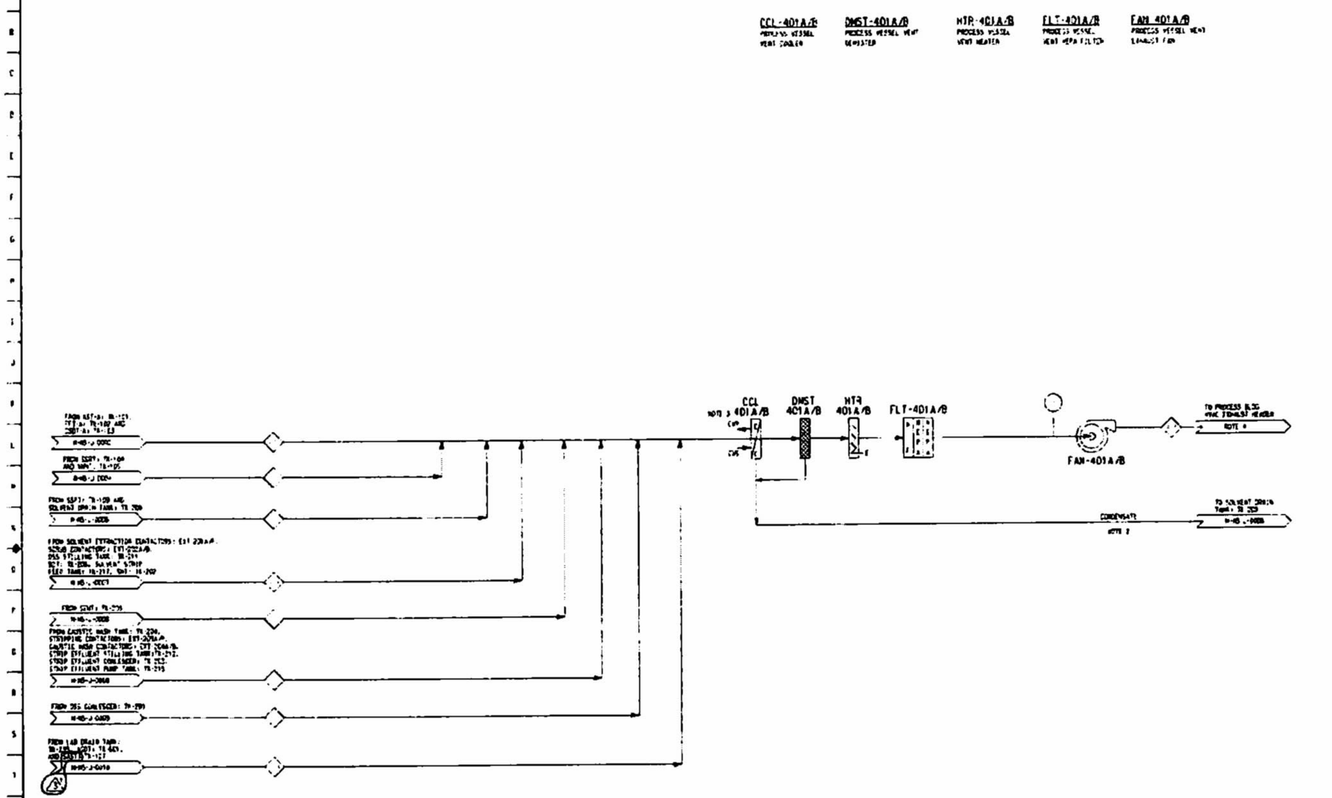
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

SWPF
SOLVENT MAKEUP TANK
PFD

(U)

M-M5-J-0013 4

SWPFE.BDR



NOTES

1. SEE DRAWING C-M-J-20002 FOR LEGEND.
2. NO FLOW IS PROVIDED FOR THIS STREAM AS THE FLOW RATE OF THE CONDENSATE STREAM WILL BE VERY LOW.
3. COOLER CCL-401A/B OUTLET TEMPERATURE CONTROLLED TO 60°F AND HEATER HTR-401A/B OUTLET TEMPERATURE CONTROLLED AT 95°F TO PREVENT ANY FREE MOISTURE FROM REACHING THE HEPA FILTER.
4. THIS STREAM CORRESPONDS TO SWPF COMPOSITE AIR FLOW DIAGRAM [illegible]. THE MATCHING STREAM IS SHOWN COMING FROM PVVS [illegible].
5. INDIVIDUAL VENT RATES VARY DEPENDING ON PLANT OPERATIONS.

STREAM NO		401	406	408	409	410	411	412	413	414
NOTES										
STREAM NAME										
FLOW	SCFM	NOTE 5	NOTE 5	NOTE 5	NOTE 5	NOTE 5	NOTE 5	NOTE 5	350	NOTE 5
TEMP	°F	75	75	75	75	75	75	75	95	75

M-M5-J-0014 3

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UNITED STATES DEPARTMENT OF ENERGY

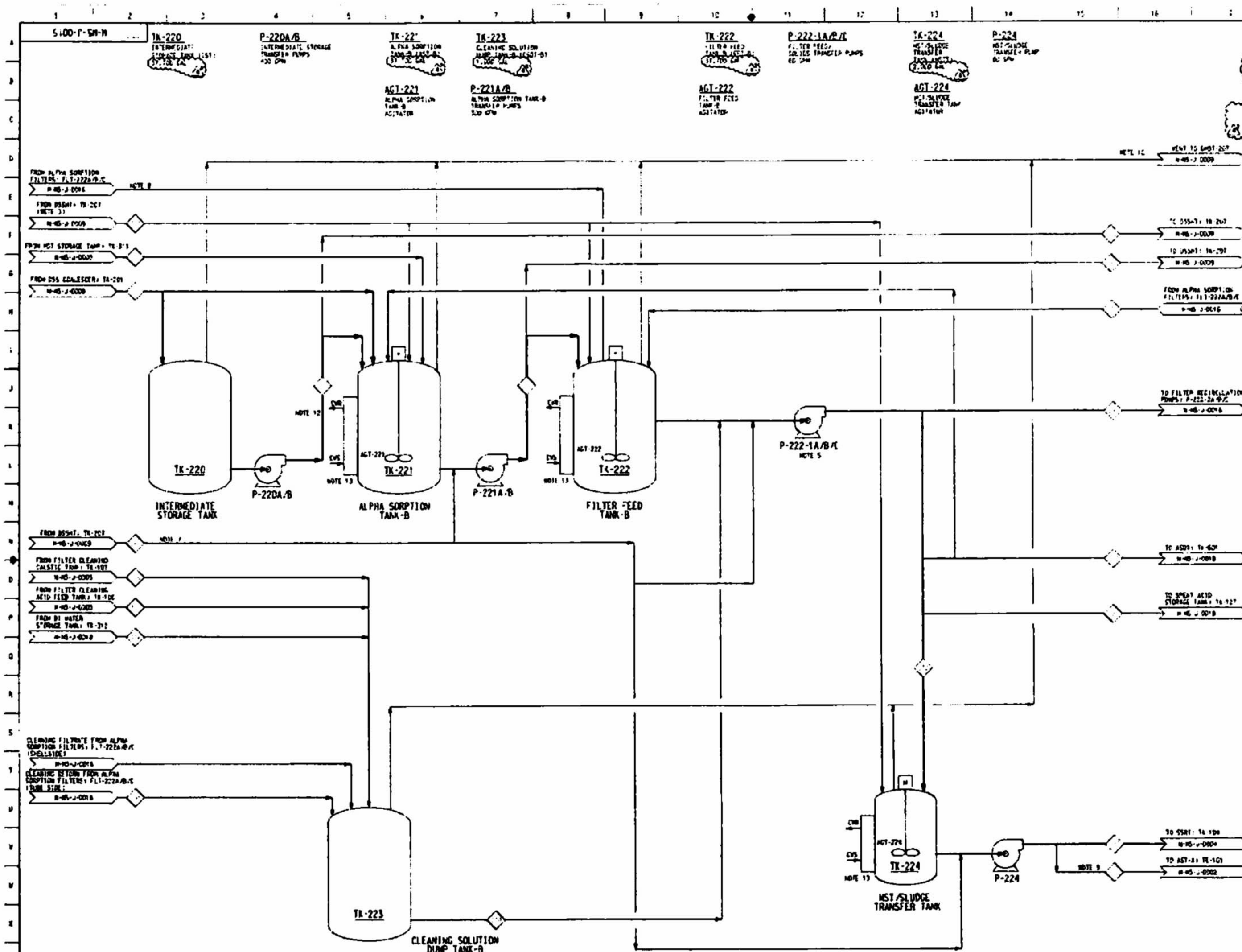
SAVANNAH RIVER SITE

SWPF
PROCESS VESSEL VENT SYSTEM
PFD

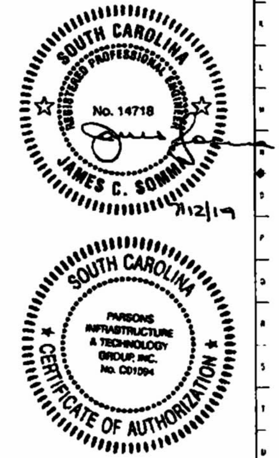
(U)

NONE | M-M5-J-0014 | 3

SWPFE.BDR



NOTES



NOTE 4

STREAM NO		130 (NOTE 2)	133 (NOTE 2)	224	225	226	230	231	232	233	234	242	247	347
STREAM NAME		Spent Filter Cleaning Caustic	Spent Filter Cleaning Acid	Ba-137 Decay Tank Effluent	AST-B Feed	Feed to FFT-B	To MST/Sludge Transfer Tank	MST/ Slurry	MST/Sludge To AST-41 TK-109	MST/Sludge To SSRT: TK-104	Cleaning Solution to Filter	Sampled DSS	Sampled DSS	MST (15 wt%)
Flow	GPM	60	60	22.50	400	300	60	60	60	60	60	400	300	5
	GAL/Batch				29721	29797	192			192				75
Mass Flow (NOTE 11)	LBS/HR	31320	32400	14137	246960	185220	31400	31400	31400	31400		246960	185220	2640
	LBS/Batch				305029	306619	1995			1985				866
Density	LBS/GAL	8.7	9.3	10.29	10.29	10.29	10.38	10.39	10.39	10.39		10.29	10.29	8.8
Temperature	°F	104	104	73	77	77	77		77	77	104	77	77	77
Na (M)	gmmoles/L			5.25	5.25	5.24	5.20		5.20	5.20		5.25	5.25	
MST	lbs/batch					99	99			99				99
Wt% Solids	%					0.03	5.0			5.0				13

M-M5-J-0015 4

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UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

SWPF
INTERMEDIATE STORAGE TANK, ALPHA SORPTION TANK-B, FILTER FEED TANK-B, AND CLEANING SOLUTION DUMP TANK-B
PFD

(U)

SCALE	DRAWING NO.	SHEET	REV
NONE	M-M5-J-0015	1 of 1	4

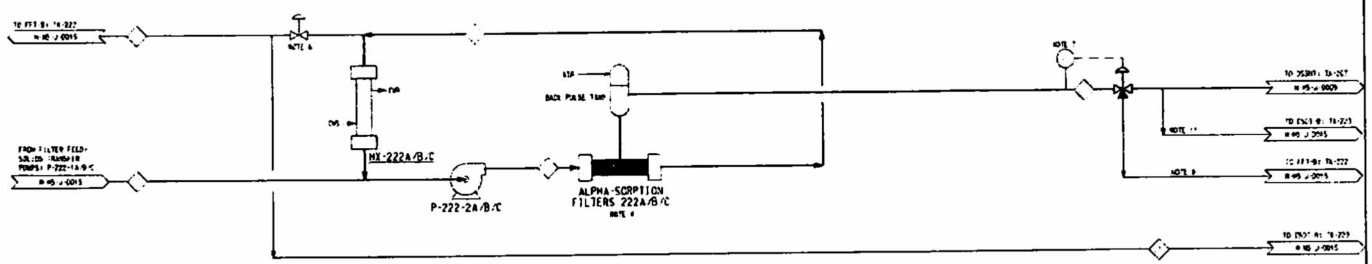
SWPFE.BDR

9100-F-SM-M

HX-222A/B/C
FILTER RECIRCULATION COOLERS

P-222-2A/B/C
FILTER RECIRCULATION PUMPS
1300 GPM

FLT 222A/B/C
ALPHA SORPTION FILTERS



NOTES

1. SEE DRAWING G-M-J-00002 FOR LEGEND.
2. DELETED.
3. REFERENCE F-ESR-J-00001 FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00143 FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH NGS (NEXT GENERATION SOLVENT) AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE M-CLC-J-00221 FOR DETAILED FLOW DATA FOR EACH STREAM.
4. EACH FILTER WILL BE DESIGNED FOR 50% OF REQUIRED TOTAL CAPACITY. TWO FILTER CIRCUITS WILL NORMALLY OPERATE WITH THIRD FILTER CIRCUIT AS SPARE.
5. DELETED.
6. CONTROL VALVE TO PROVIDE BACK PRESSURE ON FILTERS.
7. IN-LINE PARTICULATE ANALYZER TO DETECT FILTER BREAKTHROUGH.
8. ROUTE TO BE USED FOR CONDITIONING THE FILTERS DURING FILTER STARTUP. SAME ROUTE WILL BE USED WHEN FILTER BREAKTHROUGH OCCURS UNTIL THE AFFECTED FILTER CAN BE ISOLATED.
9. WHEN NOT PROVIDED IN F-ESR-J-00001, M-CLC-J-00143 OR M-CLC-J-00221, MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
10. DELETED.
11. ROUTE TO BE USED DURING FILTER CLEANING.

NOTE 3

STREAM NO		227 (Note 4)	228 (Note 4)	229	231	225	231
STREAM NAME		Filter Feed	Filter Recirc	To DSSHT	MST/Slurry	Cleaning Solution Return	Sludge Return to FFT-B
Flow	GPM	1300	1298.5	27.8	60	48.5	17.2
	GAL/Batch			29865			
Mass Flow (NOTE 9)	LBS/HR	810420	803913	14076	31404		65532
	LBS/Batch			304635			
Density	LBS/GAL	10.39	10.29	10.73	10.39		10.39
Temperature	°F			77			
Solids	gm/liter						
MST	lbs/batch						
Wt% Solids	%						

M NS J 0016 4

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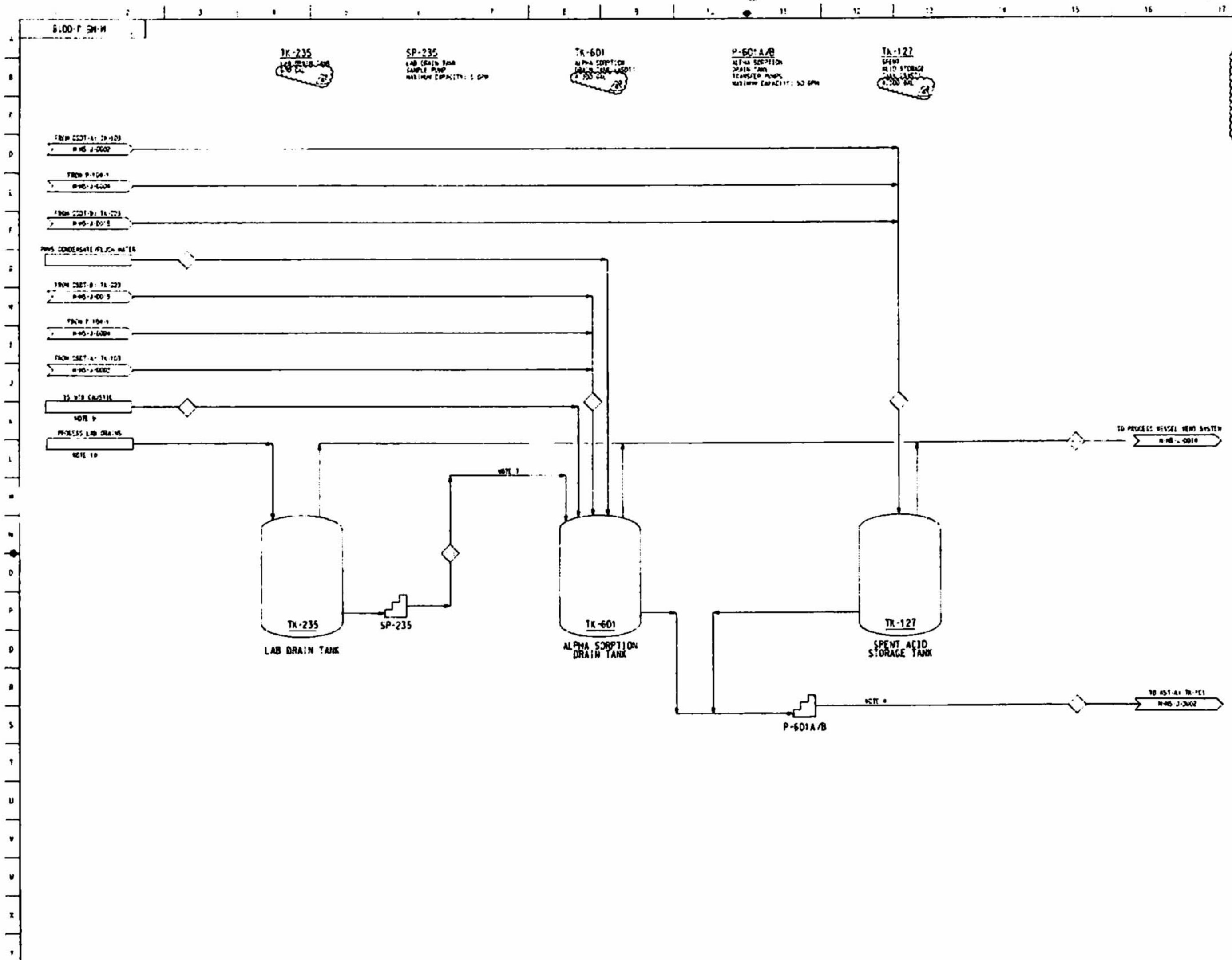
SAVANNAH RIVER SITE

SWPF
ALPHA SORPTION FILTERS
FLT-222A/B/C
PFD

(U)

M-NS-J-0016 | 4

SWPFE.BDR



NOTE 2

STREAM NO		129	129	131	131
STREAM NAME		Lab Drains	Condensate/ Flush Water	[illegible]	25 wt% Caustic
Flow	GPM	5		50	
	GAL/BATCH	40	47	755	20
Mass Flow (Note 3)	LBS/HR	2559		[illegible]	
	LBS/BATCH	349	392	6275	213
Density	LBS/GAL	8.33	8.33	8.3	10.65
Temperature	°F	77	77	77	
[illegible]	[illegible]	0.42		1.65	7.90

NOTES

1. SEE DRAWING [illegible] FOR LEGEND.
2. REFERENCE [illegible] FOR THE DETAILED SWPF BASELINE MASS BALANCE MODEL, IN WHICH OXALIC ACID IS THE FILTER CLEANING AGENT. FOR OPERATIONS WITH NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM. FOR OPERATIONS WITH [illegible] SOLVENT AND NITRIC ACID AS THE FILTER CLEANING AGENT, REFERENCE [illegible] FOR DETAILED FLOW DATA FOR EACH STREAM.
3. WHEN NOT PROVIDED IN [illegible], MASS FLOW CALCULATED BASED ON ROUNDED DENSITY VALUES.
4. RECIRCULATION LINES WILL BE PROVIDED TO TK-601 AND TK-127 FOR MIXING.
5. DELETED.
6. DELETED.
7. ALTERNATE FLOW PATH EXISTS TO TK-[illegible] IF SAMPLE SHOWS TANK CONTAINS SOLVENT.
8. TANK FLUSH TO BE PROVIDED TO [illegible] FLUSH RING FOR ALL TANKS, BUT DETAILS ARE NOT SHOWN ON DRAWING.
9. 25 WT% CAUSTIC IS FROM TK-[illegible] (NEUTRALIZATION TANK) AND IS USED TO ADJUST THE COMPOSITION OF TK-601.
10. NON-PROCESS DRAINS HANDLED THROUGH LAB COLLECTION TANK SYSTEM.

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14718 JAMES C. SOMMA 7/12/19

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UNITED STATES DEPARTMENT OF ENERGY

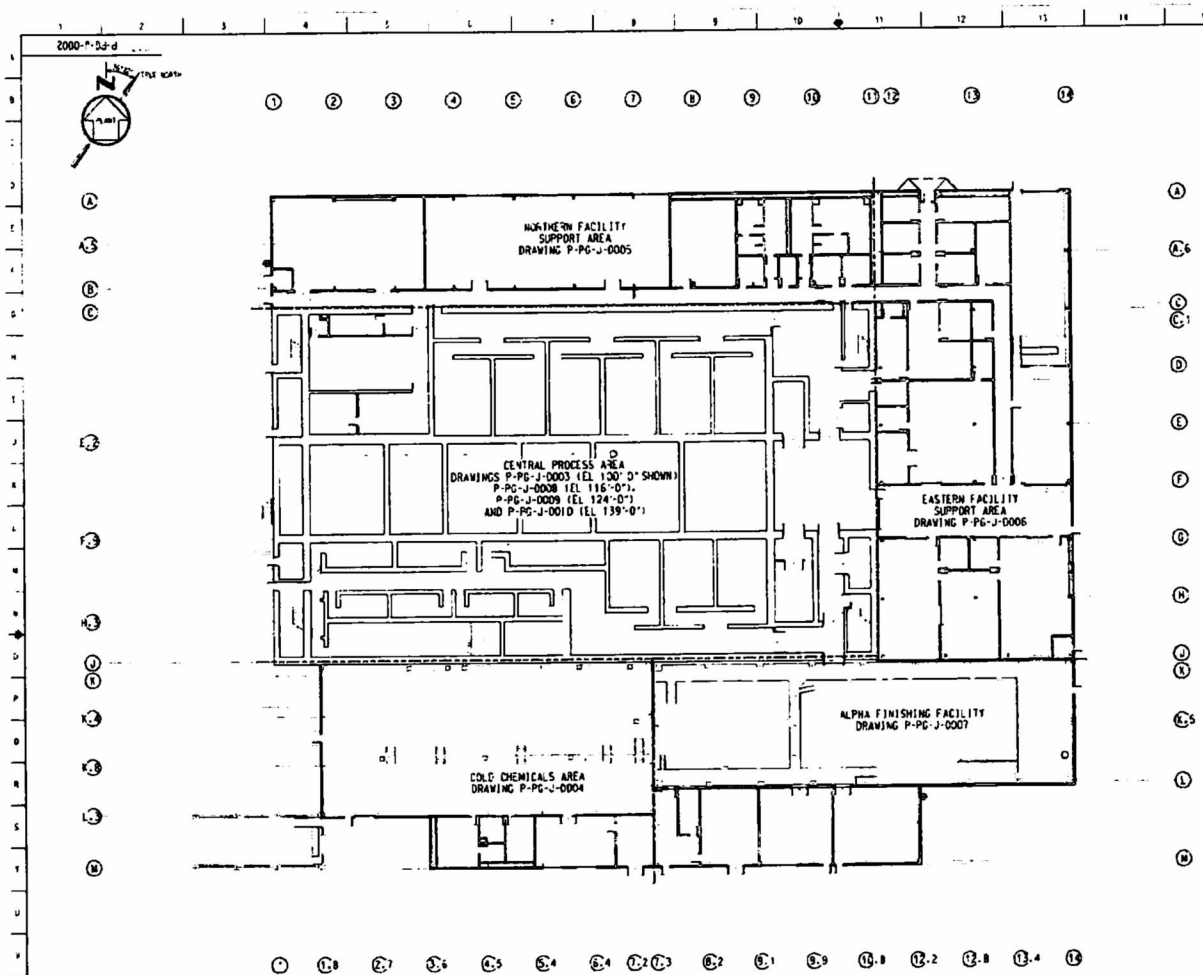
SAVANNAH RIVER SITE

SWPF
LAB DRAIN TANK,
ALPHA SORPTION DRAIN TANK AND
SPENT ACID STORAGE TANK
PFD

(U)

W-M5-J-C018 4

SWPFE.BDR



GENERAL ARRANGEMENT INDEX KEY PLAN

KEY PLAN

NOTES

1. SEE DRAWING P-PG-J-0004 FOR NEXT GENERATION SOLVENT BUILDING GENERAL ARRANGEMENT DRAWING.

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No. 14718
JAMES C. SOMMA
7/12/19

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
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SAVANNAH RIVER SITE

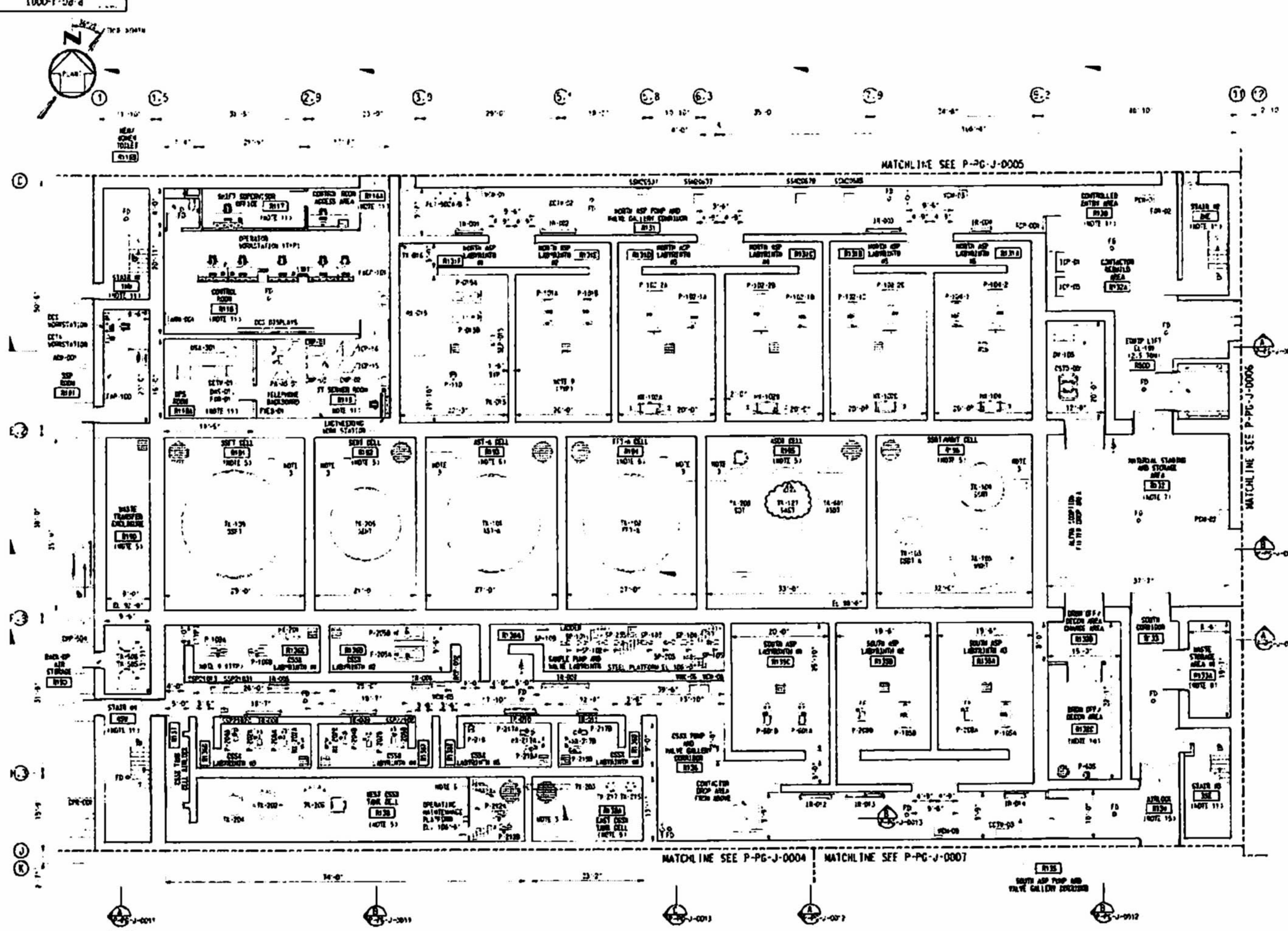
SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
INDEX KEY PLAN

(U)

P-PG-J-0002

SWPFE3D.BOR

P-PG-J-0003



CENTRAL PROCESS AREA PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)

KEY PLAN

NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND EQUIPMENT DESIGNATIONS SEE DRAWING G-P1-J-00001, SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR = 100'-0". SEE CIVIL DRAWING C-CG-J-0004 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. FIXED LADDER AND PLATFORM (ABOVE) TO PROVIDE ACCESS DURING CONSTRUCTION AND COLD COMMISSIONING PHASES.
4. DELETED.
5. STAINLESS STEEL MINIMUM LINER HEIGHTS ABOVE FINISHED FLOOR HP ARE AS FOLLOWS:
   SSFT CELL = 7'-0"
   SEHT CELL = 4'-3"
   AST-A CELL = 6'-3"
   FFT-A CELL = 6'-3"
   ASDT CELL = 9'-9"
   SSRT/AMHT CELL = 3'-1"
   HTE = 1'-0"
   EAST CSSX TANK CELL = 1'-0"
   WEST CSSX TANK CELL = 1'-0"
   CONTACTOR SUPPORT FLOOR = 1'-0"
6. THIS AREA IS RESERVED FOR ACCESS TO CONVEYOR.
7. LAYDOWN AREA FOR SPENT FILTER CASK AND OTHER PLANT EQUIPMENT.
8. 90 DAY SATELLITE STORAGE FOR PER SCDHEC REGULATION 61-79.262.34. LLW/MW CONTAINMENT PALLETS ARE PROVIDED FOR STORAGE.
9. ALL LABYRINTH FLOORS WILL SLOPE TO SUMP.
10. ALL EQUIPMENT FLOORS SHALL SLOPE TOWARD SUMPS. THE REFERENCED FLOOR ELEVATIONS ARE AT HIGH POINT OF FLOOR.
11. IT SERVER ROOM, UPS ROOM, CONTROL ROOM, SHIFT SUPERVISORS OFFICE, CONTROL ROOM ACCESS AREA, CONTROLLED ENTRY AREA, AND ALL STAIRWELLS SERVE AS TORNADO SHELTERS.
12. DELETED.
13. DELETED.
14. TEMPORARY PORTABLE ENCLOSURES TO BE ERECTED AND USED DURING WASTE TRANSFER INTO DRUMS AND DECON OPERATIONS AS REQUIRED.
15. AIRLOCK IS PROVIDED FOR ENTRY/EGRESS TO THE ALPHA FINISHING FACILITY.
16. FLOOR SLOPES ARE SHOWN ON ARCHITECTURAL DRAWINGS.
17. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE E-E0-J-00001. FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE J-J0-J-0001.

P PG J 0003 | 10

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SAVANNAH RIVER SITE

221-J | N/A | N/A | PARSONS

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
CENTRAL PROCESS AREA
PLAN AT ELEVATION 100'-0"
(UNLESS OTHERWISE NOTED)
(U)

1/8"=1'-0" | P-PG-J-0003 | 1 1 | 10

SWPFE3C.BDR

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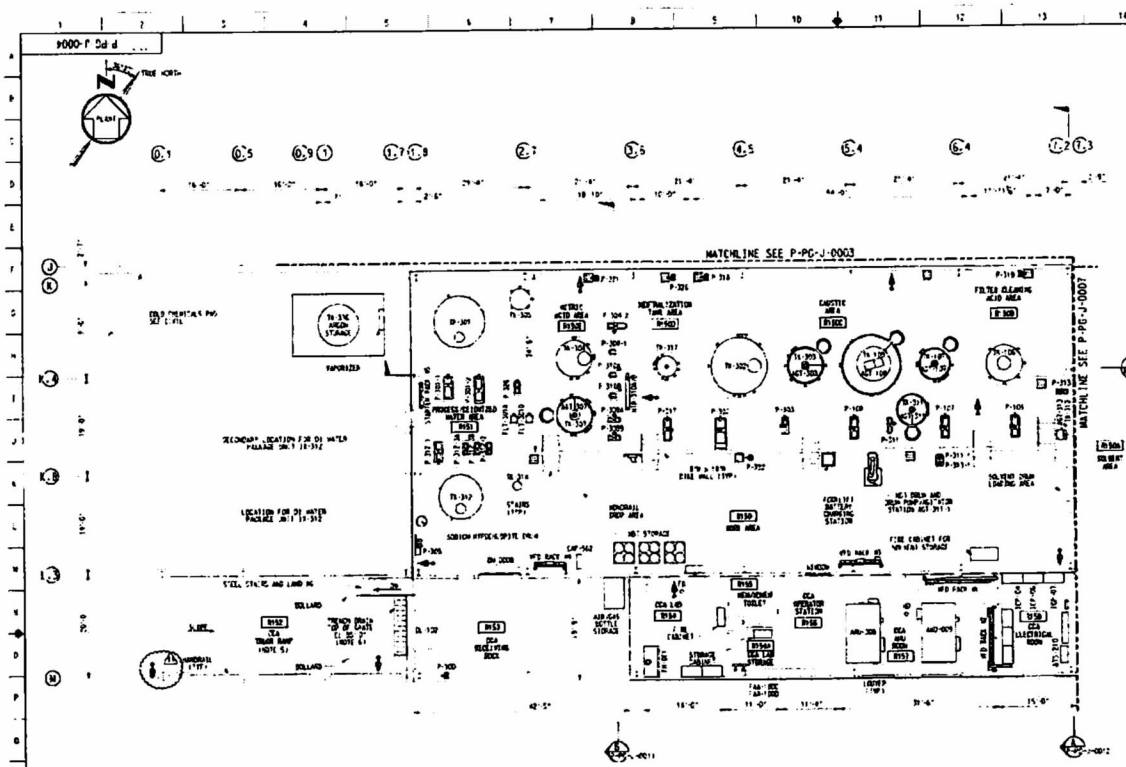
No. C01084
CERTIFICATE OF AUTHORIZATION

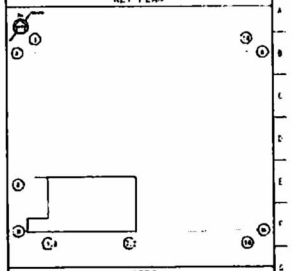
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA

7/12/19



COLD CHEMICALS AREA PLAN AT ELEVATION 100'-0"

KEY PLAN



NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND EQUIPMENT DESIGNATIONS SEE DRAWING P-PG-J-0001, SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR = 100'-0", SEE CIVIL DRAWING C-CG-J-0016 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE E-EG-J-0001 FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE I-PG-J-1001
4. PROVIDE ACCESS FOR REMOVAL OR REPLACEMENT OF 3.0 KW ENTRY HEATER ELEMENTS LOCATED IN TANKS T-310 AND T-312.
5. DCA TRUCK RAMP HAS A ROOF TO ELIMINATE RAIN WATER COLLECTION IN THE TRENCH DRAIN.
6. BLIND TRENCH DRAIN WITH GRATE FOR SPILL COLLECTION AND REMOVAL.

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/05

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CERTIFICATE OF AUTHORIZATION

P PG J 0004 11

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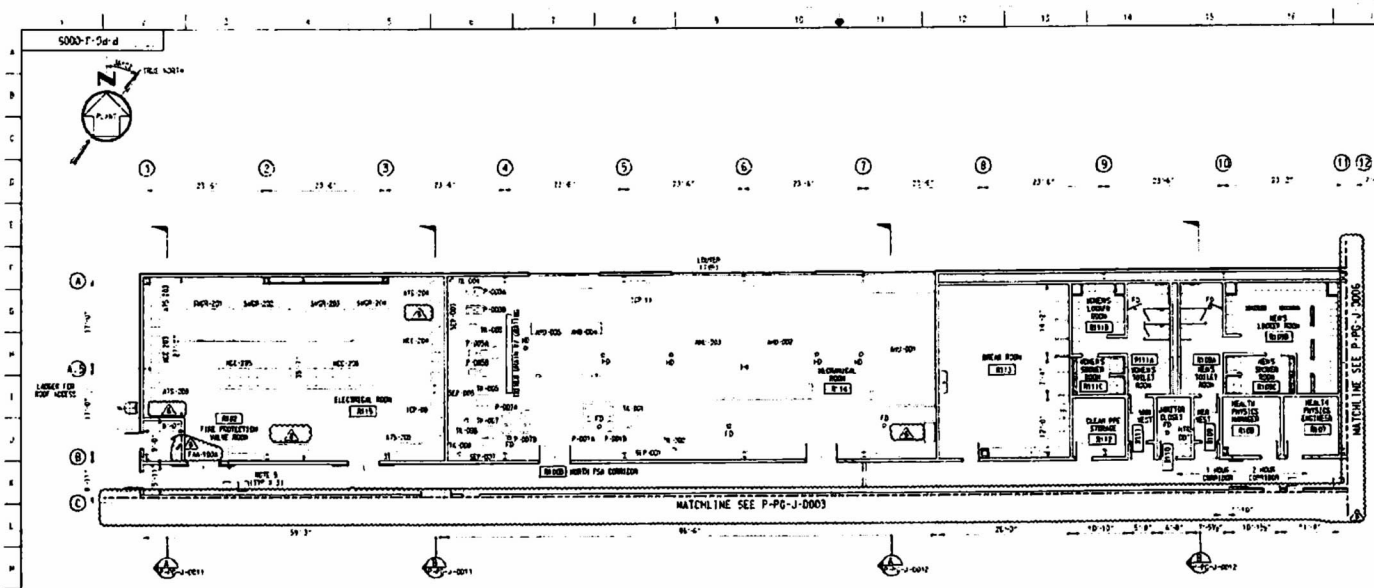
SAVANNAH RIVER SITE

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
COLD CHEMICALS AREA
PLAN AT ELEVATION 100'-0"

(U)

P-PG-J-0004 1 1 11



NORTHERN FACILITY SUPPORT AREA PLAN AT ELEVATION 100'-0"

KEY PLAN

NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND EQUIPMENT DESIGNATIONS SEE DRAWING P-PG-J-00001, SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR 100'-0", SEE CIVIL DRAWING C-CC-J-0016 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. CORRIDORS ARE 1 HOUR FIRE RATED UNLESS NOTED OTHERWISE. 1 HOUR FIRE RATED CORRIDORS HAVE 45 MINUTE FIRE RATED DOORS. 2 HOUR FIRE RATED CORRIDORS HAVE 1½ HOUR FIRE RATED DOORS. SEE DRAWING A-65-J-0003 AND A-02-J-0004 FOR DOOR SCHEDULE.
4. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE E-69-J-00001, FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE J-JW-J-0001.
5. CUT OUTS IN WALL FOR RECESSED FIRE CABINET.

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19

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No. C01094

P PG J 0005 6

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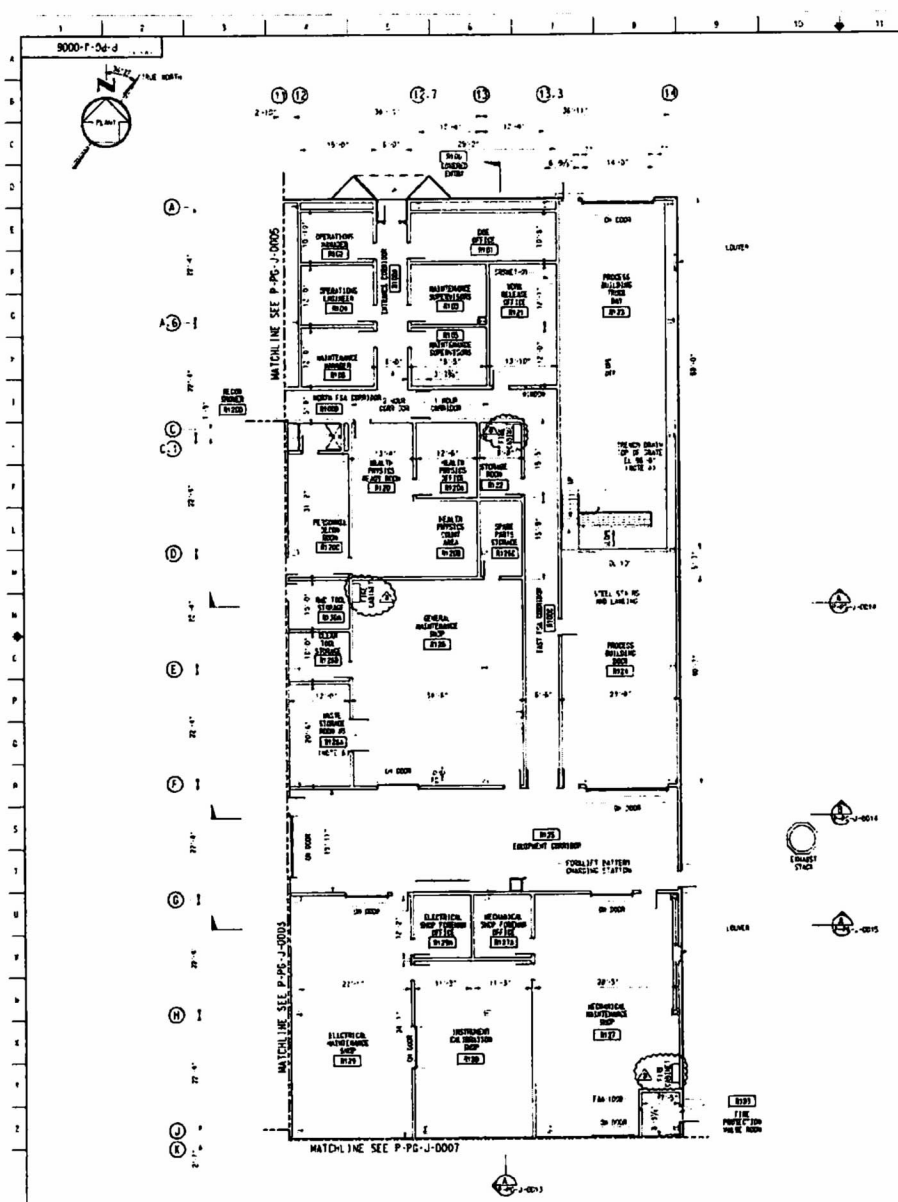
SAVANNAH RIVER SITE

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
NORTHERN FACILITY SUPPORT AREA
PLAN AT ELEVATION 100'-0"

(U)

P-PG-J-0005 6

SWPFE3D.BOR



KEY PLAN

NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND EQUIPMENT DESIGNATIONS SEE DRAWING G-PP-J-0002R, SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR = 100'-0", SEE CIVIL DRAWING C-SD-J-0019 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. CORRIDORS ARE 1 HOUR FIRE RATED UNLESS NOTED OTHERWISE: 1 HOUR FIRE RATED CORRIDORS HAVE 45 MINUTE FIRE RATED DOORS 2 HOUR FIRE RATED CORRIDORS HAVE 1½ HOUR FIRE RATED DOORS SEE DRAWING A-40-J-0003 AND A-45-J-0004 FOR DOOR SCHEDULE.
4. SLOPE TRENCH DRAIN WITH GRATE FOR SPILL COLLECTION AND REMOVAL BY PORTABLE PUMP.
5. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE P-69-J-0002R FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE J-99-J-0001.
6. NON-RAD WASTE STORAGE

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No. 14718
JAMES C. SOMM
7/12/11

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No. C01084
CERTIFICATE OF AUTHORIZATION

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UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

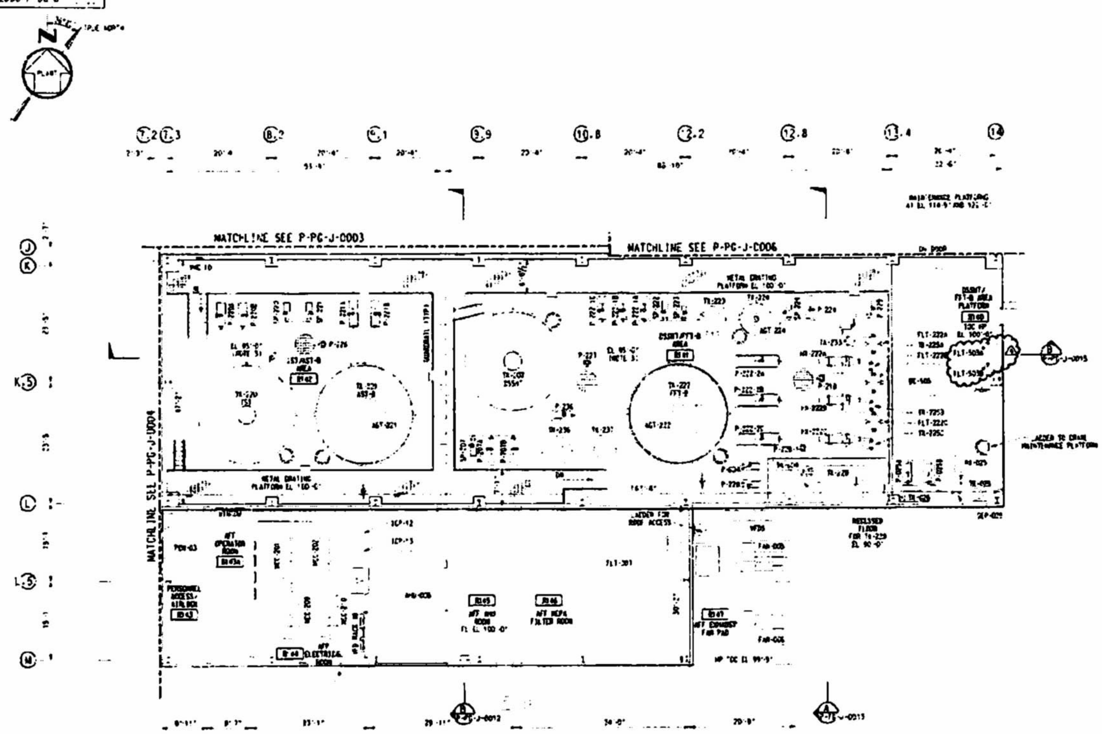
SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
EASTERN FACILITY SUPPORT AREA
PLAN AT ELEVATION 100'-0"

(U)

1/8"=1'-0" P-PG-J-0006 B

SWPFE3D.BOR

P-PG-J-0007



ALPHA FINISHING FACILITY PLAN AT ELEVATION 100'-0" (UNLESS OTHERWISE NOTED)

ALPHA FINISHING FACILITY - PROCESS EQUIPMENT

EQUIPMENT		APPROX CAPACITY (GALS) *	NO	DIA	HEIGHT OR LENGTH **
DSS HOLD TANK (DSSHT)	TK-207	45000	1	19'-0"	19'-4"
INTERMEDIATE STORAGE TANK (IST)	TK-220	31700	1	19'-0"	16'-10"
ALPHA SORPTION TANK B (AST-B)	TK-221	31700	1	19'-0"	16'-10"
FILTER FEED TANK-B (FFT-B)	TK-222	31700	1	19'-0"	16'-10"
CLEANING SOLUTION DUMP TANK B (CSDT-B)	TK-223	1000	1	5'-0"	7'-3"
MST/SLUDGE TRANSFER TANK (MSTT)	TK-224	2030	1	6'-0"	9'-0"
FINISHING AREA BACK PULSE TANKS ***	TK-224A/B/C	27	3	1'-3"	2'-6"
ALPHA FINISHING DRAIN TANK (AFDT)	TK-229	1030	1	5'-0"	7'-8"
BACK PULSE CHARGE TANK-B ***	TK-233	35	1	1'-6"	2'-3"
LAB COLLECTION TANK A	TK-236	1030	1	5'-6"	12'-5"
LAB COLLECTION TANK-B	TK-237	1030	1	5'-6"	12'-5"
LOW LEVEL DRAIN TANK	TK-604	250	1	3'-0"	4'-2"
PROCESS FILTERS					
		SIZE	NO	DIA (FEET)	HEIGHT (FEET)
ALPHA SORPTION FILTERS	FLT-222A/B/C	216 ft²	3	2'-2"	15'-0"

* THE CAPACITY IS MEASURED TO OVERFLOW OR AT FULL CAPACITY IF NO OVERFLOW IS PRESENT.

** TANK HEIGHT OR LENGTH IS MEASURED TANGENT TO TANGENT UNLESS NOTED OTHERWISE.

*** THESE TANKS ARE ELEVATED ON THE FILTER SUPPORT STEEL FRAME.

ALPHA FINISHING FACILITY CRANE		
DESCRIPTION		CAPACITY
AFF BRIDGE CRANE	BC-505	3 TON

EQUIPMENT DESIGNATIONS

PUMPS

- P-325A AFP SECONDARY LOOP PUMP
- P-325B AFP SECONDARY LOOP PUMP
- P-207A/B DSS HOLD TANK TRANSFER PUMPS
- P-210 DESHT/FFT-B AREA SUMP PUMP
- P-220A/B INTERMEDIATE STORAGE TRANSFER PUMPS
- P-221A/B ALPHA SORPTION TANK-B TRANSFER PUMPS
- P-222-1A/B/C FILTER FEED/SOLIDS TRANSFER PUMPS
- P-222-2A/B/C FILTER RECIRCULATION PUMPS
- P-224 MST/SLUDGE TRANSFER PUMP
- P-225 IST/AST-B AREA SUMP PUMP
- P-227 CSDT/FFT-B DIKED AREA SUMP PUMP
- P-229 ALPHA FINISHING DRAIN TANK TRANSFER PUMP
- P-229-1 ALPHA FINISHING DRAIN TANK AREA SUMP PUMP
- P-233 ALPHA FINISHING PROCESS FILTER LOOP DRAIN PUMP
- P-236 LAB COLLECTION TANK PUMP
- P-604 LOW LEVEL DRAIN TANK TRANSFER PUMP

SAMPLE PUMPS

- SP-207 DSS HOLD TANK SAMPLE PUMP
- SP-220 INTERMEDIATE STORAGE TANK SAMPLE PUMP
- SP-221 ALPHA SORPTION TANK-B SAMPLE PUMP
- SP-222 FILTER FEED TANK-B SAMPLE PUMP
- SP-223 CLEANING SOLUTION DUMP TANK-B SAMPLE PUMP
- SP-224 MST/SLUDGE TRANSFER TANK SAMPLE PUMP

AGITATORS

- AGT-221 ALPHA SORPTION TANK-B AGITATOR
- AGT-222 FILTER FEED TANK-B AGITATOR
- AGT-224 MST/SLUDGE TRANSFER TANK AGITATOR

AIR HANDLING EQUIPMENT

- AHU-006 AIR HANDLING UNIT

FILTERS/FANS/COILS

- FAN-005 EXHAUST FAN
- FAN-006 EXHAUST FAN
- FLT-001 EXHAUST AIR HEPA FILTER

TANKS

- TK-025 PROCESS CHILLED WATER EXPANSION TANK
- TK-026 PROCESS CHILLED WATER CHEMICAL BYPASS

ELECTRICAL SYSTEMS

- MCC-201 MOTOR CONTROL CENTER
- MCC-202 MOTOR CONTROL CENTER
- MCC-209 MOTOR CONTROL CENTER
- MCC-210 MOTOR CONTROL CENTER
- VFD RACK #6 VARIABLE FREQUENCY DRIVE

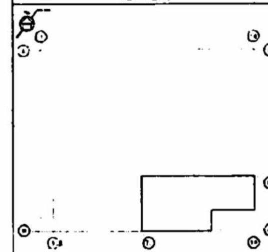
INSTRUMENTATION SYSTEMS

- ICP-12 INSTRUMENT CONTROL PANEL
- ICP-13 INSTRUMENT CONTROL PANEL
- PCM-03 PERSONNEL CONTAMINATION MONITOR
- VME-13 VIBRATION MONITOR EQUIPMENT

MISCELLANEOUS ITEMS

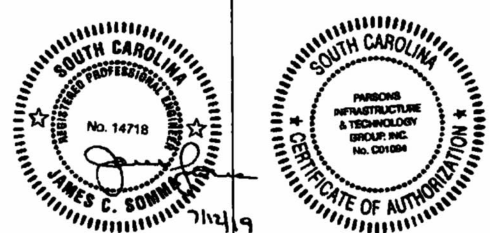
- FLT-240 BAG FILTER (NOT SHOWN)
- FLT-241 CARTRIDGE FILTER (NOT SHOWN)
- FLT-242 CARTRIDGE FILTER (NOT SHOWN)
- HX-222A/B/C FILTER RECIRCULATION COOLERS
- HX-025 AFP SECONDARY LOOP COOLER
- SEP-025 PROCESS CHILLED WATER SEPARATOR

KEY PLAN



NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND EQUIPMENT DESIGNATIONS SEE DRAWING G-PT-J-00001, SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR - 100'-0". SEE CIVIL DRAWING C-CC-J-0016 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. CAMS WILL BE LOCATED IN THE AFF.
4. DELETED.
5. DELETED.
6. DELETED.
7. FLOOR SLOPES ARE SHOWN SHOWN ON ARCHITECTURAL DRAWINGS.
8. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE E-E0-J-00001. FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE J-J0-J-00001.
9. DELETED.
10. THE GENERAL ARRANGEMENT DRAWINGS SUMMARIZE INFORMATION FROM OTHER APPROVED DOCUMENTS. THE LATEST REVISION OF THE EQUIPMENT DATABASE, DATA SHEETS, SUPPLIER SUBMITTALS, AND DETAILED DESIGN DRAWINGS TAKE PRECEDENCE OVER THE SUMMARY INFORMATION CONTAINED IN THE GENERAL ARRANGEMENT DRAWINGS.



P PG J 0007 9

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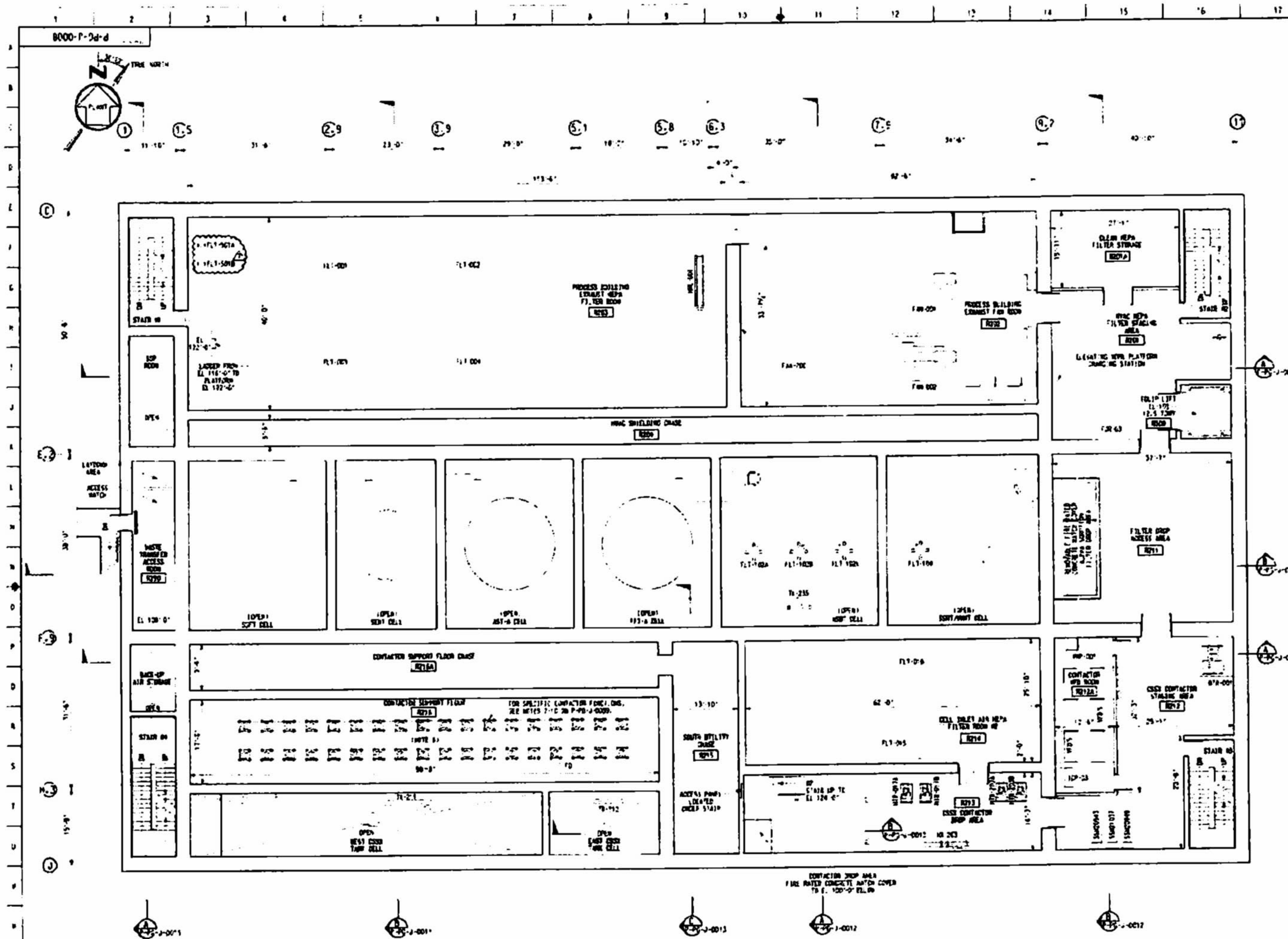
SAVANNAH RIVER SITE

SWPF
ALPHA FINISHING FACILITY
GENERAL ARRANGEMENT
ALPHA FINISHING FACILITY
PLAN AT ELEVATION 100'-0"
(UNLESS OTHERWISE NOTED)
(U)

SCALE	DRAWING NO.	SHEET	REV
1/8"=1'-0"	P-PG-J-0007	1 OF 1	9

SWPFE3D.BDR



CENTRAL PROCESS AREA PLAN AT ELEVATION 116'-0" (UNLESS OTHERWISE NOTED)

KEY PLAN

NOTES

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND EQUIPMENT DESIGNATIONS SEE DRAWING G-PY-J-0005 SHEET 1 AND SHEET 2.
2. PROCESS BUILDING ELEVATIONS ARE BASED ON FINISH FLOOR = 100'-0". SEE CIVIL DRAWING C-CG-J-0016 FOR FINISH FLOOR ELEVATION BASED ON MEAN SEA LEVEL.
3. FLOOR SLOPE DIRECTION IS SHOWN ON THE ARCHITECTURAL DRAWINGS.
4. DELETED.
5. DELETED.
6. PROVIDE STAINLESS STEEL LINER FOR SECONDARY CONTAINMENT OF CONTACTORS. MINIMUM LINER HEIGHT ABOVE FINISHED FLOOR HP IS 1'-0".
7. DELETED.
8. FLOOR SLOPES ARE SHOWN ON ARCHITECTURAL DRAWINGS.
9. FOR REFERENCE TO ELECTRICAL EQUIPMENT SEE E-E0-J-0002. FOR REFERENCE TO INSTRUMENTATION EQUIPMENT SEE J-J0-J-0002

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
1/12/19

P PG J 0008 7

PARSONS

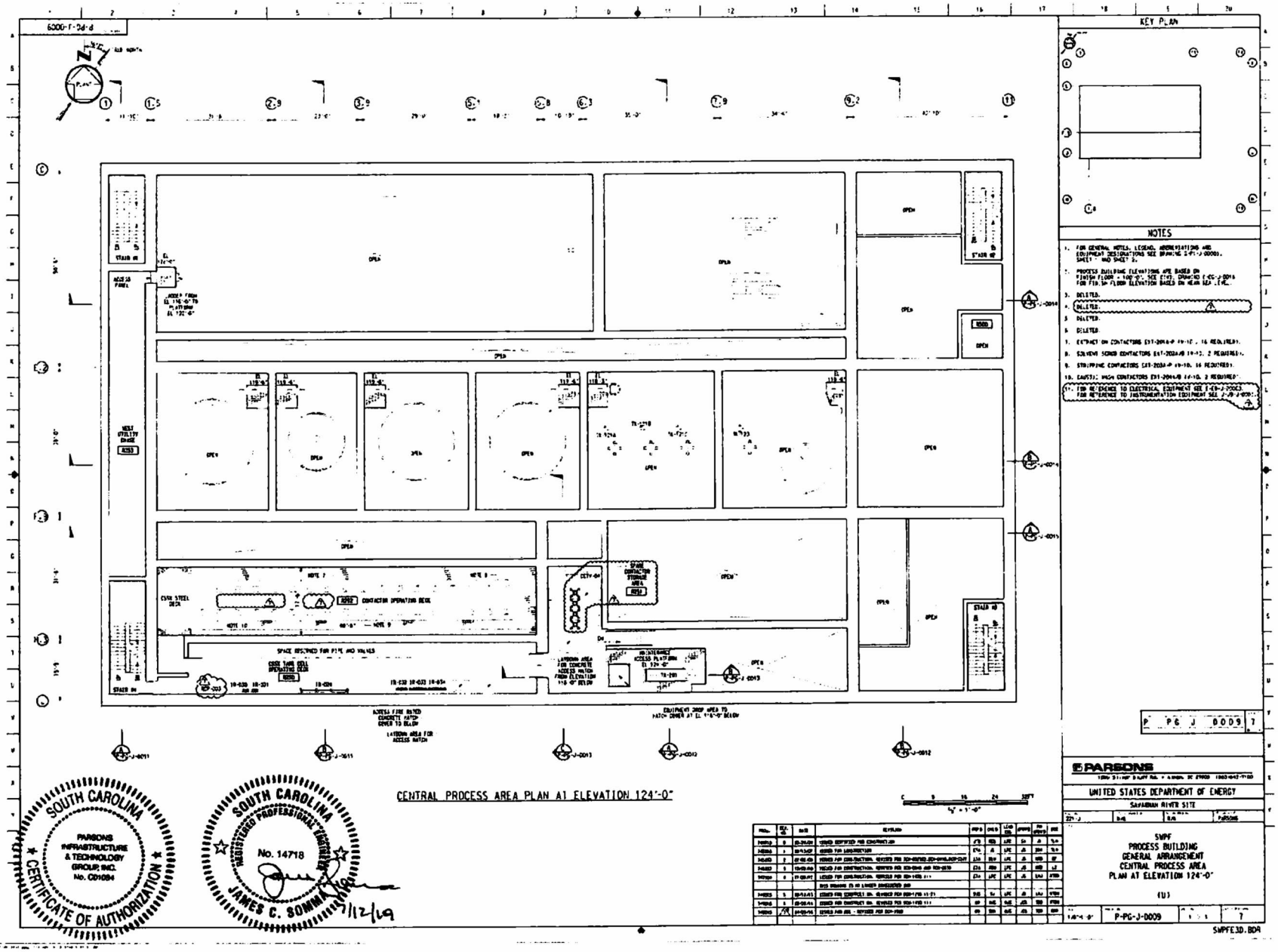
UNITED STATES DEPARTMENT OF ENERGY

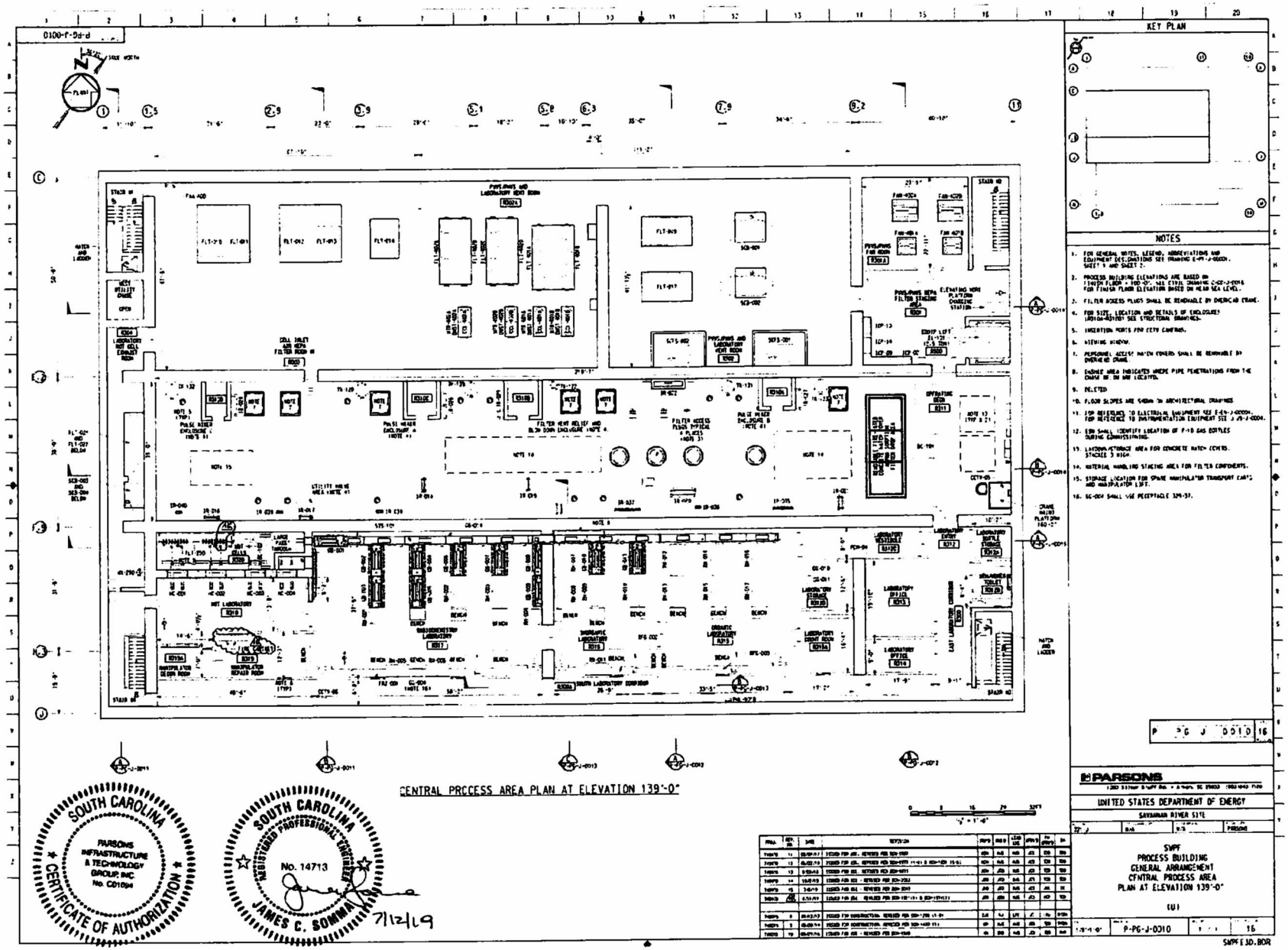
SAVANNAH RIVER SITE

SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
CENTRAL PROCESS AREA
PLAN AT ELEVATION 116'-0"
(UNLESS OTHERWISE NOTED)
(U)

1/8"=1'-0"	P-PG-J-0008	1 1	7

SWPFE3D.BCR


KEY PLAN
NOTES
CENTRAL PROCESS AREA PLAN AT ELEVATION 124'-0"
SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01084
CERTIFICATE OF AUTHORIZATION
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA
7/12/19
PARSONS
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
SWPF
PROCESS BUILDING
GENERAL ARRANGEMENT
CENTRAL PROCESS AREA
PLAN AT ELEVATION 124'-0"
(U)
P-PG-J-0009
SWPFE3D.BDA



CENTRAL PROCESS AREA PLAN AT ELEVATION 139'-0"

Please file as a record document for Construction Permit No. 19,219-IW.

Barry

dhec

WASTEWATER

FINAL APPROVAL TO PLACE INTO OPERA

ISSUED TO: US DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
BUILDING 705-3C
AIKEN SC 29808

19219-IW

for the operation of a wastewater treatment/collection system permitted under Construction Permit No. 20,234-IW, dated November 1, 2018.

PROJECT NAME: SRS/SALT WASTE PROCESSING FACILITY (SWPF) Final Tie-Ins

COUNTY: Aiken

PROJECT DESCRIPTION: The Salt Waste Processing Facility (SWPF) is designed to extract and concentrate cesium, strontium, and actinides from salt wastes in the tank farms resulting in effluents that are acceptable for treatment at the Defense Waste Processing Facility (DWPF) and the Saltstone Production Facility (SPF). Attachment A provides a list of equipment.

The effluent concentrations of those constituents the wastewater treatment system is designed to remove or reduce for wastewater transferred to Tank 50 to the SPF are contained in Construction Permit No. 18,801-IW for the SPF. The solid waste from the SPF will be disposed in the Saltstone Disposal Facility (SDF) in accordance with Solid Waste Industrial Permit #025500-1603. The wastewater sent to the DWPF will be vitrified and poured into canisters that are transferred to the Glass Waste Storage Buildings.

PERMITTED FLOW: System Nominal Daily Flow: 35,840 gallons per day
System Design Capacity Flow: 185,736 gallons per day

WWTP: US DOE/SAVANNAH RIVER SITE Salt Waste Processing Facility (SWPF)

SPECIAL CONDITIONS:

1. This permit is in addition to Construction Permit No. 19,219-IW (Salt Waste Processing Facility (SWPF)), Construction Permit No. 20,194-IW (SWPF NGS Cold Chemical Feed Facility), Construction Permit No. 18,801-IW (Saltstone Production Facility (SPF)), Construction Permit No. 17,424-IW (F-Area and H-Area Tank Farms), and Construction Permit No. 16,783, Defense Waste Processing Facility.

dhec

2. The jumpers that will tie the SWPF in with the SPF and DWPF are permitted by this construction permit. There shall be no radioactive salt solution received from the High Level Waste (HLW) tanks for processing and transfer to the DWPF and/or the SPF until these jumpers have been installed and the Department has issued the Approval to Place into Operation for this construction permit.

This approval is based on the APO request letter (SRR-ESH-2019-00118) signed by Ms. Patricia M. Allen. Note that Attachment 1 is the Engineer's letter of certification (signed by Andrew R. Redwood, P.E., South Carolina Registration No. 20525).

Barry S. Mullinax

Date Issued: October 29, 2019

Barry S. Mullinax, Engineer
(for) Environmental Affairs
AIKEN EA OFFICE

cc: Bureau of Water Permitting File – Construction Permit No. 20,234-IW
Bureau of Water Permitting File – Construction Permit No. 19,219-IW
Bureau of Water Permitting File – Construction Permit No. 20,194-IW
Bureau of Water Permitting File – Construction Permit No. 18,801-IW
Bureau of Water Permitting File – Construction Permit No. 17,424-IW
Bureau of Water Permitting File – Construction Permit No. 16,783-IW
Travis Fuss, Aiken EA Office
Crystal Robertson, Aiken EA Office
Shawn M. Clarke, BOW, Columbia Office
Crystal Rippy, BOW – Columbia Office
Andrew Redwood, P.E.,SRR

dhec

Attachment A Equipment List

The equipment included in Construction Permit No. 20,234-IW is listed below:

1. Transfer Line SDP1 and Jumper 6-7(SPP2)2 for Raw Salt Solution (RSS) Transfer Line
2. Jumper 6-7(SPP3)3 for Strip Effluent (SE) Waste Transfer Line
3. Jumper 3(SPP3)15 for Monosodium Titanate Precipitate (MSTPCP) Waste Transfer Line
4. Transfer lines DSS-0077, SSP077, and WTS-SSP4 for the Decontaminated Salt Solution to Tank 50 and the Saltstone Production Facility.

dhec
Healthy People. Healthy Communities.

September 24, 2019

Put in file for Construction Permit No. 19,219-IW BSM

Ms. Patricia M. Allen, Director
Savannah River Remediation, LLC
Bldg-766H, Room 2308
Aiken, SC 29808

RE: (1) Letter, Patricia M. Allen (SRR) to Barry S *or Reclassification of Salt Waste Processing Facility Operator Cl* 08, Dated September 23, 2019
(2) Letter, M. F. Sadler to W.L. Payne, *Wastewater Treatment Plant Classification for Specialized Facilities at SRS*, Dated August 14, 1995.

Dear Ms. Allen:

In Reference 1, SRR submitted a letter to request that the State-certification Classification for operators of specialized radioactive waste treatment facilities at SRS be established as "Not Applicable". This classification was previously established by South Carolina Department of Health and Environmental Control (SCDHEC) in Reference 2. The Department agrees with your request since the operator classifications in the South Carolina Pollution Control Act, Section 48-1-110, do not address the SRS specialized radioactive waste treatment facilities. This "NA" classification applies to the following SRS waste treatment facilities: (e.g., the Actinide Removal Process (ARP), the Modular Caustic Side Solvent Extraction Unit (MCU), the Defense Waste Processing Facility (DWPF), the Saltstone Production Facility (SPF), the Salt Waste Processing Facility (SWPF), and the Tank Closure Cesium Removal (TCCR) facility. While there are no State-certification classifications for operators of the SRS specialized radioactive waste treatment facilities, the Department of Energy (DOE) requires that operators of these specialized SRS treatment facilities receive training and obtain qualifications required by the appropriate administrative procedures. As SCDHEC has previously acknowledged (See Reference 2), the successful completion of the required training and qualification program is considered as an appropriate certification for operators of these SRS facilities.

It should be noted that the South Carolina Pollution Control Act, Section 48-1-110, requirements apply to the Effluent Treatment Project (ETP) and the DWPF Chemical Treatment Facility (through the Central Sanitary Wastewater Treatment Facility). Therefore, State-certified operators of the appropriate grade are required for these facilities.

Please contact me at 803-898-4012 or at mullinbs@dhec.sc.gov if you have any questions and/or comments.

Sincerely,

Barry Mullinax

Barry Mullinax, P.E.
Industrial Wastewater Permitting Section

I:\NPDES\INDUST\~SRS\SRS Construction Permits\Operator Classification for Specialized Radioactive Waste Treatment Facilities at SRS.doc

cc (via e-mail): Keith Liner, SRR
Shawn Clarke, SCDHEC - Columbia
Crystal Rippy, SCDHEC - Columbia
Crystal Robertson, SCDHEC - Aiken Office

I:\NPDES\INDUST\~SRS\SRS Construction Permits\Operator Classification for Specialized Radioactive Waste Treatment Facilities at SRS.doc

AIKEN EQC OFFICE
COLUMBIA, SC 29201-1708
Phn: 803-898-4302 Fax: 803-898-4215

Serving Counties: Aiken, Barnwell, Edgefield and Saluda

dhec
Healthy People. Healthy Communities.

Wastewater System Construction

APPROVAL TO PLACE INTO OPERATION

ISSUED TO: US DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE
BUILDING 705-3C
AIKEN SC 29808

for the operation of a wastewater treatment/collection system permitted under Construction Permit No. 19,219-IW, dated August 6, 2008. This construction permit superseded Construction Permit No. 19,164-IW, dated January 2, 2008, that was issued for the installation of three (3) waste transfer line segments.

PROJECT NAME: SRS/SALT WASTE PROCESSING FACILITY (SWPF)

COUNTY: Aiken

PROJECT DESCRIPTION: The Salt Waste Processing Facility (SWPF) is designed to extract and concentrate cesium, strontium, and actinides from salt wastes in the tank farms resulting in effluents that are acceptable for disposal at the Defense Waste Processing Facility (DWPF) and the Saltstone Production Facility (SPF). Attachment A lists the SWPF equipment.

The effluent concentrations of those constituents the wastewater treatment system is designed to remove or reduce for wastewater transferred to Tank 50 to the SPF are contained in Construction Permit No. 18,801-IW for the SPF. The solid waste from the SPF will be disposed in the Saltstone Disposal Facility (SDF) in accordance with Solid Waste Industrial Permit #025500-1603. The wastewater sent to the DWPF will be disposed as a solid waste in canisters that are transferred to the Glass Waste Storage Buildings.

PERMITTED FLOW: System Nominal Daily Flow: 35,840 gallons per day
System Design Capacity Flow: 185,736 gallons per day

WWTP: US DOE/SAVANNAH RIVER SITE Salt Waste Processing Facility (SWPF)

SPECIAL CONDITIONS:

1. The jumpers that will tie the SWPF in with the SPF and DWPF are permitted by Construction Permit No. 20,234-IW. There shall be no radioactive salt solution received from the HLW tanks for processing and transfer to the DWPF and/or the SPF until these jumpers have been installed and the Department has issued an Approval to Place into Operation for Construction Permit No. 20,234-IW.

2. The use of water, chemicals, and non-radioactive materials to support SWPF activities such as flushing, cleaning, startup testing, and demonstrations to validate performance of components and/or systems is allowed as long as the jumpers in Condition #1 have not been installed or the jumpers are physically isolated from the SWPF.

3. NPDES Permit No. SC0000175 allows the disposal of "scavenger" wastewater. If the wastewater is not scavenger wastewater, a written request shall be submitted to the Department describing this wastewater. No discharge of this wastewater may be performed without the written approval from the Department.

4. Note that Construction Permit No. 20,194-IW was issued for the Next Generation Solvent Cold Chemical Feed Facility. This facility is in addition to Construction Permit No. 19,219-IW that was issued for the SWPF.

This approval is based on the Engineer's letter of certification signed by James C. Somma, P.E., South Carolina Registration No. 14718 (Parsons).

Barry S. Mullinax **Date Issued:** August 14, 2019

Barry S Mullinax, Engineer
(for) Environmental Affairs
AIKEN EA OFFICE

cc: Bureau of Water Permitting File – Construction Permit No. 19,219-IW
Bureau of Water Permitting File – Construction Permit No. 20,194-IW
Bureau of Water Permitting File – Construction Permit No. 20,234-IW
Travis Fuss, Aiken EA Office
Shawn M. Clarke, BOW – Columbia
Crystal Rippy, BOW - Columbia
Crystal Robertson, Aiken EA Office
James Somma, P.E., Parsons

Attachment A for SWPF Approval to Operate (APO)

SWPF Equipment List (Drawing No. G-P1-J-00001)

PROCESS BUILDING – PROCESS EQUIPMENT

Tank Number	Tank Name
Process Cell Area	
TK-101	Alpha Sorption Tank-A (AST-A)
TK-102	Filter Feed Tank-A (FFT-A)
TK-103	Cleaning Solution Dump Tank-A (CSDT-A)
TK-104	Sludge Solids Receipt Tank (SSRT)
TK-105	Wash Water Hold Tank (WWHT)
TK-109	Salt Solution Feed Tank (SSFT)
TK-121A/B/C	Back Pulse Tank
TK-123	Washing Filter Back Pulse Tank
TK-127	**Spent Acid Storage Tank (SAST)**
TK-205	Strip Effluent Hold Tank (SEHT)
TK-208	Solvent Drain Tank
TK-235	Lab Drain Tank
TK-505	**Backup Air Receiver**
TK-506	**Backup Air Receiver**
TK-601	Alpha Sorption Drain Tank (ASDT)
Operating Deck	
TK-122	Back Pulse Charge Tank-A
TK-128	AST-A Air Pulse Agitator Charge Tank
TK-129	FFT-A Air Pulse Agitator Charge Tank
TK-131	SSRT Air Pulse Agitator Charge Tank
TK-132	SSFT Air Pulse Agitator Charge Tank
TK-133	WWHT Air Pulse Agitator Charge Tank
CSSX Tank Cell	
TK-202	Solvent Hold Tank (SHT)
TK-203	Strip Effluent Coalescer
TK-204	Caustic Wash Tank
TK-206	Ba-137 Decay Tank (BDT)
TK-211	Decontaminated Salt Solution Stilling Tank
TK-212	Strip Effluent Stilling Tank
TK-215	Strip Effluent Pump Tank
TK-217	Solvent Strip Feed Tank

Tank Number	Tank Name
CSSX Contactor Drop Area	
TK-201	Decon. Salt Solution Coalescer
Cold Chemicals Area	
TK-106	**Filter Cleaning Acid Feed Tank**
TK-107	Filter Cleaning Caustic Tank
TK-108	Caustic Dilution Feed Tank
TK-301	Process Water Tank
TK-302	Caustic Receipt Tank
TK-303	Caustic Makeup Tank
TK-304	Nitric Acid Receipt Tank
TK-305	Process Water Pressure Tank
TK-307	Nitric Acid Scrub Makeup Tank
TK-311	MST Storage Tank
TK-312	DI Water Storage Tank
TK-313	Solvent Makeup Tank
TK-314	**DI Water Expansion Tank**
TK-317	Neutralization Tank
TK-330	Argon Tank
CSSX Contactor Area	
EXT-201A-P	Solvent Extraction Contactors
EXT-202A/B	Scrub Contactors
EXT-203A-P	Stripping Contactors
EXT-204A/B	Caustic Wash Contactors
Process Filters	
FLT-102A/B/C	Alpha Sorption Filters
FLT-104	Washing Filter
Alpha Finishing Facility	
TK-207	DSS Hold Tank (DSSHT)
TK-220	Intermediate Storage Tank (IST)
TK-221	Alpha Sorption Tank - B (AST-B)
TK-222	Filter Feed Tank - B (FFT-B)
TK-223	Cleaning Solution Dump Tank - B (CSDT-B)
TK-224	MST/Sludge Transfer Tank (MSTT)
TK-225A/B/C	**Finishing Area Back Pulse Tank**
TK-228	**Alpha Finishing Drain Tank (AFDT)**
TK-233	**Back Pulse Charge Tank B**
TK-236/237	**Lab Collection Tank**
TK-604	**Low Level Drain Tank**
FLT-222A/B/C	**Alpha Sorption Filters**

PUMPS	
North ASP Pump and Valve Gallery	
P-015A	ASP Secondary Loop Pump Water Pump
P-015B	ASP Secondary Loop Pump Water Pump
P-101A/B	Alpha Sorption Tank-A Transfer Pumps
P-102-1A/B/C	Filter Feed/Solids Trans Pumps
P-102-2 A/B/C	Filter Recirculation Pumps
P-104-1	Washing FLT Feed/Sludge Solids Trans Pump
P-104-2	Washing Filter Recirculation Pump
P-110	ASP Sump Trans Pump
South ASP Pump and Valve Gallery	
P-105A/B	Wash Water Trans Pumps
P-208A/B	Solvent Drain Tank Pumps
P-601A/B	Alpha Sorption Drain TK Transfer Pumps
CSSX Pump and Valve Gallery	
P-109A/B	Salt Solution Feed Pumps
P-202A/B	Solvent Feed Pumps
P-204A/B	Caustic Wash Tank Pumps
P-205A/B	Strip Effluent Trans Pumps
P-206A/B	Ba-137 Decay Tank Trans Pumps
P-212A/B	**Strip Effluent Coalescer Feed Pumps**
P-215A/B	Strip Effluent Pump Tank Pumps
P-217A/B	Solvent Strip Feed Pumps
P-218	CSSX Tank Cell Sump Transfer Pump
Sample Pump and Valve Gallery	
SP-101	Alpha Sorption Tank-A Sample Pump
SP-102	Filter Feed Tank-A Sample Pump
SP-103	Cleaning Solution Dump Tank-A Sample Pump
SP-104	Sludge Solids Receipt Tank Sample Pump
SP-105	Wash Water Hold Tank Sample Pump
SP-109	Salt Solution Feed Tank Sample Pump
SP-205	Strip Effluent Hold Tank Sample Pump
SP-235	Lab Drain Tank Sample Pump
Drum off/Decon Area	
P-605	Decon Area Sump Pump

PUMPS (continued)	
Cold Chemicals Area	
P-106	**Acid Transfer Pump**
P-107	Filter Cleaning Caustic Trans Pump
P-108	Caustic Dilution Trans Pump
P-300	Cold Chemicals Receiving Dock Sump Pump
P-301-1	Process Water Utility Pump
P-301-2	Flush Pump
P-302	Caustic Trans Pump
P-303	Caustic Makeup Trans Pump
P-304-1	Nitric Acid Metering Pump
P-304-2	Neutralization Metering Pump
P-305A/B	Sodium Hypochlorite Addition Pump
P-309A/B	Scrub Feed Pumps
P-310A/B	Strip Feed Pumps
P-311	MST Transfer Pump
P-311-1	MST Drum Pump
P-312-1	DI Water Trans Pump
P-312-2	Scrub Water Feed Pump
P-312-3A/B	Strip Water Feed Pumps
P-313	Solvent Makeup Trans Pump
P-313-1	Solvent Drum Pump
P-317	Neutralization Tank Discharge Pump
P-318	Caustic Sump Pump
P-319	**Acid Sump Pump**
P-320	Neutralization Sump Pump
P-321	Nitric Acid Sump Pump
P-322	Water Sump Pump
P-326	Pump Seal Make-up Water Supply Pump
Alpha Finishing Facility	
P-207A/B	**DSS Hold Tank Transfer Pumps**
P-220A/B	**Intermediate Storage Tank Transfer Pumps**
P-221A/B	**Alpha Sorption Tank B Transfer Pumps**
P-222-1A/B/C	**Filter Feed/Solids Transfer Pumps**
P-222-2A/B/C	**Filter Recirculation Pumps**
P-224	**MST/Sludge Transfer Pump**
P-228	**Alpha Finishing Drain Tank Transfer Pump**
PUMPS (continued)	

P-236	**Lab Collection Tank Pump**
P-604	**Low Level Drain Tank Transfer Pump**
P-025A/B	**AFP Secondary Cooler Loop Pump**
SP-207, SP-220 – SP-224	**Sample Pumps**
P-210, P-226, P-227, P-228-1	**AFF Sump Pumps**
P-229	**Alpha Finishing Process Filter Loop Drain Pump**
AGITATORS	
AGT-107	Filter Cleaning Caustic Tank Agitator
AGT-108	Caustic Dilution Feed Tank Agitator
AGT-303	Caustic Makeup Tank Agitator
AGT-307	Nitric Acid Scrub Makeup Tank Agitator
AGT-311	MST Storage Tank Agitator
AGT-311-1	MST Drum Agitator
AGT-313	Solvent Makeup Tank Agitator
AGT-221	**Alpha Sorption Tank B Agitator**
AGT-222	**Filter Feed Tank B Agitator**
AGT-224	**MST/Sludge Transfer Tank Agitator**
LABORATORY EQUIPMENT	
GB-001 – GB-011, **GB-014**	Glove Boxes
RH-001 – RH-017	Radio Hoods
FH-001	Fume Hood
HC-001 – HC-004	Hot Cell Windows
STS-101	Sample Transfer System
ELECTRICAL SYSTEMS	
ATS-203 – ATS-205	Automatic Transfer Switch
ATS-207	Automatic Transfer Switch
ATS-208	Automatic Transfer Switch
ATS-210	Automatic Transfer Switch
MCC-201 – MCC-206	Motor Control Center
MCC-209 – MCC-210	**Motor Control Center**
SWGR-201 – SWGR-204	Switchgear
USX-301	Uninterruptible Power Supply

INSTRUMENTATION	
ICP-001 – ICP-013	Instrument Control Panel
ICP-014 – ICP-016	Instrument Control Panel
IR-001 – IR-014, IR-016 – IR-022, IR-024, IR-026 – IR-040	Instrument Control Rack
AIR HANDLING EQUIPMENT	
ACU-001	Wall Mounted Heat Pump
AHU-001 – AHU-006	Air Handling Units
AHU-008 – AHU-009	Air Handling Units
Filters/Fans/Coils	
CCL-401A/B	Process Vessel Vent Coolers
CCL-402A/B	Pulse Mixer Vent Coolers
FAN-401A/B	Process Vessel Vent Exhaust Fans
FAN-402A/B	Pulse Mixer Vent Exhaust Fans
FAN-001	Exhaust Fan
FAN-002	Exhaust Fan
FAN-003	Exhaust Fan on Roof
FAN-004	Exhaust Fan on Roof
FAN-007	Exhaust Fan on Roof
FAN-009	Exhaust Fan on Roof
FAN-010	Exhaust Fan on Roof
FAN-013	Exhaust Fan on Roof
FAN-014	Exhaust Fan on Roof
FAN-015	Exhaust Fan on Roof
FLT-001 – FLT-004	Exhaust Air HEPA Filters
FLT-009	Lab Exhaust Air HEPA Filter
FLT-010 – FLT-016	Cell Inlet Air HEPA Filters
FLT-017	Lab Exhaust Air HEPA Filter
FLT-020	Hot Lab Intake Filter Above Suspended Ceiling
FLT-021	Hot Cell Exhaust Air HEPA Filter
FLT-022	Hot Cell Exhaust Air HEPA Filter
FLT-023 – FLT-034	Glovebox Inlet Air HEPA Filters
FLT-240 – FLT-242	**Solvent Recovery Filters**
FLT-250	**Solvent Adjustment Filter**
FLT-301A/B	Process Water Cartridge Filter
FLT-401A/B	Process Vessel Vent Filters

AIR HANDLING EQUIPMENT (continued)	
FLT-402A/B/C/D	Pulse Mixer Vent Filters
HRC-001	Heat Recovery Coil
Scrubbers	
SCB-001	Scrubber
SCB-002	Scrubber
SCB-003	Hot Cell Scrubber
SCB-004	Hot Cell Scrubber
SCFS-001	**Scrubber Caustic Feed System**
SCFS-002	**Scrubber Caustic Feed System**
Separators	
SEP-001	Bldg Chilled Water Air Separator
SEP-003	Control Room Chilled Water Air Separator
SEP-005	Process Chilled Water Air Separator
SEP-007	Heat Recovery Air Separator
Pumps	
P-001A/B	Bldg Chilled Water Supply Pumps
P-003A/B	Control Room Chilled Water Pumps
P-005A/B	Process Chilled Water Supply Pumps
P-007A/B	Heat Recovery Water Pumps
Tanks	
TK-001	Bldg Chilled Wtr Exp Tank
TK-002	Bldg Chilled Wtr Chem Feed Tank
TK-003	Control Room Chilled Wtr Exp Tank
TK-004	Control Room Chilled Wtr Chem Feed Tank
TK-005	Process Chilled Wtr Exp Tank
TK-006	Process Chilled Wtr Chem Feed Tank
TK-007	Heat Recovery Bladder Exp Tank
TK-008	Heat Recovery Chemical Feed Tank
TK-015	Process Chilled Water Expansion Tank
TK-016	Chemical Bypass Feeder Tank
TK-025	**Process Chilled Water Expansion Tank**
Ventilators	
VLR-001	Gravity Roof Ventilator
VLR-002	Gravity Roof Ventilator

MISCELLANEOUS ITEMS	
BTR-001	DW Pressure Booster System
CMP-504	Back Up Air Receiver Compressor
DMST-401A/B	Process Vessel Vent Demisters
DMST-402A/B	Pulse Mixer Vent Demisters
FAN-005	Exhaust Fan
FAN-006	Exhaust Fan
FLT-007	Exhaust Air HEPA Filter
HTR-007	Domestic Water Heater/Tank
HTR-017A/B	Strip Contactors Tempered Water Heaters
HTR-203A/B	Solvent Strip Feed Tempered Water Heaters
HTR-310A/B	Strip Feed Heaters
HTR-401A/B	Process Vessel Vent Heaters
HTR-402A/B	Pulse Mixer Vent Heaters
HX-015	ASP Secondary Loop Cooler
HX-025	AFP Secondary Loop Cooler
HX-102A/B/C	Filter Recirculation Coolers
HX-104	Washing Filter Recirculation Cooler
HX-201	Salt Solution Feed Cooler
HX-202A/B	Solvent Feed Coolers
HX-203	Strip Contactor Tempered Water Heat Exchanger
HX-217A/B	Solvent Strip Feed Heat Exchanger
HX-222A/B/C	Filter Recirculation Coolers
HX-250	Solvent Adjustment Heat Exchanger
IX-312	DI Water Package Unit
SEP-015	Process Chiller Water Air Separator
SEP-025	Process Chilled Water Separator
VMP-001	Vibration Monitor Panel

SAVANNAH RIVER REMEDIATION LLC
We do the right thing.
Savannah River Site, Aiken, SC 29808

December 21, 2010

SRR-ESH-2010-00154

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,219-IW Salt Waste Processing Facility – Phase 2
Notification of Change in Permit Expiration Date by Operation of Law: Act 297

Dear Mr. Mullinax:

At the direction of the Department of Energy-Savannah River Operations Office (DOE-SR), and in accordance with discussions between DOE-SR and the South Carolina Department of Health and Environmental Control (SCDHEC) on December 13, 2010, this letter documents our notification to SCDHEC that the expiration date contained in the referenced construction permit for the Salt Waste Processing Facility (September 30, 2011) is automatically extended to February 25, 2016 by operation of law (specifically Act 297, the "Permit Extension Joint Resolution of 2010," which "suspends the running of the normal time periods of development approvals issued by DHEC").

If you have any questions, please do not hesitate in contacting Ron Campbell (803-557-6585) of my staff.

Sincerely,

Patricia M. Allen

Patricia M. Allen, Manager
Environment, Safety, Health, and Quality Assurance and Contractor Assurance

WWW.SRREMEDIATION.COM
TEL 803.952.6560
FAX 803.952.7982

cc: M. D. Wilson, SCDHEC – Columbia
C. D. Rippy, SCDHEC – Columbia
J. R. Hughes, SCDHEC – Aiken
J. C. Yon, SCDHEC – Aiken

(via electronic transmission):

Spears, T.J., DOE-SR
Suggs, P.C., DOE-SR
Ross, S. R., DOE-SR
Seitz, J. K., DOE-SR
Polk, P.A., DOE-SR
Southern, S.L., DOE-SR
Hoel, D. F., DOE-SR
Watson, A. I., DOE-SR

Hyatt, J. E., SRNS
Millings, V. E. III, SRNS

Breor, M.R., Parsons
Gurske, R.H., Parsons

Bethurem, N. L., SRR
Borders, M. N., SRR
Cantrell, J. R., SRR
Clark, W. C., Jr., SRR
Dickenson, J. E., SRR
England, T. F., SRR
Franklin, V. A., SRR
Freed, E. J., SRR
Harp, K. D., SRR
Liner, K. R., SRR
Little, D. B., SRR
Skiff, D. P., SRR
Stevens, O. D., SRR
Tseng, J. C., SRR
Wilkerson, S. W., SRR
Winkler, C. J., SRR

File Information:

SCDHEC, Industrial Wastewater Treatment Facility Permit
Modular Caustic-Side Solvent Extraction Unit
1066, DOE/ADM
16-1.5(a) Permanent

D H E C

PROMOTE PROTECT PROSPER

August 30, 2010

Mr. Ron Campbell
Savannah River Remediation, LLC
Bldg. 705-1C
Aiken, SC 29808

RE: Modification of SWPF Effluent Discharge Rate Dated August 25, 2010
Construction Permit No. 19,219-IW SWPF Phase 2
Savannah River Site
Aiken County

Dear Mr. Campbell:

This Office has reviewed the referenced letter regarding the average flow and the design capacity flow for the Salt Waste Processing Facility (SWPF). The flow rate listed in the construction permit application submittal was the influent average flow rate and did not accurately list the average flow and design capacity flow for effluent discharged from the SWPF. Based on the information submitted in your letter, the flow correct flow rates for the SWPF are listed below to reflect the design capability and normal operation of the SWPF:

System Nominal Daily Flow:	35,840 gallons per day
System Design Capacity Flow:	185,736 gallons per day

There are no modifications due to this change for Construction Permit No. 19,219-IW for the SWPF. This letter provides the Department's approval of the flow rates that reflect the actual design capacity flow and nominal daily operating flow for the SWPF. This information will be submitted as a supplemental record for this construction permit.

If there are any questions, please contact me by telephone at 803.898.4012 or contact me by e-mail at mullinbs@dhec.sc.gov.

Sincerely,

Barry Mullinax

Barry Mullinax, PE
Environmental Engineer
Industrial Wastewater Permitting Section
Water Facilities Permitting Division

cc: Josh Yon, Region 5 EQC – Aiken Office

SAVANNAH RIVER REMEDIATION LLC We do the right thing.
Savannah River Site, Aiken, SC 29808

SRR-CES-2010-00055

AUG 25 2010

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,219-IW SRS / Salt Waste Processing Facility / Phase 2
Modification of Effluent Discharge Rate

Dear Mr. Mullinax:

In 2008, on behalf of the U. S. Department of Energy, the referenced industrial wastewater treatment permit was applied for and received from the South Carolina Department of Health and Environmental Control, which allowed the Salt Waste Processing Facility to commence construction of this facility. Part of the 2008 submittal consisted of the Bureau of Water's Construction Permit Application for Wastewater Facilities (Form DHEC 1970 (06/2003), since revised) which contained an entry of 26,000 gallons per day in response to the question of total average design flow for this facility. This value accurately stated the rate of flow into the facility (the influent rate), but was not intended to reflect the gallons per day which could potentially be discharged from the Salt Waste Processing Facility to the Defense Waste Processing Facility or the Saltstone Production Facility (the effluent rate).

As detailed in the attached letter from Parsons to the U. S. Department of Energy, we respectfully request the permit be amended to indicate an effluent discharge to the Defense Waste Processing Facility and Saltstone Production Facility at a rate not to exceed 190,000 gallons per day. The nominal daily flow rate is approximately 35,840 gallons per day (estimated daily volumes of Decontaminated Salt Solution of 33,106 gal, Strip Effluent 2,074 gal, and MST/Sludge Solids 660 gal). This permit modification does not involve a change to any equipment or processing rates, but merely corrects the maximum permitted gallons per day that could be transferred out of the facility based on the design originally described in the construction permit application for which the permit was issued. If you have any questions, please contact Ron Campbell (803-557-6585) of my staff.

Sincerely,

PM Allen

Patricia M. Allen, Manager
Environment, Safety, Health, and Quality Assurance and Contractor Assurance

Enc.

cc: J. M. Ridley, DOE-SR
S. L. Southern, DOE-SR
P. A. Polk, DOE-SR
M. R. Breor, Parsons
R. H. Gurske, Parsons
C. D. Rippy, SCDHEC – Columbia
M. D. Wilson, SCDHEC - Columbia
J. C. Yon, SCDHEC – Aiken
V. E. Millings III, SRNS
K. D. Harp, SRR

PARSONS

1080 Silver Bluff Road • Aiken, South Carolina 29803 • (803) 643-7100 • Fax: (803) [illegible]

June 14, 2010 Ref. No.: 00-700-15631

Mr. Phillip A. Polk
Federal Project Director
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

Subject: Contract No. DE-AC09-02SR22210
Salt Waste Processing Facility (SWPF) Project
Request to Amend Wastewater Construction Permit #19219-IW to Increase Effluent Throughput

Reference: Wastewater Construction Permit Number 19219-IW issued to SRS/Salt Waste Processing Facility/Phase 2

Dear Mr. Polk:

In consultation and agreement with DOE Savannah River Remediation LLC (SRR), Parsons is submitting a request to amend the permitted throughput in the Wastewater Construction Permit Number 19219-IW issued by the Bureau of Water, South Carolina Department of Health and Environmental Control (SCDHEC). Specifically, Parsons is requesting to raise the permitted throughput to more accurately reflect design capacity discharge of the Salt Waste Processing Facility.

Attached is the justification for the increase in throughput. This request needs to be submitted to SRR, Ron Campbell, Environmental Services Section, in accordance with ICD-19, for submission to the SCDHEC.

If you have any questions concerning this response, please contact Richard Gurske at (803)208-6791.

Very respectfully,

Mark R. Breor
Vice President and Project Manager

MRB/dw

cc: L. Zalants, DOE-SR
S. McMullin, DOE-SR
D. Bender, DOE-SR
K. Harp, SRR
R. Campbell, SRR
B. Brasel, SWPF
A. Doswell, SWPF
SWFDCA
File 3.4.1

IWTF Construction Permit Modification Request

The Salt Waste Processing Facility (SWPF) wishes to amend the SCDHEC Construction Permit 19219-IW, issued 06 August 2008, to change the permit condition limiting the discharge rate of 26,000 gallons per day (gpd). The rationale behind this request is, because SWPF understood the SCDHEC Construction Permit Application form in block "**X. Wastewater Systems: B) Total average design flow of the project not to exceed ____ GPD**" as being the influent, SWPF put in the number 26,000 gpd which equates to the design annual design capacity of 9.4 M gallons per year divided by 365. This number is not the effluent proposed to discharge to the Defense Waste Processing Facility (DWPF) and the Saltstone Processing Facility (SPF). Because SWPF is a wastewater treatment facility, a large amount of specialty chemicals will be introduced and mixed with the influent for treatment and separation purposes. This will create wastewater effluent in quantities much greater than the influent. Since it is a batch process, the amount transferred on any given calendar day can greatly exceed the average rate.

SWPF's batch discharge of Decontaminated Salt Solution (DSS) will occur on an approximate daily basis, but once a week, the MST/Sludge and Strip Effluent streams could be transferred on the same day as a DSS transfer. The table below summarizes the waste streams and rate or amount anticipated to be discharged. Pump capacities are shown in parentheses to demonstrate the ability to achieve the volumes per day shown. The total daily volume discharged on a day when all streams are transferred is anticipated to be 36,000 gpd, rounded up.

Stream	***Rate or Amount***	***Volume per day***
MST/Sludge Solids Receipt Tank (SSRT)(TK-104)to DWPF	*4,158 gallons/7 batches/21.6 hours (Washing filter feed /sludge solids transfer pump P-104-1 150 gpm)*	*660 gal*
Strip Effluent Hold Tank (SEHT) (TK-205)to DWPF	*1.44gpm(Strip effluent transfer pumps P-205A/B 300 gpm)*	*2,074 gal*
DSS Hold Tank (DSSHT) (TK-207)to SPF	*22.99 gpm (DSS Hold Tank transfer pumps P-207A/B – max. cap. 400 gpm)*	*33,106 gal*
Total		***35,840 gal***

Another scenario could occur warranting a number even higher that the 36,000 gpd mentioned above. Because the 36,000 gpd number does not take into account any outages occurring at DWPF or SPF, there will be a need to store as much treated material as possible pending concurrent discharge to DWPF or SPF. As a worst case scenario, during an outage at DWPF and SPF, SWPF could store DSS in up to 4 large Alpha Finishing Facility vessels (Decontaminated Salt Solution Hold Tank [DSSHT], Intermediate Storage Tank [IST], Alpha Sorption Tank-B [AST-B] and Filter Feed Tank-B [FFT-B]), and strip effluent in the Strip Effluent Hold Tank (SEHT), and the MST/Sludge stored in the Sludge Solids Receipt Tank (SSRT). Additionally, the DSSHT and the SEHT would be normally filling while the transfers are going on. This scenario assumes that coming out of an outage from either DWPF or SPF, the 4 AFF vessels, the SSRT and the SEHT are full of conforming product and SEHT and an AFF vessel (DSSHT)

continue to receive product at design rates for the entire 24 hours. SWPF could discharge all of these tanks within a 24 hour period and a discharge of almost 190,000 gallons in one day could occur. As this number would be the maximum amount that could be transferred in one day, SWPF is requesting 190,000 gallons per day for a limiting permit condition. This would avoid the need for a permit variance request or reduction in throughput. Please see the table below that details this scenario.

Vessel	*Working Volume (gal)*	*Influent during transfer (gal)*	*Total (gal) discharged within 24 Hours*
SSRT (TK-104)	5,200	0	To DWPF 5,200
SEHT (TK-205)	16,600	2,016	To DWPF 18,616
Alpha Finishing Facility tanks			
DSSHT (TK-207)	35,900	33,120	To SPF 69,020
IST (TK-220)	30,300	0	To SPF 30,300
AST-B (TK-221)	30,700	0	To SPF 30,700
FFT-B (TK-222)	31,900	0	To SPF 31,900
Grand Total			**Total 185,736**

D H E C

PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment

August 06, 2008

Mark R Breor
US DEPT OF ENERGY SAVANNAH RIVER SITE
742-A
AIKEN, SC 29808

Re: Construction Permit No. 19219-IW
SRS/SALT WASTE PROCESSING FACILITY/PHASE 2
Aiken County

Dear Mark R Breor:

Enclosed is a SC Wastewater Construction Permit for the above referenced project. Construction is to be performed in accordance with this permit and supporting engineering report, plans, and specifications approved by this Office.

This system cannot be placed into operation until final approval is granted by the appropriate Environmental Quality Control (EQC) Regional Office. Your Regional contact is Joshua C Yon, in the Aiken EQC Office. This regional office should be notified when construction begins at the following address and phone number: 206 Beaufort St NE, Aiken, SC 29801, 803-641-7670.

Upon completion of any construction, a letter must be submitted to the EQC Regional Office from the registered engineer certifying that the construction has been completed in accordance with the approved plans and specifications. An inspection may then be scheduled. The EQC Regional Office will approve the system for operation upon successful completion of this project.

Sincerely,

Barry Mullinax

Barry Mullinax, PE,
Industrial Wastewater Permitting Section
Water Facilities Permitting Division

cc: Joshua C Yon - Region 5, Aiken EQC Office
James Somma, Parsons, 1080 Silver Bluff Rd., AIKEN, SC 29803

WW- 1498- 19

Wastewater Construction Permit
Bureau of Water

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

PROJECT NAME: SRS/SALT WASTE PROCESSING FACILITY/PHASE 2	COUNTY: AIKEN

PERMISSION IS HEREBY GRANTED TO: **US DEPT OF ENERGY SAVANNAH RIVER SITE**
Srs
Aiken SC 29808

in accordance with the construction plans, specifications, engineering report and the Construction Permit Application signed by James Somma, Registered Professional Engineer, S.C. Registration Number: .

PROJECT DESCRIPTION: Phase 2 construction of the SWPF which pre-treats salt waste from Tank Farm by extracting Cs, Sr, and actinides from the salt waste to render effluents acceptable for DWPF and the Saltstone Production Facility. See Attachment A for a list of the SWPF equipment. This list was submitted in SRS letter ESH-EPG-2008-00101 (dated July 28, 2008) and is in addition to the piping and appurtenances for this facility.

The effluent will be discharged to the Saltstone Production Facility (SPF) and the Defense Waste Processing Facility (DWPF) at a rate not to exceed 26000 gallons per day.

The effluent concentrations of those constituents the wastewater treatment system is designed to remove or reduce for wastewater transferred from Tank 50 to the SPF are contained in Construction Permit # 18,801-IW for the SPF. The solid waste from the SPF will be disposed in the Saltstone Disposal Facility (SDF) in accordance with Industrial Permit # 025500-1603.

CONDITIONS: See page 2.

In accepting this permit, the owner agrees to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection. This is a permit for construction only and does not constitute DHEC approval, temporary or otherwise, to place the system in operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the AIKEN EQC OFFICE at 803-641-7670. Additional permits may be required prior to construction (e.g., Stormwater).

PERMIT NUMBER:	**19219-IW**
ISSUANCE DATE:	**August 06, 2008**
EXPIRATION DATES:	**August 06, 2010** (to begin construction) **September 30, 2011** (to obtain Approval to Place in Operation)

Jeffrey P. deBessonet, P.E., Director
Water Facilities Permitting Division

BM

CONDITIONS

1. The permittee shall continue to maintain at the permitted facility a complete Operations and Maintenance (O&M) Manual for the SWPF. The manual shall be made available for on-site review during normal working hours. The manual shall contain operation and maintenance instructions for all equipment and appurtenances associated with the wastewater treatment system. The manual shall contain a general description of the treatment process(es), operating characteristics that will produce maximum treatment efficiency and corrective action to be taken should operating difficulties be encountered. The O&M Manual shall be developed no later than six (6) months after issuance of the Construction Permit.

2. The permittee shall provide for the performance of routine daily inspections of the SWPF when the systems are in operation. The inspections shall include, but are not limited to, areas which require a visual observation to determine efficient operations, and for which immediate corrective measures can be taken using the O&M Manual as a guide. All inspections shall be recorded and shall include the date, time, and name of the person making the inspection, corrective measures taken, and routine equipment maintenance, repair or replacement performed. The permittee shall maintain all records of inspections at the permitted facility and the records shall be made available for on-site review during normal working hours.

3. All wastewater treatment facilities and land application systems shall be closed out within one hundred eighty (180) days in accordance with applicable regulations, when the facility is closed or the effluent disposal permit is inactivated, terminated or revoked, unless determined by the Department that a greater time is necessary. As a prerequisite to closure, the Department must approve the closure plan.

4. If necessary, final as-built drawings shall be submitted to the Department when you submit a request to perform an inspection of the SWPF to obtain the Approval to Place into Operation.

5. This construction permit supercedes Construction Permit No. 19,164-IW and includes the waste transfer line segments.

6. The jumpers that will tie the SWPF in with the SPF and the DWPF will be covered in a future construction permit. There shall be no actual radioactive salt solution received from the HLW tanks for processing and transfer to the SPF and/or the DWPF until these jumpers have been installed and the Department has issued the Approval to Place into Operation.

7. NPDES Permit No. SC0000175 Part V.E.1 allows the disposal of "scavenger" wastewater. If the wastewater is not considered to be scavenger wastewater, a written request shall be submitted to the Department describing this wastewater and no discharge of this wastewater may be performed without written approval from the Department.

8. All waste oil and solid and hazardous waste shall be properly disposed of in accordance with the rules and regulations of the Bureau of Land and Waste Management.

9. The use of water, chemicals, and non-radioactive materials to support SWPF activities such as flushing, cleaning, start-up testing, and demonstrations to validate performance of components and/or systems is allowed as long as the jumpers in Item #6 have not been installed and the requirements in Item #7 have been met. Without the installation of these jumpers, there will be physical isolation from the High Level Waste (HLW) tanks in F-Area and H-Area and there is no ability to receive, process, or transfer actual salt solution from the HLW tanks.

Attachment A

SWPF Equipment List (Drawing No. G-P1-J-00001)

PROCESS BUILDING – PROCESS EQUIPMENT

Tank Number	Tank Name
Process Cell Area	
TK-101	Alpha Sorption Tank-A (AST-A)
TK-102	Filter Feed Tank-A (FFT-A)
TK-103	Cleaning Solution Dump Tank-A (CSDT-A)
TK-104	Sludge Solids Receipt Tank (SSRT)
TK-105	Wash Water Hold Tank (WWHT)
TK-109	Salt Solution Feed Tank (SSFT)
TK-121A/B/C	Back Pulse Tank
TK-123	Washing Filter Back Pulse Tank
TK-127	Spent Oxalic Acid Storage Tank (SOAST)
TK-205	Strip Effluent Hold Tank (SEHT)
TK-208	Solvent Drain Tank
TK-235	Lab Drain Tank
TK-601	Alpha Sorption Drain Tank (ASDT)
Operating Deck	
TK-122	Back Pulse Charge Tank-A
TK-128	AST-A Air Pulse Agitator Charge Tank
TK-129	FFT-A Air Pulse Agitator Charge Tank
TK-131	SSRT Air Pulse Agitator Charge Tank
TK-132	SSFT Air Pulse Agitator Charge Tank
TK-133	WWHT Air Pulse Agitator Charge Tank
CSSX Tank Cell	
TK-202	Solvent Hold Tank (SHT)
TK-203	Strip Effluent Coalescer
TK-204	Caustic Wash Tank
TK-206	Ba-137 Decay Tank (BDT)
TK-211	Decontaminated Salt Solution Stilling Tank
TK-212	Strip Effluent Stilling Tank
TK-215	Strip Effluent Pump Tank
TK-217	Solvent Strip Feed Tank
CSSX Contactor Drop Area	
TK-201	Decon. Salt Solution Coalescer

Tank Number	Tank Name
Cold Chemicals Area	
TK-106	Oxalic Acid Feed Tank
TK-107	Filter Cleaning Caustic Tank
TK-108	Caustic Dilution Feed Tank
TK-301	Process Water Tank
TK-302	Caustic Receipt Tank
TK-303	Caustic Makeup Tank
TK-304	Nitric Acid Receipt Tank
TK-305	Process Water Pressure Tank
TK-307	Nitric Acid Scrub Makeup Tank
TK-311	MST Storage Tank
TK-312	DI Water Storage Tank
TK-313	Solvent Makeup Tank
TK-317	Neutralization Tank
TK-330	Argon Tank
CSSX Contactor Area	
EXT-201A-P	Solvent Extraction Contactors
EXT-202A/B	Scrub Contactors
EXT-203A-P	Stripping Contactors
EXT-204A/B	Caustic Wash Contactors
Process Filters	
FLT-102A/B/C	Alpha Sorption Filters
FLT-104	Washing Filter
Alpha Finishing Facility	
TK-207	DSS Hold Tank (DSSHT)
TK-220	Intermediate Storage Tank (IST)
TK-221	Alpha Sorption Tank - B (AST-B)
TK-222	Filter Feed Tank - B (FFT-B)
TK-223	Cleaning Solution Dump Tank - B (CSDT-B)
TK-224	MST/Sludge Transfer Tank (MSTT)

EQUIPMENT DESIGNATIONS

PUMPS	
North ASP Pump and Valve Gallery	
P-015A	ASP Secondary Loop Pump Water Pump
P-015B	ASP Secondary Loop Pump Water Pump
P-101A/B	Alpha Sorption Tank-A Transfer Pumps
P-102-1A/B/C	Filter Feed/Solids Trans Pumps
P-102-2 A/B/C	Filter Recirculation Pumps
P-104-1	Washing FLT Feed/Sludge Solids Trans Pump
P-104-2	Washing Filter Recirculation Pump
P-110	ASP Sump Trans Pump
South ASP Pump and Valve Gallery	
P-105A/B	Wash Water Trans Pumps
P-208A/B	Solvent Drain Tank Pumps
P-601A/B	Alpha Sorption Drain TK Transfer Pumps
CSSX Pump and Valve Gallery	
P-109A/B	Salt Solution Feed Pumps
P-202A/B	Solvent Feed Pumps
P-204A/B	Caustic Wash Tank Pumps
P-205A/B	Strip Effluent Trans Pumps
P-206A/B	Ba-137 Decay Tank Trans Pumps
P-215A/B	Strip Effluent Pump Tank Pumps
P-217A/B	Solvent Strip Feed Pumps
P-218	CSSX Tank Cell Sump Transfer Pump
Sample Pump and Valve Gallery	
SP-101	Alpha Sorption Tank-A Sample Pump
SP-102	Filter Feed Tank-A Sample Pump
SP-103	Cleaning Solution Dump Tank-A Sample Pump
SP-104	Sludge Solids Receipt Tank Sample Pump
SP-105	Wash Water Hold Tank Sample Pump
SP-109	Salt Solution Feed Tank Sample Pump
SP-205	Strip Effluent Hold Tank Sample Pump
SP-235	Lab Drain Tank Sample Pump
Material Staging and Storage Area	
P-601	Low Level Drain Sump Transfer Pump

PUMPS (continued)	
Drum off/Decon Area	
P-605	Decon Area Sump Pump
Cold Chemicals Area	
P-106	Oxalic Acid Transfer Pump
P-107	Filter Cleaning Caustic Trans Pump
P-108	Caustic Dilution Trans Pump
P-300	Cold Chemicals Receiving Dock Sump Pump
P-301-1	Process Water Utility Pump
P-301-2	Flush Pump
P-302	Caustic Trans Pump
P-303	Caustic Makeup Trans Pump
P-304-1	Nitric Acid Metering Pump
P-304-2	Neutralization Metering Pump
P-305	Sodium Hypochlorite Addition Pump
P-309A/B	Scrub Feed Pumps
P-310A/B	Strip Feed Pumps
P-311	MST Transfer Pump
P-311-1	MST Drum Pump
P-312-1	DI Water Trans Pump
P-312-2	Scrub Water Feed Pump
P-312-3A/B	Strip Water Feed Pumps
P-313	Solvent Makeup Trans Pump
P-313-1	Solvent Drum Pump
P-317	Neutralization Tank Discharge Pump
P-318	Caustic Sump Pump
P-319	Oxalic Acid Sump Pump
P-320	Neutralization Sump Pump
P-321	Nitric Acid Sump Pump
P-322	Water Sump Pump
P-326	Pump Seal Make-up Water Supply Pump

AGITATORS	
AGT-107	Filter Cleaning Caustic Tank Agitator
AGT-108	Caustic Dilution Feed Tank Agitator
AGT-303	Caustic Makeup Tank Agitator
AGT-307	Nitric Acid Scrub Makeup Tank Agitator
AGT-311	MST Storage Tank Agitator
AGT-311-1	MST Drum Agitator
AGT-313	Solvent Makeup Tank Agitator
LABORATORY EQUIPMENT	
GB-001 – GB-012	Glove Boxes
RH-001 – RH-017	Radio Hoods
FH-001	Fume Hood
HC-001 – HC-004	Hot Cell Windows
STS-101	Sample Transfer System
ELECTRICAL SYSTEMS	
ATS-203	Automatic Transfer Switch
ATS-204	Automatic Transfer Switch
ATS-205	Automatic Transfer Switch
ATS-207	Automatic Transfer Switch
ATS-208	Automatic Transfer Switch
ATS-210	Automatic Transfer Switch
MCC-203	Motor Control Center
MCC-204	Motor Control Center
MCC-205	Motor Control Center
MCC-206	Motor Control Center
SWGR-201	Switchgear
SWGR-202	Switchgear
SWGR-203	Switchgear
SWGR-204	Switchgear
USX-301	Uninterruptible Power Supply

INSTRUMENTATION	
ICP-001 – ICP-011	Instrument Control Panel
ICP-014	Instrument Control Panel
IR-001 – IR-021	Instrument Control Rack
AIR HANDLING EQUIPMENT	
ACU-001	Wall Mounted Heat Pump
AHU-001 – AHU-005	Air Handling Units
AHU-008 – AHU-009	Air Handling Units
Filters/Fans/Coils	
CCL-401A/B	Process Vessel Vent Coolers
CCL-402A/B	Pulse Mixer Vent Coolers
FAN-401A/B	Process Vessel Vent Exhaust Fans
FAN-402A/B	Pulse Mixer Vent Exhaust Fans
FAN-001	Exhaust Fan
FAN-002	Exhaust Fan
FAN-003	Exhaust Fan on Roof
FAN-004	Exhaust Fan on Roof
FAN-007	Exhaust Fan on Roof
FAN-009	Exhaust Fan on Roof
FAN-010	Exhaust Fan on Roof
FAN-013	Exhaust Fan on Roof
FAN-014	Exhaust Fan on Roof
FAN-015	Exhaust Fan on Roof
FLT-001 – FLT-004	Exhaust Air HEPA Filters
FLT-009	Lab Exhaust Air HEPA Filter
FLT-010 – FLT-016	Cell Inlet Air HEPA Filters
FLT-017	Lab Exhaust Air HEPA Filter
FLT-020	Hot Lab Intake Filter Above Suspended Ceiling
FLT-021	Hot Cell Exhaust Air HEPA Filter
FLT-022	Hot Cell Exhaust Air HEPA Filter
FLT-023 – FLT-034	Glovebox Inlet Air HEPA Filters
FLT-301	Process Water Cartridge Filter
FLT-401A/B	Process Vessel Vent Filters
FLT-402A/B/C/D	Pulse Mixer Vent Filters
HRC-001	Heat Recovery Coil

AIR HANDLING EQUIPMENT (continued)	
Scrubbers	
SCB-001	Scrubber
SCB-002	Scrubber
SCB-003	Hot Cell Scrubber
SCB-004	Hot Cell Scrubber
Separators	
SEP-001	Bldg Chilled Water Air Separator
SEP-003	Control Room Chilled Water Air Separator
SEP-005	Process Chilled Water Air Separator
SEP-007	Heat Recovery Air Separator
Pumps	
P-001A/B	Bldg Chilled Water Supply Pumps
P-003A/B	Control Room Chilled Water Pumps
P-005A/B	Process Chilled Water Supply Pumps
P-007A/B	Heat Recovery Water Pumps
Tanks	
TK-001	Bldg Chilled Wtr Exp Tank
TK-002	Bldg Chilled Wtr Chem Feed Tank
TK-003	Control Room Chilled Wtr Exp Tank
TK-004	Control Room Chilled Wtr Chem Feed Tank
TK-005	Process Chilled Wtr Exp Tank
TK-006	Process Chilled Wtr Chem Feed Tank
TK-007	Heat Recovery Bladder Exp Tank
TK-008	Heat Recovery Chemical Feed Tank
TK-015	Process Chilled Water Expansion Tank
TK-016	Chemical Bypass Feeder Tank
Ventilators	
VLR-001	Gravity Roof Ventilator
VLR-002	Gravity Roof Ventilator

MISCELLANEOUS ITEMS	
BTR-001	DW Pressure Booster System
CMP-054	Back Up Air Receiver Compressor
DMST-401A/B	Process Vessel Vent Demisters
DMST-402A/B	Pulse Mixer Vent Demisters
DT-311	MST Drum Tumbler
HTR-007	Domestic Water Heater/Tank
HTR-217A/B	Solvent Heaters
HTR-310A/B	Strip Feed Heaters
HTR-401A/B	Process Vessel Vent Heaters
HTR-402A/B	Pulse Mixer Vent Heaters
HX-015	ASP Secondary Loop Cooler
HX-102A/B/C	Filter Recirculation Coolers
HX-104	Washing Filter Recirculation Cooler
HX-201	Salt Solution Feed Cooler
HX-202A/B	Solvent Feed Coolers
IX-312	DI Water Package Unit
RMP-001	Radiation Monitoring Panel
SEP-015	Process Chiller Water Air Separator
SI-210	Steam Flash/Tank
VMP-01	Vibration Monitor Panel

D H E C
PROMOTE PROTECT PROSPER

Construction Permit Application Water/Wastewater Facilities

BUREAU OF WATER

DRP SUBMITTAL: No [X] Yes [ ]

SELECT ONE ➧ [ ] Water Facilities [X] Wastewater Facilities [ ] Water & Wastewater Facilities

RECEIVED
APR 04 2008
WATER FACILITIES
PERMITTING DIVISION

I. **Project Name:** Salt Waste Processing Facility (SWPF) **County:** Aiken

II. **Project Location** (street names, etc.):

Savannah River Site, Aiken, SC

III. **Project Description(s):** *Water System:*

Wastewater System:

SWPF pre-treats salt waste from the Tank Farm by extracting cesium, strontium and actinides from the salt waste to render effluents acceptable for DWPF and the Saltstone Production Facility. This application addresses Phase 2 Construction.

Project Type (A-Z): Water: | Wastewater: Z Other Project, not listed

IV. ***Initial* Owner:** [Time of Application] Name/Organization: USDOE/Owner

Address: Building 730-B City: Aiken State: South Carolina Zip: 29808 Phone: (803) 952-6931

V. ***Final* Owner:** [After Construction] Name/Organization: USDOE / Owner

Address: Building 730-B City: Aiken State: South Carolina Zip: 29808 Phone: (803) 952-6931

VI. **Entity Responsible for Final Operation & Maintenance of System:**

Water System: Name: Address:

City: State: Zip: Phone: Fax:

Wastewater System: Name: USDOE/Owner Address: same as above

City: State: Zip: Phone: Fax:

VII. **Engineering Firm:** Name: Parsons Corporation Address: 1080 Silver Bluff Rd.

City: Aiken State: South Carolina Zip: 29803 Phone: (803) 643-7100 Fax:

VIII. **Is this project:** A) Part of a phased project? No☐ Yes☒. If Yes, Phase 2 of 2

B) A revision to a previously permitted project? No☒ Yes☐. If Yes, Permit #

Date Approved: *(MM/DD/YYYY)* Project name (if different):

C) Submitted based on a Schedule of Compliance or Order issued by DHEC? No☒ Yes☐. Order #

D) Anticipating funding by the State Revolving Fund (SRF)? No☒ Yes☐.

E) Crossing a water body? (e.g., river, creek) No☒ Yes☐. If Yes, Name of water body

IX. **Are Standard Specifications approved by DHEC being used on this project?** No☒ Yes☐. If Yes:

Water: Date Approved: *(MM/DD/YYYY)* Approved for whom:

Wastewater: Date Approved: *(MM/DD/YYYY)* Approved for whom:

X. **Wastewater Systems:** A) Type: Domestic ☐ Process *(Industrial)* ☒ Combined *(Domestic & Process)* ☐

B) Total average design flow of the project not to exceed 26,000 GPD

C) *Sewers or Pretreatment* 1. Name of facility (e.g., POTW) treating the wastewater:

2. NPDES/ND Number of facility in Item #1:

Treatment Systems 3. Date Preliminary Engineering Report (PER) approved: *(MM/DD/YYYY)*

4. NPDES/ND application submitted? No☐ Yes☐. If Yes, Date: *(MM/DD/YYYY)*

Disposal Sites 5. Effluent Disposal Site (Description):

6. Sludge Disposal Site (Description):

XI. **Water Systems:** Project located within city limits? No☐ Yes☐.

Public water system providing water (Name & System ID No.): No.:

New water system (including master meter)? No☐ Yes☐. If Yes, System name:

XII. **Type of Submittal:** Complete **Section A (Standard)** *or* **Section B (Delegated Review Program - DRP).**

A) Standard Submittal *must* include the following, where applicable:

- ☒ 1. A transmittal letter outlining the submittal package.
- ☒ 2. The **original** construction permit application, properly completed, with three (3) copies.
- ☒ 3. Three (3) sets of signed and sealed plans and specifications. Specifications may be omitted if approved standard specifications are on file with DHEC.
- ☐ 4. One (1) additional overall plan sheet showing the proposed and existing (only in the area of proposed construction) water and wastewater lines (highlighted for identification) and their sizes.
- ☐ 5. Three (3) sets of the appropriate design calculations. WASTEWATER: Design flow (based on R.61-67, Appendix A), pump station calc's. and pump curve. WATER: Recent flow test from a location near the tie-on site, design calc's. indicating pressure maintained in the distribution system during max. instantaneous demand, fire flow and flushing velocities achieved. Number/types of service connections, well record form, pumping test results, etc.
- ☐ 6. Three (3) copies of a detailed 8½" x 11" location map, separate from the plans.
- ☐ 7. Three (3) copies of construction easements unless the project owner has the right of eminent domain.
- ☐ 8. A letter(s) from the entity supplying water and/or providing wastewater treatment stating their willingness and ability to serve the project, including pretreatment permits, if applicable. The letter should include the specific flow and, when applicable, the specific number of lots being served.
- ☐ 9. A letter(s) from the entity agreeing to be responsible for the O&M of the water and/or wastewater system.
- ☒ 10. Application fee enclosed $ 700.00 . (Refer to Instructions).
- ☐ 11. WATER SYSTEMS: a) A letter from the local government which has potable water planning authority over the area, if applicable, in which the project is located, stating project consistency with water supply service plan for area.
  b) For wells, four (4) copies of a wellhead protection area inventory.
  c) For new wells, a viability demonstration is required in accordance with Regulation 61-58.1.B.(4).

Note: Other approvals may include 208 and OCRM certification, and navigable waterway permitting.

B) DRP submittal (treatment plants are not covered) *must* include the following, where applicable:

- ☐ 1. A transmittal letter, signed by the professional engineer representing the DRP entity, noting this is a DRP submittal. The letter should state that the project has been reviewed and complies with R.61-58 and/or R.61-67.
- ☐ 2. The **original** construction permit application, properly completed, with two (2) copies.
- ☐ 3. Two (2) sets of the signed and sealed plans.
- ☐ 4. One (1) additional plan sheet with water and wastewater lines highlighted, as required under Sec. XII.A.4. above.
- ☐ 5. Two (2) sets of the appropriate design calculations. WASTEWATER: Same information as required under Section XII.A.5. above. WATER: Same information as required under Section XII.A.5. above.
- ☐ 6. Two (2) copies of a detailed 8½" x 11" location map, separate from the plans.
- ☐ 7. Two (2) copies of construction easements, unless the project owner has the right of eminent domain.
- ☐ 8. DHEC's Ocean and Coastal Resource Management certification (for projects in applicable counties).
- ☐ 9. DHEC's Water Quality permit or conditions for placement in navigable waters, and other Agency approvals.
- ☐ 10. WASTEWATER SYSTEMS: a) A letter of acceptance from the entity providing the treatment of the wastewater that includes the specific flow and, when applicable, the specific number of lots being accepted.
  b) A letter from the organization agreeing to be responsible for the O&M of the sewer system.
  c) The 208 Plan certification from the appropriate Council of Governments (designated 208 areas), or from DHEC on the non-designated 208 areas.
- ☐ 11. WATER SYSTEMS: A letter from the local government which has potable water planning authority over the area, if applicable, in which the project is located, stating project consistency with water supply service plan for area.
- ☐ 12. Fee of $75 for water and $75 for sewer ($150 if combined).

Note: The DRP entity should ensure that a copy of the final approved plans are returned to the design engineer.

SOUTH CAROLINA PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01094 CERTIFICATE OF AUTHORIZATION

XIII. Construction plans, material and construction specifications, the engineering report including supporting design data and calculations are herewith submitted and made a part of this application. I have placed my signature and seal on the engineering documents submitted, signifying that I accept responsibility for the design of this system, and that I have submitted a complete administrative package.

Engineer's Name (Printed): James Somma Signature: [signature]

S.C. Registration Number: 14718 3/28/08 Registered Professional Engineer

SOUTH CAROLINA PROFESSIONAL ENGINEER NO. 14718 REGISTERED JAMES C. SOMMA

XIV. Prior to final approval, I will submit a statement certifying that construction is complete and in accordance with the approved plans and specifications, to the best of my knowledge, information and belief. This certification will be based upon periodic observations of construction and a final inspection for design compliance by me or a representative of this office who is under my supervision.

Engineer's Name (Printed): James Somma Signature: [signature]

S.C. Registration Number: 14718 3/28/08 Registered Professional Engineer

XV. I hereby make application for a permit to construct the project as described above. I have read this application and agree to the requirements and conditions and agree to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

Owner's Name (Printed): MARK R BREOR Signature: [signature]

Owner's Title: PROJECT MANAGER Date: 3/27/08 *(MM/DD/YYYY)*

From: <rm.campbell@srs.gov>
To: "Barry Mullinax" <MULLINBS@dhec.sc.gov>
Date: 8/5/2008 9:30 AM
Subject: Re: SWPF Equipment List

The equipment list is not OUO, and can be attached to a construction permit. You are correct that attachment 5 is the list of specifications acceptable by Mr. Somma.
If you would call me, I'll pick up the package at your office.

Thanks,
Ron
803-952-7382 Direct Dial
803-952-6316 Facsimile

"Barry Mullinax" <MULLINBS@dhec.sc.gov>
08/04/2008 04:00 PM

To
<rm.campbell@srs.gov>
cc

Subject
SWPF Equipment List

Is this equipment list OUO material? If yes, I need a redacted version to attach to the construction permit.

Also, in the June 26 letter, Somma included a letter stating that all the specs in attachment 5 were acceptable to him. I assume attachment 5 is the list of specs in the May 30 letter.

When we issue the permit, it will be a big package. I assume you want me to send it thru the regular mail or do you want to pick it up here?

From: Victor E. (Ted) Millings
To: mullinbs
Date: 7/30/2008 9:15 PM
Subject: Re: SWPF Construction Permit

Not sure if Josh copied you on this e-mail.

Ted.

>>> Joshua C. Yon 07/30/08 11:01 AM >>>
P.O. Box A
Aiken, SC 29802

That sound right Ted?

I didn't catch anything that Ted didn't catch, and it looks good to me Barry.
Oh and just to let you know, Ted and I went out to look at the Stannous Chloride System at the M-1 Air Stripper last week and I issued the APO for it yesterday. Let me know if you need anything else.
I'm curious about the scavenger wastewater too.

Josh

>>> Victor E. (Ted) Millings 7/30/2008 8:43 AM >>>
Barry,

I'm out of the office this morning, so I thought I would send my comments now. Josh will send his separately soon.

Cover Letter:
1. Something about the SRS address looks weird - I think DOE mail goes to a 29802 address and a PO Box or something - Josh help me out with this.

2. Stray comma after "PE" in your signature block

Permit:
1. Address seems odd (see comment 1 above).
2. Extra space before "in accordance" just after the DOE address.
3. In the project description, please specify which Tank Farm.
4. In the paragraph that starts "See Attachment A...", I don't think a comma is needed after "July 28, 2008".
5. Typo in first condition - "The manual shall contain a genera description..." Should be "general description".
6. Period is needed after sentence in condition 4.
7. In condition 6, has the acronym HLW been spelled out before using the acronym?
8. Period is needed after last sentence in condition 7.

Not a comment but more of a question outside of reviewing the permit - I know I should know this, but what is scavenger wastewater?

Ted.

>>> Barry Mullinax 07/29/08 3:10 PM >>>
I am about ready to issue the construction permit for the SWPF. It will include the waste transfer segment lines put in by an earlier permit. I just wanted you two to look at the draft and see if you want me to add something or change something. Note that I will be attaching a list of equipment that SRS put together for the SWPF. Including a list of equipment will be helpful when we get into the closure phase.

SC DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
And PARSONS INFRASTRUCTURE MEETING
CONSTRUCTION PERMIT APPLICATION – PHASE II (BUILDING)
2600 Bull Street, Columbia, SC – April 24, 2008

ATTENDEES

Name:	Company or Agency:	Signature:
Barry S. Mullinax	SC DHEC	Barry Mullinax
Crystal D. Rippy	SC DHEC	
William B. Brasel	Parsons	Bill Brasel
Richard H. Gurske	Parsons	Richard H. Gurske
Arlis T. Reynolds, Jr.	Parsons	
David R. Faubert	DOE-SR	
David F. Hoel	DOE-SR	David F. Hoel
Phillip A. Polk	DOE-SR	
Larry E. Zalants	DOE-SR	Larry Zalants
Keith D. Harp	WSRC	Keith D Harp
Ronald Campbell	WSRC	Ronald Campbell

Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

MAY 15 2008

Crystal Rippy, Manager
Industrial Waste Water Permitting Section
Water Facilities Permitting Division
South Carolina Department of Health and
Environmental Control

Subject: Clarification of Adequacy to Operate the Salt Waste Processing Facility (SWPF) and Delegation of Signature Authority to Parsons Regarding Waste Water Permitting

Reference: Letter, Rippy (SCDHEC) to Somma (Parsons) April 4, 2008, SCDHEC Application Tracking #818672

Dear Ms. Rippy:

The U.S. Department of Energy (DOE) wishes to respond to two comments contained in the above referenced letter. For comment #5, "*A letter of acceptance from the owner stating that they have adequate equipment and personnel to operate and maintain the proposed sewer system must be submitted.*" The Department of Energy and its operating contractor(s) will have adequate equipment and personnel to operate and maintain the proposed Salt Waste Processing Facility (SWPF).

For comment #7, "*The person who signed as owner does not appear to meet the requirements of the application instructions in Part XV. Please resubmit a revised permit application with the appropriate owner's signature (one original and 3 copies) or submit a letter describing how this person who signed meets these requirements.*" Pursuant to SC Code Ann. Reg. 61-9.122.22(b), please be advised that Parsons Infrastructure and Technology Group, Inc., the entity responsible for the overall construction and operations of the SWPF, including environmental matters, is hereby designated as the duly authorized representative of the DOE in connection with waste water permitting matters. This means those Parsons individuals (and their respective designees) who occupy the position of Project Manager may sign all applications and reports required for such permits. Also, the enclosure confirms that DOE recognizes Mr. Mark R. Breor as the Project Manager, replacing Mr. David B. Amerine.

Questions concerning this delegation of authority may be directed to Mary-Ellen Noone, Attorney, Advisor in the Office of Chief Counsel at 803-952-8414. Questions concerning technical matters may be addressed to Larry Zalants, SWPF Operations, at 803-641-8905.

Sincerely,

Jeffrey M. Allison
Manager

SWPF-08-266

Enclosure: Amendment of Modification
of Contract #M048

Enclosure:
SUBJECT: Amendment of Modification of Contract #M048
Dated: January 17, 2008

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE 1 OF PAGES 2

2. AMENDMENT/MODIFICATION NO. M048	3. EFFECTIVE DATE See Block 16C	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)

6. ISSUED BY CODE	7. ADMINISTERED BY (If other than Item 6) CODE
U. S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29802	

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and ZIP Code)		9A. AMENDMENT OF SOLICITATION NO.
Parsons Infrastructure and Technology Group, Inc. 1060 Silver Bluff Road Aiken, SC 29803		9B. DATED (See Item 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. DE-AC09-02SR22210
CODE FACILITY CODE		10B. DATED (See Item 13) 9/17/02

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning ____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) Parsons' Letter #00-700-07644 (Replacement of Key Personnel)

E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return ___ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

A. The purpose of this modification is to revise Section J, Attachment F – Key Personnel. Mr. David B. Amerine is replaced by Mr. Mark R. Breor as the Project Manager. (See page 2 hereof for the revised Key Personnel List.)

B. All other terms and conditions of the contract remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Charlene Smith, Contracting Officer	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY Charlene Smith (Signature of Contracting Officer)	16C. DATE SIGNED 1/17/08

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

30-105

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION J – LIST OF ATTACHMENTS

ATTACHMENT F

KEY PERSONNEL

Name	Position
Mark R. Brecr	Project Manager
Alice C. Doswell	ESH&Q Manager
Romi W. Puckett	Project Controls Manager
Dan Jensen	Technology Manager
Phil Dovaston	Processing Engineering
James C. Somma	Engineering Manager
Charles E. Swain	Construction Manager
Alois (Skip) Singer	Commissioning Manager
John Kasper	EPC Manager
Paul J. Whittingham	Contracts Manager

D H E C

PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment

BUREAU OF WATER

April 04, 2008

JAMES SOMMA
PARSONS INFRASTRUCTURE AND TECHNOLOGY GROUP INC
1080 SILVER BLUFF RD
AIKEN SC 29803

Re: **SRS/SALT WASTE PROCESSING FACILITY/PHASE 2**
Aiken County
Application Tracking # 818672

Dear James Somma:

The Industrial Wastewater Permitting section received an engineering submittal on the above project on 04/04/2008. In accordance with R.61-30 we have reviewed your application for completeness. Based on our review, your project application package is administratively incomplete. For this reason, your project will not be in line for a technical review until you satisfy the deficiencies noted below. As a courtesy, we have logged in your project and will keep it here pending your complete response. To complete your application package, please provide the following items:

1. Three (3) copies of pump station calculations and pump curves need to be submitted.

2. Three (3) copies of flow calculations must be submitted justifying the sizing of the lines and/or equipment.

3. Three (3) copies of a detailed 8 ½" by 11" location map must be submitted.

4. Three (3) sets of signed and sealed specifications must be submitted. Specifications should include all materials of construction (e.g. PVC pipe or stainless steel tanks) and sizes of equipment.

5. A letter of acceptance from the owner stating that they have adequate equipment and personnel to operate and maintain the proposed sewer system must be submitted.

6. A SC registered PE must sign and seal all plans and specifications and the Certificate of Authorization (COA) from the engineering firm must also be affixed near the PE seal. Please resubmit these documents with the appropriate seals. Please note: If the plans and specifications are bound (a staple is sufficient for this purpose), then it is only necessary to place

the COA and PE seal/signature on the front of the bound document. If the plans and specifications are not bound, then each page must include the COA and the PE seal/signature.

7. The person who signed as owner does not appear to meet the requirements of the application instructions in Part XV. Please resubmit a revised permit application with the appropriate owner's signature (one original and 3 copies) or submit a letter describing how the person who signed meets these requirements.

Please return the above noted items as soon as possible. Failure to submit these items will result in significant delays in the review process.

Also, please note that any land clearing activity that is being performed in relation to this project must be permitted under the State Sediment and Erosion Control Program. For more information contact Ann Clark at (803) 898-4028.

If you have any questions, please do not hesitate to contact this office at 803-898-3964.

Sincerely,

Crystal D. Rippy

Crystal Rippy, Manager
Industrial Wastewater Permitting Section
Water Facilities Permitting Division

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

Environmental Quality Control

Wastewater Application Fee
2600 Bull Street
Columbia, SC 29201

US DEPT OF ENERGY SAVANNAH RIVER SITE
SC HWY 19 & 781
AIKEN SC 29802

Invoice Date: 04/04/2008
Invoice Number: QY18570-2
Invoice Amount: $700.00
Program ID: 818672

Department Name: BOW - IND WW PERMITTING
Department Contact: CRYSTAL RIPPY
Department Phone: 803-898-3964

Qty	Description	Unit	Extended
1.00	TS < 1MGD - New	700.00	700.00
	Total		**$700.00**

South Carolina Department of Health and Environmental Control

Facility Name: US DEPT OF ENERGY SAVANNAH RIV
Program ID: 818672
Invoice Number: QY18570-2 Amount Due: $700.00

Amount Remitted:
$

To ensure proper credit, please return this portion of the invoice with your payment to the address below or you may go to our agency's website: www.dhec.sc.gov then click on **INVOICE PAYMENT** under **quick links** or use the reverse side of this form for credit card payments. Please include the invoice number on your remittance. **Payment due upon receipt. Past Due 30 days from invoice date. Change of address and credit card payment forms are on the reverse side.**

SC DHEC
Attn: Bureau of Financial Management
PO Box 100103
Columbia, SC 29202-3103

JPMorgan Chase Bank, N.A.
DISBURSEMENT ACCOUNT
SYRACUSE, NEW YORK

PARSONS
100 WEST WALNUT STREET
PASADENA, CALIFORNIA 91124

RECEIVED
APR 04 2008
WATER FACILITIES
PERMITTING DIVISION

50-937
213

VOID AFTER 90 DAYS

CHECK NUMBER	DATE
0117604	3/13/08

AMOUNT
$700.00

PAY Seven Hundred DOLLARS and Zero CENTS

JPMorgan Chase Bank, N.A.
Syracuse, NY

TO THE ORDER OF
SC DHEC
2600 BULL STREET
COLUMBIA, SC 29201-1708

QY18570-2

BY _____
AUTHORIZED SIGNATURE

⑈0117604⑈ ⑆021309379⑆ 601868367⑈

REMITTANCE ADVICE

INVOICE NO	DATE	VOUCHER NO	DESCRIPTION	AMOUNT	DISCOUNT	NET AMOUNT
PHASE2	3/10/08	30802392		700.00		700.00

CHECK NO	DATE	VENDOR NO	VENDOR NAME	TOTAL AMOUNT
0117604	3/13/08	JW073	SC DHEC	700.00

100 WEST WALNUT STREET

PLEASE DETACH THIS VOUCHER BEFORE DEPOSITING CHECK

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MEMORANDUM

April 04, 2008

TO: Joshua C Yon
Region 5
Aiken EQC Office

FROM: Crystal Rippy
Industrial Wastewater Permitting Section
Water Facilities Permitting Division

RE: Construction Permit Application
SRS/SALT WASTE PROCESSING FACILITY/PHASE 2
Aiken County

Are there any problems or comments which you have on the referenced project? Copies of the application and location map are enclosed.

Please return any comments that you may have by: April 14, 2008. An e-mail response is suitable if you prefer. If you have no comments, please just note so. Thanks.

COMMENTS:

SAVANNAH RIVER SITE
Aiken, SC 29808 • www.srs.gov

ESH-EPG-2008-00101

July 28, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Water Facilities Permitting Division of the Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW / Salt Waste Processing Facility – Phase II (Building)
Sixth Supplemental Industrial Wastewater Treatment Facility Construction Permit Application Information
Ref.: Communications of July 21, 2008 with B. S. Mullinax regarding List of Equipment and Flow Rate Clarification

Dear Mr. Mullinax:

As we discussed by telephone and email on 21 July, please find (a) the original and two sets of the equipment list and (b) revised page 36 of 39 to the Engineering Report (Q-PER-J-00002, Rev. 2) for the referenced construction project.

Please substitute the enclosed Engineering Report page for the one currently in your files. This page clarifies the average production flow rate of 26,000 gallons per day. This information is considered Official Use Only which requires U.S. Department of Energy review prior to public disclosure. A redacted version of these documents, if needed, will be provided at the time request is made for the operating permit.

Please let me know if you need any additional information to assist you in the issuance of a construction permit at your earliest opportunity. If you have any questions, do not hesitate to contact me at 803-952-7382.

Sincerely,

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

RMC/r
Enc.

c: M. P. Prater, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B*
J. C. Somma, P.E., Parsons
V. E. Millings III, SCDHEC Region 5 EQC*
J. C. Yon, SCDHEC Region 5 EQC*
J. R. Hughes, SCDHEC Region 5 EQC*
M. D. Sherritt, SCDHEC*
* - Copy of Transmittal Letter Only

SWPF Equipment List (Drawing No. G-P1-J-00001)

PROCESS BUILDING – PROCESS EQUIPMENT

Tank Number	Tank Name
Process Cell Area	
TK-101	Alpha Sorption Tank-A (AST-A)
TK-102	Filter Feed Tank-A (FFT-A)
TK-103	Cleaning Solution Dump Tank-A (CSDT-A)
TK-104	Sludge Solids Receipt Tank (SSRT)
TK-105	Wash Water Hold Tank (WWHT)
TK-109	Salt Solution Feed Tank (SSFT)
TK-121A/B/C	Back Pulse Tank
TK-123	Washing Filter Back Pulse Tank
TK-127	Spent Oxalic Acid Storage Tank (SOAST)
TK-205	Strip Effluent Hold Tank (SEHT)
TK-208	Solvent Drain Tank
TK-235	Lab Drain Tank
TK-601	Alpha Sorption Drain Tank (ASDT)
Operating Deck	
TK-122	Back Pulse Charge Tank-A
TK-128	AST-A Air Pulse Agitator Charge Tank
TK-129	FFT-A Air Pulse Agitator Charge Tank
TK-131	SSRT Air Pulse Agitator Charge Tank
TK-132	SSFT Air Pulse Agitator Charge Tank
TK-133	WWHT Air Pulse Agitator Charge Tank
CSSX Tank Cell	
TK-202	Solvent Hold Tank (SHT)
TK-203	Strip Effluent Coalescer
TK-204	Caustic Wash Tank
TK-206	Ba-137 Decay Tank (BDT)
TK-211	Decontaminated Salt Solution Stilling Tank
TK-212	Strip Effluent Stilling Tank
TK-215	Strip Effluent Pump Tank
TK-217	Solvent Strip Feed Tank
CSSX Contactor Drop Area	
TK-201	Decon. Salt Solution Coalescer

Tank Number	Tank Name
Cold Chemicals Area	
TK-106	Oxalic Acid Feed Tank
TK-107	Filter Cleaning Caustic Tank
TK-108	Caustic Dilution Feed Tank
TK-301	Process Water Tank
TK-302	Caustic Receipt Tank
TK-303	Caustic Makeup Tank
TK-304	Nitric Acid Receipt Tank
TK-305	Process Water Pressure Tank
TK-307	Nitric Acid Scrub Makeup Tank
TK-311	MST Storage Tank
TK-312	DI Water Storage Tank
TK-313	Solvent Makeup Tank
TK-317	Neutralization Tank
TK-330	Argon Tank
CSSX Contactor Area	
EXT-201A-P	Solvent Extraction Contactors
EXT-202A/B	Scrub Contactors
EXT-203A-P	Stripping Contactors
EXT-204A/B	Caustic Wash Contactors
Process Filters	
FLT-102A/B/C	Alpha Sorption Filters
FLT-104	Washing Filter
Alpha Finishing Facility	
TK-207	DSS Hold Tank (DSSHT)
TK-220	Intermediate Storage Tank (IST)
TK-221	Alpha Sorption Tank - B (AST-B)
TK-222	Filter Feed Tank - B (FFT-B)
TK-223	Cleaning Solution Dump Tank - B (CSDT-B)
TK-224	MST/Sludge Transfer Tank (MSTT)

EQUIPMENT DESIGNATIONS

PUMPS	
North ASP Pump and Valve Gallery	
P-015A	ASP Secondary Loop Pump Water Pump
P-015B	ASP Secondary Loop Pump Water Pump
P-101A/B	Alpha Sorption Tank-A Transfer Pumps
P-102-1A/B/C	Filter Feed/Solids Trans Pumps
P-102-2 A/B/C	Filter Recirculation Pumps
P-104-1	Washing FLT Feed/Sludge Solids Trans Pump
P-104-2	Washing Filter Recirculation Pump
P-110	ASP Sump Trans Pump
South ASP Pump and Valve Gallery	
P-105A/B	Wash Water Trans Pumps
P-208A/B	Solvent Drain Tank Pumps
P-601A/B	Alpha Sorption Drain TK Transfer Pumps
CSSX Pump and Valve Gallery	
P-109A/B	Salt Solution Feed Pumps
P-202A/B	Solvent Feed Pumps
P-204A/B	Caustic Wash Tank Pumps
P-205A/B	Strip Effluent Trans Pumps
P-206A/B	Ba-137 Decay Tank Trans Pumps
P-215A/B	Strip Effluent Pump Tank Pumps
P-217A/B	Solvent Strip Feed Pumps
P-218	CSSX Tank Cell Sump Transfer Pump
Sample Pump and Valve Gallery	
SP-101	Alpha Sorption Tank-A Sample Pump
SP-102	Filter Feed Tank-A Sample Pump
SP-103	Cleaning Solution Dump Tank-A Sample Pump
SP-104	Sludge Solids Receipt Tank Sample Pump
SP-105	Wash Water Hold Tank Sample Pump
SP-109	Salt Solution Feed Tank Sample Pump
SP-205	Strip Effluent Hold Tank Sample Pump
SP-235	Lab Drain Tank Sample Pump
Material Staging and Storage Area	
P-601	Low Level Drain Sump Transfer Pump

PUMPS (continued)	
Drum off/Decon Area	
P-605	Decon Area Sump Pump
Cold Chemicals Area	
P-106	Oxalic Acid Transfer Pump
P-107	Filter Cleaning Caustic Trans Pump
P-108	Caustic Dilution Trans Pump
P-300	Cold Chemicals Receiving Dock Sump Pump
P-301-1	Process Water Utility Pump
P-301-2	Flush Pump
P-302	Caustic Trans Pump
P-303	Caustic Makeup Trans Pump
P-304-1	Nitric Acid Metering Pump
P-304-2	Neutralization Metering Pump
P-305	Sodium Hypochlorite Addition Pump
P-309A/B	Scrub Feed Pumps
P-310A/B	Strip Feed Pumps
P-311	MST Transfer Pump
P-311-1	MST Drum Pump
P-312-1	DI Water Trans Pump
P-312-2	Scrub Water Feed Pump
P-312-3A/B	Strip Water Feed Pumps
P-313	Solvent Makeup Trans Pump
P-313-1	Solvent Drum Pump
P-317	Neutralization Tank Discharge Pump
P-318	Caustic Sump Pump
P-319	Oxalic Acid Sump Pump
P-320	Neutralization Sump Pump
P-321	Nitric Acid Sump Pump
P-322	Water Sump Pump
P-326	Pump Seal Make-up Water Supply Pump

AGITATORS	
AGT-107	Filter Cleaning Caustic Tank Agitator
AGT-108	Caustic Dilution Feed Tank Agitator
AGT-303	Caustic Makeup Tank Agitator
AGT-307	Nitric Acid Scrub Makeup Tank Agitator
AGT-311	MST Storage Tank Agitator
AGT-311-1	MST Drum Agitator
AGT-313	Solvent Makeup Tank Agitator
LABORATORY EQUIPMENT	
GB-001 – GB-012	Glove Boxes
RH-001 – RH-017	Radio Hoods
FH-001	Fume Hood
HC-001 – HC-004	Hot Cell Windows
STS-101	Sample Transfer System
ELECTRICAL SYSTEMS	
ATS-203	Automatic Transfer Switch
ATS-204	Automatic Transfer Switch
ATS-205	Automatic Transfer Switch
ATS-207	Automatic Transfer Switch
ATS-208	Automatic Transfer Switch
ATS-210	Automatic Transfer Switch
MCC-203	Motor Control Center
MCC-204	Motor Control Center
MCC-205	Motor Control Center
MCC-206	Motor Control Center
SWGR-201	Switchgear
SWGR-202	Switchgear
SWGR-203	Switchgear
SWGR-204	Switchgear
USX-301	Uninterruptible Power Supply

INSTRUMENTATION	
ICP-001 – ICP-011	Instrument Control Panel
ICP-014	Instrument Control Panel
IR-001 – IR-021	Instrument Control Rack
AIR HANDLING EQUIPMENT	
ACU-001	Wall Mounted Heat Pump
AHU-001 – AHU-005	Air Handling Units
AHU-008 – AHU-009	Air Handling Units
Filters/Fans/Coils	
CCL-401A/B	Process Vessel Vent Coolers
CCL-402A/B	Pulse Mixer Vent Coolers
FAN-401A/B	Process Vessel Vent Exhaust Fans
FAN-402A/B	Pulse Mixer Vent Exhaust Fans
FAN-001	Exhaust Fan
FAN-002	Exhaust Fan
FAN-003	Exhaust Fan on Roof
FAN-004	Exhaust Fan on Roof
FAN-007	Exhaust Fan on Roof
FAN-009	Exhaust Fan on Roof
FAN-010	Exhaust Fan on Roof
FAN-013	Exhaust Fan on Roof
FAN-014	Exhaust Fan on Roof
FAN-015	Exhaust Fan on Roof
FLT-001 – FLT-004	Exhaust Air HEPA Filters
FLT-009	Lab Exhaust Air HEPA Filter
FLT-010 – FLT-016	Cell Inlet Air HEPA Filters
FLT-017	Lab Exhaust Air HEPA Filter
FLT-020	Hot Lab Intake Filter Above Suspended Ceiling
FLT-021	Hot Cell Exhaust Air HEPA Filter
FLT-022	Hot Cell Exhaust Air HEPA Filter
FLT-023 – FLT-034	Glovebox Inlet Air HEPA Filters
FLT-301	Process Water Cartridge Filter
FLT-401A/B	Process Vessel Vent Filters
FLT-402A/B/C/D	Pulse Mixer Vent Filters
HRC-001	Heat Recovery Coil

AIR HANDLING EQUIPMENT (continued)	
Scrubbers	
SCB-001	Scrubber
SCB-002	Scrubber
SCB-003	Hot Cell Scrubber
SCB-004	Hot Cell Scrubber
Separators	
SEP-001	Bldg Chilled Water Air Separator
SEP-003	Control Room Chilled Water Air Separator
SEP-005	Process Chilled Water Air Separator
SEP-007	Heat Recovery Air Separator
Pumps	
P-001A/B	Bldg Chilled Water Supply Pumps
P-003A/B	Control Room Chilled Water Pumps
P-005A/B	Process Chilled Water Supply Pumps
P-007A/B	Heat Recovery Water Pumps
Tanks	
TK-001	Bldg Chilled Wtr Exp Tank
TK-002	Bldg Chilled Wtr Chem Feed Tank
TK-003	Control Room Chilled Wtr Exp Tank
TK-004	Control Room Chilled Wtr Chem Feed Tank
TK-005	Process Chilled Wtr Exp Tank
TK-006	Process Chilled Wtr Chem Feed Tank
TK-007	Heat Recovery Bladder Exp Tank
TK-008	Heat Recovery Chemical Feed Tank
TK-015	Process Chilled Water Expansion Tank
TK-016	Chemical Bypass Feeder Tank
Ventilators	
VLR-001	Gravity Roof Ventilator
VLR-002	Gravity Roof Ventilator

MISCELLANEOUS ITEMS	
BTR-001	DW Pressure Booster System
CMP-054	Back Up Air Receiver Compressor
DMST-401A/B	Process Vessel Vent Demisters
DMST-402A/B	Pulse Mixer Vent Demisters
DT-311	MST Drum Tumbler
HTR-007	Domestic Water Heater/Tank
HTR-217A/B	Solvent Heaters
HTR-310A/B	Strip Feed Heaters
HTR-401A/B	Process Vessel Vent Heaters
HTR-402A/B	Pulse Mixer Vent Heaters
HX-015	ASP Secondary Loop Cooler
HX-102A/B/C	Filter Recirculation Coolers
HX-104	Washing Filter Recirculation Cooler
HX-201	Salt Solution Feed Cooler
HX-202A/B	Solvent Feed Coolers
IX-312	DI Water Package Unit
RMP-001	Radiation Monitoring Panel
SEP-015	Process Chiller Water Air Separator
SI-210	Steam Flash/Tank
VMP-01	Vibration Monitor Panel

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ESH-EPG-2008-00093

July 17, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Water Facilities Permitting Division of the Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW / Salt Waste Processing Facility – Phase II (Building)
Fifth Supplemental Industrial Wastewater Treatment Facility Construction Permit Application Information
Ref.: Email from B. S. Mullinax, P.E., dated July 16, 2008 regarding Thermal Insulation Specification No.: 15080

Dear Mr. Mullinax:

As requested by your email yesterday, enclosed please find three sets of compact disks containing thermal insulation specification number 15080. As with the three disks transmitted to you yesterday, these disks are classified as Official Use Only requiring U. S. Department of Energy approval before any release to the public can be made.

If you have any questions, please call me at 803-952-7382.

Sincerely,

Ronald Campbell

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

RMC/r
Enc.

c: D. P. Ryan, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B*
J. C. Somma, P.E., Parsons
B. S. Mullinax, P.E., SCDHEC
V. E. Millings III, SCDHEC Region 5 EQC*
J. C. Yon, SCDHEC Region 5 EQC*
J. R. Hughes, SCDHEC Region 5 EQC*
M. D. Sherritt, SCDHEC*
* - Copy of Transmittal Letter Only

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ESH-EPG-2008-00087

June 26, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW / Salt Waste Processing Facility – Phase II (Building)
Third Supplemental Industrial Wastewater Treatment Facility Construction Permit Application Information
Ref.: Telephone Conversation June 23, 2008 with B. S. Mullinax, P.E.

Dear Mr. Mullinax:

In response to our discussion on June 23, please find enclosed the original and three copies of the Project Engineer's acceptance of the list of material and construction specifications (Attachment 5) submitted to you on May 30, 2008.

In addition, we have enclosed revised pages 3 and 9 of the Engineering Report (Q-PER-J-00002, Rev. 2, 03/25/2008) submitted to you under cover letter dated April 2, 2008. Please insert these two pages into the Engineering Report and discard the original pages 3 and 9 of that report.

Washington Savannah River Company requests your continued review and issuance of a construction permit for the proposed building at your earliest opportunity. If you have any questions, please call me at 803-952-7382.

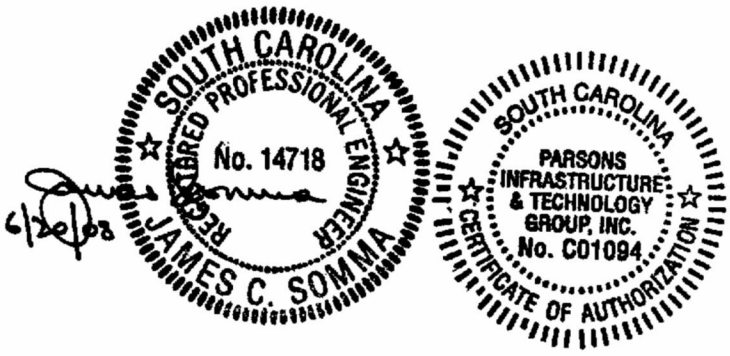
Sincerely,

Ronald Campbell

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

RMC/r
Enc.
c: M. P. Prater, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B
V. E. Millings III, SCDHEC Region 5 EQC
J. C. Yon, SCDHEC Region 5 EQC
J. R. Hughes, SCDHEC Region 5 EQC

I, James Somma, P.E., attest that the SWPF SPECIFICATIONS (Attachment 5) stamped by the individual Professional Engineers are acceptable to me.



S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Facility features described herein, including numerical values assigned to process parameters or equipment specifications, may be subject to change as the design is further refined and finalized. Construction of the SWPF will begin after SCDHEC issues approval. The scheduled construction start date is June 2008 and Construction is currently projected to be completed by December 2011.

Limited Construction activities commenced in September 2007. Limited Construction includes: site preparation, including site clearing and grubbing; site utilities; electrical; excavation; grading; installation of the mud and base mat for the Process Building; and installation of stormwater control structures. Additionall y, under SCDHEC Phase 1 Waste Transfer Line (WTL) Construction Permit No. 19,164-IW, the WTL segments will be installed in July 2008. SWPF stormwater control structures have been permitted by SCDHEC (Permit # SCR10H152[2]) under a Notice of Intent for Stormwater Discharges from Large and Small Construction Activities, National Pollutant Discharge Elimination System General Permit SCR100000[3].

During Construction, the Engineering, Procurement and Construction (EPC) Contractor (Parsons) will contact SCDHEC representatives on a periodic basis to witness the construction progress occurring in J-Area. The EPC will provide notification to SCDHEC of the schedule for final closure of major process areas, such as the dark cells. SCDHEC is requested to identify any other specific areas that they may wish to observe before covering the excavations. Quarterly updates will be issued on progress, as well as on scheduled activity.

Following completion of Construction, initial testing (Cold Commissioning) will be performed prior to the tie-ins to the liquid waste processing facilities to confirm that all major processes and equipment perform as designed. Water runs will be followed by non-radioactive simulant runs. The products from this testing will be disposed in accordance with SCDHEC's Wastewater or Solid and Hazardous Waste Management Regulations. After SCDHEC issues an operating permit following Cold Commissioning, the tie-ins to the liquid waste processing facilities will be performed and Hot Commissioning will begin. Hot Commissioning is planned to commence as described in the quarterly status reports submitted to SCDHEC. SWPF Design, Construction, Commissioning, and one year of Operations will be completed by the EPC.

2.0 BACKGROUND INFORMATION

Nuclear material production and processing at SRS generated millions of gallons of liquid radioactive waste (LRW) that is presently stored in underground waste storage tanks in the SRS F- and H-Area Tank Farms. Approximately 37 Mgal of the waste remains in the F- and H-Area Tank Farms and includes approximately 3 Mgal of sludge, comprising insoluble and precipitated solids, and 34 Mgal of salt solution and crystallized salts. The SWPF's function is to extract and concentrate the radioactive constituents from the salt solution and crystallized salts. The 3 Mgal of sludge will be retrieved and sent to the Extended Sludge Processing facilities and then to DWPF.

The SRS *Approved Site Treatment Plan* (WSRC-TR-94-0608[4]) (STP) and the *Federal Facility Agreement for the Savannah River Site* (WSRC-OS-94-92[5]) (FFA) require DOE to remove the LRW from the non-compliant LRW tanks. The high-level waste portion of liquid waste is

The SRS Tank Farm will prepare blended macro-batches for SWPF feed that range in size up to 1.2 Mgal. The SWPF ASP receives a small batch of SRS Tank Farm waste that is approximately 23,200 gallons. Upon receipt of a small batch, MST is added to the waste to sorb Sr and actinides, including isotopes of plutonium, americium, neptunium, and uranium. The MST and waste are mixed for several hours, during which time the MST selectively sorbs the Sr and actinides from the wastewater. The resulting MST slurry is then filtered to produce a concentrate of MST slurry and solids that contains most of the Sr and actinides, and a clarified salt solution (CSS) filtrate. The concentrated MST solids are transferred to a holding vessel and washed to reduce the sodium (Na) concentration, prior to transfer to the DWPF. The CSS filtrate is routed to the CSSX process for Cs removal. Section 4.3.1 describes the ASP in more detail.

CSSX is a continuous process that utilizes 36 centrifugal contactors for extraction, scrubbing, stripping, and washing of the aqueous and organic process streams. The Cs is removed by contacting the aqueous CSS with an organic solvent in 16 extraction stage contactors.

Cs is captured in the organic phase by the extractant and then released into a low-volume, slightly acidic strip solution via 16 stripping stages. The strip effluent is collected in the Strip Effluent Hold Tank (SEHT) prior to transfer to the DWPF for vitrification. The decontaminated salt solution (DSS) from the extraction stages is sent to the AFP for either an additional MST strike or for sampling and analysis prior to transfer to the SPF, where it will be solidified into a grout matrix known as saltstone grout. Section 4.3.2 provides a more detailed description of the CSSX process.

The AFP provides the capability to perform an additional MST strike if the Sr and actinide levels present in the CSS after the first MST strike in the ASP are too high to meet the SPF waste acceptance criteria (WAC). For the single-strike processing mode, one of the AFP tanks collects DSS from the CSSX for verification sampling and analysis, prior to transfer to the DSS Hold Tank (DSSHT). DSS that meets the SPF WAC is transferred from the DSSHT to SPF. The basic process steps for the AFP are described in more detail in Section 4.3.3.

4.1 Waste Transfer Line Segments

A construction application form, engineering report, and application fee for Phase I WTL Segments of the SWPF Project were submitted to SCDHEC and Phase 1 WTL Construction Permit No. 19, 164-IW was issued on January 02, 2008. This application detailed the WTL segments to be constructed before actual construction of the SWPF. These line segments are illustrated in Figure 4-2. Discussion of the operational use of each WTL follows.

The EPC will work with SCDHEC in the transition from the Phase 1 WTL Construction Permit to the Phase II SWPF Construction Permit including closeout notifications, letters, and drawings needed by SCDHEC.

4.2 Wastewater Receipt from Tank Farms

Wastewater is transferred from a tank in the H-Area Tank Farm to Alpha Sorption Tank-A (AST-A), located in the SWPF AST-A Process Vessel Cell. New transfer lines are required to

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ESH-EPG-2008-00077

May 30, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW / Salt Waste Processing Facility – Phase II (Building)
Second Supplemental Industrial Wastewater Treatment Facility Construction Permit Application Information
Ref.: Telephone Conversation May 20, 2008 with B. S. Mullinax, P.E.

Dear Mr. Mullinax:

As discussed in the referenced telephone conversation with you in which you requested approval by the Salt Waste Processing Facility's Project Engineer of the specifications submitted with the Phase II Construction Permit Application, enclosed are three (3) original sets of lists of material and construction specifications bearing South Carolina Registered Engineer stamps and signatures in compliance with your request. These originals replace the sets previously transmitted to you.

Washington Savannah River Company requests your continued review and issuance of a construction permit for the proposed building at your earliest opportunity. If you have any questions, please call me at 803-952-7382.

Sincerely,

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

RMC/r
Enc.
c: M. P. Prater, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B
V. E. Millings III, SCDHEC Region 5 EQC
J. C. Yon, SCDHEC Region 5 EQC
J. R. Hughes, SCDHEC Region 5 EQC

PARSONS

1080 Silver Bluff Road • Aiken, South Carolina 29803 • (803) 643-7100 • Fax: (803) 643-7118 • www.parsons.com

May 30, 2008

Ref. No.: 00-700-09103

Mr. T. Zack Smith.
Federal Project Director
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29802

Subject: Contract No. DE-AC09-02SR22210
Salt Waste Processing Facility (SWPF) Project
Construction Permit No.: 19,164-IW - Phase II (Building)
Supplemental Industrial Wastewater Treatment Facility Engineering Report Information

Reference: Letter with attachments, Campbell (WSRC) to Mullinax (SCDHEC) Reference Number ESH-EPG-2008-00071 dated May 15, 2008

Reference: C. Rippy (SCDHEC) to J. Somma (Parsons) dated 04 April 2008 SCDHEC Tracking No. #818672

Dear Mr. Smith:

As discussed during a conversation between Mr. Ron Campbell, Washington Savannah River Company LLC and SCDHEC on 20 May 2008, SCDHEC requested that the list of specifications submitted as referenced above be resubmitted with the appropriate professional engineer signature and seal per R.61-67.100.E.4.a.(5).

Three (3) sets (originals) of a list of material and construction specifications signed and sealed by professional engineers, are found in the attachment (identified as Attachment 5) and need to replace the three (3) copies previously submitted to SCDHEC as referenced above. This attachment needs to be submitted to Washington Savannah River Company (WSRC), Environmental Services Section, in accordance with ICD-19, for their submission to the SCDHEC.

Should you have any questions, please feel free to contact Richard Gurske at (803) 643-1602.

Very truly yours,

Mark R. Breor
Project Manager

MRB/RHG/cs

Attachment

cc: L. Zalants, DOE-SR
D. Hoel, DOE-SR
K. Harp, WSRC
R. Campbell, WSRC
J. Somma, SWPF
A. Doswell, SWPF
R. Gurske, SWPF
SWPFDCA
File No.: 3.4.1

Attachment 5

PARSONS

Salt Waste Processing Facility (SWPF)

Number	Title		Discipline
03100	Structural Concrete Formwork	0	Structural
03200	Concrete Reinforcement	0	Structural
03250	Expansion Joints, Contraction Joints, and Waterstops	0	Structural
03300	Cast-In-Place Concrete	0	Structural
03315	Non-Shrink Grout	0	Structural
03410	Plant Pre-cast Structural Concrete	0	Structural
05055	Welding, Structural	0	Structural
05120	Structural Steel	0	Structural
05310	Steel Roof Decking	0	Structural
05320	Composite Steel Decking	0	Structural
05505	Miscellaneous Metals	0	Structural

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
LICENSED PROFESSIONAL ENGINEER
No. 23351
FREDDY J. DICKENS

5/29/08

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

PERMIT NO. 19219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number	Title	Rev	Discipline
11811	ASME Small Vessels	1	Mechanical
11812	Steel Tanks	0	Mechanical
11813	ASME Large Vessels (PP-17A)	1	Mechanical
11814	Polyethylene Tanks	0	Mechanical
11817	Positive Material Identification	0	Mechanical
11818	ASME Vessels - Carbon Steel	E2	Mechanical
11819	Seismic Qualification Criteria for Mechanical Equipment	0	Mechanical
11852	Shell and Tube Heat Exchangers	E3	Mechanical
11903	Cross-Flow Filters	F	Engineering Mechanics
11904	Tank Mixing Eductors	0	Mechanical
15140	Waste Transfer Line Casing Spacer	0	Mechanical

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 14718
JAMES C. SOMMA

5/20/08

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES
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FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number	Title	Rev	Discipline
11815	Fabrication of Stainless Steel Sumps	0	Mechanical
11821	Centrifugal Pumps (PC-1)	0A2	Mechanical
11822	Seismic Qualification Criteria for PC-3 Pumps	0	Mechanical
11823	Rotary Gear Pumps (PC-1)	1	Mechanical
11824	Air Diaphragm Pumps	0A2	Mechanical
11825	Centrifugal Pumps (PC-3)	0	Mechanical
11826	Rotary Gear Pumps (PC-3)	0	Mechanical
11827	Rotary Gear Pumps (PC-1, GS-2, PL-4)	1	Mechanical
11831	Mechanical Agitators	0	Mechanical
11841	Compressed Air System	0	Mechanical
11842	Backup Air Receivers Compressor	0	Mechanical
11855	Heaters (Electric)	0	Mechanical
15080	Thermal Insulation	1	Piping
15085	Bolting Procurement (Piping)	0	Piping
15111	Pipe Fabrication	0A2	Piping
15112	Pipe Leak Testing	0	Piping
15113	Piping Specialty Item Procurement	0	Piping
15114	General Piping Material Procurement	0	Piping
15115	Valve Procurement	0	Piping
15116	Pipe Procurement	0	Piping
15117	Fitting Procurement	0	Piping
15118	Flange Procurement	0	Piping
15119	Gasket Procurement	0	Piping
15120	Piping Material Specification	1	Piping
15121	Field Installation of Process Piping	0	Piping
15123	Protective Coatings - Underground Steel Pipe	0	Piping

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BUREAU OF WATER

WASTEWATER FACILITIES APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

SOUTH CAROLINA PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01094 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 20141 GEORGE C. HUGHES 5/21/08

PERMIT NO. 19219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number	Title	Rev.	Discipline
15185	Hydronic Pumps	C2	Piping
15201	Seismic Restraint of Mechanical Systems and Equipment	B1	HVAC

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 19180
05-29-08
DAVID R. BROCK

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number	Title	Rev	Division
15330	Fire Protection Wet Pipe Sprinkler System	0	Fire Protection
15331	Fire Protection Interior Distribution System	0	Fire Protection
15332	Fire Protection Underground Water Supply System	0	Fire Protection
16721	Fire Alarm and Detection System	0	Fire Protection

SOUTH CAROLINA PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC. No. C01094 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER NO. 16667 G. MARK LEGRAND

5-29-08

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES APPROVED FOR CONSTRUCTION

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PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number			Discipline
16231	Standby Diesel Generator Package	0	Electrical
16641	Cathodic Protection	0	Electrical

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
LICENSED PROFESSIONAL ENGINEER
No. 25675
KAI C. RAMSING
8/7/08

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

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DIRECTOR, WATER FACILITIES PERMITTING DIVISION

Number	Title		Discipline
14510	Sample Transfer System	0	Material Handling
14513	Drum Tumbler	0	Material Handling
14516	Gloveboxes	0	Material Handling
14518	Hot Cell Stainless Steel Lining	0	Material Handling
14519	Fabrication of Specialty Equipment	0	Material Handling

SOUTH CAROLINA
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP, INC.
No. C01094
CERTIFICATE OF AUTHORIZATION

Michael O. Vaughn, P.E.
5/29/08

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

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PERMIT NO. 19219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION

SAVANNAH RIVER SITE
Aiken, SC 29808 • www.srs.gov

ESH-EPG-2008-00071

May 15, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW / Salt Waste Processing Facility – Phase II (Building)
Supplemental Industrial Wastewater Treatment Facility Engineering Report Information
Ref.: Letter, C. Rippy (SCDHEC) to J. Somma (Parsons) dated April 04, 2008

Dear Mr. Mullinax:

As discussed at the meeting with you in Columbia on April 24, 2008, enclosed are three (3) sets of supplemental documents to the proposed Salt Waste Processing Facility's Engineering Report (Q-PER-J-00002, Revision 2 dated 03/25/2008) in compliance with Ms. Crystal Rippy's letter referenced above.

These documents include the following:

- Letter from the Department of Energy-Savannah River Office regarding the recognition of the Project Manager, Mr. Mark R. Breor, on behalf of Parsons Infrastructure and Technology Group, Inc., and the adequacy of personnel and equipment to maintain and operate the proposed treatment facility;
- Responses to the eight items contained in Ms. Rippy's April 04 letter;
- Lists of major items of equipment and specifications, along with example specifications and calculations as discussed at the April 24 meeting; and
- Proposed Salt Waste Processing Facility Location Map.

Accordingly, Washington Savannah River Company requests your review and issuance of a construction permit for the proposed building at your earliest opportunity. If you have any questions, please call me at 803-952-7382.

Sincerely,

Ronald Campbell

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER
WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)
FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.
PERMIT NO. 19219-IW DATE Aug. 6, 2008
DIRECTOR, WATER FACILITIES PERMITTING DIVISION

RMC/r
Enc.
c: M. P. Prater, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B
V. E. Millings III, SCDHEC Region 5 EQC
J. C. Yon, SCDHEC Region 5 EQC
J. R. Hughes, SCDHEC Region 5 EQC

Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

MAY 15 2008

Crystal Rippy, Manager
Industrial Waste Water Permitting Section
Water Facilities Permitting Division
South Carolina Department of Health and
Environmental Control

Subject: Clarification of Adequacy to Operate the Salt Waste Processing Facility (SWPF) and Delegation of Signature Authority to Parsons Regarding Waste Water Permitting

Reference: Letter, Rippy (SCDHEC) to Somma (Parsons) April 4, 2008, SCDHEC Application Tracking #818672

Dear Ms. Rippy:

The U.S. Department of Energy (DOE) wishes to respond to two comments contained in the above referenced letter. For comment #5, "*A letter of acceptance from the owner stating that they have adequate equipment and personnel to operate and maintain the proposed sewer system must be submitted.*" The Department of Energy and its operating contractor(s) will have adequate equipment and personnel to operate and maintain the proposed Salt Waste Processing Facility (SWPF).

For comment #7, "*The person who signed as owner does not appear to meet the requirements of the application instructions in Part XV. Please resubmit a revised permit application with the appropriate owner's signature (one original and 3 copies) or submit a letter describing how this person who signed meets these requirements.*" Pursuant to SC Code Ann. Reg. 61-9.122.22(b), please be advised that Parsons Infrastructure and Technology Group, Inc., the entity responsible for the overall construction and operations of the SWPF, including environmental matters, is hereby designated as the duly authorized representative of the DOE in connection with waste water permitting matters. This means those Parsons individuals (and their respective designees) who occupy the position of Project Manager may sign all applications and reports required for such permits. Also, the enclosure confirms that DOE recognizes Mr. Mark R. Breor as the Project Manager, replacing Mr. David B. Amerine.

Questions concerning this delegation of authority may be directed to Mary-Ellen Noone, Attorney, Advisor in the Office of Chief Counsel at 803-952-8414. Questions concerning technical matters may be addressed to Larry Zalants, SWPF Operations, at 803-641-8905.

Sincerely,

Jeffrey M. Allison
Manager

SWPF-08-266

Enclosure: Amendment of Modification
of Contract #M048

Enclosure
SUBJECT: Amendment of Modification of Contract #M048
Dated: January 17, 2008

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE 1 OF PAGES 2

2. AMENDMENT/MODIFICATION NO. M048	3. EFFECTIVE DATE See Block 16C	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)

6. ISSUED BY CODE

U. S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29802

7. ADMINISTERED BY (If other than item 6) CODE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and ZIP Code)

Parsons Infrastructure and Technology Group, Inc.
1060 Silver Bluff Road
Aiken, SC 29803

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (See item 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. DE-AC09-02SR22210

10B. DATED (See item 13) 9/17/02

CODE FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning ____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A

13 THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) Parsons' Letter #00-700-07644 (Replacement of Key Personnel)

E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return ___ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

A. The purpose of this modification is to revise Section J, Attachment F – Key Personnel. Mr. David B. Amerine is replaced by Mr. Mark R. Breor as the Project Manager. (See page 2 hereof for the revised Key Personnel List.)

B. All other terms and conditions of the contract remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Charlene Smith, Contracting Officer	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED 1/17/08

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

30-105

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION J – LIST OF ATTACHMENTS

ATTACHMENT F

KEY PERSONNEL

Name	Position
Mark R. Breor	Project Manager
Alice C. Doswell	ESH&Q Manager
Romi W. Puckett	Project Controls Manager
Dan Jensen	Technology Manager
Phil Dovaston	Processing Engineering
James C. Somma	Engineering Manager
Charles E. Swain	Construction Manager
Alois (Skip) Singer	Commissioning Manager
John Kasper	EPC Manager
Paul J. Whittingham	Contracts Manager

PARSONS

1080 Silver Bluff Road • Aiken, South Carolina 29803 • (803) 643-7100 • Fax: (803) 643-7118 • www.parsons.com

May 7, 2008

Ref. No.: 00-700-08904

Mr. T. Zack Smith
Federal Project Director
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29802

Subject: Contract No. DE-AC09-02SR22210
Salt Waste Processing Facility (SWPF) Project
SCDHEC Construction Permit Application for Water/Wastewater Facilities and Engineering Report for an Industrial Wastewater Treatment Facility, Document No.: Q-PER-J-00002, Revision 2

Reference: Letter, Rippy (SCDHEC) to Somma (Parsons), April 04, 2008, SCDHEC Application Tracking # 818672

Dear Mr. Smith:

Parsons received the above referenced letter from the South Carolina Department of Health and Environmental Control (SCDHEC) declaring the permit application package administratively incomplete. Comment resolution was reached during a meeting with SCDHEC, the U.S. Department of Energy (DOE), Washington Savannah River Company (WSRC), and Parsons on April 24, 2008. The comments and responses are provided below and need to be submitted to WSRC, Environmental Services Section, in accordance with Interface Control Document (ICD)-19 for their submission to SCDHEC.

1. **Three (3) pump station calculations and pump curves need to be submitted.**

   Response: Pump stations as described in SCDHEC Regulation 61-67.300.C are not an integral part of the proposed SWPF. Operation of the batch processing within SWPF utilizes small pumps to transfer the batches at low flow rates between the respective process units inside the building. These pumps are identified on the General Arrangement Drawing Index (page A2 of the Engineering Report).

   Three copies of a table listing the process pumps, their capacity and the basis for the minimum flow rate to be used for the SWPF are provided in Attachment 1. Additionally, we attached an example of a pump data sheet for one of the centrifugal pumps to be used within the SWPF (see Attachment 2). A complete set of data sheets and calculations is available on file at the site.

2. **Three (3) copies of flow calculations must be submitted justifying the sizing of the lines and/or equipment.**

   Response: The basis of the minimum flow rate is provided in Attachment 1.

3. **Three (3) copies of a detailed 8½" by 11" location map must be submitted.**

   Response: Three copies of a detailed 8½" by 11" location map, cleared for public release, are attached (see Attachment 3).

4. **Three (3) sets of signed and sealed specifications must be submitted. Specifications should include all materials of construction (e.g., PVC pipe or stainless steel tanks) and sizes of equipment.**

   Response: All tanks, pumps and piping that will contain radioactive materials are constructed of stainless steel. All other tanks and piping used for nonradioactive chemicals, process water, etc. are stainless steel or polyethylene. Sizes and specifications of the various tanks proposed for the SWPF are described in the General Arrangement Drawing Index (see page A2 of the Engineering Report) and in Attachment 4 of this letter (the SWPF Process Tanks list). Three copies of the SWPF List of Specifications are provided in Attachment 5 and are not signed and Professional Engineer (PE) stamped as agreed to with SCDHEC during the meeting on April 24, 2008. A complete set of specifications is available on file at the site.

5. **A letter of acceptance from the owner stating that they have adequate equipment and personnel to operate and maintain the proposed sewer system must be submitted.**

   Response: The owner of SWPF is the DOE. A letter of acceptance from DOE verifying that equipment and personnel are adequate to operate and maintain the proposed wastewater treatment facility is being submitted under separate cover.

6. **A SC registered PE must sign and seal all plans and specifications and the Certificate of Authorization (COA) from the engineering firm must also be affixed near the PE seal. Please resubmit these documents with the appropriate seals. Please note: If the plans and specifications are bound (a staple is sufficient for this purpose), then it is only necessary to place the COA and PE seal/signature on the front of the bound document. If the plans and specifications are not bound, then each page must include the COA and PE seal/signature.**

   Response: The Plans (i.e., Engineering Report for an Industrial Wastewater Treatment Facility, Q-PER-J-00002, Rev. 2) were signed and sealed by a SC registered PE, and a COA was also affixed to the bound document.

7. **The person who signed as owner does not appear to meet the requirements of the application instructions in Part XV. Please resubmit a revised permit application with the appropriate owner's signature (one original and 3 copies) or submit a letter describing how the person who signed meets these requirements.**

   Response: Amendment of DOE Contract DE-AC09-02SR22210 approved Mark R. Breor as the SWPF Project Manager thus meeting the requirements of the application instructions found in Part XV. DOE is addressing this response under separate cover.

Unnumbered Comment: Also, please note that any land clearing activity that is being performed in relation to this project must be permitted under the State Sediment and Erosion Control Program.

Response: A Notice of Intent for stormwater and sediment control management under SCDHEC's General Permit for Storm Water Discharges from Large and Small Construction Activities was properly filed with the SCDHEC on August 23, 2007. This Project's General Permit coverage number is SCR10H152.

Should you have any questions, please feel free to contact Richard Gurske at (803) 643-1602.

Very respectfully,

Mark R. Breor
Vice President and Project Manager

MRB/rhg/as

Attachments

cc: L. Zalants, DOE-SR
D. Hoel, DOE-SR
K. Harp, WSRC
R. Campbell, WSRC
J. Somma, SWPF
A. Doswell, SWPF
R. Gurske, SWPF
SWPFDCA
File No.: 3.4.1

Attachment 1

PARSONS

Salt Waste Processing Facility (SWPF)

SWPF PUMP SPECIFICATIONS

Note – Only pumps that are key to meeting design throughput of 9.4 million gallons/year included. Non-critical cold chemical pumps, drain tank pumps, filter cleaning pumps, etc. not listed.

Pump Number	Description	Process Flow Diagram Number	Design Capacity (gpm)	Basis for Design Capacity
P-101A/B	Alpha Sorption Tank A Transfer Pumps	M-M5-J-0002P	300	Needed to meet AST-A cycle time requirements for "Transfer from AST-A" (see attached Table 1)
P-102-1A/B/C	Filter Feed/Solids Transfer Pumps	M-M5-J-0002P	60	Needed to meet design filtrate rate of 10.75 gpm and to provide sufficient bleed-back flow to prevent excessive solids concentration in the filter loop
P-102-2A/B/C	Filter Recirculation Pumps	M-M5-J-0003P	1300	Needed to meet design requirement of 9-13 feet/second through the filter tubes
P-104-1	Washing Filter Feed/Sludge Solids Transfer Pump	M-M5-J-0004P	150	Needed to prevent settling of solids in waste transfer line to DWPF and to minimize transfer time
P-104-2	Washing Filter Recirculation Pump	M-M5-J-0004P	1300	Same basis as P-102-2A/B/C
P-105 A/B	Wash Water Transfer Pumps	M-M5-J-0004P	175	Needed to meet AST-A cycle time requirements for "Caustic Adjustment" (see attached Table 1)
P-109A/B	Salt Solution Feed Pumps	M-M5-J-0006P	30	Salt Solution flow of 22 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-206A/B	Ba-137 Decay Tank Transfer Pumps	M-M5-J-0007P	30	Decontaminated Salt Solution flow of 23 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-202A/B	Solvent Feed Pumps	M-M5-J-0007P	40	Solvent flow of 7.2 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-217A/B	Solvent Strip Feed Pumps	M-M5-J-0007P	15	Solvent flow of 7.2 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-215A/B	Strip Effluent Pump Tank Pumps	M-M5-J-0008P	10	Strip Effluent flow of 1.44 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-205A/B	Strip Effluent Transfer Pumps	M-M5-J-0008P	300	Transfer rate to DWPF is 100 gpm to minimize transfer time. Pump is oversized to provide sufficient flow to TK-205 mixing eductors
P-204A/B	Caustic Wash Tank Pumps	M-M5-J-0008P	10	Caustic Wash flow of 1.44 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts

Attachment 1

PARSONS

Salt Waste Processing Facility (SWPF)

Pump Number	Description	Process Flow Diagram Number	Design Capacity (gpm)	Basis for Design Capacity
P-207A/B	DSS Hold Tank Transfer Pumps	M-M5-J-0009P	400	Transfer rate to Tank Farm Tank 50 is 150 gpm to minimize transfer time. Pump is oversized to provide sufficient flow to TK-207 mixing eductors and DSS Flush Header
P-309A/B	Scrub Feed Pumps	M-M5-J-0012P	5	Scrub flow of 1.44 gpm is needed to meet 9.4 Mgal/year salt waste feed receipts
P-310A/B	Strip Feed Pumps	M-M5-J-0012P	0.1	0.05 M nitric acid flow at .029 gpm mixed with 1.41 gpm of Process Water is required to provide Strip flow of 1.44 gpm which is needed to meet 9.4 Mgal/year salt waste feed receipts
P-220A/B	Intermediate Storage Transfer Pumps	M-M5-J-0015P	400	300 gpm is needed to meet AST-B cycle time requirements for "CDCSS Delivery from IST to AST-B" (see attached Table 2). Pump is oversized to sufficient flow to TK-220 mixing eductors.
P-221A/B	Alpha Sorbtion Tank-B Transfer Pumps	M-M5-J-0015P	300	300 gpm is needed to meet AST-B cycle time requirements for "Transfer from AST-B to FFT-B" (see attached Table 2).
P-222-1A/B/C	Filter Feed/Solids Transfer Pumps	M-M5-J-0015P	60	Same as for P-102-1A/B/C
P-222-2A/B/C	Filter Recirculation Pumps	M-M5-J-0016P	1300	Same as for P-102-2A/B/C

PARSONS

Salt Waste Processing Facility (SWPF)

Table 1. Alpha Sorption Tank-A Cycle Time – Single Monosodium Titanate Strike

Operational Step	Volume[1] (gallons)	Flow Rate (gpm)	Time[1] (hours)
Feed Delivery	23,200	130	2.97
MST Addition	72	5	0.24
Caustic Adjustment	5,003	100	0.83
Mix/Reaction	N/A	N/A	12
Operation Verification	N/A	N/A	2
Contingency[2]	N/A	N/A	2
Transfer from AST-A	28,275	300	1.57
Line Flush[4]	100	100	0.02
Total Cycle Time			21.63

Notes:

1. Volumes and times are based on MST concentration of 0.4 g/L in AST-A.
2. Contingency allowance is for unanticipated delays.
3. Line flush approximated. Flushing requirements to be determined following development of piping isometric drawings.

PARSONS

Salt Waste Processing Facility (SWPF)

Table 2. Alpha Sorption Tank-B Cycle Time – Two Monosodium Titanate Strikes

Operation/Step	Volume (gallons)	Flow Rate (gpm)	Time (hours)
CDCSS Delivery from IST to AST-B	29,860	300	1.66
MST Addition	76	5	0.25
Mix/Reaction	N/A	N/A	6
Operation Verification	N/A	N/A	2
Sampling and Analysis [2]	N/A	N/A	8
Contingency	N/A	N/A	2
Transfer from AST-B to FFT-B	29,936	300	1.66
Line Flush	100[3]	100	0.02
Total Cycle Time			21.59

Notes:

1. Volumes and times are based on MST loading of 0.4 g/L.
2. It is assumed that the sample collection will be performed in AST-B.
3. Line flush approximated. Flushing requirements to be determined following development of piping isometric drawings.

Attachment 2

Strip Effluent Transfer Pumps
P-205A & P-205B

Data Sheets
Centrifugal Pumps General Specifications
Sizing Calculation

For Example Only

PARSONS

Data Sheet

PARSONS Data Sheet	Job Number 745253	Document Number M-DS-J-00132	Rev 0	Date 2/28/2008	Sheet 1 of 4

Salt Waste Processing Facility
US Department of Energy
Aiken, South Carolina

Title

STRIP EFFLUENT TRANSFER PUMPS
P-205A & P-205B

☐ Quotation ☐ Purchase ☐ Construction ☑ Use ☐ Other

Functional Classification SS | Procurement Level: 2 | Performance Category: PC-3

Rev	Date	By	Check	Approvals: Lead Disc. Eng.	Approvals: Func. Area Mgr / Eng. and Des. Mgr.	Remarks
0	02/28/08	JKJ	CJH	GCH	JS	Issued for Use

This sheet is a record of each issue or revision to the subject document. The exact sheets changed and the nature of the change should be noted under Remarks. All sheets, including revised sheets, shall be compiled and issued in their entirety.

■ Indicates supplier is to provide the information of the furnished item

No. Required: Two (2) | ■ Pump size | ■ Type | ■ Model | ■ Manufacturer

GENERAL

Pump Item No.: P-205A & P-205B | P&ID: M-M6-J-0033
Motor Item No.: | PFD: M-M5-J-0008
Pump Calc. No.: M-CLC-J-00013

Motor Data Sheet No.: TBD
Motor by: Supplied and mounted by pump supplier

OPERATING CONDITIONS (Note 5)

Capacity, Normal: 300 (150) gpm | Rated: 300 (150) gpm
Other:
Suction Pressure Max/Normal: 21.4 / 6.1 (11.5) psia
Discharge Pressure: psia 53 / 98.4
Differential Pressure: psi / ft 47 (86.9) / 109 (201)
Rated TDH: ft 121 (221) | NPSHA: 13 (25.4) ft
Hydraulic Power: 9.2 (8.4) HP
Service: Continuous

LIQUID

Liquid: Strip effluent (Note 4)
Solids % by weight: None | Size:

Pumping Temperature: Design 120 °F
Normal 77 °F | Max 95 °F | Min 60 °F
Vapor Pressure 0.46 psia @ 77 °F
Specific gravity 1.00 @ 77 °F
Viscosity 0.9 cP @ 77 °F

SITE AND UTILITY DATA

Location:
Indoor X | Heated X | Outdoor

North ASP Pump & Valve Gallery | Cold Chemical area
South ASP Pump & Valve Gallery | CSSX Pump & Valve Gallery X
Altitude ft | Barometer 14.7 psia
Range of Ambient Temps. Min/Max 60 / 90 °F
NEC Area Classification: CL. I, DIV. 2, GP. D
Temperature Classification: T3 (410 °F)

PERFORMANCE (Note 1)

Proposal Curve No. ■ RPM
■ Impeller Dia Rated | Max | Min in
■ Impeller type:
■ Rated Power bhp | Efficiency %
■ Minimum Continuous Flow:
Thermal gpm | Stable gpm
■ Max Head @ Rated Impeller ft
■ NPSHR at Rated Capacity ft
Max Sound Press. Level Req'd 85 dba

CONSTRUCTION (Note 1)

Applicable Standard: ASME B73.1

■ Nozzles:	Size	Rating	Fac'g	Position
Suction	3"	150 #	RF	End
Discharge	2"	150 #	RF	Top
■ Drain	Note 6			
■ Seal In			NPT	
■ Seal Out			NPT	

Casing mounting: Foot mounted

Base plates:
☐ API Baseplate Number
Non-Grout Construction:
Vertical Leveling Screws | Fab Steel with Drip Rim X
Horizontal Positioning Screws for all Drive Train Components
Non Spark Guard

Testing	Non-Witness	Witness
Hydrostatic		X
Performance/Vibration	X	
NPSH	X	
Complete Unit Test	X	
Sound Level Test	X	
Cleanliness Prior to Final Assembly	X	

■ **Weights (Note 1)**

Weight of Pump	lb
Weight of Base plate	lb
Weight of Motor	lb
Weight of Gear	lb
Total Weight	lb

CONSTRUCTION (Cont'd)

Couplings: Type
■ Make | ■ Model/Size
■ Lubrication: Constant Level Oiler

Mechanical Seal or Packing (Note 1)
Seal: Double Mechanical Seal
■ Seal Manufacturer
■ Size and Type / Double Seal
■ Big Bore Box | ☐ Taper Bore Box
Seals and Gaskets: Kalrez 6375 / Peek (Note 9)
■ Gland Material: 316L SS
■ Seal Flush Piping Plan: 53A (No cooling, see sheet 3)

MOTOR DRIVE (Note 1)

■ Manufacturer
■ HP, RPM (Note 7) | ■ TEFC, Non-arcing/Non-sparking
■ Frame | ■ Service Factor 1.15
Volts/Phase/Hertz: 460 V/ 3Ø / 60 Hz
Variable speed drive: Yes
■ Full Load Amps | ■ Locked Rotor Amps
■ Lubrication: Grease Lube for Life

MATERIALS (Note 1)

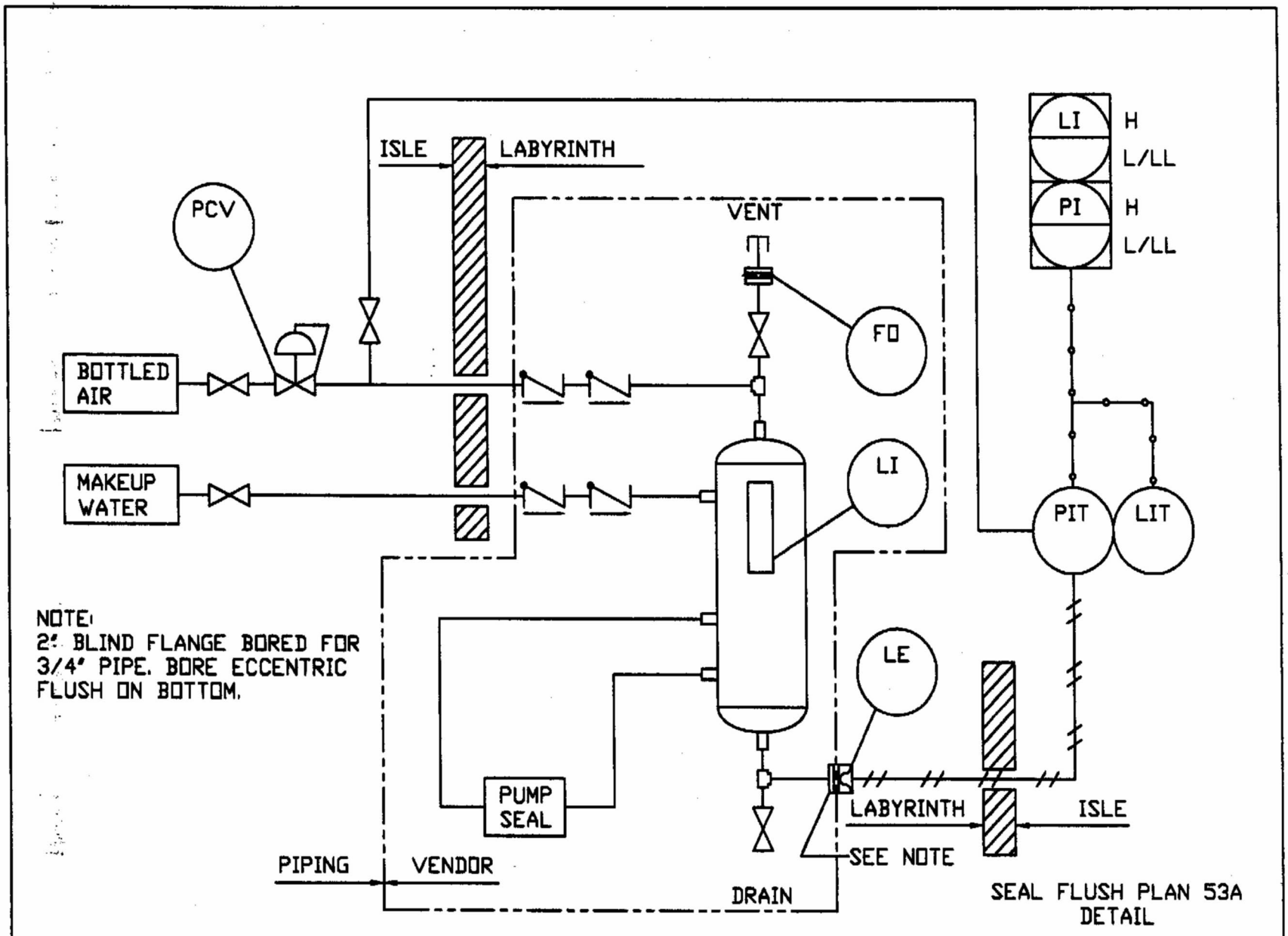
■ Barrel/Case: 316L SS | Impeller: 316L SS
■ Case/Impeller Wear Rings: 316L SS
■ Shaft/Sleeve: 316L SS
Diffusers
Bearing Housing
Coupling Diaphragms (Disks)
Coupling Spacer/Hubs

Material Certification Required for
Casing X | Impeller X | Shaft X
Other

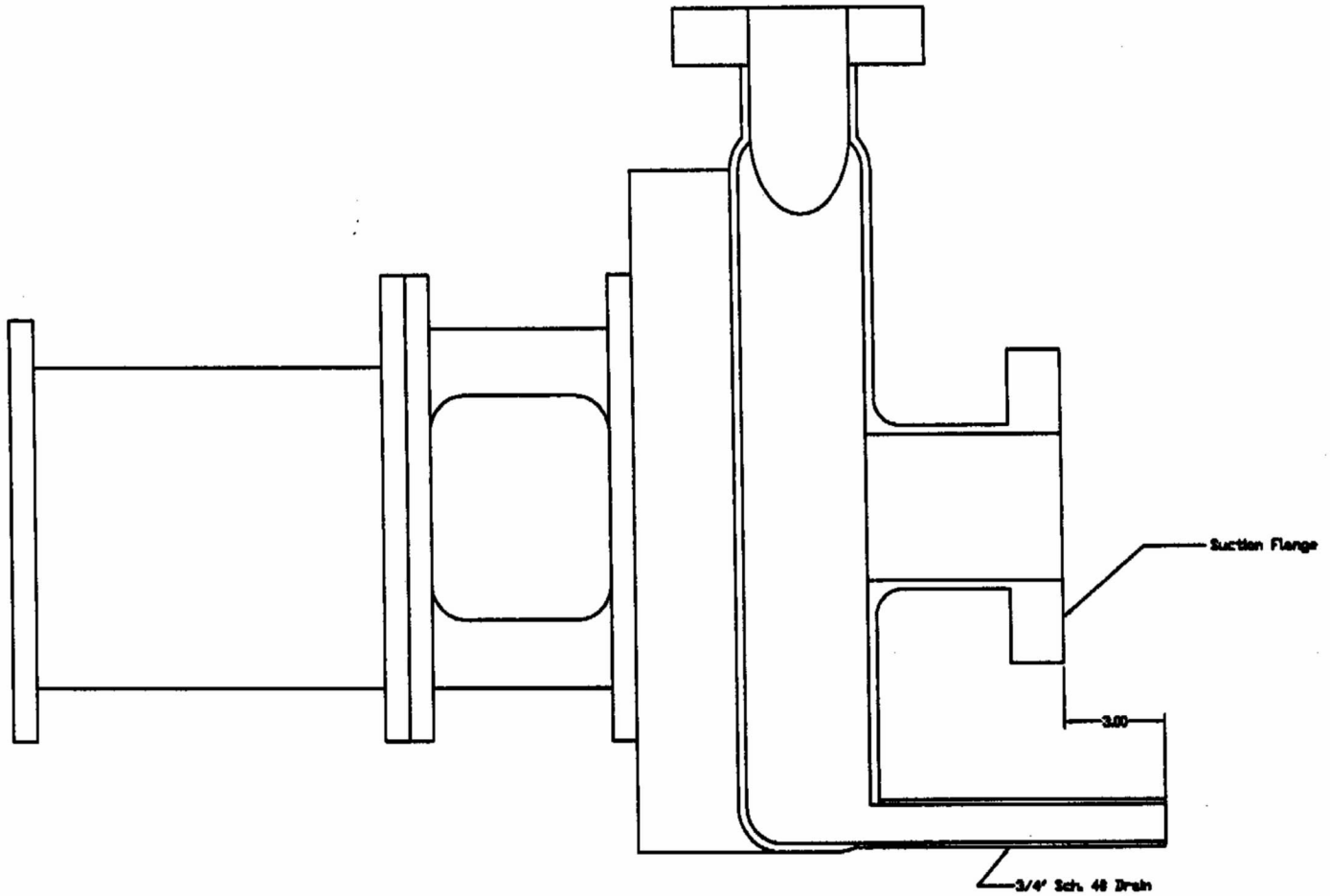
SURFACE PREPARATION AND PAINT

Manufacturer's Standard and Specification 11825

Notes:
1. Supplier to provide/verify information.
2. Pump shall be complete with drive motor, coupling, seal flush equipment, piping and base plate.
3. Supplier to provide pump curves and dimensioned arrangement drawings.
4. Pump is exposed to radioactive fluid. Total integrated dose rate is 610 rad/hr.
5. Pump shall function at two operating conditions:
   a) 300 gpm @ 121 ft TDH b) 150 gpm @ 221 ft TDH (in parenthesis)
6. Pump shall have a 3/4" casing drain. See sheet 4.
7. The supplier shall provide HP and RPM.
8. Basis of Design: Pump "footprint" dimensions shall not exceed 64" x 21".
9. Buyer to verify material.
10. Supplier to provide tapped holes on the pump and motor for installation of vibration monitoring device.



PARSONS CENTRIFUGAL PUMP DATA SHEET	STRIP EFFLUENT TRANSFER PUMPS	SHEET 3 OF 4	EQUIPMENT NUMBER P-205A & P-205B
		DOCUMENT NUMBER M-DS-J-00132	REV 0



3/4" DRAIN PIPE TO EXTEND 3" BEYOND FACE OF SUCTION FLANGE WITH BEVELED END FOR BUTT WELDING.

WHEN REQUIRED FOR HYDROSTATIC TESTING, FABRICATE 3/4" DRAIN PIPE TO 6" BEYOND FACE OF SUCTION FLANGE AND CAP THE END.

PARSONS CENTRIFUGAL PUMP DATA SHEET	STRIP EFFLUENT TRANSFER PUMPS	SHEET 4 OF 4	EQUIPMENT NUMBER P-205A & P-205B
		DOCUMENT NUMBER M-DS-J-00132	REV 0

Model: 3196	Size: 2x3-13	Group: MTX	60Hz	RPM: 1770	Stages: 1

Job/Inq.No. :
Purchaser : PARSONS
End User :
Item/Equip.No. : P-205A & P-205B
Service : Strip Effluent Transfer Pumps
Order No. :

Issued by : Richard Warren
Quotation No. : 82595 120704

Date : 08/20/2007

Certified By :

Operating Conditions

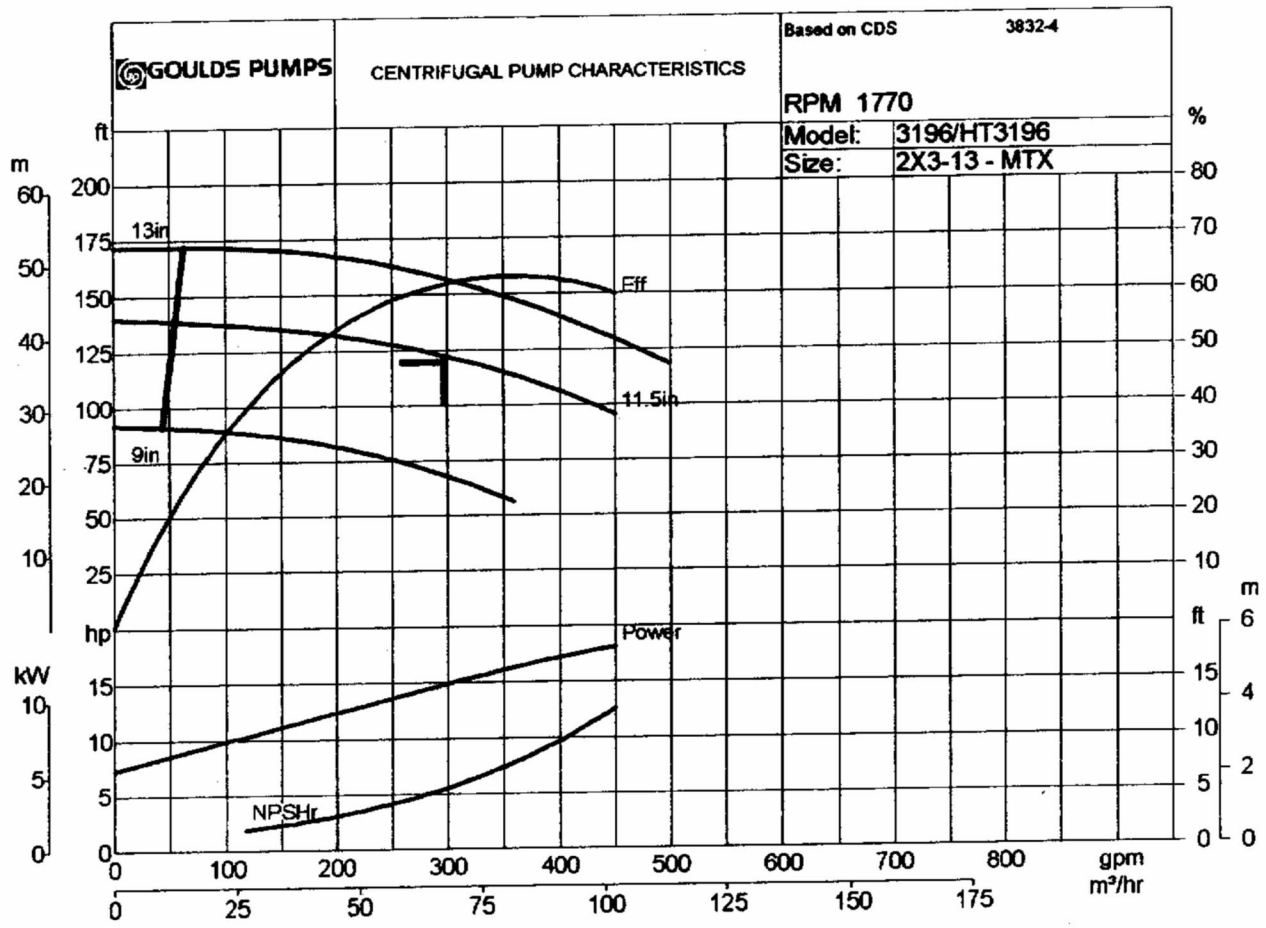
Liquid:	Strip Effluent
Temp.:	120.0 deg F
S.G./Visc.:	1.000/0.900 cp
Flow:	300.0 gpm
TDH:	121.0 ft
NPSHa:	13.0 ft
Solid size:	0.0020 in
% Solids:	0.1
Max. Solids Size:	0.3750 in

Pump Performance

Actual Pump Eff.:	61.5 %
Actual Pump Power:	14.9 hp
Total Power Loss:	0.39 hp
Rated Total Power:	14.9 hp
Imp. Dia. First 1 Stg(s):	11.5000 in
NPSHr:	5.6 ft
Shut off Head:	140.1 ft
Vapor Press:	

Suction Specific Speed:	6,330 gpm(US) ft
Min. Hydraulic Flow:	55.7 gpm
Min. Thermal Flow:	N/A
Non-Overloading Power:	18.1 hp

Notes: 1. Elevated temperature effects on performance are not included.



PARSONS Specification Section	Job Number 745253	Section Number 11825	Rev 0	Date 12/10/07	Sheet 1 of 14

Salt Waste Processing Facility
U.S. Department of Energy
Aiken, South Carolina

Section Title:
Centrifugal Pumps (PC-3)

☐ Purchase ☐ Construction ☐ Quotation ☒ Other ☒ All Pages Attached

Functional Classification:
SS

Performance Category:
PC-3

Rev	Date	By	Ck	Approvals: Lead Disc. Eng.	Approvals: Func. Area Mgr./ Eng. and Des. Mgr.	Remarks
0	12/10/07	JKJ	CJH	CH	JS 1/7/08	Issued for Use

This sheet is a record of each issue or revision to the subject Section. Each time this Section document is changed, all sheets must be issued. The nature of the change should be noted in the Remarks column; however, these remarks are not a part of the Section. All changes to documents after issue as Revision 0 shall be recorded on the Revision Summary Sheet.

CENTRIFUGAL PUMPS (PC-3)

TABLE OF CONTENTS

CENTRIFUGAL PUMPS (PC-3)

INDEX OF TABLES

CENTRIFUGAL PUMPS (PC-3)

PART 1: GENERAL

1.1 SECTION INCLUDES

A. This section covers the minimum requirements for the mechanical design, materials, fabrication, testing, inspection and preparation for shipment of Seismic Performance Category 3 (PC-3) centrifugal pumps to be installed in the Salt Waste Processing Facility (SWPF).

B. This section is supplemented by pump data sheets, which may indicate specific design conditions in addition to the requirements of this section. If the SUPPLIER's interpretation presents a conflict among this section, the equipment data sheets, standards, or supplemental sections, the SUPPLIER shall contact the BUYER and obtain a written clarification before proceeding with work affected by the conflict.

1.1.1 Definitions

A. Approval (and approved) shall be understood as written approval (approved in writing by the BUYER).

B. Approved equal shall be a substitution to the specified product and be approved in writing by the BUYER. A manufacturer's name or figure number specified in an individual item description is only a reference; an approved-equal substitution may be made, subject to the BUYER's written approval.

C. BUYER: Parsons SWPF project.

D. Contract documents shall be the purchase order along with its attachments and references.

E. SUPPLIER: Any individual or organization who furnishes items or services in accordance with a procurement document. An all-inclusive term used in place of any of the following: vendor, seller, contractor, subcontractor, fabricator, consultant, and their sub-tier levels.

F. Performance Category (PC): In accordance with DOE G420.1-2, a classification using a graded approach in which structures, systems, or components in a category are designed to ensure similar levels of protection (i.e., meet the same performance goal and damage consequences) during natural phenomena hazard events.

1.2 RELATED SECTIONS AND DOCUMENTS

A. The sections/specifications and/or other documents listed herein form a part of this document to the extent specified. In the event of a conflict between the referenced section/document and the contents of this document, the BUYER shall be notified to resolve the conflict prior to proceeding with items or services affected by the conflict.

1. Section 01300 – Supplier Submittals
2. Section 01610 – Packaging, Shipping, and Storage of Items
3. Section 11817 – Positive Material Identification
4. Section 11822 – Seismic Qualification Criteria for PC-3 Pumps
5. Section 15120 – Piping Material Specification

CENTRIFUGAL PUMPS (PC-3)

1.3 REFERENCES

A. The codes and standards/documents listed herein form a part of this section. In the event of a conflict between the referenced item and the contents of this section, the BUYER shall be notified to resolve the conflict prior to proceeding with items or services affected by the conflict. Unless otherwise specified, use the latest edition of a referenced item.

1.3.1 American Petroleum Institute (API)

A. API-682-2002, Pumps – Shaft Sealing systems for Centrifugal and Rotary Pumps

1.3.2 American Society of Civil Engineers (ASCE)

A. ASCE 4-98, *Seismic Analysis of Safety-Related Nuclear Structures*, 2000

B. ASCE 7-02, *Minimum Design Loads for Buildings and Other Structures*, 2002

1.3.3 American Society of Mechanical Engineers (ASME)

A. ASME B 1.1–1989, *Unified Inch Screw Threads (UN and UNR Thread Form)*

B. ASME B16.5–1996 (A1998), *Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24*

C. ASME B16.11–1996, *Forged Fittings, Socket-Welding and Threaded*

D. ASME B1.20.1–1983 (A1992), *Pipe Threads, General Purpose (Inch)*

E. ASME B31.3–2002, *Process Piping*

F. ASME B73.1–2001, *Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process*

G. ASME B73.2M–1991, *Vertical In-Line Centrifugal Pumps for Chemical Process*

H. 2004 ASME Boiler and Pressure Vessel Code, Section VIII: Division 1, *Rules for Construction of Pressure Vessels*

I. 2004 ASME Boiler and Pressure Vessel Code, Section IX: *Welding and Brazing Qualifications*

1.3.4 American Welding Society (AWS)

A. AWS D1.1–2004, *Structural Welding Code – Steel*

B. AWS D1.6–1999, *Structural Welding Code – Stainless Steel*

1.3.5 Code of Federal Regulations (CFR)

A. 29 CFR 1910, *Occupational Safety and Health Standards, 2004*

B. 29 CFR 1910.95, *Occupational Safety and Health Standards, Occupational Noise Exposure, 2004*

1.3.6 American National Standards Institute/Hydraulic Institute (ANSI/HI)

A. ANSI/HI 9.6.1 – 1998, American National Standard for Centrifugal and Vertical Pumps

B. ANSI/HI 9.6.2 – 2001, American National Standard for Centrifugal and Vertical Pumps for Allowable Nozzle Loads

1.3.7 Institute of Electrical and Electronics Engineers (IEEE)

A. IEEE 841–2001, *Standard for Petroleum and Chemical Industry - Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 370 kW (500 hp)*

1.3.8 National Electrical Manufacturers Association (NEMA)

A. NEMA MG1–1998, Chg: w/Rev. 3, 2002, *Motors and Generators*

1.3.9 National Fire Protection Association (NFPA)

A. NFPA 70–2005, *National Electrical Code* (NEC)

1.3.10 U.S. Department of Energy (DOE)

A. DOE G 420.1-2, Guide for the Mitigation of Natural Phenomena Hazards for DOE Facilities and Nonnuclear Facilities, 2000

1.4 QUALITY ASSURANCE

A. Quality Assurance requirements are specified in the contract documents.

1.5 SUBMITTALS

A. SUPPLIER shall submit to the BUYER documents shown in Section III of the Material Requisition/PO in accordance with Section 01300.

B. The SUPPLIER will be required to submit detailed design, fabrication and testing documentation sufficient to verify the adequacy and compliance of design, fabrication methods and testing procedures and results.

1.5.1 Drawings

A. The SUPPLIER shall submit shop drawings to the BUYER for approval.

1. Shop drawings shall consist of outline drawings, parts lists, schedules, performance charts, installation instructions, brochures, diagrams, and other information to illustrate equipment, piping, wiring, and related components.

2. The shop drawings shall indicate clearance requirements and weights.

1.5.2 Calculations

A. Seismic qualification shall be provided for pump baseplate and anchorage as detailed in ASCE 4.

B. Calculations shall bear the signature and seal of a professional engineer.

1.5.3 Reports

A. Certified performance curves shall be provided depicting pump capacity, total discharge head (TDH), differential pressure, net positive suction head required (NPSHR), and efficiency. These performance curves shall provide such information as necessary to determine compliance to the specified and indicated requirements and shall include minimum capacity for stable operation of each pump.

CENTRIFUGAL PUMPS (PC-3)

B. Factory testing and test reports, including hydro pressure test report and noise level test report, shall be submitted for approval to the BUYER.

C. Mill test reports for pressure containing parts, and certificate of material compliance, shall be submitted.

D. Welding procedure specifications (WPS), procedure qualification reports (PQR), and weld repair procedures shall be submitted to the BUYER for approval before any welding is performed. SUPPLIER shall also provide welder performance qualification test records to the BUYER for information and records.

E. All required data for materials subject to positive material identification (PMI) shall be documented and submitted in accordance with Section 11817.

F. Pump and motor shaft actual alignment reading and pump assembly actual clearance readings shall be submitted to the BUYER.

1.5.4 Spare Parts Data

A. After approval of the shop drawings, the SUPPLIER shall furnish recommended spare parts data for each different item of materials and equipment specified. The data shall include a complete list of recommended parts and supplies, with current unit prices and source of supplies.

1.5.5 Operation and Maintenance Manuals

A. The SUPPLIER shall furnish to the BUYER for concurrence, complete copies of operating instructions outlining the step-by-step procedures required for pump startup, operation, and shutdown. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all items of equipment and their basic operating features.

B. The SUPPLIER shall furnish to the BUYER for concurrence, complete copies of maintenance instructions listing routine maintenance procedures, recommended lubricants, and standard materials for nonmetallic parts typically consumed during operation or maintenance, possible breakdowns and repairs, and troubleshooting guides.

1.5.6 Seismic Qualification Report

A. The SUPPLIER shall submit an outline of the proposed methods and procedures for seismic qualification of the equipment in accordance with Section 11822.

B. The SUPPLIER shall submit a seismic qualification report. The submittal shall include support reactions at equipment supports for the design of anchorage and displacement of nozzles due to seismic and concurrent loadings.

CENTRIFUGAL PUMPS (PC-3)

PART 2: PRODUCTS

2.1 GENERAL REQUIREMENTS

A. The equipment SUPPLIER shall offer standard equipment, where possible, to fulfill the requirements stated in this section, on the design drawings and data sheets. The SUPPLIER must identify any variations of the SUPPLIER's standard equipment from the stated requirements; otherwise it will be assumed that all equipment offered is in compliance.

B. Material and equipment shall be a standard product of the SUPPLIER engaged in the manufacture of the products. Materials used shall be those proven by service in similar pump designs and for similar operating conditions.

C. Pumps shall be suitable for operation at indicated temperature without vapor binding and without cavitation under entire range of system operating conditions. The only acceptable means of rectification of cavitation shall be the replacement of entire pump assembly.

2.2 TECHNICAL REQUIREMENTS

2.2.1 General

A. Pumps shall conform to ASME B73.1. Each pump shall be a complete unit, including driver, coupling, shaft sealing with seal flush/cooling (when required), coupling guard, mounting base, finish coating, special features, and accessories as specified.

B. When solids are present in the pumping fluid, as specified in the data sheet, a low shear pump design shall be provided.

C. Unless otherwise specified in the data sheet, pump selection shall be based on an impeller design requiring not more than 90 percent of full impeller diameter to meet the specified operating conditions.

D. When operating at rated conditions, the pump operating point is preferred to be within 10 percent of the best efficiency point flow as shown on the pump performance curve. The impeller shall have the characteristic of increasing head from rated capacity to shutoff.

E. Pump operating speed shall not be greater than 70 percent of the first critical speed of the combined rotating elements at the specified maximum operating conditions.

F. Pump units shall be capable of specified discharge capacities and heads when operating at the suction conditions, temperatures, specific gravities, and viscosities shown on the data sheet. Pump units shall not overload the drivers at any operating point along the head capacity curve from shutoff head to maximum capacity for the impeller provided. At rated conditions and at maximum horsepower along the pump curve, the horsepower requirements shall not exceed the rating of the driver nameplate horsepower.

G. Pumps with the same rating and service shall be identical. Component parts of the same end function shall be interchangeable.

H. Maximum noise level shall be 85 dBA at a distance of 3 feet from the equipment, as detailed in 29 CFR 1910.95, Occupation Noise Exposure, unless otherwise specified in the data sheets.

CENTRIFUGAL PUMPS (PC-3)

2.2.2 Capacities

A. Capacities of pumps shall be not less than those specified on the data sheets. No additional capacity margin need be added.

2.2.3 Net Positive Suction Head

A. There should be no less than a 25 percent margin between net positive suction head available and net positive suction head required at the maximum sustained capacity.

2.2.4 Seismic Design

A. The pump supporting structure and anchorages shall be designed to withstand seismic loads. Seismic calculations shall be performed per ASCE 4, Importance Factor I per Section 11822.

B. These calculations shall incorporate any allowable nozzle loads imposed by piping connections.

2.3 MATERIALS AND EQUIPMENT

2.3.1 General

A. All pressure containing parts of pumps shall be fabricated and inspected in accordance with ANSI/HI, ASME and other industry standards for heavy-duty rugged construction.

B. Maximum interchangeability of pump components is desired among similar pump designs. Parts in identical pump designs shall be completely interchangeable.

C. Each pump and motor combination shall include all external piping, when required for cooling or flushing, and base for each pump and driver.

D. The equipment furnished shall be a complete package of components required to develop the performance conditions described in this section. The design of the equipment shall be heavy duty, suitable for intermittent or continuous operation at the minimum and maximum capabilities of the furnished pump.

E. Environmental conditions and seismic design requirements shall be in accordance with the data sheet requirements.

F. The materials shall be new and conform as specified on the BUYER's equipment data sheets, or as specified in this section. Any alternates or deviations shall be specifically approved by the BUYER.

G. Castings used for any part of pumps shall be sound and free of shrink or blowholes, scale blisters, and other casting defects. The materials used shall be those proven by service in similar pump designs and for similar operating conditions. The SUPPLIER shall maintain certifications of material compliance for the specific pumps being furnished in their files.

H. Pressure containing parts shall be repaired only if permitted by the material specification. No repair of defects by peening or impregnation shall be permitted for any castings.

I. Products which contain asbestos are prohibited. This prohibition includes items such as packing or gaskets even though the item is encapsulated or the asbestos fibers are impregnated with binder material.

CENTRIFUGAL PUMPS (PC-3)

2.3.2 Pump Drivers

A. All motors shall be a minimum totally enclosed, fan cooled, severe duty with integral horsepower NEMA frames and shall meet requirements of IEEE 841.

B. Electric motor drivers shall conform to NEMA MG1. Motors shall be sized to be non-overloading over the entire pump operating range.

C. Pump motors located in hazardous areas shall be suitable for use in those areas as shown on the pump data sheet.

D. Motors used with variable frequency drives (VFDs), as specified on the data sheets, shall be inverter duty rated. All ratings, characteristics and features shall be coordinated with, and approved by, the VFD manufacturer.

E. Inverter duty motors shall be provided with Class H insulation (NEC), with Class B temperature rise characteristics or better (NEC).

F. Motors furnished shall be rated to produce the required torque at the maximum operating condition specified on the data sheet.

2.3.3 Couplings and Guards

A. Couplings shall be of the flexible-spacer type, keyed and locked to the shaft. Disconnecting the couplings shall be accomplished without removing the driver of the pump from the shaft.

B. A normal service factor rating of 1.5 shall be applied to all couplings.

C. All moving or rotating parts of equipment, i.e. motors, couplings, etc., shall be provided with guards, in accordance with 29 CFR 1910, guidelines.

2.3.4 Baseplates

A. Fabricated baseplate with full drip rim and drain shall be furnished and shall have a raised lip. Connections for drains shall be tapped in the raised lip at the pump end. The pan or upper surface of the baseplate shall be sloped toward the drain end of the pan. Unless otherwise specified on the data sheets, the baseplate shall be sized to accommodate the next size larger motor frame and shall extend under the pump and driver. Baseplate and pump supports shall be of rigid construction and shall be designed to minimize misalignment caused by mechanical forces such as normal piping strains, internal differential thermal expansion, and hydraulic piping thrust.

2.3.5 Auxiliary Piping

A. Auxiliary piping and tubing (per ASME B31.3), when furnished by the pump manufacturer, shall be securely supported to resist vibration and damage. Auxiliary tubing shall be heavy-wall steel per Section 15120, suitable for the service conditions (e.g. carbon steel or stainless steel, as required per data sheet). Connections in auxiliary systems shall be as specified on the data sheets. A means for disassembly (unions, flanges, connectors, etc.) shall be provided.

CENTRIFUGAL PUMPS (PC-3)

2.3.6 Anchor Bolts

A. Anchor bolts will be furnished and installed by the BUYER. SUPPLIER shall provide anchor bolt size, quantity and location. SUPPLIER shall also provide loadings on anchor bolts for anchorage design.

2.3.7 Flanges

A. All flanges and flanged fittings shall be per ASME B16.5. Flange face finish shall be 125 to 250 arithmetic average roughness height, unless otherwise noted. All flanges shall conform to ASME standards for the pressures and temperatures involved.

B. The thickness of the hub of a welding neck flange, where it is welded to the nozzle neck, shall not be less than that of the nozzle neck.

C. Slip-on flanges, when used, shall be drilled and tapped through the hub for air and soapsuds testing of attaching fillet welds.

D. When specified on the data sheet, flanges 2 inches and smaller shall be 300 pound minimum flange rating. Larger nozzles shall be 150 pound flange rating or rating based on temperature/pressure requirements.

2.3.8 Gaskets and O-Rings

A. Gasket and O-Ring type and material shall be as required by the pump data sheet or per the manufacturer's standard suitable for the application. Gaskets and O-Rings used for the shop hydrotest shall be of the same type as used for operation and shall be replaced before shipment with new gaskets and O-Rings.

B. Gaskets and O-Rings used on units located in the North ASP Pump and Valve Gallery, the South ASP Pump and Valve Gallery, and the CSSX Pump and Valve Gallery areas of the facilities, as identified on the data sheets, shall be selected to withstand radiation exposure of a minimum of 10^7 rad (radiation absorbed dose).

2.3.9 Shaft Sealing Flush Plans

A. All pumps shall be provided with shaft sealing provisions suitable for the service application. Flush plan selection shall be in accordance with the data sheets. All seal flush accessories and auxiliary piping shall be in accordance with API standard 682.

B. All parts of the seal flush assemblies shall be shop hydrostatically tested and furnished assembled with the pump for shipment.

2.3.10 Pump Casing

A. Under maximum suction pressure condition, maximum allowable casing working pressure shall exceed maximum discharge pressure by 10 percent, or 15 psi, whichever is greater.

B. Unless otherwise specified in the data sheet, pump casings shall be top discharge design with horizontal-end suction, foot mounting, and shall be self venting with fully confined gasket. A casing drain shall be incorporated into the design.

CENTRIFUGAL PUMPS (PC-3)

2.3.11 Bolting

A. Threading shall conform to ASME B1.1.

B. Bolted piping connections shall be through-bolted. Internal connections may use tapped connections for studs.

C. Bolt length shall be kept to a minimum for easy removal. Metal washers shall be used under all nuts and bolt heads. Bolting shall be long enough to assure full thread engagement of the nut.

2.3.12 Nozzles and Miscellaneous Connections

A. In general, suction and discharge nozzle connections should be provided with flanged or welded connections as indicated on the data sheet. Threaded pipe connections shall not be used for pumps handling acid or agent solutions unless approved by the BUYER.

B. Pipe threads shall be taper pipe threads in conformance with ASME B1.20.1. Tapped openings and bosses for pipe threads shall conform to ASME B16.5.

C. Flanges shall conform to ASME B16.5 and shall be as specified in the data sheets. All flanges shall conform to ASME standards for the pressures and temperatures involved. The back surface of all flanges shall be full or spot-faced at the bolt circle. The suction nozzle flanges (ratings) shall be designed for the same pressure as the discharge flange. Allowable flange loading shall be provided.

D. Casing vent connections shall be provided if the pump is not self-venting. Casing drain connections shall also be provided. Vent and drain connections shall be tapped, where permissible, for taper pipe threads.

2.3.13 Rotating Elements

A. Impellers shall be either fully open or enclosed single-piece castings and shall be positively secured to the pump shaft and keyed wherever practicable. Securing devices shall be threaded to tighten during normal rotation.

B. Shafts shall be sized for maximum torque required under any specified operating conditions. Shafts shall be provided with sleeves locked or clamped to the shaft when mechanical seals are used. The sleeves shall be of material resistant to wear, corrosion and erosion. Sleeves shall extend beyond packing or mechanical seal face. Sleeves shall be ground and polished on outside surfaces. Sleeves exposed to packing will be hard-faced to a surface hardness of 600 Brinell hardness number minimum.

2.3.14 Bearings

A. Bearing frames shall be oversized, heavy cast construction. Where specified oil reservoir with water jacket shall be provided. The radial bearing shall be single row and inboard mounted. The thrust bearings shall be double row, shouldered, and mounted outboard. Vented sight glass level indication shall be provided for each pump when oil reservoirs are provided.

B. Bearing lubrication shall be oil bath type with constant level oil feed regulator as per ASME B73.1, section 4.7.5, unless indicated otherwise on the data sheet.

CENTRIFUGAL PUMPS (PC-3)

2.3.15 Sealing Devices

A. When required, each pump shall be fitted with a complete seal flush system including all parts required to cool and flush the working part of the seal assembly as specified on the data sheet. Where no seal plan is specified on the data sheet, SUPPLIER shall provide a suitable seal flush plan.

B. Stuffing boxes shall be designed for use with mechanical seals or packing with little modification. Ample space shall be provided for replacement of packing without removing or dismantling any part other than the packing gland. Auxiliary sealing devices, such as throttle bushings, shall be applied to prevent massive escape of fluid if the primary sealing device fails. When auxiliary packing is used as a secondary sealing device, a tapped opening shall be provided to detect primary seal leakage. Throttle bushings shall be of a non-sparking material.

C. Shaft sealing devices shall be designed to operate satisfactorily under a full range of pump operating conditions, including maximum discharge pressure, except where such requirement is impracticable. Hydraulically balanced mechanical seals shall be provided, as required, considering fluid specific gravity and lubricating properties at stuffing box temperature, seal diameter, rotating speed, and sealing pressure. Mechanical seals shall be cartridge type unless indicated otherwise on the data sheets. Instruments required for the seal system, if any, shall also be furnished by SUPPLIER.

2.3.16 Nameplate

A. Equipment supplied under this section shall have a stainless steel nameplate, permanently attached to the equipment at an easily readable location. The nameplate shall be stamped or engraved as a minimum with the information shown in Table 1. Equipment tag numbers shall be as specified on the data sheets.

B. Nameplate letter heights shall be as shown in Table 1 except where the size of the equipment is too small, in which case the SUPPLIER shall propose the nameplate letter size to the BUYER.

Table 1 – Nameplate Information

Information	Minimum Letter Height
Item Description	1/8 inch
Item/Tag Number	1/2 inch
Supplier's Name	1/8 inch
Purchase Order Number	1/8 inch
Date of Manufacture	1/2 inch

PART 3: EXECUTION

3.1 FABRICATION

A. The following fabrication requirements shall be complied with unless otherwise specified on the BUYER's design drawings or data sheets.

CENTRIFUGAL PUMPS (PC-3)

3.1.1 Welding

A. All welding shall be in accordance with ASME Section IX and ASME B31.3. Structural welding for carbon steel shall be in accordance with AWS D1.1. Structural welding for stainless steel shall be in accordance with AWS D1.6.

B. Welding repairs shall not be performed without the written approval of the BUYER.

3.1.2 Positive Material Identification

A. The alloy content of all drive shafts, pressure boundary materials, welding rods, welding wire and welds of alloy materials shall be verified in accordance with Section 11817.

3.1.3 Painting

A. All equipment and components shall be painted per the manufacturer's standard. Paint shall be suitable for a radiation environment and decontamination wash down. Use of the standards from the Society for Protective Coatings (SSPC) is recommended for surface preparation, selection and application of paint. Stainless steel surfaces shall not be painted.

3.1.4 Assembly

A. All equipment and associated instruments, controls, piping and valving for the pump assembly shall be skid mounted. Lifting lugs shall be provided on the skids.

3.2 TESTING AND INSPECTION

A. All pump units shall be factory tested for hydrostatic integrity and mechanical operability in accordance with ASME B73.1 and ANSI/HI standards. If adjustable speed equipment is provided, the working range of the pump shall be demonstrated, recorded, and submitted for approval. Upon completion of such tests, a visual inspection of critical sealing and mechanical parts shall be performed.

B. All pump units shall be tested for noise level and test results shall be provided.

3.3 PACKAGING, SHIPPING, AND STORAGE

A. Packaging, shipping, and storage shall be per Section 01610, Level C.

END OF SECTION

PARSONS

Calculation Cover Sheet

Project: Salt Waste Processing Facility (SWPF)	**Calculation No.:** M-CLC-J-00013	**Project Number:** 744910
Title: Strip Effluent Transfer Pumps Sizing Calculation, P-205A/B	**Functional Classification** SS	Sheet 1 of 30
Security Classification: Unclassified	**Discipline:** Mechanical/Process	☒ Preliminary ☐ Confirmed
Computer Program: ☒ N/A	**Version / Release No.** N/A	

Purpose and Objective:
The purpose of this calculation is to evaluate the design criteria for the Strip Effluent Transfer Pumps, P-205A/B.

The objective of this calculation is to size the pumps P-205A/B.

Summary of Conclusion:

The pump will need to be sized for the following design points:

Tank Mixing:
The design point is 300 gpm and 121 ft TDH. Estimated required brake horse power is 18.34 hp.
Transfer:
The design point is 150 gpm and 221 ft TDH. Estimated required brake horse power is 16.74 hp.

Revisions

Rev. No.	Revision Description -
A	Issued for Preliminary Design 30% Design Review
B	Issued for Enhanced Preliminary Design

Sign Off

Rev. No.	Originator (Print) Sign / Date	Verification / Checking Method	Verifier / Checker (Print) Sign / Date	Technical Specialist / Lead Discipline Engineer (Print) Sign / Date
A	Kyle Bray	Independent Review/	Donna Yarbrough	Kevin Bartling
	12/13/2004	Math Check	12/14/2004	12/16/2004
B	Nicholas DesRocher	Independent Review/	Donna Yarbrough	Cliff Conner
	4/12/06	Math Check	4-12-06	4/12/06

This Document Affected By	
Design Change Document	Initial/Date
DCR-0124	5/23/07

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)							Calculation No. M-CLC-J- 00013	
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B								
Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker		Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough		4-12-06

Table of Contents

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)								Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B								
Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DMS	4-12-06

1.0 Purpose and Objectives

The purpose of this calculation is to evaluate the design criteria for the Strip Effluent Transfer Pumps, P-205A/B.

The objective of this calculation is to size the pumps P-205A/B.

2.0 Open Items

2.1 The viscosity of the pumped fluid is assumed to be equal to the viscosity of 0.001M nitric acid at 77°F, ~0.9 cP (Ref 3.15). This is a bounding assumption that does not require verification.

2.2 Line lengths, configuration of piping, components and elevations are assumed based on preliminary General Arrangements. They will be confirmed once the isometrics are complete.

2.3 Vessel Vent setting is 14.56 psia based on preliminary design. This will be confirmed once the PVV System design is complete.

2.4 Piping for the entire system is PS200C. For line sizes < 6", this piping is Schedule 40S. This will be verified when the pipe spec is issued Rev. 0.

2.5 The vapor pressure of the fluid is assumed equal to water at 77°F, which is the normal operating fluid temperature. This is a bounding assumption that does not require verification as the design proceeds.

2.6 The delivery pressure is assumed to be 0 psig at the SEFT in DWPF. Since the Strip Effluent Feed Tank in DWPF is maintained at a slight vacuum, this assumption is conservative and does not require verification.

2.7 The pump centerline is assumed to be 4 ft 4 inches above the floor. This will be confirmed when piping isometrics are complete.

2.8 The pressure drop from the flow meter is estimated to be 1 psi. This will be confirmed when a vendor is selected.

2.9 The tank bottom elevation is assumed to be 9" from the floor and the heel height is assumed to be 2x the nominal suction pipe diameter (4") from the bottom of the tank. This comprises the tank low low level. This will be confirmed when the tank data sheet is issued Rev. 0.

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)							Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B							

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DY	4-12-06

2.10 It is assumed that highest pipe elevation is 30 ft for tank mixing and for discharge to DWPF, from the floor elevation. This will be confirmed when piping isometrics are complete.

2.11 It is assumed that the bottom of the source tank overflow is located 20 ft from the floor elevation. This will be confirmed when piping isometrics are complete.

2.12 These pumps are used for three purposes: to mix TK-205, to transfer strip effluent to DWPF, and to flush out the sludge transfer line to DWPF. For flushing out the sludge line, P-104-1 is assumed to be used to aid in transfer, so that case will not be modeled. The other two cases will be modeled, and the results for both will be listed in order to find an appropriate pump.

2.13 The discharge length to DWPF is assumed to be 3,000 ft from the Waste Transfer Enclosure. This will be confirmed when the piping isometrics are complete.

2.14 The pressure required at the eductor is assumed to be 20 psig. This will be verified when the edcutor vendor is chosen. (Ref 3.14)

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)							Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B							

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

3.0 References

3.1 P-DB-J-00001, Rev. E, SWPF Salt Waste Processing Facility Project Basis of Design

3.2 M-M5-J-0008, Rev. 1, SWPF Solvent Stripping and Caustic Wash PFD

3.3 M-M6-J-0033, Rev. G, SWPF Process Building Strip Effluent Transfer Pumps P-205A/B P&ID

3.4 M-M6-J-0032, Rev. G, SWPF Process Building Strip Effluent Hold Tank TK-205 P&ID

3.5 DSG-MP-03, Parsons Engineering Department Design Guide: Pump Head Calculations

3.6 Peters, Elementary Chemical Engineering, McGraw Hill, 1954

3.7 M-CLC-J-00033, Rev. C, Strip Effluent Hold Tank Sizing Calculation, TK-205

3.8 M-M6-J-0002, Rev. G, SWPF Process Building Waste Transfer Enclosure P&ID

3.9 Crane, Flow of Fluids through Valves, Fittings and Pipe, Technical Paper No. 410

3.10 WSRC-TR-2003-00471, Rev. 0, MST/Sludge Agitation Studies for Actinide Removal Process & DWPF

3.11 Cameron Hydraulic Data, 19th edition

3.12 P-PG-J-0003, Rev. G2, SWPF Process Building General Arrangement Central Processing Area Plan at Elevation 92'-0" and 100'-0"

3.13 M-CLC-J-00008, Rev. B, SWPF Washing Filter Feed/Sludge Solids Transfer Pump Sizing Calcultion, P-104-1

3.14 M-CLC-J-00074, Rev. A, SWPF Tank Eductors Sizing Calculation

3.15 Lauterbach Verfahrenstechnik Properties Program, Version 8.3 (0002)

3.16 M-CLC-J-00074, Rev. A, Tank Eductors Sizing Calculation

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DY	4-12-06

4.0 Input Data

4.1 Fluid Properties:

			Notes	
• Fluid: Strip Effluent				3.1, p. 37
• Operating Temperature	77	°F		3.2
• Minimum Temperature	60	°F		3.1, p. 107
• Maximum Temperature	95	°F		3.1, p. 107
• Design Temperature	120	°F		
• Viscosity	0.9	cP		2.1
• Percent Solids	0.0%			
• Specific Gravity	1.00			3.2
• Vapor Pressure	0.46	psia		2.5

4.2 Service Conditions

Radioactive liquid, no solids, tank mixing and periodic transfer out of the SWPF — 3.1

4.3 Operating Conditions:

• Normal Flow Rate, Tank Mixing	300	gpm		3.16
• Overcapacity, All cases	0%			
• Design Flow Rate, Tank Mixing	300	gpm		
• Design Flow at Max T,P, Tank Mixing	300	gpm		
• Normal Flow Rate, Transfer	150	gpm		3.2
• Design Flow Rate, Transfer	150	gpm		
• Design Flow at Max T,P, Transfer	150	gpm		
• Source Pressure	14.56	psia		2.3
• Suction Static Head From Low Level	-2.91	ft	10.2	
• Delivery Pressure, EDT-205	34.7	psia		2.14
• Delivery Pressure, DWPF	14.7	psia		2.6
• Discharge Static Head	25.67	ft	10.2	
• Control Valve CV	na			
• Orifice Diameter	na			
• Overplus	10% or 5 psi (min.)			3.5
• Vessel PSV or Vent Setting	14.56	psia		2.3
• High Level (maximum operating level)	20	ft	10.1	2.11
• Suction Static Head from High Level	15.67	ft	10.2	
• Low Level	1.42	ft	10.1	2.9

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

• Pump Centerline	4.33	ft	10.1	2.7
• Flow Meter Pressure Drop	1	psi		2.8
• Highest Pipe Elevation on Discharge Line	30	ft	10.1	2.10

5.0 Design Basis

5.1 General:

This calculation will follow the Parsons Engineering Department Design Guide for Pump Head Calculations. Ref 3.5

Required pump head is calculated by determining the suction pressure taking into account line losses and static changes, and by determining required discharge pressure taking into account frictional and static change to the delivery point. NPSH, maximum system pressure, maximum suction pressure, and required horsepower are also calculated.

The misc. pressure drop is accounted for in the contingency added to the calculation in the form of overplus.

For pumps with multiple suctions and/or discharges, all runs will be modeled, unless otherwise specified), and the most conservative cases will be used for the pump sizing.

5.2 Definitions: (see attachment 11.6 for clarification)

Suction Static Head	Level of fluid in source vessel to pump centerline
Discharge Static Head	Pump centerline to maximum discharge elevation
NPSHA	Net positive suction head available
Suction Line Loss	Friction loss from source vessel to pump suction
Discharge Line Loss	Friction loss from pump discharge to delivery vessel
Source Pressure	Pressure in source vessel excluding static head
Delivery Pressure	Pressure at delivery point in delivery vessel
Differential Pressure	Discharge pressure minus the suction pressure
Normal Flow	Required process design flow rate
Rated Flow	Normal flow plus overcapacity
Overcapacity	Percentage of normal flow
Total Differential Head (TDH)	Total discharge head minus total suction head

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)							Calculation No. M-CLC-J- 00013
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Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DLY	4-12-06

Overplus	Percentage of TDH or differential pressure
Total Dynamic Pressure Drop	Sum of all dynamic pressure drops (Suction and Discharge)
Static Head	Discharge static head minus the suction static head

5.3 Process Design Requirements:

The pumps are supplied with VFDs and are designed to allow operation at two points within their operaing envelope.

6.0 Codes and Standards

ASME B73.1, Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

7.0 Calculations

7.1 Suction Pressure:

Suction Pressure = source pressure + the suction static head from low level - the suction line losses.

Source Pressure = 14.56 psia — Sec 4.3

Suction Static Head from Low Level = -2.91 ft — Sec 4.3

Convert Suction Static Head from feet of liquid to psi using **Equation 7.1**

$$P = SG \times \rho \times \left[\frac{g}{g_c}\right] \times h$$

where

ρ = density of water = 62.4 lb_m/ft^3

g = gravitational acceleration = 32.2 ft/s^2

g_c = universal constant = 32.2 $(ft - lb_m)/(lb_f - s^2)$

1 ft^2 = 144 in^2

$P = SG \times 0.433 \times h$ **Eq. 7.1**

P = -1.26 psi

Suction Line Loss	=	7.21	psi	(tank mixing)	Att 11.1
	=	1.84	psi	(transfer)	Att 11.3

Suction Pressure	=	14.56	psia	Source Pressure
Tank mixing	+	-1.26	psi	Suction Static Head From Low Level
	-	7.21	psi	Suction Line loss
	=	6.09	psia	

Suction Pressure	=	14.56	psia	Source Pressure
Transfer	+	-1.26	psi	Suction Static Head From Low Level
	-	1.84	psi	Suction Line loss
	=	11.46	psia	

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
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7.2 Net Positive Suction Head Available (NPSHA):

The Net Positive Suction Head Available = source pressure + the suction static head from low level - suction line loss - the fluid's vapor pressure

Suction Static Head From Low Level = -2.91 ft — Sec 4.3

Suction Line Loss = 7.21 psi (tank mixing) — Att 11.1
1.84 psi (transfer) — Att 11.3

Convert Suction Line Loss from psi to feet of liquid rearranging Equation 7.1

h = P / 0.433 / SG **Eq. 7.2**

h = 16.65 ft (tank mixing)
h = 4.25 ft (transfer)

Source Pressure = 14.56 psia — Sec 4.3

Convert Source Pressure from psia to feet of liquid using Eq. 7.2
Source Pressure = 33.63 ft

Vapor Pressure = 0.46 psia — Sec 4.1

Convert Vapor Pressure from psia to feet of liquid using Eq. 7.2
Vapor Pressure = 1.06 ft

NPSHA =			
Tank Mixing	-	16.65 ft	Suction Line Loss in feet of liquid
	+	33.63 ft	Source Pressure in terms of feet of liquid
	-	1.06 ft	Vapor Pressure in terms of feet of liquid
		13.01 ft	

NPSHA =			
Transfer	-	4.25 ft	Suction Line Loss in feet of liquid
	+	33.63 ft	Source Pressure in terms of feet of liquid
	-	1.06 ft	Vapor Pressure in terms of feet of liquid
		25.41 ft	

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)								Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B								
Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

7.3 Discharge Pressure:

Discharge Pressure = Delivery Pressure + Discharge Static Head + Dynamic line and component losses

Delivery Pressure	=	34.7 psia	(tank mixing)	Sec 4.3
	=	14.7 psia	(transfer)	Sec 4.3
Discharge Static Head	=	25.67 ft		Sec 4.3

Convert Discharge Static Head from feet of liquid to psi using Eq. 7.1

Discharge Static Head = 11.12 psi

Discharge Pressure	=	34.7 psia	Delivery Pressure	
Tank Mixing	+	11.12 psi	Discharge Static Pressure	
	+	1 psi	Flow Meter Pressure Drop	Sec 4.3
	+	6.25 psi	Pump Discharge Line Losses	Att 11.2
		53.07 psia		

Discharge Pressure	=	14.7 psia	Delivery Pressure	
Transfer	+	11.12 psi	Discharge Static Pressure	
	+	1 psi	Flow Meter Pressure Drop	Sec 4.3
	+	71.54 psi	Pump Discharge Line Losses	Att 11.4, 11.5
		98.36 psia		

7.4 Differential Pressure:

The Differential Pressure = the Discharge Pressure - the Suction Pressure

Tank Mixing:

Discharge Pressure	=	53.07 psia	Sec 7.3
Suction Pressure	=	6.09 psia	Sec 7.1
Differential Pressure	=	46.98 psi	

Convert Differential Pressure from psi to feet of liquid using Eq. 7.2

Differential Pressure = 108.50 ft

Round up to 109 ft

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

Transfer:

Discharge Pressure = 98.36 psia — Sec 7.3

Suction Pressure = 11.46 psia — Sec 7.1

Differential Pressure = 86.90 psi

Convert Differential Pressure from psi to feet of liquid using Eq. 7.2

Differential Pressure = 200.69 ft

Round up to 201 ft

7.5 Rated Differential Pressure & Rated Differential Head (TDH):

Rated Differential Pressure = the Differential Pressure + Overplus

Overplus is 10 % of the Differential Pressure or a minimum of 5 psi. — Sec 4.3

Tank Mixing:

10% of Diff. Pressure = 0.1 x 46.98 psi = 4.698 psi

Overplus = 5 psi

Rated Differential Pressure = 46.98 psi + 5 psi = 51.98 psi

Convert Rated Differential Pressure from psi to feet of liquid using Eq. 7.2

Rated Differential Pressure = 120.05 ft

Round to 121 ft

Transfer:

10% of Diff. Pressure = 0.1 x 86.90 psi = 8.69 psi

Overplus = 8.69 psi

Rated Differential Pressure = 86.90 psi + 8.69 psi = 95.59 psi

Convert Rated Differential Pressure from psi to feet of liquid using Eq. 7.2

Rated Differential Pressure = 220.76 ft

Round to 221 ft

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project:	Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title:	Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

7.6 Maximum Suction Pressure:

The Maximum Suction Pressure = Vessel PSV or Vent Setting + the Suction Static Head from High Level — Ref. 3.5

Vessel PSV or Vent Setting = 14.56 psia — Sec 4.3

Suction Static Head from High Level = 15.67 ft — Sec 4.3

Convert Suction Static Head From High Level from feet of liquid to psi using Eq. 7.1

Suction Static Head from High Level = 6.79 psi

Maximum Suction Pressure = 14.56 psia + 6.79 psi = 21.35 psia

7.7 Maximum Discharge Pressure:

The Maximum Discharge Pressure = Shut off Pressure = 1.25 x Rated Differential Pressure + Maximum Suction Pressure

Maximum Suction Pressure = 21.35 psia — Sec 7.6

Rated Differential Pressure = 51.98 psi (tank mixing) — Sec 7.5

Rated Differential Pressure = 95.59 psi (transfer) — Sec 7.5

Tank Mixing:

Maximum Discharge Pressure = 1.25 x 51.98 psi + 21.35 psia = 86.33 psia

Transfer:

Maximum Discharge Pressure = 1.25 x 95.59 psi + 21.35 psia = 140.84 psia

7.8 Required Brake Horse Power:

Required Brake Horse Power = Hydraulic Horse Power / Estimated Hydraulic Efficiency

$$\text{Hydraulic Horse Power} = \frac{[Q][TDH][SG]}{[3{,}960]}$$

Where

Q = design flow rate = 300 gpm (tank mixing) — Sec 4.3

Q = design flow rate = 150 gpm (transfer) — Sec 4.3

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DMG	4-12-06

TDH	= rated differential head	=	121	ft	(tank mixing)	Sec 7.5
TDH	= rated differential head	=	221	ft	(transfer)	Sec 7.5
SG	= fluid specific gravity	=	1.00			
3,960	= conversion constant					Ref 3.11
η	= estimated hydraulic efficiency	=	0.50			

Hydraulic Horse Power = 9.17 hp (tank mixing)

Hydraulic Horse Power = 8.37 hp (transfer)

$$\text{Required Brake Horse Power} = \frac{\text{Hydraulic Horse Power}}{\eta}$$

Tank Mixing:

$$\text{Required Brake Horse Power} = \frac{9.17}{0.50}\ \text{hp} = 18.34\ \text{hp}$$

Transfer:

$$\text{Required Brake Horse Power} = \frac{8.37}{0.50}\ \text{hp} = 16.74\ \text{hp}$$

7.9 Total Dynamic Pressure Drop: Tank Mixing

= Suction Line Loss	=	7.21	psi	Att 11.1
+ Discharge Line Loss	=	6.25	psi	Att 11.2
+ Control Valve Pressure Drop	=	0	psi	
+ Flow meter Pressure Drop	=	1	psi	Sec 4.3
+ Heater Pressure Drop	=	0	psi	
+ Filter Pressure Drop	=	0	psi	
+ Spare Pressure Drop	=	0	psi	
Total Dynamic Pressure Drop	=	14.46	psi	

Total Dynamic Pressure Drop: Transfer

= Suction Line Loss	=	1.84	psi	Att 11.3
+ Discharge Line Loss	=	71.54	psi	Att 11.4, 11.5
+ Control Valve Pressure Drop	=	0	psi	
+ Flow meter Pressure Drop	=	1	psi	Sec 4.3
+ Heater Pressure Drop	=	0	psi	
+ Filter Pressure Drop	=	0	psi	
+ Spare Pressure Drop	=	0	psi	
Total Dynamic Pressure Drop	=	74.38	psi	

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

7.10 Minimum Static Head:

= Discharge Static Head	=	25.67 ft	Sec 4.3
- Suction Static Head From High Level	-	15.67 ft	Sec 4.3
Minimum Static Head	=	10.00 ft	

7.11 Maximum Static Head:

= Discharge Static Head	=	25.67 ft	Sec 4.3
- Suction Static Head From Low Level	-	-2.91 ft	Sec 4.3
Maximum Static Head	=	28.58 ft	

7.12 Maximum Control Valve Pressure Drop: N/A

= Total Dynamic Pressure Drop	=	0.00
- Maximum Total Static Head	=	0.00
Maximum Control Valve Pressure Drop	=	N/A

7.13 Minimum Control Valve Pressure Drop: N/A

= Total Dynamic Pressure Drop	=	0.00
- Minimum Static Head	=	0.00
Minimum Control Valve Pressure Drop	=	N/A

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

8.0 Results

8.1 Tank Mixing

8.1.1	Suction Pressure:	6.09	psia				Sec 7.1
8.1.2	Net Positive Suction Head Available (NPSHA):	13.01	ft				Sec 7.2
8.1.3	Discharge Pressure:	53.07	psia				Sec 7.3
8.1.4	Differential Pressure & Head:	46.98	psi	=	109	ft	Sec 7.4
8.1.5	Rated Differential Pressure & Head:	51.98	psi	=	121	ft	Sec 7.5
8.1.6	Maximum Suction Pressure:	21.35	psia				Sec 7.6
8.1.7	Maximum Discharge Pressure:	86.33	psia				Sec 7.7
8.1.8	Required Brake Horsepower:	18.34	hp				Sec 7.8
8.1.9	Total Dynamic Pressure Drop:	14.46	psi				Sec 7.9
8.1.1	Minimum Static Head:	10.00	ft				Sec 7.10
8.1.11	Maximum Static Head:	28.58	ft				Sec 7.11
8.1.12	Maximum Control Valve Pressure Drop:	N/A	psi				Sec 7.12
8.1.13	Minimum Control Valve Pressure Drop:	N/A	psi				Sec 7.13

8.2 Transfer

8.2.1	Suction Pressure:	11.46	psia				Sec 7.1
8.2.2	Net Positive Suction Head Available (NPSHA):	25.41	ft				Sec 7.2
8.2.3	Discharge Pressure:	98.36	psia				Sec 7.3
8.2.4	Differential Pressure & Head:	86.90	psi	=	201	ft	Sec 7.4
8.2.5	Rated Differential Pressure & Head:	95.59	psi	=	221	ft	Sec 7.5
8.2.6	Maximum Suction Pressure:	21.35	psia				Sec 7.6
8.2.7	Maximum Discharge Pressure:	140.84	psia				Sec 7.7
8.2.8	Required Brake Horsepower:	16.74	hp				Sec 7.8
8.2.9	Total Dynamic Pressure Drop:	74.38	psi				Sec 7.9
8.2.1	Minimum Static Head:	10.00	ft				Sec 7.10
8.2.11	Maximum Static Head:	28.58	ft				Sec 7.11
8.2.12	Maximum Control Valve Pressure Drop:	N/A	psi				Sec 7.12
8.2.13	Minimum Control Valve Pressure Drop:	N/A	psi				Sec 7.13

Calculation Continuation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Title: Strip Effluent Transfer Pumps Sizing Calculation P-205A/B	

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

9.0 Conclusions

P-205A/B will need to be sized to handle the following two conditions:

Tank Mixing:
The design point is 300 gpm and 121 ft TDH. Estimated required brake horse power is 18.34 hp.

Transfer:
The design point is 150 gpm and 221 ft TDH. Estimated required brake horse power is 16.74 hp.

10.0 Notes

10.1 Elevation with respect to the floor elevation

10.2 Elevation with respect to the pump centerline

11.0 Attachments

11.1	Pump Suction Line Loss Calculation, Tank Mixing	Sheets	1
11.2	Pump Discharge Line Loss Calculation, Tank Mixing	Sheets	1
11.3	Pump Suction Line Loss Calculation, Transfer	Sheets	1
11.4	Pump Discharge Line Loss Calculation, Transfer, 4" section	Sheets	1
11.5	Pump Discharge Line Loss Calculation, Transfer, 3" section	Sheets	1
11.6	Pump Calculation Data Sheet	Sheets	3
11.7	Xomox Valve Data	Sheets	5

Calculation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Subject: Pump Suction Line Loss Calculation, Tank Mixing	Sheet No. 18 of 30

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

Line Number: 4"-AQU-0162-PS200C
P&ID Number: M-M6-J-0032 M-M6-J-0033 Ref. 3.3, 3.4
ISO DWG No.: TBD

Fluid: Strip Effluent Sec 4.1
Flow Rate (Q) : 300 gpm Sec 4.3
Viscosity (μ): 0.9 cp Sec 4.1
Specific Gravity: 1.00 Sec 4.1

From: TK-205
To: Pump Suction of P-205A/B

Basis Internal Dia.(d): 4.026 in. Internal Area = 0.088405 ft^2 = $\pi \times 0.25 \times d^2/144$

Surface Roughness (ε): 0.00015 ft [3.11]
Relative Roughness ε/D: 0.000447

Reynolds Number: 261,421 $= \frac{[50.6][Q][SG][62.4]}{[\mu][d]}$ [3.9]

Note: Since the Reynolds Number is > 4,000, the flow is turbulent and the friction factor is calculated using the Colebrook equation.

Colebrook Equation (For Reynolds Numbers > 4,000): $\frac{1}{f^{1/2}} = [-2]\ \text{Log}\left(\left[\frac{\varepsilon/D}{3.7}\right] + \frac{2.51}{[Re][f^{1/2}]}\right)$

Colebrook Friction Factor (f): = 0.018 [3.11]

Laminar Friction Factor f = 64/Re = 0.000 Velocity (v) = 7.56 fps [3.11]

Friction Factor For This Calc. = 0.018

Item	Component	QTY	"K" Formula [3.9]	d_1	d_2	β^2	β^4	K
1	Entrance	1	K = 0.78					0.78
2	Pipe*	900 in.	K = f L/d					4.024
3	Plug Valve, Straight-way	3	Cv = 548 [11.7] $K = 891\ d^4/Cv^2$					2.338
4	Plug Valve, 3-way, T-port	1	Cv = 159 [11.7] $K = 891\ d^4/Cv^2$					9.26
5	Tee Branch	1	K = 60 f					1.08
6	L.R. 90	5	K = 14 f					1.26
7	Total K							18.74

* Pipe length estimated from ref. 3.12

Pressure Drop: $= \frac{K\ SG\ \rho_{H2O}}{2\ g_c}\left(\frac{v^2\ ft^2}{144\ in^2}\right)$ = 7.21 psi [3.11]

Calculation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Subject: Pump Discharge Line Loss Calculation, Tank Mixing	Sheet No. 19 of 30

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

Line Number: 4"-AQU-6693-PS200C **Fluid:** Strip Effluent Sec 4.1

P&ID Number: M-M6-J-0032 M-M6-J-0033 Ref. 3.3, 3.4 **Flow Rate (Q) :** 300 gpm Sec 4.3

ISO DWG No.: TBD **Viscosity (μ):** 0.9 cp Sec 4.1

Specific Gravity: 1.00 Sec 4.1

From: Pump Discharge of P-205A/B

To: EDT-205

Basis Internal Dia.(d): 4.026 in. Internal Area = 0.088405 ft^2 = $\pi \times 0.25 \times d^2/144$

Surface Roughness (ε): 0.00015 ft [3.11]

Relative Roughness ε/D: 0.000447

Reynolds Number: 261,421 $= \frac{[50.6][Q][SG][62.4]}{[\mu][d]}$ [3.9]

Note: Since the Reynolds Number is > 4,000, the flow is turbulent and the friction factor is calculated using the Colebrook equation.

Colebrook Equation (For Reynolds Numbers > 4,000): $\frac{1}{f^{1/2}} = [-2]\ \text{Log}\left(\left[\frac{\varepsilon/D}{3.7}\right] + \frac{2.51}{[Re][f^{1/2}]}\right)$

Colebrook Friction Factor (f) : = 0.018 [3.11]

Laminar Friction Factor f = 64/Re = 0.000 Velocity (v) = 7.56 fps [3.11]

Friction Factor For This Calc. = 0.018

Item	Component	QTY	"K" Formula [3.9]	d_1	d_2	β^2	β^4	K
1	Expander	1	$K = (1-\beta^2)^2/\beta^4$	3.068	4.026	0.581	0.3380	0.519
2	Pipe*	1680 in.	K = f L/d					7.511
3	Plug Valve, Straight-way	3	Cv = 548 [11.7] $K = 891 d^4/Cv^2$					2.338
4	Exit	1	K = 1.0					1
5	Tee Run	2	K = 20 f					0.7
6	Tee Branch	2	K = 60 f					2.16
7	L.R. 90	8	K = 14 f					2.02
9	Total K							16.25

* Pipe length estimated from ref. 3.12

Pressure Drop: $= \frac{K\ SG\ \rho_{H2O}}{2\ g_c}\left(\frac{v^2\ ft^2}{144\ in^2}\right)$ = 6.25 psi [3.11]

Calculation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Subject: Pump Suction Line Loss Calculation, Transfer	Sheet No. 20 of 30

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

Line Number: 4"-AQU-0162-PS200C
P&ID Number: M-M6-J-0032 M-M6-J-0033 Ref. 3.3, 3.4
ISO DWG No.: TBD

Fluid: Strip Effluent Sec 4.1
Flow Rate (Q) : 150 gpm Sec 4.3
Viscosity (μ): 0.9 cp Sec 4.1
Specific Gravity: 1.00 Sec 4.1

From: TK-205
To: Pump Suction of P-205A/B

Basis Internal Dia.(d): 4.026 in. Internal Area = 0.088405 ft^2 = $\pi \times 0.25 \times d^2/144$

Surface Roughness (ε) : 0.00015 ft [3.11]
Relative Roughness ε/D: 0.000447

Reynolds Number: 130,710 $= \frac{[50.6][Q][SG][62.4]}{[\mu][d]}$ [3.9]

Note: Since the Reynolds Number is > 4,000, the flow is turbulent and the friction factor is calculated using the Colebrook equation.

Colebrook Equation (For Reynolds Numbers > 4,000): $\frac{1}{f^{1/2}} = [-2]\ \text{Log}\left(\left[\frac{\varepsilon/D}{3.7}\right] + \frac{2.51}{[Re][f^{1/2}]}\right)$

Colebrook Friction Factor (f) : = 0.019 [3.11]

Laminar Friction Factor f = 64/Re = 0.000 Velocity (v) = 3.78 fps [3.11]

Friction Factor For This Calc. = 0.019

Item	Component	QTY	"K" Formula [3.9]	d_1	d_2	β^2	β^4	K
1	Entrance	1	K = 0.78					0.78
2	Pipe*	900 in.	K = f L/d					4.247
3	Plug Valve, Straight-way	3	Cv = 548 [11.7] K= 891 d^4/Cv^2					2.338
4	Plug Valve, 3-way, T-port	1	Cv = 159 [11.7] K= 891 d^4/Cv^2					9.26
5	Tee Branch	1	K = 60 f					1.14
6	L.R. 90	5	K = 14 f					1.33
7	Total K							19.1

* Pipe length estimated from ref. 3.12

Pressure Drop: $= \frac{K\ SG\ \rho_{H2O}\left(\frac{v^2\ ft^2}{144\ in^2}\right)}{2\ g_c}$ = 1.84 psi [3.11]

Calculation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Subject: Pump Discharge Line Loss Calculation, Transfer, 4" section	Sheet No. 21 of 30

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough	4-12-06

Line Number: 4"-AQU-0119-PS200C **Fluid:** Strip Effluent Sec 4.1

P&ID Number: M-M6-J-0033 Ref. 3.3 **Flow Rate (Q) :** 150 gpm Sec 4.3

ISO DWG No.: TBD **Viscosity (μ):** 0.9 cp Sec 4.1

Specific Gravity: 1.00 Sec 4.1

From: Pump Discharge of P-205A/B

To: 4" x 3" Reducer

Basis Internal Dia.(d): 4.026 in. Internal Area = 0.088405 ft^2 = $\pi \times 0.25 \times d^2/144$

Surface Roughness (ε) : 0.00015 ft [3.11]

Relative Roughness ε/D: 0.000447

Reynolds Number: 130,710 $= \dfrac{[50.6][Q][SG][62.4]}{[\mu][d]}$ [3.9]

Note: Since the Reynolds Number is > 4,000, the flow is turbulent and the friction factor is calculated using the Colebrook equation.

Colebrook Equation (For Reynolds Numbers > 4,000) : $\dfrac{1}{f^{1/2}} = (-2)\ \text{Log}\left(\left(\dfrac{\varepsilon/D}{3.7}\right) + \dfrac{2.51}{(Re)(f^{1/2})}\right)$

Colebrook Friction Factor (f) : = 0.019 [3.11]

Laminar Friction Factor f = 64/Re = 0.000 Velocity (v) = 3.78 fps [3.11]

Friction Factor For This Calc. = 0.019

Item	Component	QTY	"K" Formula [3.9]	d_1	d_2	β^2	β^4	K
1	Expander	1	$K = (1-\beta^2)^2/\beta^4$	3.068	4.026	0.581	0.3380	0.519
2	Pipe*	180 in.	K = f L/d					0.849
3	Plug Valve, Straight-way	1	Cv = 548 [11.7] $K = 891\ d^4/Cv^2$					0.779
4	Tee Run	4	K = 20 f					1.52
5	L.R. 90	4	K = 14 f					1.06
6	Total K							4.727

* Pipe length estimated from ref. 3.12

Pressure Drop: $= \dfrac{K\ SG\ \rho_{H2O}}{2\ g_c}\left(\dfrac{v^2\ ft^2}{144\ in^2}\right)$ = 0.45 psi [3.11]

Calculation Sheet

PARSONS Engineering Calculation	Project: Salt Waste Processing Facility (SWPF)	Calculation No. M-CLC-J- 00013
	Subject: Pump Discharge Line Loss Calculation, Transfer, 3" section	Sheet No. 22 of 30

Rev	Originator	Date	Checker	Date	Rev	Originator	Date	Checker	Date
A	Kyle Bray	12/13/2004	Donna Yarbrough	12/14/2004	B	N. DesRocher	3/23/2006	Donna Yarbrough DYB	4-12-06

Line Number: 3"-AQU-0119-PS200C
P&ID Number: M-M6-J-0033 M-M6-J-0002 Ref. 3.3, 3.8
ISO DWG No.: TBD

Fluid: Strip Effluent Sec 4.1
Flow Rate (Q) : 150 gpm Sec 4.3
Viscosity (μ): 0.9 cp Sec 4.1
Specific Gravity: 1.00 Sec 4.1

From: 4" x 3" Reducer
To: DWPF

Basis Internal Dia.(d): 3.068 in. Internal Area = 0.051338 ft^2 = $\pi \times 0.25 \times d^2/144$

Surface Roughness (ε) : 0.00015 ft [3.11]
Relative Roughness ε/D: 0.000587

Reynolds Number: 171,525 = $\frac{[50.6][Q][SG][62.4]}{[\mu][d]}$ [3.9]

Note: Since the Reynolds Number is > 4,000, the flow is turbulent and the friction factor is calculated using the Colebrook equation.

Colebrook Equation (For Reynolds Numbers > 4,000) : $\frac{1}{f^{1/2}} = [-2]\ \text{Log}\left(\left[\frac{\varepsilon/D}{3.7}\right] + \frac{2.51}{[Re][f^{1/2}]}\right)$

Colebrook Friction Factor (f) : = 0.020 [3.11]

Laminar Friction Factor f = 64/Re = 0.000 Velocity (v) = 6.509 fps [3.11]

Friction Factor For This Calc. = 0.020

Item	Component	QTY	"K" Formula [3.9]	d_1	d_2	β^2	β^4	K
1	Reducer	1	$K = 0.5(1-\beta^2)$	3.068	4.026	0.581	0.3380	0.21
2	Pipe*	36,600 in.	K = f L/d					238.6
3	Plug Valve, Straight-way	3	Cv = 294 [11.7] $K = 891\ d^4/Cv^2$					2.74
4	Exit	1	K = 1.0					1
5	Tee Branch	1	K = 60 f					1.2
6	L.R. 90	20	K = 14 f					5.6
7	Total K							249.35

* Pipe length estimated from ref. 3.12 and Open Item 2.13

Pressure Drop: = $\frac{K\ SG\ \rho_{H2O}\left(\frac{v^2\ ft^2}{144\ in^2}\right)}{2\ g_c}$ = 71.09 psi [3.11]

REVISIONS	NO	DATE	BY	CK	APP	DESCRIPTION
	A	12/13/04	KKB	DMY	KEB	Issued for Preliminary Engineering
	B	3/23/06	NDD			Issued for Enhanced Preliminary Design

REVISIONS	NO	DATE	BY	CK	APP	DESCRIPTION

CLIENT & LOCATION	DOE SAVANNAH RIVER SITE	EQUIPMENT NUMBER	P-205A/B
PROJECT NO.	744910	PUMP CALCULATION NO.	M-CLC-J- 00013
SYSTEM	Caustic-Side Solvent Extraction	PFD REF. DRAWING NO.	M-M5-J-0008
AREA	J	P & ID REF. DRAWING NO.	M-M6-J-0032 / M-M6-J-0033 / M-M6-J-0002

DESIGN DATA

FLUID:	Strip Effluent						
SERVICE:	Mixing TK-205						
DISSOLVED CONTAMINANTS:	Cesium						
SUSPENDED SOLIDS:	None						
OPERATION:	Batch	HOURS / DAY	Intermittent	DRIVER TYPE:	Electric Motor	RPM	CLASS B
PUMP TYPE:	Centrifugal	ORIENTATION:	Horizontal	IMPELLER TYPE:	Standard		HP
SEAL TYPE:	Dual Cartridge Mechanical			PUMP SIZE:			

TEMPERATURE			FLUID PROPERTIES		
PUMPING TEMPERATURE	°F	77	VAPOR PRESSURE @ P,T	PSIA	0.46
MIN / MAX OPERATING TEMPERATURE	°F	60 / 95	SPECIFIC GRAVITY (SG) @ P,T		1.00
DESIGN TEMPERATURE	°F	120	VISCOSITY @ P,T	CP	0.9

FLOW RATE					
NORMAL FLOW @ P,T	GPM	300	MIN FLOW @ P,T	GPM	TBD
OVERCAPACITY %		0%	DESIGN FLOW @ MAX T,P	GPM	300

PUMP CALCULATION SUMMARY

SUCTION PRESSURE		NORM	DESIGN
= VESSEL OPERATING PRESSURE	PSIA		14.56
+ SUCTION STATIC HEAD	PSIA		-1.26
- LINE LOSS	PSI		7.21
TOTAL SUCTION PRESSURE	PSIA		6.09

NET POSITIVE SUCTION HEAD (NPSHA)		NORM	DESIGN
= SUCTION STATIC HEAD	FT		-2.91
- LINE LOSS	FT		16.65
+ VESSEL OPERATING PRESSURE	FT		33.63
- VAPOR PRESSURE	FT		1.06
NET POSITIVE SUCTION HEAD (NPSHA)	FT		13.01

DISCHARGE PRESSURE			NORM	DESIGN
=	DELIVERY PRESSURE	PSIA		34.7
+	DISCHARGE STATIC HEAD	PSI		11.12
+	CONTROL VALVE ΔP	PSI		0.0
+	HEAT EXCHANGER ΔP	PSI		0.0
+	HEATER ΔP	PSI		0.0
+	FILTER ΔP	PSI		0.0
+	FLOW METER ΔP	PSI		1
+	LINE LOSS	PSI		6.25
+	SPARE ΔP	PSI		0.0
DISCHARGE PRESSURE		PSIA		53.07

TOTAL DYNAMIC PRESSURE DROP			NORM	DESIGN
=	SUCTION LINE LOSS	PSI		7.21
+	DISCHARGE LINE LOSS	PSI		6.25
+	CONTROL VALVE ΔP	PSI		0.0
+	HEAT EXCHANGER ΔP	PSI		0.0
+	HEATER ΔP	PSI		0.0
+	FILTER ΔP	PSI		0.0
+	FLOW METER ΔP	PSI		1
+	SPARE ΔP	PSI		0.0
TOTAL DYNAMIC PRESSURE DROP		PSI		14.46

DIFFERENTIAL PRESSURE		NORM	DESIGN
= DISCHARGE PRESSURE	PSIA		53.07
- TOTAL SUCTION PRESSURE	PSIA		6.09
DIFFERENTIAL PRESSURE	PSI		46.98
DIFFERENTIAL PRESSURE	FT		109

RATED DIFFERENTIAL PRESSURE		NORM	DESIGN
= DIFFERENTIAL PRESSURE	PSI		46.98
+ OVERPLUS	PSI		5
RATED DIFFERENTIAL PRESSURE	PSI		51.98
RATED DIFFERENTIAL HEAD	FT		121

MAXIMUM SUCTION PRESSURE		NORM	DESIGN
= VESSEL PSV SETTING	PSIA		14.56
+ STATIC HEAD FROM HIGH LEVEL	PSI		6.79
MAXIMUM SUCTION PRESSURE	PSIA		21.35

MAXIMUM DISCHARGE PRESSURE		NORM	DESIGN
= MAXIMUM SUCTION PRESSURE	PSIA		21.35
+ SHUT OFF ΔP (1.25 X RATED ΔP)	PSI		64.98
MAXIMUM DISCHARGE PRESSURE	PSIA		86.33

REQUIRED BRAKE HORSEPOWER		NORM	DESIGN
= HYDRAULIC POWER	HP		9.17
/ EST. HYDRAULIC EFFICIENCY			0.50
REQUIRED BRAKE HORSEPOWER	HP		18.34

STATIC HEAD			MIN	MAX
=	DISCHARGE STATIC HEAD	FT	25.67	25.67
-	SUCTION STATIC HEAD	FT	15.67	-2.91
STATIC HEAD		FT	10.00	28.58

	MIN	MAX
CONTROL VALVE PRESSURE DROP PSI	N/A	N/A

DESIGN DATA							
FLUID:	Strip Effluent						
SERVICE:	Strip Effluent Transfer						
DISSOLVED CONTAMINANTS:	Cesium						
SUSPENDED SOLIDS:	None						
OPERATION:	Batch	HOURS / DAY	Intermittent	DRIVER TYPE:	Electric Motor	RPM	CLASS B
PUMP TYPE:	Centrifugal	ORIENTATION:	Horizontal	IMPELLER TYPE:	Standard		HP
SEAL TYPE:	Dual Cartridge Mechanical			PUMP SIZE:			

TEMPERATURE			FLUID PROPERTIES		
PUMPING TEMPERATURE	°F	77	VAPOR PRESSURE @ P,T	PSIA	0.46
MIN / MAX OPERATING TEMPERATURE	°F	60 / 95	SPECIFIC GRAVITY (SG) @ P,T		1.00
DESIGN TEMPERATURE	°F	120	VISCOSITY @ P,T	CP	0.9

FLOW RATE					
NORMAL FLOW @ P,T	GPM	150	MIN FLOW @ P,T	GPM	TBD
OVERCAPACITY %		0%	DESIGN FLOW @ MAX T,P	GPM	150

PUMP CALCULATION SUMMARY

SUCTION PRESSURE		NORM	DESIGN
= VESSEL OPERATING PRESSURE	PSIA		14.56
+ SUCTION STATIC HEAD	PSIA		-1.26
- LINE LOSS	PSI		1.84
TOTAL SUCTION PRESSURE	PSIA		11.46

NET POSITIVE SUCTION HEAD (NPSHA)		NORM	DESIGN
= SUCTION STATIC HEAD	FT		-2.91
- LINE LOSS	FT		4.25
+ VESSEL OPERATING PRESSURE	FT		33.63
- VAPOR PRESSURE	FT		1.06
NET POSITIVE SUCTION HEAD (NPSHA)	FT		25.41

DISCHARGE PRESSURE			NORM	DESIGN
=	DELIVERY PRESSURE	PSIA		14.7
+	DISCHARGE STATIC HEAD	PSI		11.12
+	CONTROL VALVE ΔP	PSI		0.0
+	HEAT EXCHANGER ΔP	PSI		0.0
+	HEATER ΔP	PSI		0.0
+	FILTER ΔP	PSI		0.0
+	FLOW METER ΔP	PSI		1
+	LINE LOSS	PSI		71.54
+	SPARE DP	PSI		0.0
DISCHARGE PRESSURE		PSIA		98.36

TOTAL DYNAMIC PRESSURE DROP			NORM	DESIGN
=	SUCTION LINE LOSS	PSI		1.84
+	DISCHARGE LINE LOSS	PSI		71.54
+	CONTROL VALVE ΔP	PSI		0.0
+	HEAT EXCHANGER ΔP	PSI		0.0
+	HEATER ΔP	PSI		0.0
+	FILTER ΔP	PSI		0.0
+	FLOW METER ΔP	PSI		1
+	SPARE DP	PSI		0.0
TOTAL DYNAMIC PRESSURE DROP		PSI		74.38

DIFFERENTIAL PRESSURE		NORM	DESIGN
= DISCHARGE PRESSURE	PSIA		98.36
- TOTAL SUCTION PRESSURE	PSIA		11.46
DIFFERENTIAL PRESSURE	PSI		86.90
DIFFERENTIAL PRESSURE	FT		201

RATED DIFFERENTIAL PRESSURE		NORM	DESIGN
= DIFFERENTIAL PRESSURE	PSI		86.90
+ OVERPLUS	PSI		8.69
RATED DIFFERENTIAL PRESSURE	PSI		95.59
RATED DIFFERENTIAL HEAD	FT		221

MAXIMUM SUCTION PRESSURE		NORM	DESIGN
= VESSEL PSV SETTING	PSIA		14.56
+ STATIC HEAD FROM HIGH LEVEL	PSI		6.79
MAXIMUM SUCTION PRESSURE	PSIA		21.35

MAXIMUM DISCHARGE PRESSURE		NORM	DESIGN
= MAXIMUM SUCTION PRESSURE	PSIA		21.35
+ SHUT OFF ΔP (1.25 X RATED ΔP)	PSI		119.49
MAXIMUM DISCHARGE PRESSURE	PSIA		140.84

REQUIRED BRAKE HORSEPOWER		NORM	DESIGN
= HYDRAULIC POWER	HP		8.37
/ EST. HYDRAULIC EFFICIENCY			0.50
REQUIRED BRAKE HORSEPOWER	HP		16.74

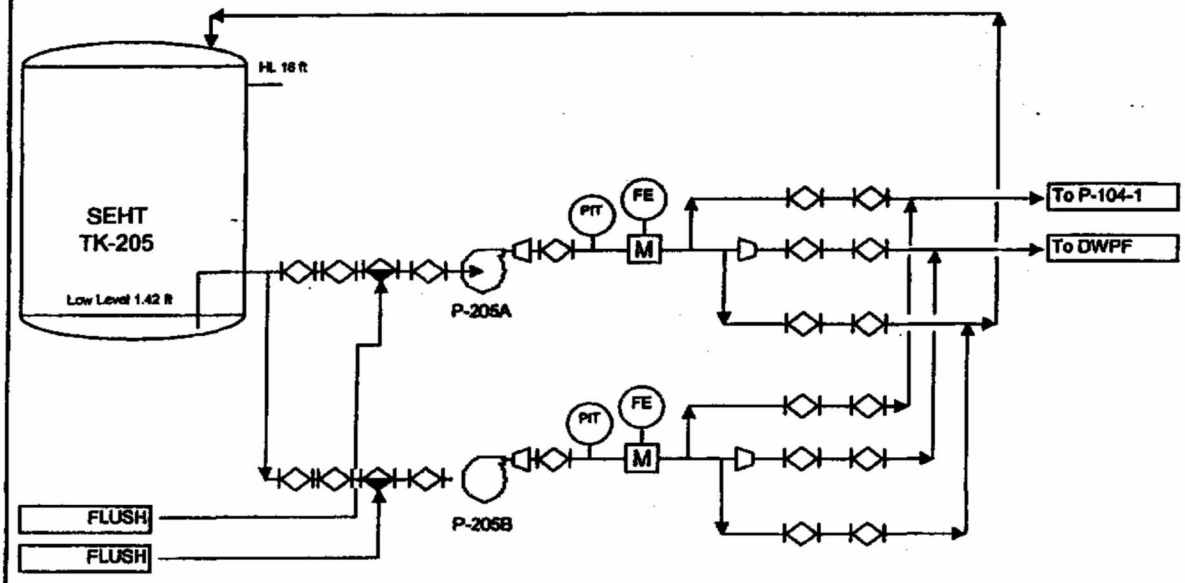
STATIC HEAD			MIN	MAX
=	DISCHARGE STATIC HEAD	FT	25.67	25.67
-	SUCTION STATIC HEAD	FT	15.67	-2.91
STATIC HEAD		FT	10.00	28.58

	MIN	MAX
CONTROL VALVE PRESSURE DROP PSI	N/A	N/A

CLIENT & LOCATION	DOE SAVANNAH RIVER SITE	EQUIPMENT NUMBER		P-205A/B	
PROJECT NO.	744910	PUMP CALCULATION NO.		M-CLC-J- 00013	
SYSTEM	Caustic-Side Solvent Extraction	PFD REF. DRAWING NO.		M-M5-J-0008	
AREA	J	P & ID REF. DRAWING NO.	M-M6-J-0032	M-M6-J-0033	M-M6-J-0002

SYSTEM SKETCH

8.1 Sketch



NOTES

XOMOX Process Valves & Actuators

XP Sleeved Plug Valves
Class 150, 2-way, Fig. 067XP
Cv factors for valve sizing

Size	2-Way	3-Way A, AX, C pos.	3-Way D pos. 0° & 180°	3-Way D pos. 90°	4-Way	5-Way
1/2	9	7	4	5	4	6
3/4	9	7	4	5	6	6
1	43	20	11	17	15	27
1 1/2	89	40	21	37	30	42
2	172	70	40	47	54	69
3	294	100	54	87	74	120
4	548	175	94	159	150	200
6	1075	350	210	255	340	390
8	1591	475	360	450	455	575
10	2159	650	450	750	610	785
12	3200	965	650	1000	900	1160
14	3200	--	--	--	--	--
16	5280	--	--	--	--	--
18	5600	--	--	--	--	--
20	5900	--	--	--	--	--
24	11,000	--	--	--	--	--

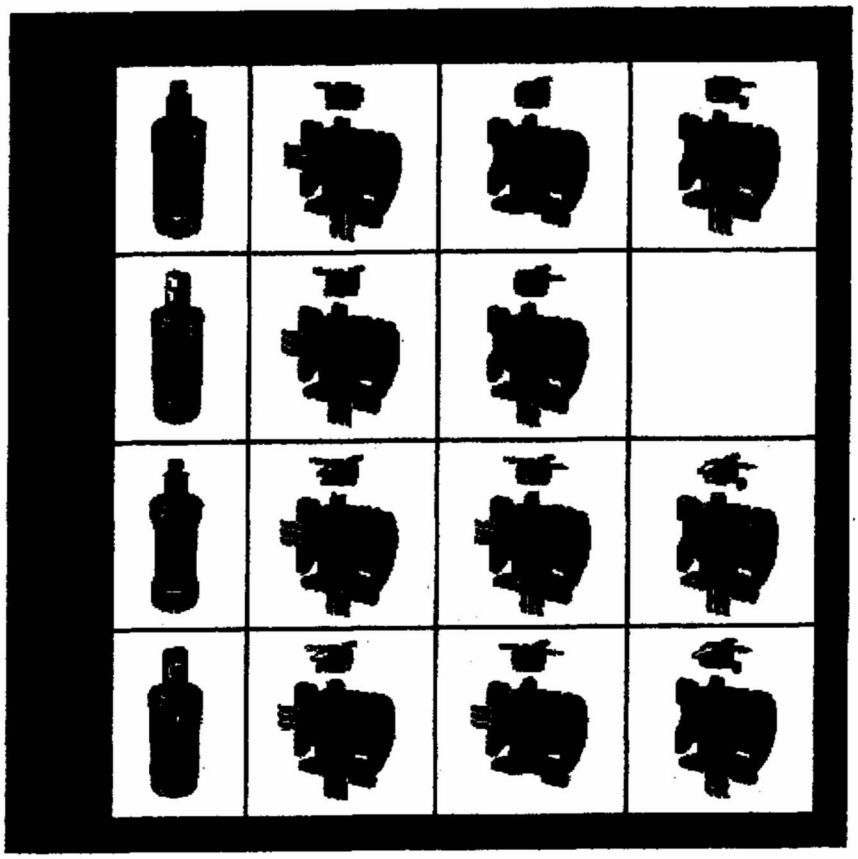
Multi Port Flow Arrangement

Attachment 11.7

Xomox Valve Data

Sheet 1 of 5

m-CLC-3-00013, Rev. B



For more information on Xomox products please Contact Us

To access all of Xomox's brochures or any Installation, Operation and Maintenance manuals in PDF format please visit our download section

Page Last Updated: March 21, 2005
Send comments to xomox.webmaster@xomox.com.

Attachment 11.7

Xomox Valve Data

Sheet 2 of 5

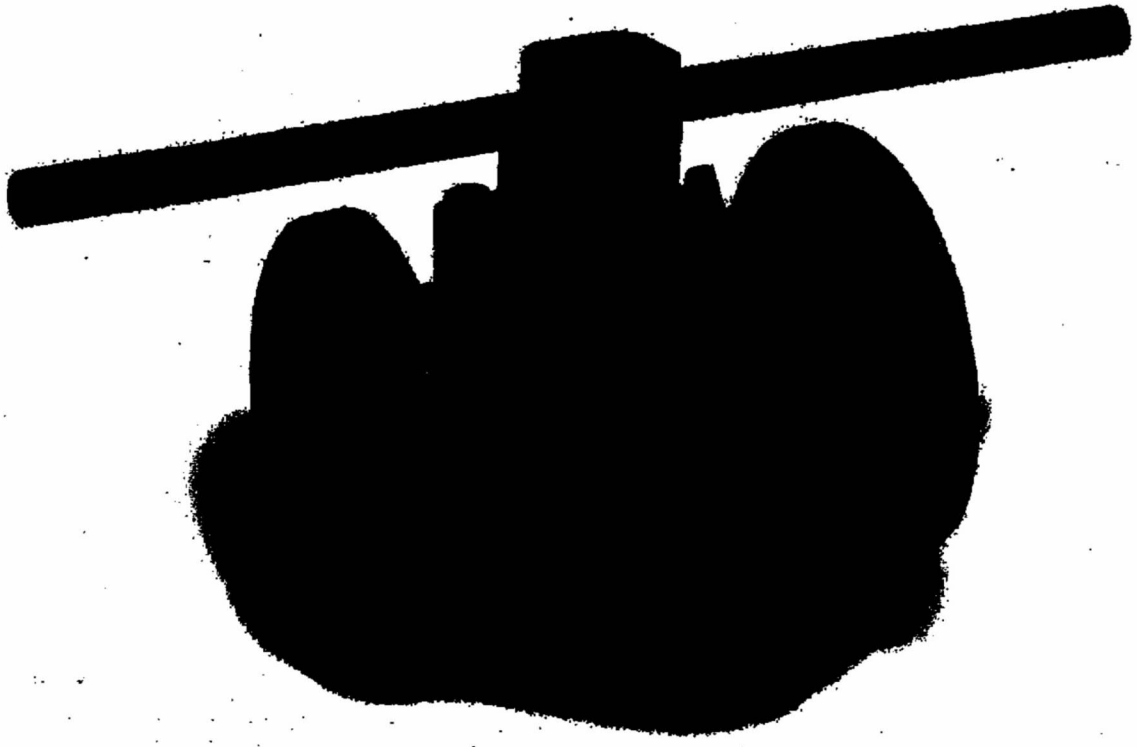
M-CLC-J-00013, Rev. B

XOMOX
Process Valves & Actuators

3-Way Plug Valves

FROM THE XOMOX SPECIAL PRODUCTS GROUP

Sheet 3 OF 5



Tufline non-lubricated sleeved plug valves are available in a side-entry, 3-way configuration.

This valve incorporates the unique features and benefits of the Tufline line of valves including superior sealing performance and long service life with virtually maintenance free operation.

The Tufline side-entry 3-way valve adds the advantage of more compact, flexible, and economical system design and operation.

No pockets or cavities.

Unlike many other 3-way valve designs, Tufline sleeved plug valves have no cavities to entrap contaminating media. This is an important consideration for food and pharmaceutical applications.

For applications such as polymers, chemicals, salts, slurries, brines, muds, plastics, or sewage, there are no cavities where the flow media can collect and solidify.

Self cleaning.

Metal lips completely surround the valve ports. With each rotation of the valve, any scale which may have collected on the plug seal surface is broken-up and wiped away.

Variety of materials.

For maximum versatility, the Special Products Group offers Tufline 3-way side entry sleeved plug valves in a variety of standard and high-alloy metals.

Increased flow capacity.

As compared to Tufline's bottom entry 3-way sleeved plug valve, the side entry valve typically offers higher flow capacity.

Pressure/temperature ratings.

Pressure and temperature ratings for standard sleeved plug valves apply with the exception that the pressure drop should not exceed 170 psig at 100°F while switching.

Tufline Side Entry 3-Way Sleeved Plug Valves

Cv Values

Size	"AX" Port 0° & 90° "D" Port 0° & 180°	"D" Port 90°
½	4.5	9
¾	4.5	9
1	17.5	35
1½	37.5	74
2	64	146
3	108	250
4	193	468
6	374	936
8	515	1400
10	860	2159
12	1280	3200

How to specify

Sheet 4 of 5

Size - Figure No. - Option - Body - Plug - Sleeve - Operator - Service

2" - 077 - FT - 2 - 6 - P1 - W - C

Size & Figure No.

Options

Fire Tested ..... FT
Tertiary Top Seal ... TS
Cage Control CCV
Extended Packing . XP
Partial Jacket ..... PJ
Full Jacket ..... FJ
Port Arrangements ..... "AX" or "D"

Valve specifications may include multiple options.

Body

Alloy 20 0
Carbon Steel ... 2
Monel 3
Nickel 5
316SS 6
Hastelloy B 8
Hastelloy C 9
Inconel 40
Other (Specify) . X

Sleeve

PTFE P1
15% RPTFE . P2
25% RPTFE . P3
PFA P6
Xomox-7 .... P7
UHMWPE ... P8
Tufline-475 . P16
Tufline-600 . P20
Other (Specify) ... PX

Plug

Alloy 20 0
Monel 3
304SS 4
Nickel 5
316SS 6
Hastelloy B 8
Hastelloy C ... 9
Inconel 40
Other (Specify) . X

Service

Chlorine .. C
Oxygen .. O
Vacuum .. V
General Service ... Blank
Other** ... X

Operator

Less Operator ... N
Wrench ..... W
Wrench with locking device . WY
Gear ..... G
Gear with locking device .. GZ
Actuator* ..... A

* Specify actuator type and available air supply.

** Consult your Xomox Sales Engineer for a wide variety of other available service options.

M-CLC-J-00013, Rev. B

fline 120° 3-Way Full Port Sleeved Plug Valve

Facilitates more efficient and more economical system design.

The Tufline 120° Full Port 3-way Sleeved Plug Valve replaces conventional and cumbersome pipe "T" and twin block valve arrangements.

Improved flow characteristics.

In addition to the improved flow provided by the full port configuration, the 120° flow pattern provides greater flow efficiency than 90° 3-way valves.

Additional design features.

In addition to the unique design features found in the standard-port and 2-way full port configurations, this valve offers:

- Configuration for cleaning with a mechanical pig.
- 120° and 240° manual or automated operation.
- Visual indication of flow direction.
- Allows transflow when switching.

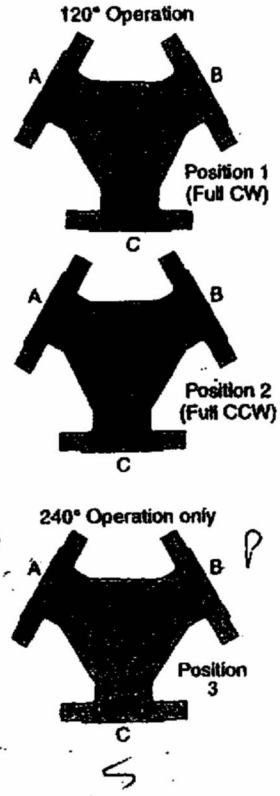
Appropriate applications.

This valve is ideal for dual safety relief valve switching and other applications where low pressure drop and high flow efficiency are important.

This design offers significant advantages for handling slurries, diversion, or blending where full flow and the ability to scrape or "pig" the line to remove solids buildup are desirable.

Port arrangements.

In the diagrams at the right, the color indicates the path of fluid flow.

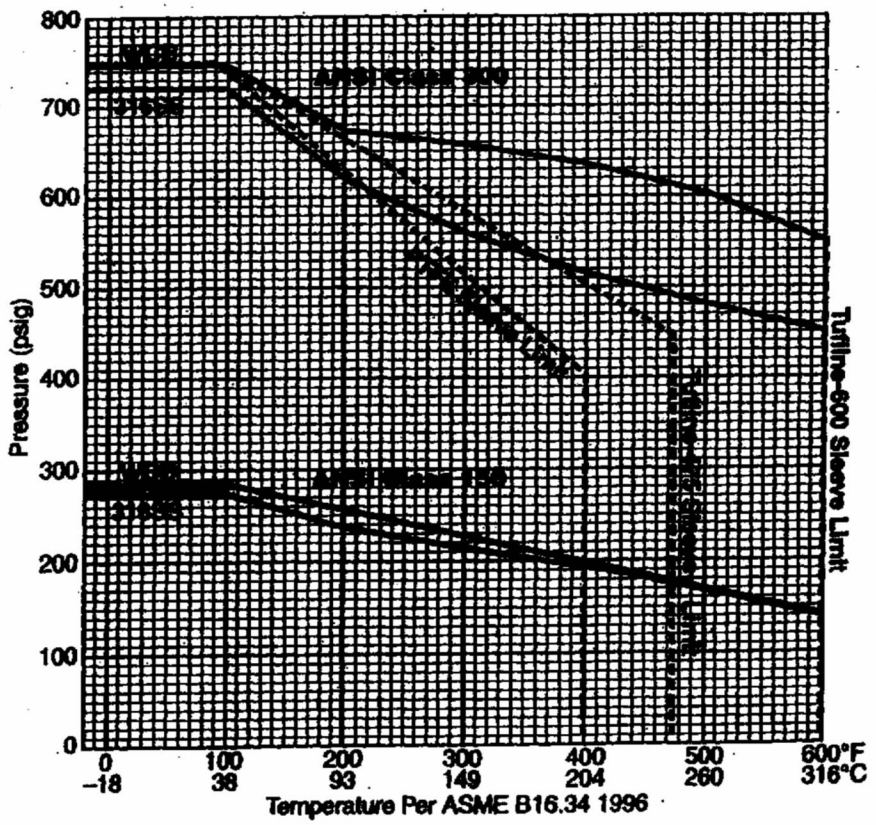


Cv factors.

Size	Cv Factors For Valve Sizing	Valve Break Torques ft.lbs* (PTFE Sleeve)
[illegible]	36	25
1½	90	123
[illegible]	175	123
3	400	585
[illegible]	725	630
6	1750	1417
[illegible]	3200	2667

* For Tufline-600 sleeves, multiply valve break torques by 1.35.

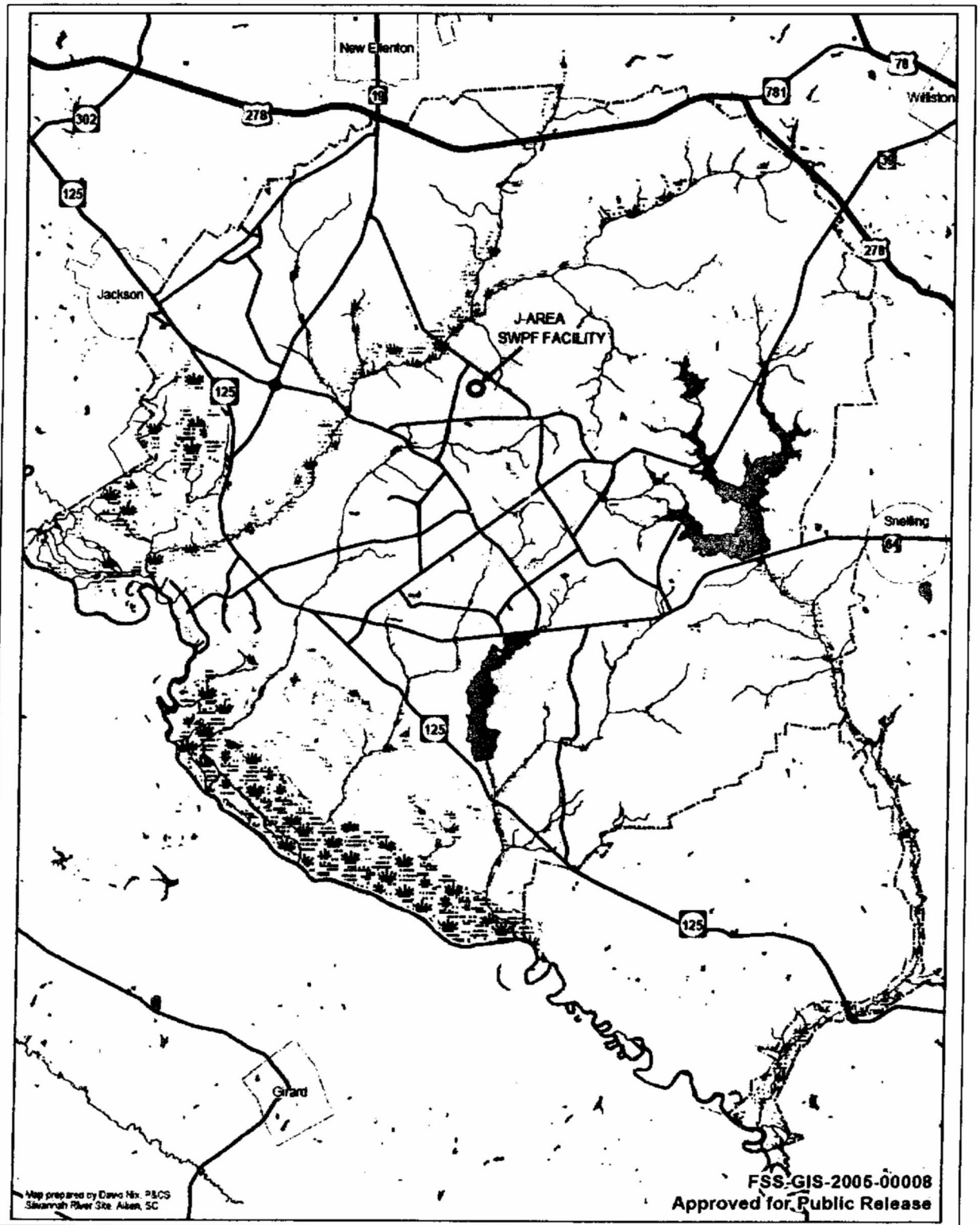
Pressure-temperature ratings.



Attachment 3

PARSONS

Salt Waste Processing Facility (SWPF)



Title: Salt Waste Processing Facility Phase II Location Map	Doc. No: FSS-GIS-2005-00008
	Revision: 0

Attachment 4

PARSONS

Salt Waste Processing Facility (SWPF)

SWPF PROCESS TANKS

Tank Number	Tank Name	Tank Description	Working Volume (gallons)	Diameter (feet)	Height or Length (feet)	Material	Process Flow Diagram Number
TK-101	Alpha Sorption Tank-A (AST-A)	Receives HLW and mixes with MST for strontium/actinide adsorption process.	28,700	19'-0"	16'-10"	316L SS	M-M5-J-0002
TK-102	Filter Feed Tank-A (FFT-A)	Used to supply filters and store concentrated slurry.	31,300	19'-0"	16'-10"	316L SS	M-M5-J-0002
TK-103	Cleaning Solution Dump Tank-A (CSDT-A)	Receives spent cleaning solution during filter cleaning cycles.	850	5'-0"	7'-3"	316L SS	M-M5-J-0002
TK-104	Sludge Solids Receipt Tank (SSRT)	Receives sludge from the FFT-A and MST/Sludge Transfer Tank from AFF.	5,200	9'-0" - 13'0"	23'-10"	316L SS	M-M5-J-0004
TK-105	Wash Water Hold Tank (WWHT)	Receives and stores wash water until transfer to AST	11,500	12'-0"	15'-11"	316L SS	M-M5-J-0004
TK-106	Oxalic Acid Feed Tank	Used to mix and store oxalic acid for transfer to CSDT for filter cleaning.	850	7'-0"	15'-0"	304L SS	M-M5-J-0005
TK-107	Filter Cleaning Caustic Tank	Used to mix and store caustic prior to transfer to CSFT for filter cleaning.	850	6'-0"	6'-0"	304L SS	M-M5-J-0005
TK-108	Caustic Dilution Feed Tank	Used to mix 1.66 M caustic solution feed to TK-101 (AST-A).	8,000	11'-0"	15'-0"	304L SS	M-M5-J-0005
TK-109	Salt Solution Feed Tank (SSFT)	Used to stage Clarified Salt Solution for feed to cesium extraction contactors	41,400	21'-0"	16'-3"	316L SS	M-M5-J-0006
TK-127	Spent Oxalic Acid Storage Tank	Used to collect and store used oxalic acid from the filter cleaning cycle	3,400	6'-0"	20'-0"	316L SS	M-M5-J-0018
TK-202	Solvent Hold Tank (SHT)	Used to hold solvent	500	5'-0"	5'5"	316L SS	M-M5-J-0007
TK-204	Caustic Wash Tank	Used to hold caustic 0.01M wash solution	400	4'-0"	5'-9"	316L SS	M-M5-J-0008
TK-205	Strip Effluent Hold Tank (SEHT)	Used to receive strip effluent	16,600	14'-0"	16'-10"	316L SS	M-M5-J-0008

Attachment 4

PARSONS

Salt Waste Processing Facility (SWPF)

SWPF PROCESS TANKS							
Tank Number	Tank Name	Tank Description	Working Volume (gallons)	Diameter (feet)	Height or Length (feet)	Material	Process Flow Diagram Number
TK-206	Ba-137 Decay Tank (BDT)	Used for DSS holdup to allow ^{137m}Ba decay.	1,200	7'-0"	6'-6"	316L SS	M-M5-J-0007
TK-207	DSS Hold Tank (DSSHT)	Used to store decontaminated salt solution prior to transfer to Tank 50 or Saltstone.	35,900	19'-0"	19'-8"	316L SS	M-M5-J-0009
TK-208	Solvent Drain Tank	Used to collect drainage and flush from the CSSX contactors and to hold solvent recovered from Strip Effluent Coalescer TK-203	4,300	6'-0"	20'-0"	316L SS	M-M5-J-0006
TK-211	Decontaminated Salt Solution Stilling Tank	Used to separate aqueous from organic liquids.	235	2'-0"	10'-0"	316L SS	M-M5-J-0007
TK-212	Strip Effluent Stilling Tank	Used to separate aqueous from organic liquids	29	1'-0"	5'-0"	316L SS	M-M5-J-0008
TK-215	Strip Effluent Pump Tank	Receives strip effluent from the Strip Effluent Coalescer, allows for 137mBa ingrowth, and transfers strip effluent to TK-205 via P-215 A/B.	50	1'-6"	4'-11"	316L SS	M-M5-J-0008
TK-217	Solvent Strip Feed Tank	Used to allow a hold-up volume for the solvent strip feed pumps	50	1'-6"	4'-11"	304L SS	M-M5-J-0007
TK-220	Intermediate Storage Tank (IST)	Receives DSS from Ba-137 Decay Tank and sends DSS to TK-221 for second MST strike or for use as storage for sampling during single strike mode.	30,300	19'-0"	16'-10"	316L SS	M-M5-J-0015
TK-221	Alpha Sorption Tank - B (AST-B)	Receives DSS from Intermediate Storage Tank for second MST strike or for use as a storage for sampling during single strike mode	30,700	19'-0"	16'-10"	316L SS	M-M5-J-0015
TK-222	Filter Feed Tank - B (FFT-B)	Used to supply filters and store concentrated slurry from second MST strike.	31,900	19'-0"	16'-10"	316L SS	M-M5-J-0015
TK-223	Cleaning Solution Dump Tank - B (CSDT-B)	Receives cleaning solution during filter cleaning cycles.	850	5'-0"	7'-3"	316L SS	M-M5-J-0015

Attachment 4

PARSONS

Salt Waste Processing Facility (SWPF)

SWPF PROCESS TANKS							
Tank Number	Tank Name	Tank Description	Working Volume (gallons)	Diameter (feet)	Height or Length (feet)	Material	Process Flow Diagram Number
TK-224	MST/Sludge Transfer Tank (MSTT)	Holds MST/Sludge from second strike before transfer to TK-101 or TK-104	1,600	6'-0"	9'-9"	316L SS	M-M5-J-0015
TK-235	Lab Drain Tank	Used to collect material from lab drains.	450	4'-0"	6'-8"	316L SS	M-M5-J-0018
TK-301	Process Water Tank	Used to store process water.	8,000	11'-0"	15'-0"	Polyethylene	M-M5-J-0010
TK-302	Caustic Receipt Tank	Used to receive and store 50% caustic	8,000	11'-0"	15'-0"	304L SS	M-M5-J-0010
TK-303	Caustic Makeup Tank	Used to make up 0.01 M caustic.	2,000	7'-0"	10'-0"	304L SS	M-M5-J-0010
TK-304	Nitric Acid Receipt Tank	Used to receive and store 20% wt Nitric Acid	2,000	7'-0"	10'-0"	304L SS	M-M5-J-0011
TK-307	Nitric Acid Scrub Makeup Tank	Used for make-up and storage of scrub nitric acid solution.	2,000	7'-0"	10'-0"	304L SS	M-M5-J-0011
TK-311	MST Storage Tank	Used to mix and store MST slurry prior to transfer to the AST-A or AST-B.	800	5'-0"	7'-0"	316L SS	M-M5-J-0005
TK-312	DI Water Storage Tank	Used to store DI water.	6,000	9'-0"	16'-0"	Polyethylene	M-M5-J-0010
TK-313	Solvent Makeup Tank	Used for solvent makeup.	50	2'-0"	3'-0"	304L SS	M-M5-J-0013
TK-601	Alpha Sorption Drain Tank (ASDT)	Used to collect ASP area drains until disposition determined.	3,400	6'-0"	20'-0"	316L SS	M-M5-J-0018

Attachment 5

PARSONS

Salt Waste Processing Facility (SWPF)

SWPF SPECIFICATIONS

Number	Title	Rev	Discipline
03100	Structural Concrete Formwork	0	Structural
03200	Concrete Reinforcement	0	Structural
03250	Expansion Joints, Contraction Joints, and Waterstops	0	Structural
03300	Cast-In-Place Concrete	0	Structural
03305	Miscellaneous Cast-In-Place Concrete	A1	Civil
03315	Non-Shrink Grout	0	Structural
03410	Plant Pre-cast Structural Concrete	0	Structural
05055	Welding, Structural	0	Structural
05120	Structural Steel	0	Structural
05310	Steel Roof Decking	0	Structural
05320	Composite Steel Decking	0	Structural
05505	Miscellaneous Metals	0	Structural
11811	ASME Small Vessels	1	Mechanical
11812	Steel Tanks	0	Mechanical
11813	ASME Large Vessels (PP-17A)	1	Process
11814	Polyethylene Tanks	0	Mechanical
11815	Fabrication of Stainless Steel Sumps	0	Mechanical
11817	Positive Material Identification	0	Mechanical
11818	ASME Vessels - Carbon Steel	E2	Mechanical
11819	Seismic Qualification Criteria for Mechanical Equipment	0	Mechanical
11821	Centrifugal Pumps (PC-1)	0A2	Mechanical
11822	Seismic Qualification Criteria for PC-3 Pumps	0	Mechanical
11823	Rotary Gear Pumps (PC-1)	1	Mechanical
11824	Air Diaphragm Pumps	0A2	Mechanical
11825	Centrifugal Pumps (PC-3)	0	Mechanical
11826	Rotary Gear Pumps (PC-3)	0	Mechanical
11827	Rotary Gear Pumps (PC-1, GS-2, PL-4)	1	Mechanical
11831	Mechanical Agitators	0	Mechanical
11841	Compressed Air System	0	Mechanical
11842	Backup Air Receivers Compressor	0	Mechanical
11852	Shell and Tube Heat Exchangers	E3	Mechanical
11855	Heaters (Electric)	0	Mechanical
11903	Cross-Flow Filters	F	Engineering Mechanics
11904	Tank Mixing Eductors	0	Mechanical
14510	Sample Transfer System	0	Material Handling
14512	Oxalic Acid Loading System	B1	Material Handling
14513	Drum Tumbler	0	Material Handling
14516	Gloveboxes	0	Material Handling
14518	Hot Cell Stainless Steel Lining	0	Material Handling
14519	Fabrication of Specialty Equipment	0	Material Handling
15080	Thermal Insulation	1	Piping
15085	Bolting Procurement (Piping)	0	Piping
15111	Pipe Fabrication	0A2	Piping
15112	Pipe Leak Testing	0	Piping
15113	Piping Specialty Item Procurement	0	Piping
15114	General Piping Material Procurement	0	Piping
15115	Valve Procurement	0	Piping
15116	Pipe Procurement	0	Piping
15117	Fitting Procurement	0	Piping
15118	Flange Procurement	0	Piping
15119	Gasket Procurement	0	Piping
15120	Piping Material Specification	1	Piping
15121	Field Installation of Process Piping	0	Piping
15123	Protective Coatings - Underground Steel Pipe	0	Piping
15140	Waste Transfer Line Casing Spacer	0	Mechanical
15185	Hydronic Pumps	C2	Piping
15201	Seismic Restraint of Mechanical Systems and Equipment	B1	HVAC
15221	Chemical Drains Trade Waste	B1	HVAC
15330	Fire Protection Wet Pipe Sprinkler System	0	Fire Protection
15331	Fire Protection Interior Distribution System	0	Fire Protection
15332	Fire Protection Underground Water Supply System	0	Fire Protection
16231	Standby Diesel Generator Package	0	Electrical
16641	Cathodic Protection	0	Electrical
16721	Fire Alarm and Detection System	0	Fire Protection
M-SPC-J-00002	Positive Material Identification	0	Vessel
SPC-ME-6204-0002	BOBCalixC6	1	Chemical
SPC-ME-6204-0003	Cs-7SB	1	Chemical
SPC-ME-6204-0005	CSSX Solvent Mixing	3	Chemical
X-SPC-J-00007	Centrifugal Contactor Modules	1	Mechanical
X-SPC-J-00008	Centrifugal Contactors	0	Mechanical

D H E C
PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment

BUREAU OF WATER

April 04, 2008

JAMES SOMMA
PARSONS INFRASTRUCTURE AND TECHNOLOGY GROUP INC
1080 SILVER BLUFF RD
AIKEN SC 29803

Re: **SRS/SALT WASTE PROCESSING FACILITY/PHASE 2**
Aiken County
Application Tracking # 818672

Dear James Somma:

The Industrial Wastewater Permitting section received an engineering submittal on the above project on 04/04/2008. In accordance with R.61-30 we have reviewed your application for completeness. Based on our review, your project application package is administratively incomplete. For this reason, your project will not be in line for a technical review until you satisfy the deficiencies noted below. As a courtesy, we have logged in your project and will keep it here pending your complete response. To complete your application package, please provide the following items:

1. Three (3) copies of pump station calculations and pump curves need to be submitted.

2. Three (3) copies of flow calculations must be submitted justifying the sizing of the lines and/or equipment.

3. Three (3) copies of a detailed 8 ½" by 11" location map must be submitted.

4. Three (3) sets of signed and sealed specifications must be submitted. Specifications should include all materials of construction (e.g. PVC pipe or stainless steel tanks) and sizes of equipment.

5. A letter of acceptance from the owner stating that they have adequate equipment and personnel to operate and maintain the proposed sewer system must be submitted.

6. A SC registered PE must sign and seal all plans and specifications and the Certificate of Authorization (COA) from the engineering firm must also be affixed near the PE seal. Please resubmit these documents with the appropriate seals. Please note: If the plans and specifications are bound (a staple is sufficient for this purpose), then it is only necessary to place

the COA and PE seal/signature on the front of the bound document. If the plans and specifications are not bound, then each page must include the COA and the PE seal/signature.

7. The person who signed as owner does not appear to meet the requirements of the application instructions in Part XV. Please resubmit a revised permit application with the appropriate owner's signature (one original and 3 copies) or submit a letter describing how the person who signed meets these requirements.

Please return the above noted items as soon as possible. Failure to submit these items will result in significant delays in the review process.

Also, please note that any land clearing activity that is being performed in relation to this project must be permitted under the State Sediment and Erosion Control Program. For more information contact Ann Clark at (803) 898-4028.

If you have any questions, please do not hesitate to contact this office at 803-898-3964.

Sincerely,

Crystal D. Rippy

Crystal Rippy, Manager
Industrial Wastewater Permitting Section
Water Facilities Permitting Division

SAVANNAH RIVER SITE
Aiken, SC 29808 • www.srs.gov

ESH-EPG-2008-00048

April 2, 2008

Mr. Barry S. Mullinax, P.E.
Industrial Wastewater Permitting Section
Bureau of Water
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Construction Permit No.: 19,164-IW
Salt Waste Processing Facility
J-Area of the Savannah River Site
Aiken County

Dear Mr. Mullinax:

Enclosed for your review and approval please find three (3) sets of the Construction Permit Application form, Engineering Report, and application fee for Phase II of the Salt Waste Processing Facility. One Engineering Report is identified as Official Use Only (OUO) which requires U.S. Department of Energy review prior to public disclosure. The other two sets are redacted versions of the OUO Report. This package pertains to the building to be constructed in J-Area that will house the main salt waste treatment units of the Salt Waste Processing Facility, including the Actinide Finishing, Caustic-Side Solvent Extraction, and the Alpha Strike Processes.

The Salt Waste Processing Facility is a specialized radioactive waste treatment facility. This facility is not included in any of the wastewater treatment plant classifications under the South Carolina Pollution Control Act (i.e., Section 48-1-110). Therefore, in addition to the issuance of a construction permit, we request that no wastewater treatment facility operator-in-charge, required to hold a certificate of registration issued by the South Carolina Environmental Certification Board, be included as a condition for the construction or operation of this facility. The F- and H-Area Tank Farm facilities, Defense Waste Processing facility, and the Saltstone Production Facility do not require such certified operators.

We look forward to your approval and issuance of a construction permit for this facility as soon as practicable. If you have any questions, please call me at 803-952-7382.

Sincerely,

Ronald Campbell

Ronald M. Campbell
Environmental Services Section
Washington Savannah River Company LLC

RMC/r
Enc.
c: M. P. Prater, 730-B
G. S. Hoover, 730-B
D. F. Hoel, 730-B
M.D. Sherritt, SCDHEC *
V. E. Millings III, SCDHEC Region 5 EQC **
J. C. Yon, SCDHEC Region 5 EQC **
R. T. Caldwell II, SCDHEC Region 5 EQC **
* - Transmittal Letter Only / ** - Redacted Version Only

R

United States Department of Energy
Salt Waste Processing Facility

Savannah River Site
Aiken, South Carolina

Engineering Report

for an

Industrial Wastewater Treatment Facility

Prepared By

PARSONS

1080 Silver Bluff Road
Aiken, South Carolina 29803

for the

United States Department of Energy

Function: Environmental Permitting
Doc. No.: Q-PER-J-00002
Revision: 2
Date: 03/25/2008

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

List of Figures

List of Tables

List of Attachments

LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
AFF	Alpha Finishing Facility
AFP	Alpha Finishing Process
APA	Air Pulse Agitator
ARP	Actinide Removal Process
ASDT	Alpha Sorption Drain Tank
ASP	Alpha Strike Process
AST-A	Alpha Sorption Tank-A (in the Alpha Strike Process)
AST-B	Alpha Sorption Tank-B (in the Alpha Finishing Process)
Ba	Barium
BDT	Barium-137 Decay Tank
CCA	Cold Chemicals Area
CFF	Cross-Flow Filter
Ci	Curie
CPA	Central Processing Area
CR	Control Room
CSDT-A	Cleaning Solution Dump Tank-A (in the Alpha Strike Process)
Cs	Cesium
CSS	Clarified Salt Solution
CSSX	Caustic-side Solvent Extraction
DCS	Distributed Control System
Drum Off/Decon Area	Decontamination Area
Decon Room	Decontamination Room
DF	Decontamination Factor
DG	Diesel Generator
DOE	U.S. Department of Energy
DSS	Decontaminated Salt Solution
DSSHT	Decontaminated Salt Solution Hold Tank
DWPF	Defense Waste Processing Facility
EPC	Engineering, Procurement, and Construction (Contractor)
FFA	Federal Facility Agreement
FFT-A	Filter Feed Tank-A (in the Alpha Strike Process)
FFT-B	Filter Feed Tank-B (in the Alpha Finishing Process)
g/L	Grams per liter
GA	General Arrangement
$H_2C_2O_2$	Oxalic acid
HEPA	High-Efficiency Particulate Air
HNO_3	Nitric acid
IST	Intermediate Storage Tank
lb/hr	Pounds per hour
LPPP	Low Point Pump Pit
LRW	Liquid Radioactive Waste
LWC	Liquid Waste Contractor

LIST OF ACRONYMS AND ABBREVIATIONS (cont.)

M	Moles/Liter (Molar)
Mgal	Million gallons
MST	Monosodium Titanate
Na	Sodium
Na^+	Sodium ion
NaOH	Sodium hydroxide
nCi/g	Nanocuries per gram
P&VG	Pump and Valve Gallery
PCP	Precipitate Process (Transfer Line)
PFD	Process Flow Diagram
PMVS	Pulse Mixer Ventilation System
PPT	Precipitate Pump Tank
PVVS	Process Vessel Ventilation System
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SCR	South Carolina Regulation
SDF	Saltstone Disposal Facility
SDT	Solvent Drain Tank
SEHT	Strip Effluent Hold Tank
SEIS	Supplemental Environmental Impact Statement
SHT	Solvent Hold Tank
SPF	Saltstone Production Facility
Sr	Strontium
SRS	Savannah River Site
SSFT	Salt Solution Feed Tank
SSRT	Sludge Solids Receipt Tank
STP	Site Treatment Plan
SWPF	Salt Waste Processing Facility
TCDS	Telecommunications and Control Datalink System
TOA	Tri-n-octylamine
UPS	Uninterruptible Power Supply
WAC	Waste Acceptance Criteria
wt%	Weight percent
WWHT	Wash Water Hold Tank
WTE	Waste Transfer Enclosure
WTL	Waste Transfer Lines

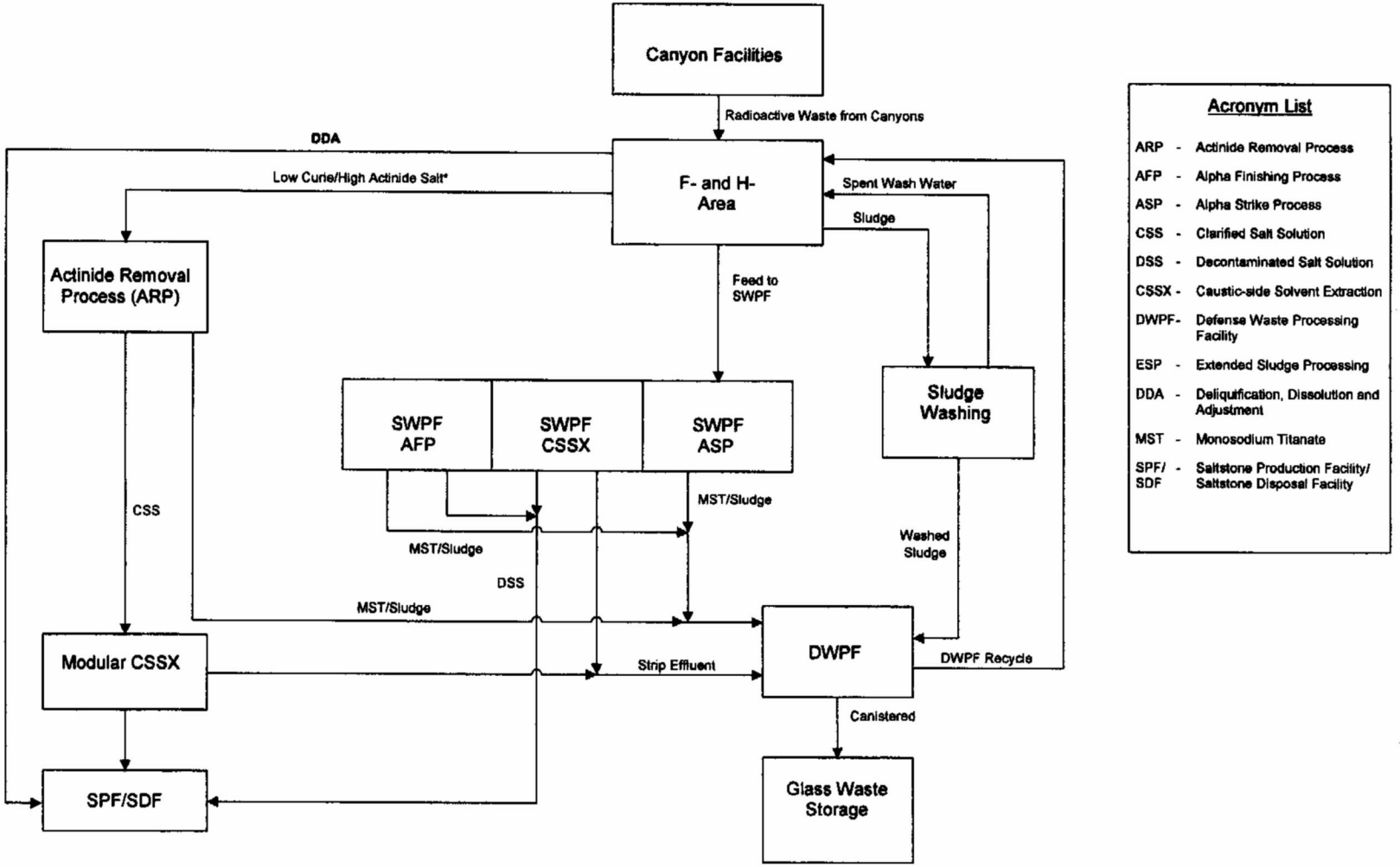
1.0 ENGINEERING REPORT

This Engineering Report is being submitted pursuant to South Carolina Regulation (SCR) 61-67 (*Standards for Wastewater Facility Construction*[1]). This Engineering Report describes the location, industrial wastewater treatment processes, wastewater characteristics, wastewater treatability, and configuration of the proposed U.S. Department of Energy (DOE) Salt Waste Processing Facility (SWPF) at Savannah River Site (SRS).

The SWPF is being designed to treat approximately 34 million gallons (Mgal) of liquid radioactive waste (LRW) currently stored in underground waste storage tanks in the SRS F- and H-Area Tank Farms. The primary function of the SWPF is to extract and concentrate cesium (Cs), strontium (Sr), and actinides from the Tank Farm wastewater to render the wastewater acceptable for treatment as decontaminated salt solution (DSS) in the SRS Saltstone Production Facility (SPF). The DSS will be transferred via underground pipe to the SPF and immobilized and disposed as grout at the Saltstone Disposal Facility (SDF). The SWPF concentrate will be transferred via underground pipe to the SRS Defense Waste Processing Facility (DWPF) for vitrification. The vitrified waste is stored in the SRS Glass Waste Storage Building, pending final disposition at the National Geological Repository.

Figure 1-1 provides an overview of SWPF integration into the SRS LRW System. As shown in Figure 1-1, SWPF receives wastewater influent from F- and H-Area. SWPF wastewater effluents are transferred to the DWPF and SPF wastewater facilities for further treatment. The Tank Farms, DWPF, and SPF operate under South Carolina Department of Health and Environmental Control (SCDHEC) industrial wastewater treatment facility and air quality permits. The SPF transfers grout to the SDF, which operates under an SCDHEC Industrial Solid Waste Landfill Permit. The SWPF will have no industrial wastewater discharges to the environment.

Figure 1-1. Savannah River Site Liquid Radioactive Waste System



* Transfers of salt solution to ARP may be discontinued after SWPF startup.

Facility features described herein, including numerical values assigned to process parameters or equipment specifications, may be subject to change as the design is further refined and finalized. Construction of the SWPF will begin after SCDHEC issues approval. The scheduled construction start date is June 2008 and Construction is currently projected to be completed by December 2011.

Limited Construction activities commenced in September 2007. Limited Construction includes: site preparation, including site clearing and grubbing; site utilities; electrical; excavation; grading; installation of the mud and base mat for the Process Building; and installation of stormwater control structures. Additionall y, under SCDHEC Phase 1 Waste Transfer Line (WTL) Construction Permit No. 19,164-IW, the WTL segments will be installed in July 2008. SWPF stormwater control structures have been permitted by SCDHEC (Permit # SCR10H152[2]) under a Notice of Intent for Stormwater Discharges from Large and Small Construction Activities, National Pollutant Discharge Elimination System General Permit SCR100000[3].

During Construction, the Engineering, Procurement and Construction (EPC) Contractor (Parsons) will contact SCDHEC representatives on a periodic basis to witness the construction progress occurring in J-Area. The EPC will provide notification to SCDHEC of the schedule for final closure of major process areas, such as the dark cells. SCDHEC is requested to identify any other specific areas that they may wish to observe before covering the excavations. Quarterly updates will be issued on progress, as well as on scheduled activity.

Following completion of Construction, initial testing (Cold Commissioning) will be performed prior to the tie-ins to the liquid waste processing facilities to confirm that all major processes and equipment perform as designed. Water runs will be followed by non-radioactive simulant runs. The products from this testing will be disposed in accordance with SCDHEC's Wastewater or Solid and Hazardous Waste Management Regulations. After SCDHEC issues an operating permit following Cold Commissioning, the tie-ins to the liquid waste processing facilities will be performed and Hot Commissioning will begin. Hot Commissioning is planned to commence as described in the quarterly status reports submitted to SCDHEC. SWPF Design, Construction, Commissioning, and one year of Operations will be completed by the EPC.

2.0 BACKGROUND INFORMATION

Nuclear material production and processing at SRS generated millions of gallons of liquid radioactive waste (LRW) that is presently stored in underground waste storage tanks in the SRS F- and H-Area Tank Farms. Approximately 37 Mgal of the waste remains in the F- and H-Area Tank Farms and includes approximately 3 Mgal of sludge, comprising insoluble and precipitated solids, and 34 Mgal of salt solution and crystallized salts. The SWPF's function is to extract and concentrate the radioactive constituents from the salt solution and crystallized salts. The 3 Mgal of sludge will be retrieved and sent to the Extended Sludge Processing facilities and then to DWPF.

The SRS *Approved Site Treatment Plan* (WSRC-TR-94-0608[4]) (STP) and the *Federal Facility Agreement for the Savannah River Site* (WSRC-OS-94-92[5]) (FFA) require DOE to remove the LRW from the non-compliant LRW tanks. The high-level waste portion of liquid waste is

immobilized in glass. This process is called vitrification, which is carried out at the DWPF; the vitrified waste will ultimately be transported to the National Geological Repository for final disposal. To support tank closure efforts established in the *STP*[4], the total volume of LRW to be vitrified by the DWPF should be reduced. The SWPF will perform this volume reduction by extracting and concentrating the high-activity constituents from the bulk salt waste. The concentrated high-activity waste fraction will be sent to the DWPF for vitrification. The higher-volume decontaminated salt solution (DSS) is processed into solidified grout at the SPF.

The *Savannah River Site Salt Processing Alternatives Final Supplemental Environmental Impact Statement* (DOE/EIS-0082-S2[6]) (SEIS) and *Record of Decision: Savannah River Site Salt Processing Alternatives*[7] (ROD), as amended January 17, 2006 (DOE/EIS-0082-S2-SA-01) document DOE's analysis and selection of the technologies currently integrated into the SWPF design. The preferred technologies selected in the *SEIS* and *ROD* included the monosodium titanate (MST)-based Alpha Strike Process (ASP) for removal of actinides and Sr, and Caustic-side Solvent Extraction (CSSX) for removal of Cs.

3.0 SALT WASTE PROCESSING FACILITY LOCATION AND FACILITY LAYOUT

The SWPF is located in J-Area at SRS. The configuration of the SWPF Process Building, supporting facilities, and locations of the WTLs are shown in Figure 3-1. Other support structures adjacent to the Process Building include the Exhaust Stack, Administration Building, Chiller Pad, Compressor Building, Diesel Generator (DG) Pad, and parking lot. The SWPF and J-Area are located east of the Low Point Pump Pit (LPPP). The environmental impacts associated with SWPF construction at this location were extensively evaluated and the results were documented in the *SEIS*[6].

Figure 3-2 provides a three-dimensional Design view of the SWPF Process Building. All waste processing operations are performed within the Central Processing Area (CPA) and Alpha Finishing Facility (AFF) areas of the Process Building. The CPA includes five Process Vessel Cells, the Alpha Strike Process (ASP) Pump and Valve Gallery (P&VG), and the Caustic-side Solvent Extraction (CSSX) Cell. The ASP P&VG is located beneath the Process Building Ventilation Systems shown in Figure 3-2.

Attachment A includes the SWPF General Arrangement (GA) drawings. The GAs show five areas: 1) CPA, 2) Cold Chemicals Area (CCA), 3) Northern Facility Support Area, 4) Eastern Facility Support Area, and 5) AFF. GAs for the CPA are also included, showing various equipment at different elevations. The GA Index also identifies the tanks' designated numbers, size and capacity, and designation of pumps, agitators, and other miscellaneous equipment.

Figure 3-1. Salt Waste Processing Facility General Layout

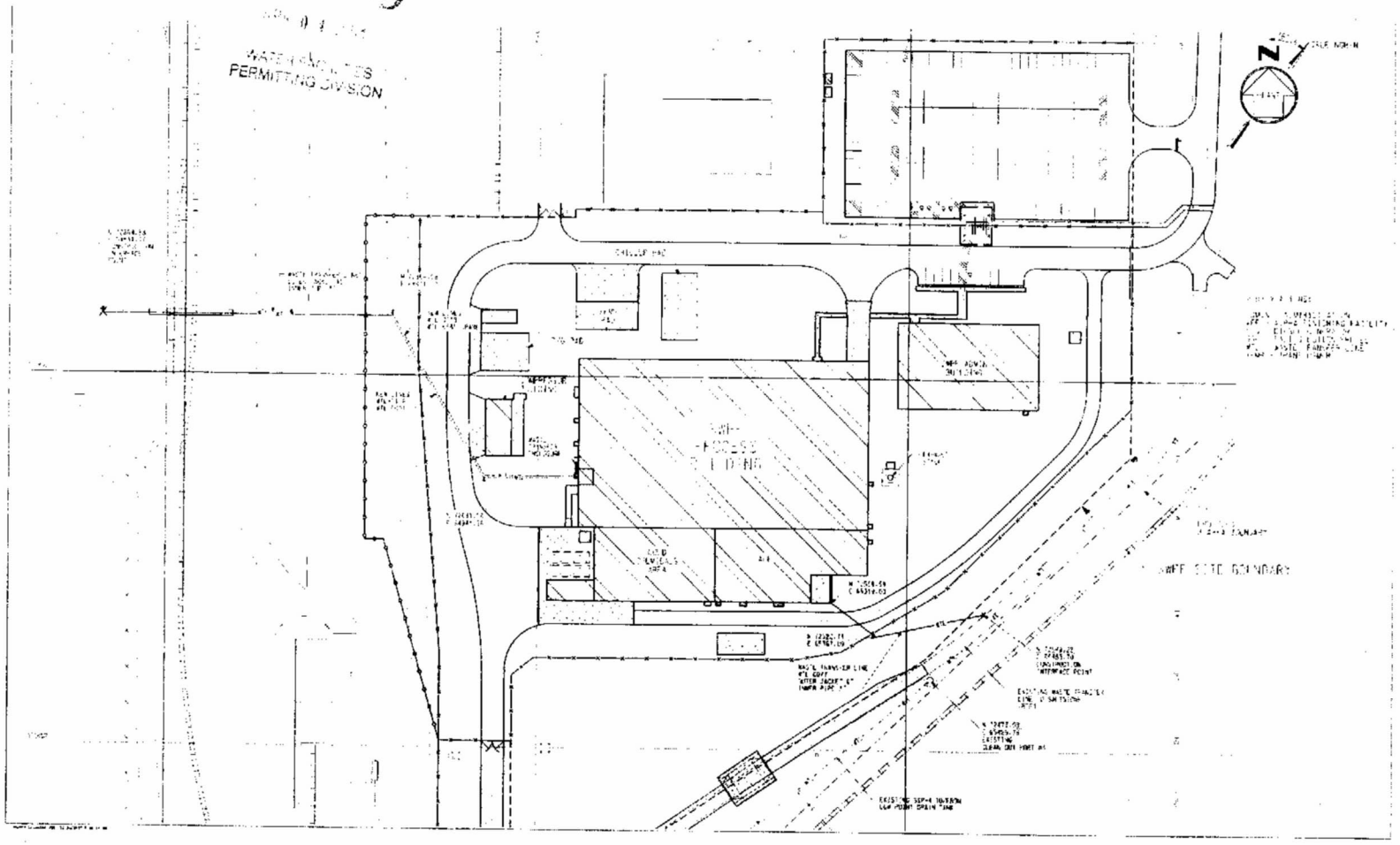
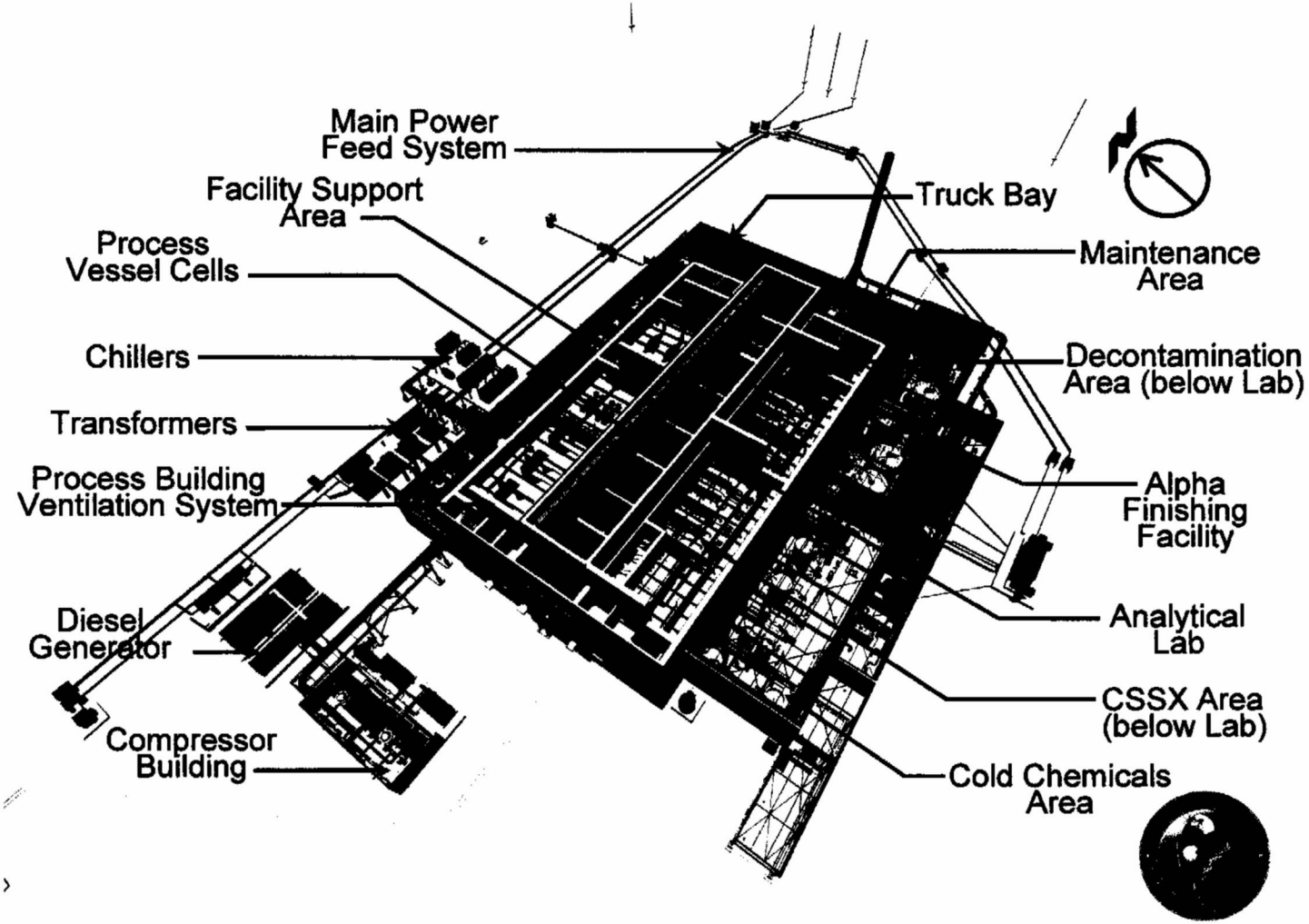


Figure 3-2. Three Dimensional, Preliminary Design View of the SWPF Process Building



4.0 COMPREHENSIVE DESCRIPTION OF PROPOSED SWPF PROJECT

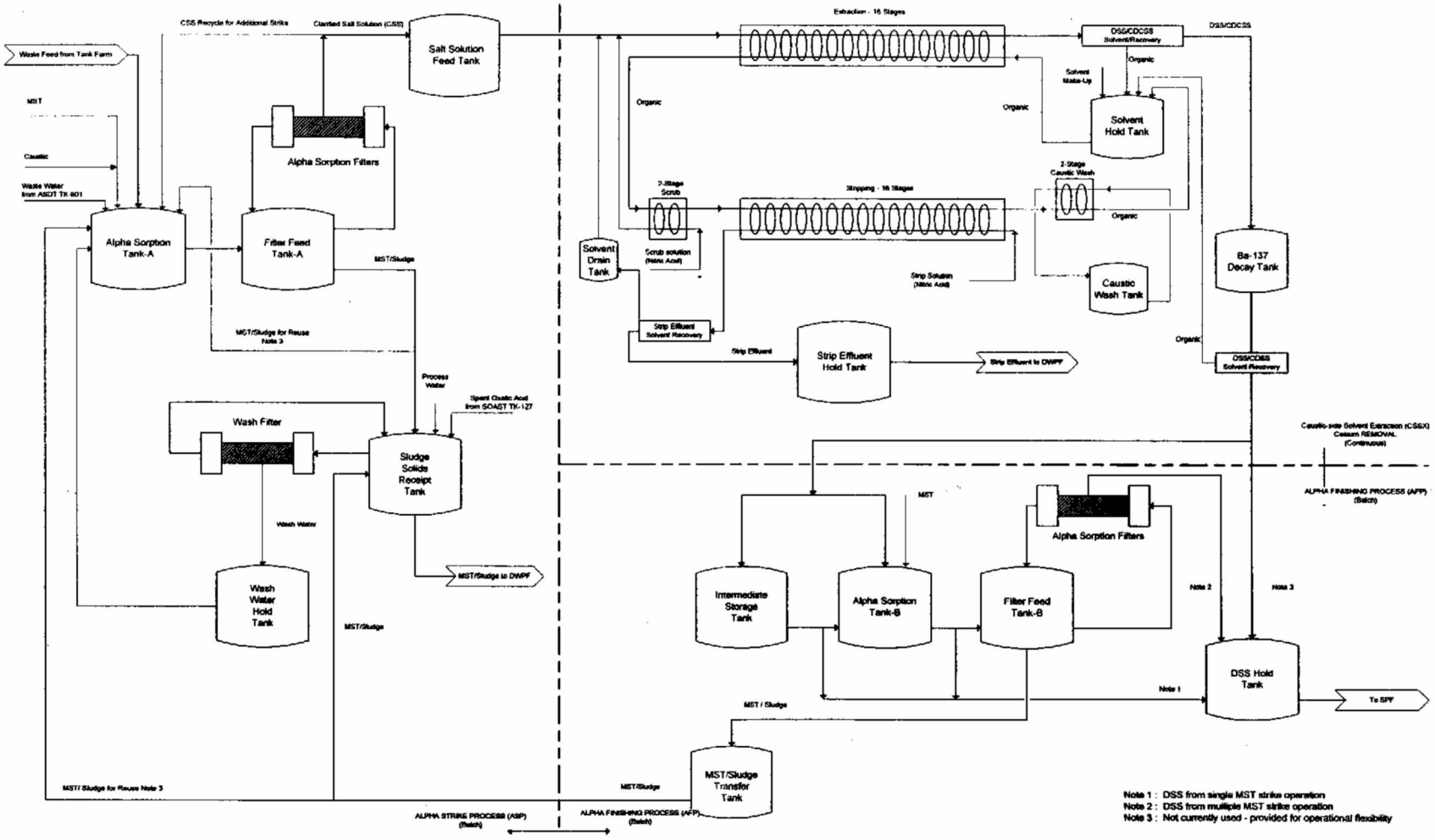
The SWPF is being designed to process 34 Mgal of liquid radioactive waste (LRW) stored as salt solution or saltcake. The saltcake requires dissolution and blending prior to transfer to the SWPF. After saltcake dissolution, the total wastewater volume requiring processing is approximately 84 Mgal. Most of this wastewater requires processing by the SWPF. This section describes the operational units comprising the SWPF. Wastewater processing at the SWPF occurs in the following five operational steps, including two transfer steps and three processing units:

1. Wastewater receipt from the Tank Farm,
2. Alpha Strike Process (ASP) for removal of actinides and ^{90}Sr,
3. Caustic-side Solvent Extraction (CSSX) for removal of ^{137}Cs,
4. Alpha Finishing Process (AFP) for additional removal of actinides and ^{90}Sr, and
5. Wastewater Transfer to the SPF or DWPF.

A simplified process flow diagram (PFD) is provided in Figure 4-1. The three process units are the ASP, CSSX, and AFP. These process units are separated by dashed lines in Figure 4-1. A brief summary of the three process units follows.

Detailed process flow drawings are found in Attachment B. These drawings identify waste streams, waste stream characteristics, and tank throughput capacity.

Figure 4-1. Salt Waste Processing Facility Simplified Process Flow Diagram



The SRS Tank Farm will prepare blended macro-batches for SWPF feed that range in size up to 1.2 Mgal. The SWPF ASP receives a small batch of SRS Tank Farm waste that is approximately 23,200 gallons. Upon receipt of a small batch, MST is added to the waste to sorb Sr and actinides, including isotopes of plutonium, americium, neptunium, and uranium. The MST and waste are mixed for several hours, during which time the MST selectively sorbs the Sr and actinides from the wastewater. The resulting MST slurry is then filtered to produce a concentrate of MST slurry and solids that contains most of the Sr and actinides, and a clarified salt solution (CSS) filtrate. The concentrated MST solids are transferred to a holding vessel and washed to reduce the sodium (Na) concentration, prior to transfer to the DWPF. The CSS filtrate is routed to the CSSX process for Cs removal. Section 4.3.1 describes the ASP in more detail.

CSSX is a continuous process that utilizes 36 centrifugal contactors for extraction, scrubbing, stripping, and washing of the aqueous and organic process streams. The Cs is removed by contacting the aqueous CSS with an organic solvent in 16 extraction stage contactors.

Cs is captured in the organic phase by the extractant and then released into a low-volume, slightly acidic strip solution via 16 stripping stages. The strip effluent is collected in the Strip Effluent Hold Tank (SEHT) prior to transfer to the DWPF for vitrification. The decontaminated salt solution (DSS) from the extraction stages is sent to the AFP for either an additional MST strike or for sampling and analysis prior to transfer to the SPF, where it will be solidified into a grout matrix known as saltstone grout. Section 4.3.2 provides a more detailed description of the CSSX process.

The AFP provides the capability to perform an additional MST strike if the Sr and actinide levels present in the CSS after the first MST strike in the ASP are too high to meet the SPF waste acceptance criteria (WAC). For the single-strike processing mode, one of the AFP tanks collects DSS from the CSSX for verification sampling and analysis, prior to transfer to the DSS Hold Tank (DSSHT). DSS that meets the SPF WAC is transferred from the DSSHT to SPF. The basic process steps for the AFP are described in more detail in Section 4.3.3.

4.1 Waste Transfer Line Segments

A construction application form, engineering report, and application fee for Phase I WTL Segments of the SWPF Project were submitted to SCDHEC and Phase 1 WTL Construction Permit No. 19, 164-IW was issued on January 02, 2008. This application detailed the WTL segments to be constructed before actual construction of the SWPF. These line segments are illustrated in Figure 4-2. Discussion of the operational use of each WTL follows.

The EPC will work with SCDHEC in the transition from the Phase 1 WTL Construction Permit to the Phase II SWPF Construction Permit including closeout notifications, letters, and drawings needed by SCDHEC.

4.2 Wastewater Receipt from Tank Farms

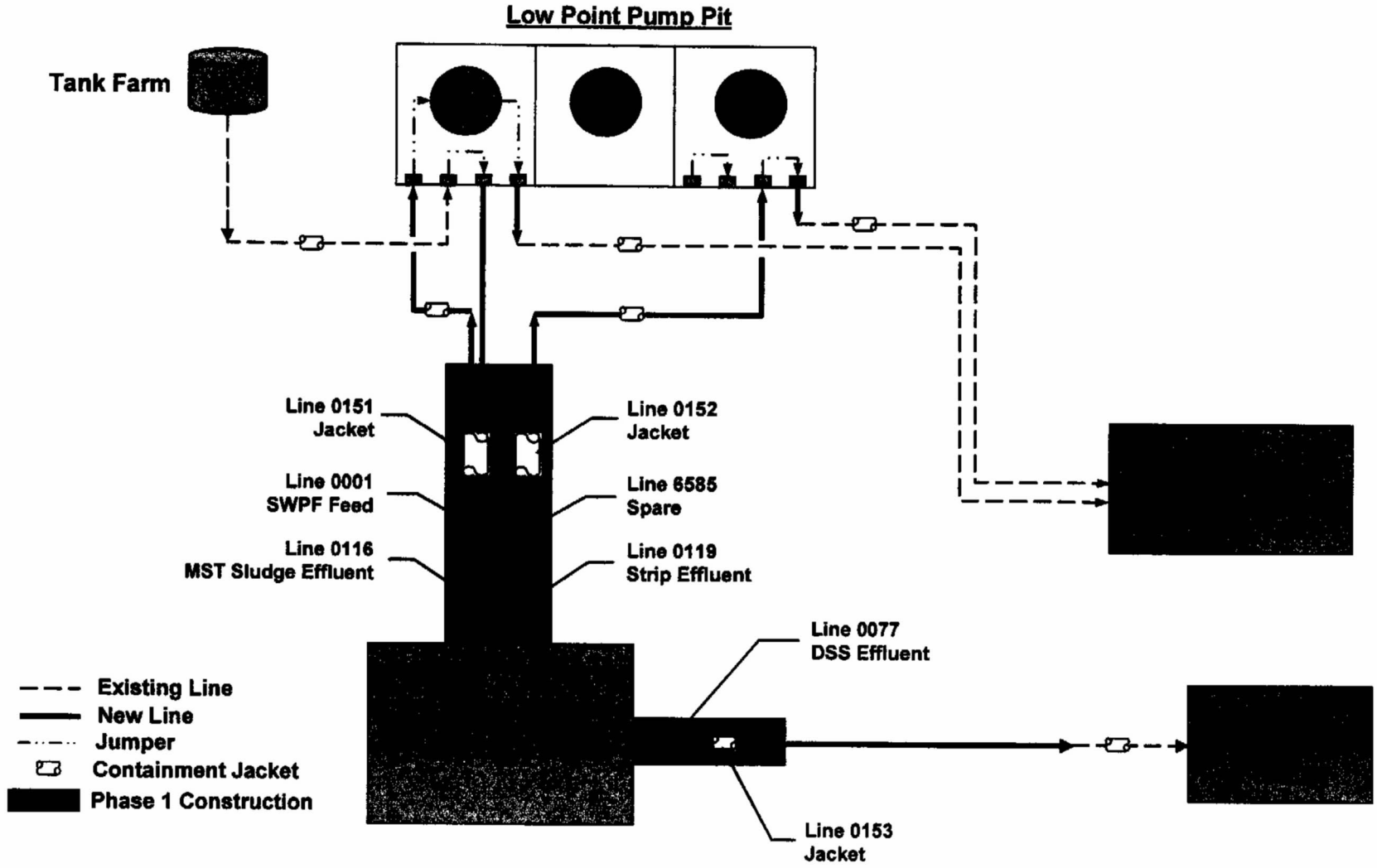
Wastewater is transferred from a tank in the H-Area Tank Farm to Alpha Sorption Tank-A (AST-A), located in the SWPF AST-A Process Vessel Cell. New transfer lines are required to

connect the SWPF to the existing SRS Liquid Waste Transfer System. The WTLs consist of two 3-inch-diameter stainless steel pipes that are encased in 10-inch-diameter carbon steel pipe. The SWPF transfer lines tie into existing underground pipelines operated by the SRS Liquid Waste Operations Contractor.

SWPF feed from the H-Area Tank Farm is routed through existing Process Transfer Line PCP-341 to the 512-S (Actinide Removal Process [ARP]) Facility. At 512-S, the wastewater is routed into existing line PCP-4 that connects to the Low Point Pump Pit (LPPP). A new transfer line, Line 0001, is to be constructed from the LPPP to the SWPF. Figure 4-2 shows the proposed transfer pathways between the SWPF and the Tank Farm, DWPF, and SPF, respectively. The SCDHEC Construction Permit for the Phase 1 WTL Segments details construction and installation of the WTLs. Wastewater transfers to the DWPF and SPF are described in Section 4.4. The EPC is responsible for constructing Line 0001 to the interface point defined at N72864.6, E64531.9 of the SRS Coordinate System. Figure 3-1 shows the location of the proposed WTLs to the LPPP west of the SWPF Process Building. Although the EPC is responsible for constructing most of the WTLs, its operational interface boundary is the first isolation valve inside the SWPF.

SWPF feed delivery is controlled by the Tank Farm 3H Control Room (CR) (Bldg. 241-2H) and monitored from the SWPF CR. The SWPF and Tank Farm 3H CRs have access to all relevant information for waste transfers via the Telecommunications and Control Datalink System (TCDS). The TCDS is the network of telephone and data cables interconnecting various facilities.

Figure 4-2. Transfer Flow Paths Between SWPF and the Tank Farm, DWPF, and SPF



4.3 SWPF Process Design

The SWPF performs three treatment operations for wastewater received from the H-Area Tank Farm. In the first pretreatment step, the Sr and actinides are separated from the wastewater (salt solution) in the ASP. The ASP is carried out in the AST-A, Filter Feed Tank-A (FFT-A), and Wash Water Hold Tank (WWHT) Process Vessel Cells. The salt solution is then sent to the CSSX pretreatment process, where Cs is separated from the bulk solution. If additional Sr and actinide removal is required, a third pretreatment step, similar to the ASP, is performed. This third optional pretreatment step is referred to as the AFP. Arrangement of the areas in which the three process operations occur in the SWPF is shown in Figure 3-2 and the General Arrangement (GA) drawings in Attachment A.

4.3.1 Alpha Strike Process

Wastewater is transferred from the H-Area Tank Farm to AST-A in batches of 23,200 gallons each. MST is then added to AST-A and the tank contents are mixed. Sr and actinides are sorbed from the wastewater onto suspended MST particles. The resulting MST slurry is then transferred to FFT-A and filtered to approximately 5 weight percent (wt%) suspended solids. Filtrate (CSS) is collected in the Salt Solution Feed Tank (SSFT), from which it is fed forward to the CSSX process. The concentrated MST sludge is transferred from FFT-A to the Sludge Solids Receipt Tank (SSRT). The MST sludge is washed with water in the SSRT to reduce the sodium ion (Na^+) for vitrification, and the washed sludge is then sent to the DWPF. Tank sizes and working volumes are listed in Attachment A.

4.3.1.1 Strontium and Actinide Sorption

H-Area waste feed batches prepared for the SWPF are sampled and analyzed prior to transfer from the H-Area Tank Farm. The analytical results are used to determine the number of MST strikes required, given established Decontamination Factor (DF) values for Sr and actinides (See Section 5.2).

After H-Area Tank Farm feed is transferred to AST-A, it is chemically adjusted from 6.44 Molar (M) Na^+ to 5.6M Na^+ by adding recovered wash water from the MST sludge washing step (see Section 4.3.1.4) and fresh 1.66M sodium hydroxide (NaOH). This chemical adjustment enhances the rate of Sr and actinide sorption.

The MST added to AST-A selectively sorbs soluble Sr and actinides present in the waste solution. Most of the Sr and actinide sorption occurs shortly after the MST addition. In order to maximize the MST sorption for one MST strike, the mixing and contact duration within AST-A is 12 hours. When two or more strikes are required to sufficiently remove Sr or actinides, the mixing/contact duration is reduced to 6 hours for both AST-A and Alpha Sorption Tank-B (AST-B) in the AFP. The reduction to 6 hours is due to the fact that the MST removal rate is not linear; it falls off significantly after 6 hours. For example, for plutonium, the 12-hour DF has been measured to be 5.5, while the 6-hour factor is 4.7. By performing separate MST strikes and filtering between strikes, the DF for each strike is essentially multiplied together, resulting in a combined DF of 18.

4.3.1.2 Cross-flow Filtration

After the MST sorption cycle, the waste in AST-A is transferred to FFT-A in the FFT-A Process Vessel Cell, where it is filtered to separate MST and suspended solids from the wastewater. The salt solution in FFT-A is recirculated through cross-flow filters (CFFs) (Alpha Sorption Filters) located in the FFT-A Process Vessel Cell to concentrate the MST and entrained Tank Farm solids to 5 wt% total suspended solids. Figure 4-3 shows the FFT-A - Alpha Sorption Filter circuit. The CFF contains parallel tubes fabricated from sintered metal, with a pore size of 0.1 micron (Figure 4-4).

Under nominal conditions, the MST slurry reaches 5 wt% solids when the FFT-A volume is reduced to 400 gallons. Measurement of the FFT-A liquid level and the quantity of filtrate removed are used to determine when the 5 wt% target is reached. The MST sludge is then transferred from FFT-A to the SSRT. The CSS filtrate is transferred to the SSFT, where it is staged for the CSSX pretreatment process. There is an in-line turbidity meter in addition to a sampling and analysis program to monitor filter performance and detect an inadvertent transfer of MST solids into the SSFT.

A two-pump system is employed for each Alpha Sorption Filter circuit. This two-pump system consists of a feed pump and a filter circuit recirculation pump (Figure 4-3). There are three independent Filter Feed/Solids Transfer Pumps. Two of the pumps are used at one time to feed their respective filter loops. A spare filter circuit can be placed into service when one of the other circuits needs maintenance or filter cleaning. Cross-flow through the Alpha Sorption Filters is provided by the Filter Recirculation Pump (Figure 4-3). A bleed-back flow, equal to the feed flow rate minus the filtrate flow rate, is returned to FFT-A. The Filter Feed/Solids Transfer Pumps are also used to transfer MST concentrate from FFT-A to the SSRT, which is also located in the FFT-A Process Vessel Cell.

Each filter incorporates a backpulse tank that is connected to the shell side of each filter. Compressed air is used for backpulsing the filters to dislodge particles that have accumulated in the filter pores.

Figure 4-3. FFT-A Filter Circuit Flow Diagram

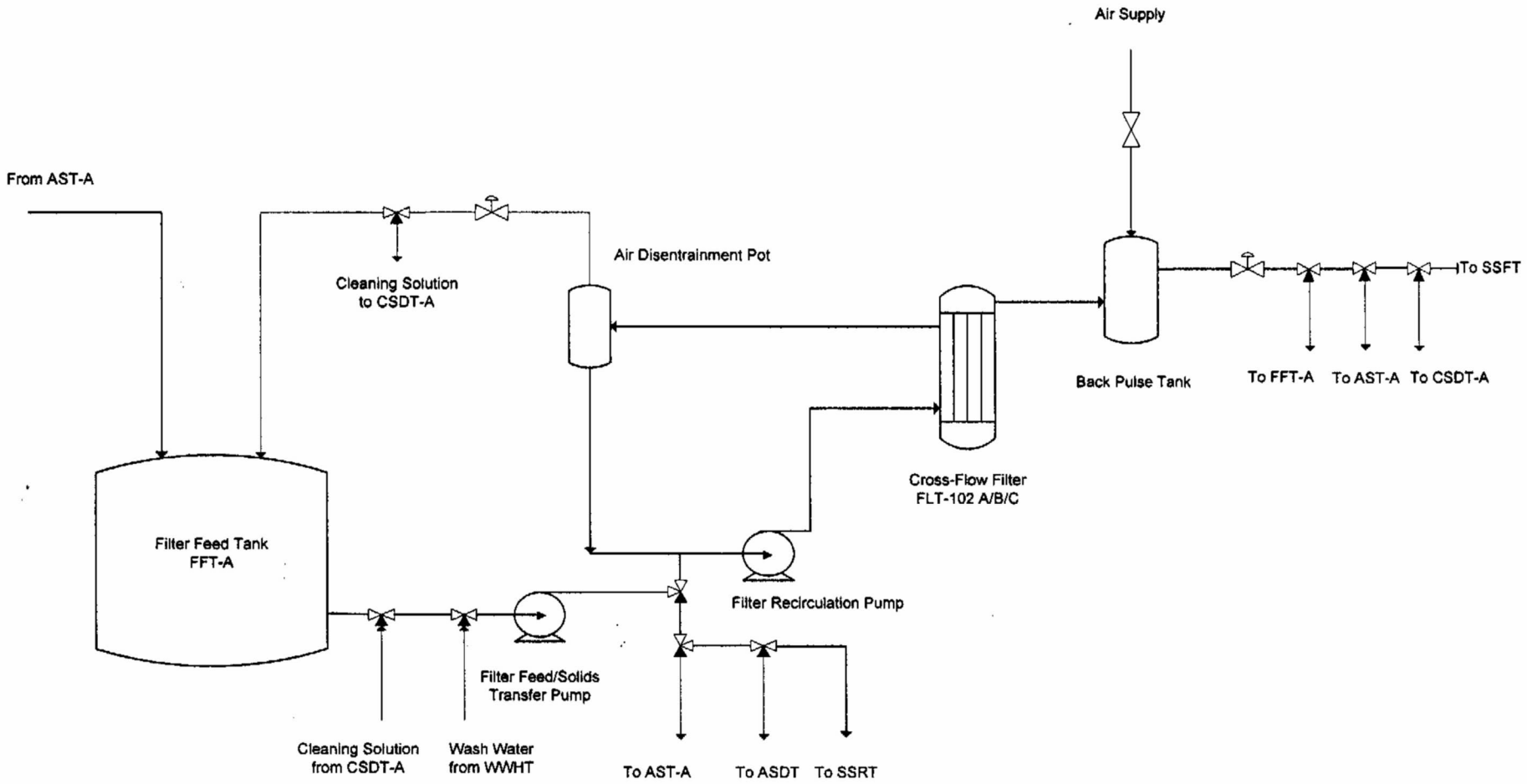
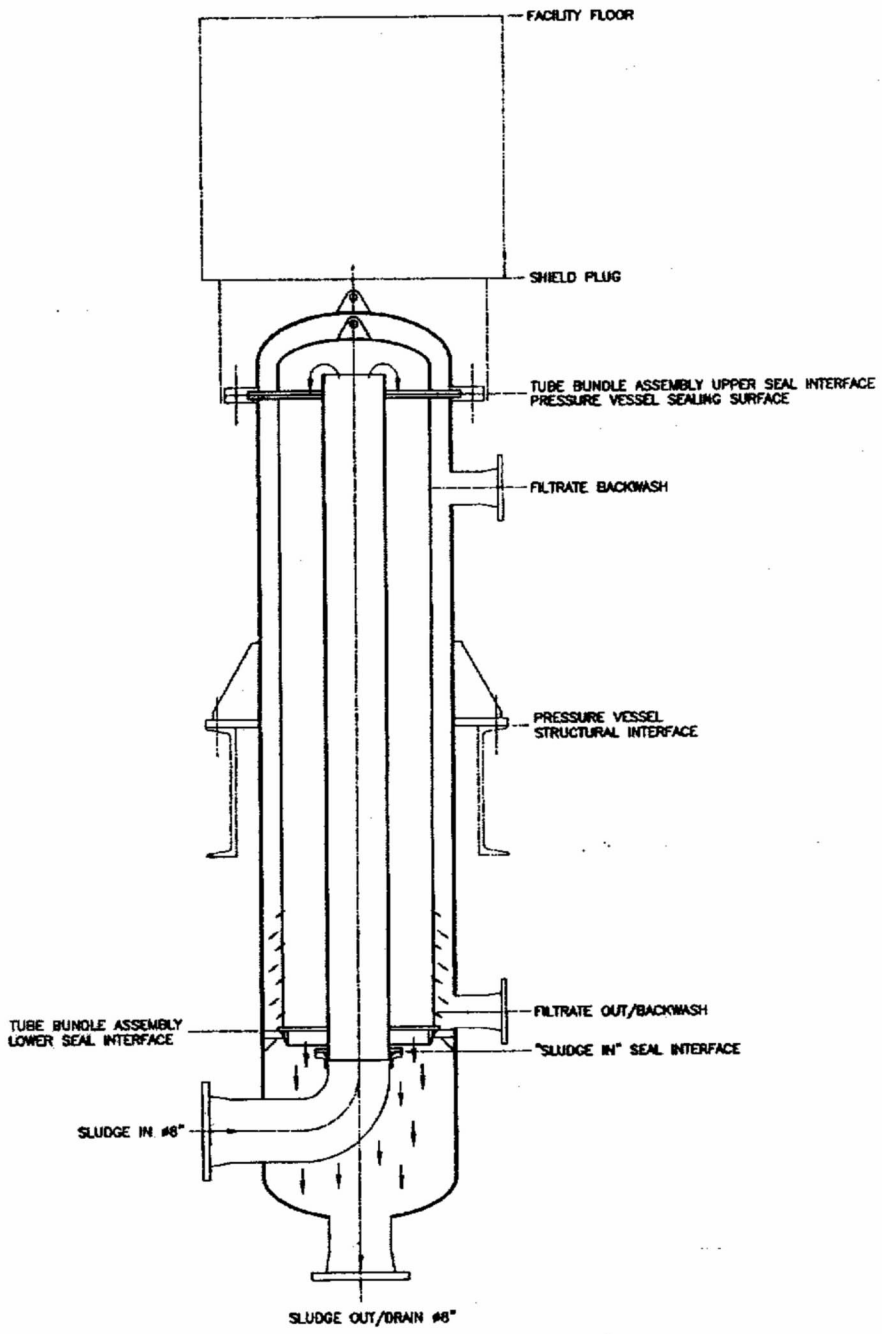


Figure 4-4. Conceptual Schematic of a Cross-Flow Filter



4.3.1.3 Clarified Salt Solution Storage

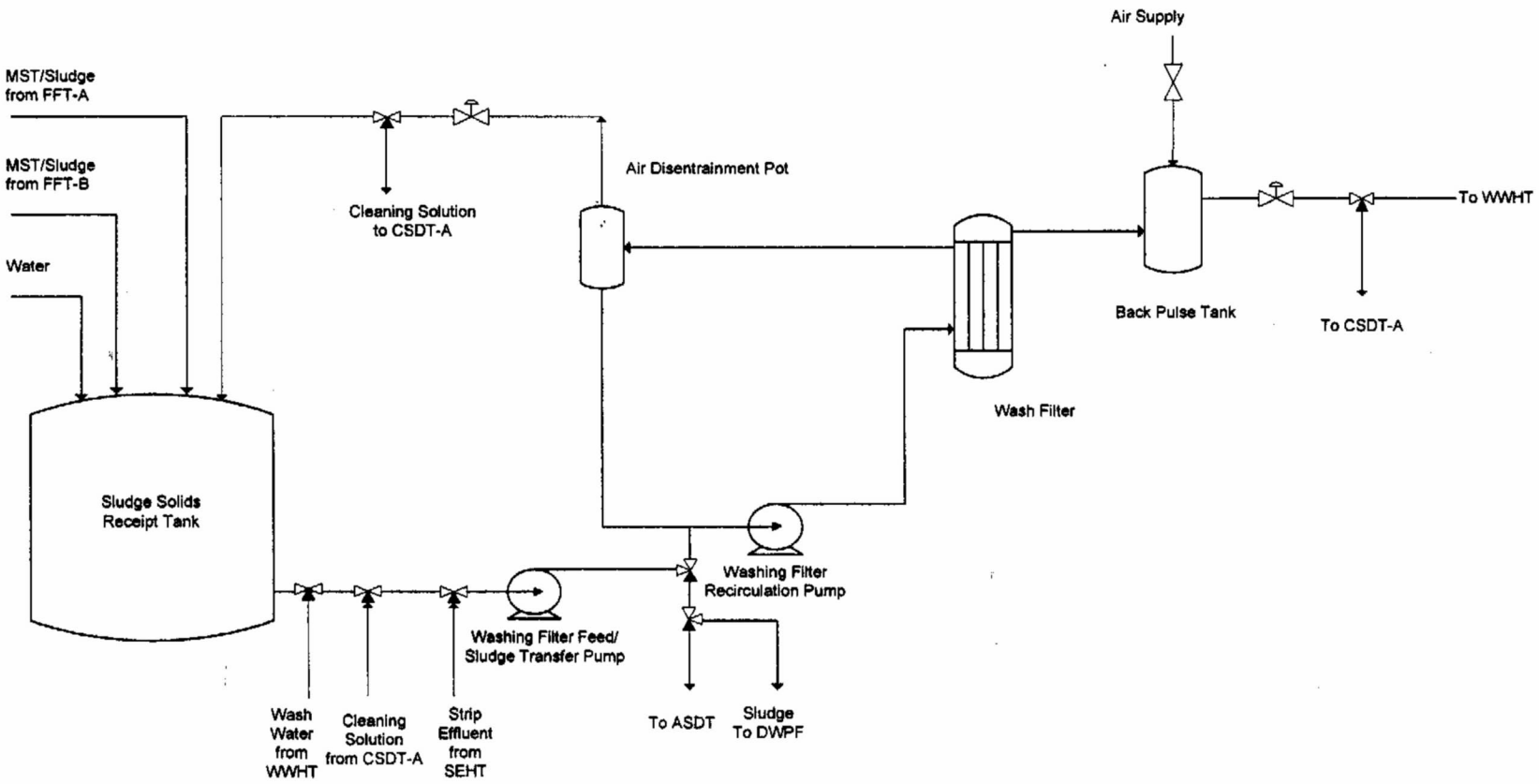
The CSS produced from the FFT-A filtration cycle is stored in the SSFT, located in the SSFT Process Vessel Cell. This vessel provides a means to decouple the ASP and CSSX processes. The SSFT is sized to allow the ASP to process several batches of waste feed with the CSSX shut down for planned outages, or to operate the CSSX for an equivalent time period with the ASP shut down. CSS is normally pumped from the SSFT to the aqueous inlet of the CSSX extraction stages. The CSS can also be transferred back to the ASP for reprocessing.

4.3.1.4 MST Solids Washing

The SSRT is sized (5,200 gallons) to accommodate at least five concentrated batches of MST sludge from FFT-A and another five batches from the Alpha Finishing Facility (AFF) Filter Feed Tank-B (FFT-B). After collecting sufficient MST concentrate in the SSRT, the vessel contents are washed with water to reduce the Na^+ concentration from 5.6M to approximately 0.5M to meet the WAC for DWPF. Figure 4-5 shows a flow diagram for sludge or concentrate washing.

During the wash cycle, water is added continuously and the SSRT contents are circulated through the cross-flow Washing Filter by a two-pump arrangement that includes the Washing Filter Feed/Sludge Solids Transfer Pump and Washing Filter Recirculation Pump. The filtrate is collected in the WWHT, located in the WWHT Process Vessel Cell. When the calculated quantity of water has been added and removed, the SSRT contents are sampled for Na^+ concentration. The wash water (approximately 2,000 gallons) is transferred from the WWHT to AST-A to mix with the next batch of Tank Farm wastewater (see Section 4.3.1.1).

Figure 4-5. MST Sludge Washing Flow Diagram



4.3.1.5 Cross-Flow Filter Cleaning

The Alpha Sorption and Sludge Washing Filters require periodic cleaning. During operations, two of the three Alpha Sorption Filters are in use and the other is available for routine cleaning.

The filter cleaning steps are as follows. The filter circuit is first drained to FFT-A and flushed with DSS from the DSSHT (Figure 4-1) for several minutes. The filter is then flushed with 0.02M NaOH, followed by an hour of cleaning with 0.5M oxalic acid ($H_2C_2O_2$). The cleaning solution is provided by Cleaning Solution Dump Tank-A (CSDT-A). The 0.5M $H_2C_2O_2$ is prepared in the Cold Chemicals Area (CCA) Oxalic Acid Feed Tank by mixing $H_2C_2O_2$ (liquid) and water. CSDT-A receives cleaning solution from the CCA. The 0.02M NaOH flush solution is prepared in the Filter Cleaning Caustic Tank in the CCA by mixing 50% NaOH solution with the appropriate quantity of water. When the cleaning process is completed, the cleaning solution is transferred from CSDT-A to the Alpha Sorption Drain Tank (ASDT) and from the ASDT to the WWHT or AST-A.

4.3.2 Caustic-side Solvent Extraction Process

The CSSX process is carried out in the CSSX Cell, located adjacent to the Process Vessel Cells (Figure 3-2). The CSSX process uses centrifugal contactors to mix the salt solution with an engineered organic solvent, and then separates the aqueous and organic phases. Cs is extracted from the CSS by the BOBCalixC6 molecule in the organic phase. Dilute nitric acid (HNO_3) (0.001M) solution is then used to strip or transfer the Cs from the organic solvent. The aqueous strip solution is transferred to the DWPF for vitrification.

The CSSX System consists of 16 stages of extraction, 2 stages of scrub, 16 stages of strip, and 2 stages of caustic wash. Figure 4-6 illustrates the CSSX process. Each contactor has inlets and outlets for both the organic solvent phase and an aqueous phase. Contactors are installed in two parallel rows of 18 units each, with their drive motors protruding through a shielded upper floor.

The CSSX process uses a specially engineered solvent that selectively removes Cs. The solvent is comprised of four components:

1. Cs extractant, a calixarene crown ether known as BOBCalixC6[A];
2. Modifier, Cs-7SB[B], which enhances extraction and helps prevent third-phase formation by increasing the solubility of the extractant;
3. Suppressor, Tri-n-octylamine (TOA), which inhibits impurity effects and enhances stripping performance; and
4. Diluent, Isopar®L, which is a blend of C_{10} to C_{12} branched alkanes.

The centrifugal contactors mix and then separate the aqueous waste and organic solvent. The mixing and separation process allows the transfer of Cs between the aqueous and organic phases

[A] The chemical name for the extractant is Calix[4]arene-bis(tert-actylbenzo-crown-6).
[B] The chemical name for the modifier is 1-(2,2,3,3-Tetrafluoropropoxy)-3-(4-sec-butylphenoxy)-2-propanol.

to occur. Figure 4-7 shows a conceptual cutaway view of the contactor housing, rotor, liquid flow paths, and two wiers. The immiscible organic and aqueous phases are fed into separate inlets and rapidly mixed in the annular space between the spinning rotor and stationary housing. The mixed phases are directed toward the center of the rotor bottom by radial vanes in the housing base. As the liquids enter the central opening of the rotor, they are accelerated toward the outer wall of the contactor.

The mixed phases are rapidly accelerated to rotor speed, and separation begins as the immiscible liquids with differing densities are displaced upward. Weirs at the top of the rotor divert the separated liquids into annular collector rings that lead to the discharge piping.

Figure 4-6. Caustic-side Solvent Extraction Process

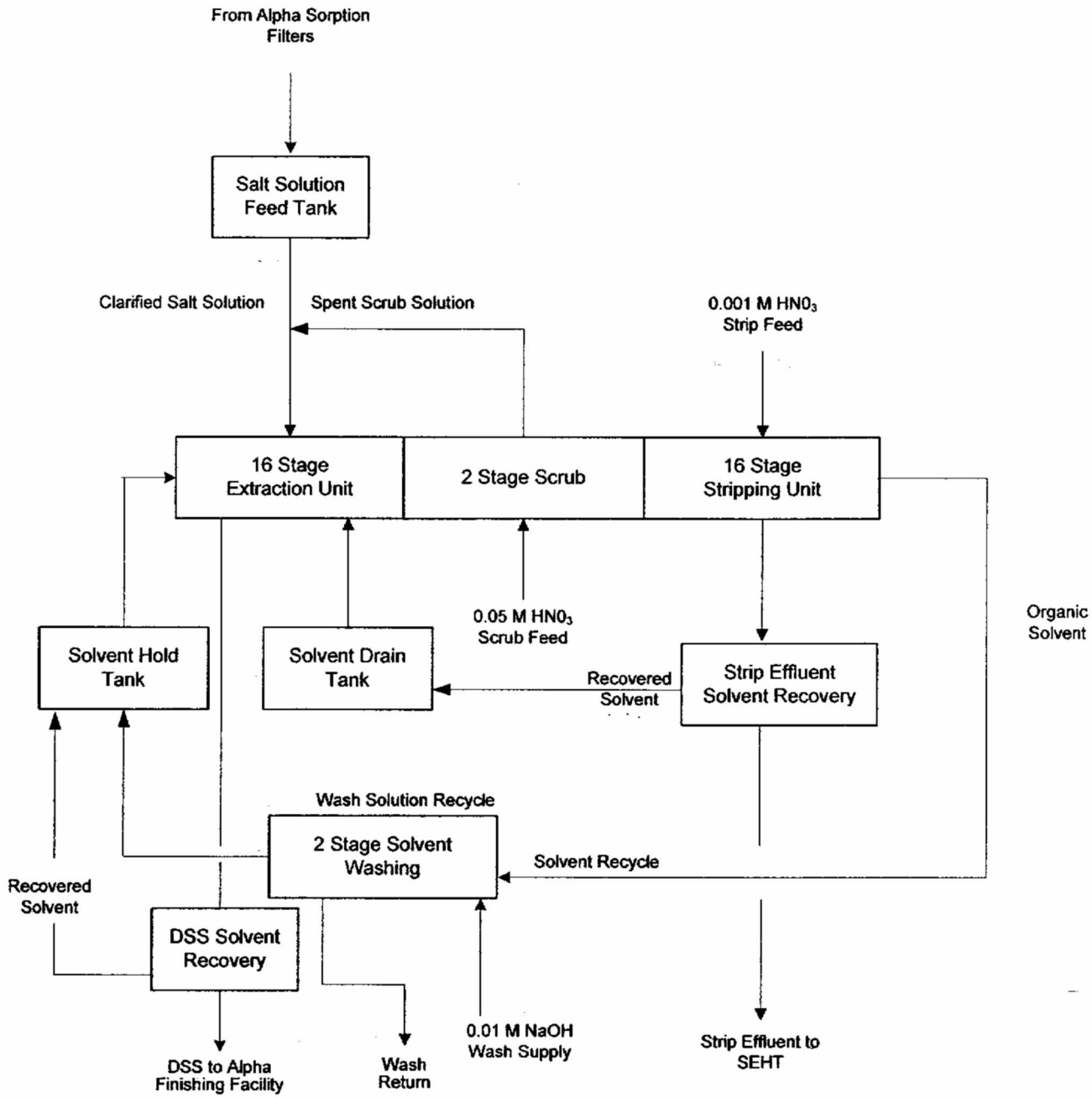
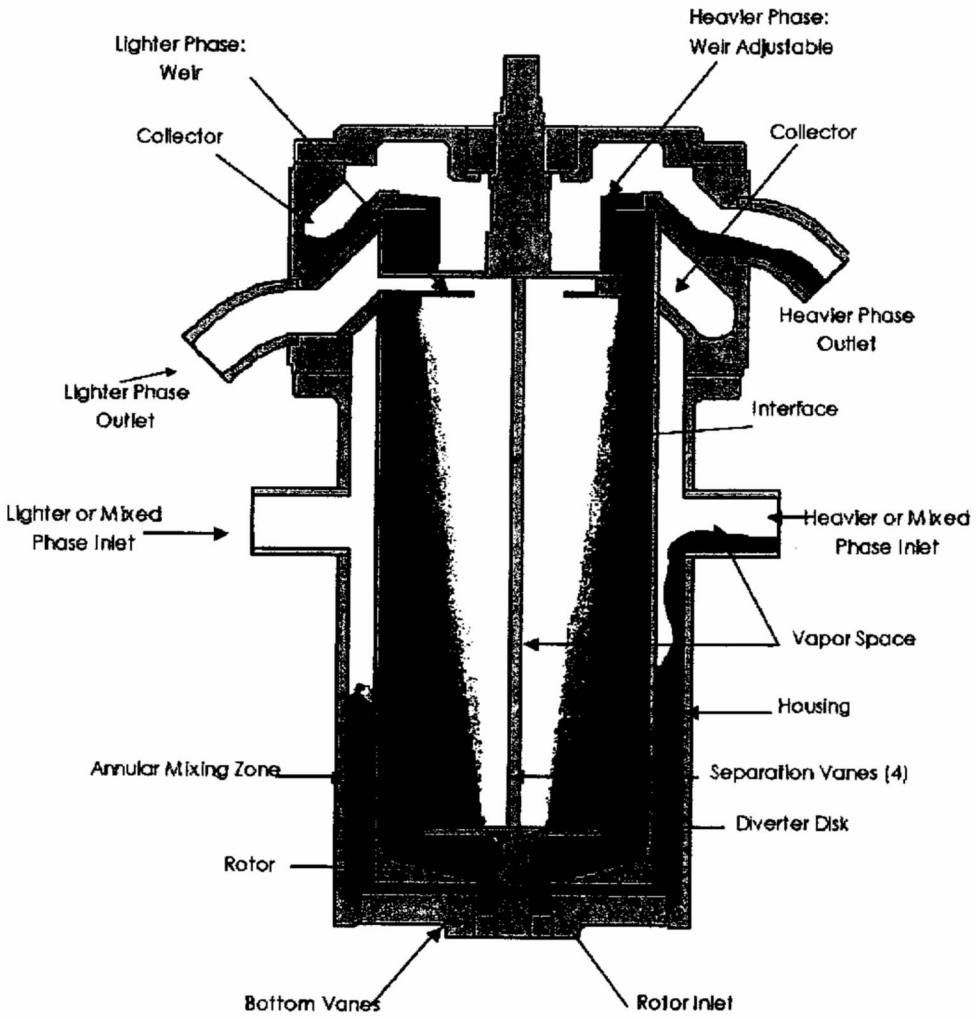


Figure 4-7 Cutaway View of Centrifugal Contactor



4.3.2.1 Cesium Extraction

Extraction of Cs from the wastewater feed is performed in 16 successive contactor stages. Solvent flows through the extraction stages counter-current to the aqueous feed. Each individual stage mixes and then separates the aqueous and organic phases. During the mixing and separation, Cs is transferred from the aqueous phase to the organic phase. Due to the opening size in the BOBCalixC6 molecule, Cs is removed in preference to the Na^+ and potassium ion that is present in the wastewater.

DSS leaves the extraction stages and passes through the DSS Stilling Tank and DSS Coalescer to recover solvent. The stilling tank and coalescer are shown as DSS Solvent Recovery in Figure 4-6. The top of the stilling tank contains the lower-density organic solvent that overflows into the Solvent Hold Tank (SHT). The bottom of the stilling tank contains the denser aqueous phase that flows to the DSS Coalescer. The DSS Coalescer further removers entrained droplets of solvent. The organic solvent drains to the SHT. DSS from the bottom of the coalescer flows to the Barium (Ba)-137 Decay Tank (BDT).

The DSS is passed through the BDT to allow the ^{137}Ba to decay (in excess of 10 half-lives or at least 30 minutes), prior to transfer to the AFF. The DSS is then pumped to the Intermediate Storage Tank (IST) or to AST-B. After one tank is filled, it is sampled and analyzed for Sr/actinides and Cs content. One of the two BDT Transfer Pumps is used to transfer the DSS to one of the Process Vessels in the AFF. An in-line gamma monitor is installed downstream of the pumps. If the radiation monitor detects high levels of ^{137}Ba, an interlock is activated to divert DSS to the SSFT.

4.3.2.2 Solvent Scrub

Following Cs extraction, the Cs-loaded solvent is scrubbed with 0.05M HNO_3. Contacting the organic stream with the dilute acid has the effect of neutralizing any caustic carryover from the extraction stages. Neutralization of the caustic carryover is necessary to ensure stable operation of the strip stages. Two stages of scrub are provided. The scrub solution enters the second scrub stage and proceeds counter-current to the solvent.

4.3.2.3 Cesium Strip

The scrubbed solvent flows to the Solvent Strip Feed Tank and is pumped by one of the two Solvent Strip Feed Pumps to the 16 strip stages. The scrubbed solvent flows through 16 centrifugal contactor stages to strip Cs from the organic solvent into an aqueous phase. In the strip stages, organic solvent is contacted with a 0.001M HNO_3 solution, resulting in the transfer of Cs to the strip solution. The nitrate ion concentration in the aqueous phase shifts the equilibrium to favor transport of the Cs ion from the solvent to the aqueous phase.

The strip solution is supplied to the aqueous inlet to the strip stage from the Strip Feed Tank by the Strip Feed Pumps located in the CCA.

Strip effluent exiting the strip stages flows by gravity to the Strip Effluent Stilling Tank and then to the Strip Effluent Coalescer to remove trace amounts of entrained solvent in the aqueous phase. The strip effluent then drains to the Strip Effluent Pump Tank and is pumped to the SEHT by one of the two Strip Effluent Pump Tank Pumps. The recovered solvent from the stilling tank and the coalescer flows by gravity to the Solvent Drain Tank (SDT). The SDT is pumped by the Solvent Drain Tank Pump to the aqueous inlet line to the extraction stages. The recovered solvent is separated from the aqueous phase by the action of the extraction stages.

4.3.2.4 Caustic Wash

The organic solvent passes from the stripping stages through a two-stage caustic wash process after the strip stages. The caustic wash removes impurities in the solvent that interfere with solvent performance. The TOA and Cs-7SB organic solvent components degrade with time, with the TOA forming dioctylamine and the Cs-7SB forming phenolic compounds. The caustic wash removes these impurities to maintain performance of the solvent. The solvent outlet from the wash stages flows by gravity to the SHT.

The Caustic Wash Tank and one of two Caustic Wash Tank Pumps supply caustic wash solution to the wash contactor aqueous inlet. The caustic wash solution is returned to Caustic Wash Tank. On indication of low pH at the wash stage aqueous outlet, the wash stage solution is transferred to the DSS Stilling Tank and the DSS Coalescer, prior to transfer to the AFF through the BDT. The wash solution is then replaced with 0.01M NaOH make-up provided to the Caustic Wash Tank by the Caustic Make-up Tank located in the CCA.

4.3.2.5 Strip Effluent Storage and Transfer

The SEHT is located in the SEHT Process Vessel Cell and collects strip effluent for transfer to the DWPF. The SEHT is sized to provide a working volume of approximately 17,000 gallons (approximately 8 days of strip effluent production). Contents of the SEHT are transferred to the DWPF approximately once a week.

4.3.2.6 DSS Storage and Transfer

DSS is transferred to one of the vessels in the AFF for additional Sr and actinide removal (as required), sampling and analysis, and staging for transfer to the SPF. Section 4.3.3.1 provides a further description of process steps performed in the AFF.

4.3.3 Alpha Finishing Process

The AFP is carried out in the AFF. Figure 3-2 shows the AFF location within the SWPF. The AFP is essentially identical to corresponding operations in the ASP. The purpose of the AFP is to remove additional Sr and actinides to meet the SPF WAC, without affecting the SWPF throughput rate. The configuration and sequence of the AFP operation are similar to the ASP.

The AFF houses Process Vessels, Alpha Sorption Filters, and pumps and valves that provide the capability to perform additional MST strikes. It is also used to stage, sample, and analyze single-strike and multi-strike DSS prior to transfer to the SPF.

The AFF receives DSS from the CSSX process. Because ^{137}Cs and its gamma-emitting daughter, ^{137m}Ba, are reduced in activity by approximately five orders of magnitude, the AFF does not require shield walls and is constructed of a steel frame enclosed with sheet metal and insulation. The AFF provides the essential confinement and secondary containment required for processing low-activity wastewater.

4.3.3.1 AFP Processing in the Multi-Strike Mode

If an additional alpha strike is required to meet SPF WAC, DSS from the BDT is fed to the IST. When the IST is full, the contents are transferred to AST-B. Following completion of a batch transfer from the IST to AST-B, MST is added and the contents are mixed with a mechanical agitator. After the six-hour MST sorption cycle is complete, the contents of AST-B are transferred to FFT-B for filtration.

In FFT-B, the MST slurry contents are circulated through two of the three AFP CFFs to concentrate the MST solids to 5 wt%. A mechanical agitator is used to mix the MST slurry in FFT-B. A two-pump system is used, similar to that shown in Figure 4-3. The size and configuration of the CFFs and the pumping system are identical to the ASP arrangement.

Filtrate from these AFP Alpha Sorption Filters is routed to the DSSHT. The concentrated MST slurry is transferred to the MST/Sludge Transfer Tank for interim storage and subsequent transfer to the SSRT for washing.

During routine operation, the filter flux decreases as each FFT-B batch is processed. When the filter flux decreases significantly, the filter is isolated and cleaned to restore normal operation. The cleaning procedure is identical to the procedure used for cleaning the ASP filters.

4.3.3.2 DSS Staging, Sampling, and Analysis in the AFF

DSS is staged in the DSSHT for transfer to the SPF. The DSSHT is sized to provide a working volume of approximately 35,500 gallons, providing storage for 26 hours of DSS production when the plant is operating at full capacity. In multi-strike mode, DSS is produced/transferred in a batch-wise process.

Collection of a sample that is representative of a discrete DSS batch will require filling the DSSHT, sampling the tank contents, and waiting 12 hours for the SWPF Analytical Laboratory results to verify compliance with the SPF WAC. Such delay would require halting operation of the CSSX and the AFP for 12 hours. In lieu of a shutdown, a sample is collected from AST-B after 6 hours of actinide and Sr sorption. The sample is then filtered and analyzed in the SWPF Analytical Laboratory.

The CFFs in the AFP have 0.1-micron pore size; therefore, the sample collected from AST-B is filtered in the laboratory by a 0.1-micron filter, prior to analysis. If analysis indicates that the sample will meet SPF WAC, the DSS is transferred to FFT-B for filtering. Filtrate produced from circulating the contents of FFT-B through the Alpha Sorption CFFs is directed to the DSSHT, where it is staged for eventual processing at the SPF.

4.4 Wastewater Transfer to DWPF and SPF

Figure 4-2 shows the transfer path between the MST sludge effluent and DWPF, the strip effluent and DWPF, and the DSS effluent and SPF.

The operational interface boundary is the first isolation valve inside the SWPF. The SWPF transfer lines tie into existing underground pipelines operated by the Site Liquid Waste Contractor (LWC). Although the EPC is responsible for constructing part of the WTLs, the Site LWC has operations and maintenance responsibility for the transfer lines.

The jumpers or line segments connecting the SWPF WTLs are not identified at this point for the existing Site Infrastructure. A new Project (SWPF Tie-ins and Modifications) will be requested/funded by DOE.

4.4.1 Transfer of MST Sludge from the SWPF to LPPP and DWPF

The washed MST slurry and sludge solids from the SSRT are transferred to the Precipitate Pump Tank (PPT) located in the LPPP (Figure 4-2). The wastewater is pumped with the Washing Filter Feed/Sludge Solids Transfer Pump. The waste transfer path to the LPPP is flushed with strip effluent from the CSSX process output.

Line 0116 is a proposed WTL to be constructed by the EPC from the Waste Transfer Enclosure (WTE) within the SWPF (shown on Attachment A, page A4) to an interface point outside the LPPP. Line 0116 is a 3-inch stainless steel pipe enclosed in a 10-inch carbon steel pipe with Line 0001, the proposed WTL for SWPF feed.

MST/sludge transfers from the SWPF to the PPT in the LPPP are controlled at the SWPF CR. Transfers from the PPT to the Precipitate Reactor Feed Tank in DWPF are controlled by DWPF Operations. The SWPF and DWPF CRs shall have access to all relevant waste transfer information from the TCDS.

4.4.2 Transfer of Strip Effluent from the SWPF to the LPPP and DWPF

.Strip effluent from the SWPF is routed to DWPF by new proposed WTL 0119 to a jumper (i.e., steel pipe) at the LPPP that connects to a transfer line to DWPF. Line 0119 is a 3-inch stainless steel line jacketed in a 10-inch carbon steel pipe, shared with a spare Line 6585. Strip effluent transfers to the DWPF are controlled by the SWPF CR. The SWPF and DWPF CRs monitor all relevant waste transfer information via the TCDS

4.4.3 Transfer of DSSHT from the SWPF to SPF

DSS is routed from the SWPF to a tie-in, where it is directed by way of an existing permitted transfer line to the SPF.

DSS transfers from the SWPF are controlled by the SWPF CR. The SWPF and SPF CRs have access to all relevant waste transfer information from the TCDS.

4.5 Cold Chemicals Area

The CCA is used to receive, store, and mix process chemicals used in the ASP, CSSX, and AFP. Chemicals received, stored, and mixed for processing include HNO_3 (at 50 wt%), 50 wt% NaOH, $H_2C_2O_2$, Isopar®L, MST, BOBCalixC6, TOA, and Cs-7SB. The CCA is a completely enclosed structure, with access provided through a door to the outside and a Truck Bay. The chemical storage area is provided with a dike and sump system for spill control. The tanks are passively vented through overflow lines that extend into the floor sumps.

NaOH is received as 50 wt% from tanker trucks and pumped to the 50% Caustic Receipt Tank. The estimated annual usage of caustic is 144,560 gallons. The 50% Caustic Receipt Tank is sized to provide a minimum working volume of 8,000 gallons. Metered quantities of 50% caustic are provided to the Caustic Wash Tank, Caustic Dilution Feed Tank, and Filter Cleaning Caustic Tank. Caustic for the solvent wash process is made up in batches in the Caustic Make-up Tank. Water and concentrated caustic are added to the Caustic Make-up Tank to achieve a concentration of 0.4 grams per liter (g/L) (0.01M).

HNO_3 is received as 50 wt% by tanker truck and pumped to the Nitric Acid Receipt Tank. The estimated usage of HNO_3 is 308 gallons per month. The Nitric Acid Receipt Tank is sized for a working volume of 2,000 gallons. The HNO_3 is transferred to the Nitric Acid Strip Make-up Tank and to the Nitric Acid Scrub Make-up Tank, where it is diluted to 0.001M and 0.05M, respectively. From the Strip and Scrub Make-up Tanks, dilute HNO_3 is transferred to the Strip Feed Tank (0.001M) as feed to the aqueous inlet for the CSSX strip stages and to the Scrub Feed Tank (0.05M) as feed to the CSSX scrub stage aqueous inlet.

The CSSX solvent is either purchased premixed in 55-gallon drums for addition to the Solvent Make-up Tank or mixed in the CCA. The minimum volume of solvent required for CSSX operation is 200 gallons. The SHT is sized to provide a maximum working volume of 400 gallons. The concentration of the solvent components is determined by periodic sampling and analysis of the SHT. Individual solvent components are added to maintain the optimum solvent composition and density. Small quantities of solvent components are stored in the CCA.

$H_2C_2O_2$ is received in liquid form and added to water to make a dilute solution for cleaning the ASP and AFF CFFs. This cleaning solution of 0.5M $H_2C_2O_2$ will be prepared in the Oxalic Acid Feed Tank. A caustic flush solution at 0.02M concentration will be prepared in the Filter Cleaning Caustic Tank by mixing 50% caustic solution with water. The working volume of these tanks is approximately 1,000 gallons each. Cleaning solutions are prepared as needed.

MST is received in 55-gallon drums and stored in the CCA. Twenty drums are required to make up an MST batch in the MST Storage Tank. Mechanical agitation is provided in the MST Storage Tank to prevent MST settling.

Working volumes for tanks that receive chemicals from offsite vendors are sized for at least one week's worth of inventory. Working volumes for tanks that receive and adjust chemicals from other CCA tanks are typically sized for at least one day or one batch of inventory. It is expected that the CSSX solvent will typically be replenished on a component basis and will maintain one complete inventory in one full solvent load. When the solvent is analyzed, any of the four components (extractant, modifier, suppressant, and diluent) that are low will be individually replenished.

4.6 Distributed Control System

The SWPF Distributed Control System (DCS) provides centralized monitoring and control of all in-cell equipment and support systems. The DCS will gather and record data and information necessary to control the processes and provide historical data from the facility.

The DCS consists of a group of servers, controllers, and workstations linked together by redundant Ethernet networks. The servers provide the network backbone for the DCS and the Plant Information Network. Remote access points are available to access the specialty software for monitoring, data storage, and remote interface. The operator workstations provide the Human-Machine Interface.

4.7 Equipment and Service Failure or Shutdown

The SWPF is configured so that system failures or shutdowns do not result in the need to bypass the three treatment units and discharge untreated wastewater to the effluent transfer lines to the SPF. If the need arises to shut down any inter-facility transfer or any of the three processing units, all units and transfers can be stopped, as necessary. For example, if there is a system failure or shutdown in the ASP that requires cessation of a transfer from H-Area Tank Farm to AST-A, the wastewater transfer can be stopped and the isolation valve to AST-A can be closed. Double isolation valves are provided.

4.7.1 Redundant Pumps and Filters

The AFP, CSSX process, and ASP are provided with redundant sets of pumps and filters, where required, to ensure uninterrupted processing (see Attachment A). Single pumps are provided when continuous service is not required by the process unit. For example, the Washing Filter Feed/Sludge Solids Transfer Pump is used to transfer MST solids from the SSRT to DWPF approximately once every five to six days. It is also used in the SSRT washing and filtering process (Figure 4-5) prior to transfers to the DWPF. One pump is used for this particular set of tasks because five days provides sufficient time to replace the pump or the washing filter.

A preliminary spare parts list has been developed and will be further refined as vendor recommendations are obtained during the Construction phase.

4.7.2 Maintainability

The Process Vessel Cells are designed to be unmanned. The Process Vessels and piping are welded and equipped with systems that have no moving parts or components that require maintenance. Equipment requiring periodic replacement is removed from sealed wells accessible from the overlying Operating Deck (e.g., filters and cameras). The Process Vessel Cells are adjoining reinforced concrete structures. Although the cells are designed to be unmanned, entry is possible through a concrete entry plug. The concrete plug requires removal by an overhead crane, located in the overlying Operating Deck area.

Pumps used to transfer high-activity waste in the ASP and CSSX are located in the ASP and CSSX Pump & Valve Galleries (P&VGs), respectively. The galleries are subdivided by an array of labyrinth shield walls. Because pumps must be drained prior to maintenance or replacement to reduce the radiation dose rate, the labyrinth configuration allows maintenance or replacement of a single pump without necessarily requiring all pumps to be drained. This configuration allows the ASP or CSSX process to continue during the pump change-out.

The Alpha Sorption Filter configuration (two active and one standby) in the ASP and AFP allows cleaning or replacement of a single filter, without slowing or stopping either process.

To facilitate maintenance activities, the CSSX process area is subdivided into the CSSX P&VG, CSSX Tank Cell, and Contactor Cell. The CSSX P&VG and CSSX Tank Cell are located at grade. With the exception of the Contactor Operating Floor, the cell walls and ceilings are constructed of thick reinforced concrete that is provided for shielding, structural strength, and wastewater containment. The Contactor Support Floor (elevation 116 feet) is a stainless steel liner for secondary containment of liquid. The Contactor Cell contains 36 contactors arranged in two east-west linear arrays (shown on Attachment A, page A9). The Contactor Operating Floor is constructed of steel grating able to support use of temporary shielding, as needed. This design permits maintenance access to the contactor motors. The contactor drive shaft penetrates this Contactor Operating Floor, above which the motor is installed. This configuration allows a contactor motor to be removed without the need to drain the entire contactor system.

Installed spare contactors are not envisioned due to the complexity of valving one in or out of the process. However, there will be spare "motor/rotor" assemblies, such that the contactor internals and motor can be replaced with a refurbished unit. The motor/rotor assembly contains all the contactor equipment that requires maintenance.

4.7.3 SWPF Containment and Ventilation System Design

The SWPF incorporates a number of design features to contain hazardous materials. Multiple containment barriers are provided for all hazardous chemicals and radioactive waste. The high-activity radioactive waste is processed and contained in the Central Processing Area (CPA), which is a reinforced concrete structure. Low-activity waste is processed in the AFF. Hazardous chemicals used in the SWPF are stored in the CCA. All of these areas are located in the Process Building, which provides a secondary containment boundary in the event of a tank or piping system leak.

4.7.3.1 Wastewater Process System Containment

All tanks for receiving, processing, and collecting high-activity wastes are constructed of stainless steel and are located within enclosed concrete cells in the CPA. These cells are intended to be inaccessible during normal operations. The cells are provided with a stainless steel liner and collection sumps with leak detectors. Piping, pumps, and valves used to route high-activity waste are located in the P&VGs within the CPA. The P&VGs are lined with an epoxy coating. Separate collection sumps and leak detection devices are provided for each labyrinth area.

All sumps located in the Process Building are equipped with leak detection and alarm systems to alert operators in the event of a leak. Waste transfer pumps are interlocked to trip if a leak is detected. Isolation valves to and from the associated tanks or process systems automatically close if a leak is detected. The transfer pumps are also interlocked to trip, based on low level in the source tank or high level in the receiving tank.

Low-activity waste that requires a second MST strike to meet the SPF WAC is processed in the AFF area of the Process Building. The process tanks, piping, and other process equipment are located in concrete diked areas. These diked areas are provided with stainless steel liners that serve as a secondary containment boundary. Sumps and leak detection devices are also provided for each diked area within the AFF.

4.7.3.2 Waste Transfer Containment

The WTLs are routed into and out of the SWPF Process Building via the WTE. This enclosure is partially below grade to allow WTLs to enter and exit the external wall of the WTE at least four feet below grade. The WTE has a sump and a leak detector, and the capability to transfer liquid in the sump to ASP process vessels. The WTE is equipped with a removable shield cover for access, if needed. The leak detector is interlocked to trip the H-Area Tank Farm transfer pump. The WTE and the sump leak detector alarm provide secondary containment and leak detection functions, respectively.

Encasement pipes drain to valve boxes or pump pits provided with leak detection. Valve box and pump pit leak detectors are provided to detect leakage originating from transfer line encasements or from valve manifolds or jumpers (i.e., steel pipes) in the valve boxes or pump pits.

WTLs external to the SWPF are located below grade for shielding purposes. These transfer lines are of a "pipe-in-pipe" design, in which the exterior pipe serves as a secondary containment boundary. Leak detectors are installed in the transfer line encasements and in the pits, valves, or pump boxes where the transfer lines terminate or connect to other transfer lines. Transfer line encasement, cell sump, valve box, and pump pit leak detectors will activate an alarm in the CRs of all interconnected facilities and activate an interlock to prevent or stop the operation of any transfer pump connected to the pathway.

4.7.3.3 Ventilation Systems

The SWPF has four ventilation systems that filter air that could potentially contain radioactive contaminants. The primary airborne confinement boundary is provided by the Process Building Ventilation Exhaust System. This system maintains a cascaded airflow from normally occupied "clean" areas of the facility to potentially contaminated areas (Zone 2) and then to the process cells (Zone 3). The process cells' air is then filtered by one pre-filter and two stages of high-efficiency particulate air (HEPA) filter banks. The exhaust fans draw air through the HEPA filters and discharge it to the SWPF Exhaust Stack.

The process vessels and contactors used in the ASP or CSSX processes are maintained at a negative pressure, with respect to the process cells, by the Process Vessel Ventilation Systems (PVVS). This system draws air from the vapor space of the process vessels and from the contactor aqueous phase outlet nozzles into a mist eliminator, a pre-filter, and two stages of HEPA filters. The PVVS exhaust fans then discharge the filtered air to the SWPF Exhaust Stack.

A Pulse Mixer Ventilation System (PMVS) is also used to assist the Air Pulse Agitator (APA) system in mixing the process vessels. The APA alternately pressurizes and vents "pulse pots" located in the process vessels. When a pulse pot is pressurized by air, the liquid inside is discharged into the tank. After the liquid has been blown out of the pulse pot, the air supply is isolated and the PMVS draws a vacuum in the pulse pot to promote refilling with liquid from the tank. The periodic blow down and refilling of the pulse pots provides sufficient agitation to keep the tank contents well mixed. The PMVS design is identical to that of the PVVS, except that the PMVS is designed for a higher air flow.

The process vessels located in the AFF are vented through HEPA filters into the processing area. The AFF ventilation exhaust system operates in a similar manner to the Process Building Ventilation Exhaust system, and maintains a cascaded air flow from the normally occupied areas of the AFF to the process areas. The air from the AFF process areas is then drawn into a pre-filter and two stages of HEPA filter banks. The AFF ventilation exhaust fans discharge the filtered air to the SWPF Exhaust Stack.

4.7.4 Miscellaneous Process Systems

4.7.4.1 Decontamination Area

A Decontamination Area (Drum Off/Decon Area) is provided to allow decontamination of process equipment and miscellaneous plant items. Decontamination may be undertaken prior to performing maintenance on or shipping an equipment piece or component out of the SWPF. A local sump and transfer pump are installed to collect and transfer any spent decontamination fluids. Decon Area sump discharge can be routed to the ASDT, Drum Off Station, and DSSHT (see Attachment A).

The material collected in the Decon Area sump will typically be dispositioned back to various processes within the SWPF. Sump material that can not be dispositioned internally will be

characterized by SWPF personnel and then dispositioned in accordance with applicable SCDHEC Wastewater or Solid and Hazardous Waste Management Regulations.

4.7.4.2 Drum Off Station

A Drum Off Station is located in the Decon Room to allow removal of material from the process systems and sumps. Spent solvent in the CSSX Area is drained to the SDT or pumped from the SHT to the Drum Off Station to allow replacement. Liquid collected in cell sumps that may be incompatible with the process can also be transferred to the Drum Off Station. This could include cleaning or decontamination chemicals, propylene glycol from the Chilled Water System, or other miscellaneous materials (see Attachment A).

Waste drummed up in the Drum Off Station will be characterized by SWPF personnel and then dispositioned by existing Site facilities.

4.7.5 Back-up Power

Back-up power is provided to support process systems if normal Site-supplied power is lost. An Uninterruptible Power Supply (UPS) is provided for equipment required to operate continuously through voltage or frequency excursions, or during the momentary power loss that occurs before the back-up power source comes on-line and picks up essential electrical loads after a loss of normal power. The SWPF UPS consists of two sets of battery packs. Upon loss of normal power, UPS-1 and -2 provide continuous and distortion-free power. The batteries are sized to carry the required connected loads for at least 30 minutes.

A loss of supplied power results in a start signal to the back-up DG. Automatic transfer switches transfer the loads to the back-up power source after the DG starts. Power is then provided by the DG to systems essential to the wastewater treatment process. The DG is capable of automatically starting and reaching rated speed, and is capable of accepting a full load within 10 seconds after receiving a start signal. The DG provides power to charge both UPS battery banks when the standby busses are feeding the UPS units.

The DG day tank is refilled by a transfer pump connected to a storage tank that provides a four-day fuel supply. The DG is housed in a self-contained engineered structure with all support systems and the double-walled with leak detection day tank.

5.0 WASTE CHARACTERISTICS AND TREATABILITY

The SWPF mission is to process 34 Mgal of salt waste presently stored in the SRS F- and H-Area Tank Farms. The salt waste is present in nearly equal proportions as precipitated salts or salt solution. The former is referred to as saltcake and the latter as supernate. Both saltcake and supernate are largely comprised of NaOH, sodium nitrate, and sodium nitrite. Dissolution of F- and H-Tank Farm saltcake and supernate for blending, transfer, and adjustment to 6.44M Na^+ will result in a total volume of approximately 84 Mgal of industrial wastewater. Some of this wastewater may be processed by the Actinide Removal Process (ARP) and Modular Caustic-side Solvent Extraction (CSSX) Unit prior to SWPF start-up. Some small quantity of low-curie (Ci)

salt may also be sent directly to the SPF prior to SWPF start-up. After SWPF start-up, all remaining wastewater will be processed by the SWPF. The current planning basis assumes that 74 Mgal of wastewater will be processed by the SWPF.

5.1 Wastewater Influent Characteristics and Flow Rate

The SWPF Alpha Strike Process (ASP) is a batch process; therefore, the flow between the Tank Farm and SWPF is not continuous. The H-Area Tank Farm will blend macro-batches of approximately 0.3 – 1.2 Mgal each in an H-Area Tank Farm blend tank. The blended waste will then be transferred to an existing SRS permitted staging tank. The staging tank will then transfer 23,200-gallon batches to Alpha Sorption Tank-A (AST-A) at a flow rate of approximately 130 gallons per minute.

The SWPF is designed to have a maximum instantaneous processing rate of 9.4 Mgal per year.

Tank Farm liquid waste was primarily generated from spent nuclear fuel reprocessing at the F- and H-Canyons. Reprocessing used HNO_3 dissolution that resulted in acidic Canyon wastewater effluents. The acid effluents were combined with NaOH to increase pH to a level suitable for long-term storage in carbon steel tanks. Caustic in excess of available nitrate, nitrite, and other available anions (such as sulfate and carbonate) remained as NaOH. In addition to these Na species, numerous chemical and radioactive species are present as trace amounts of soluble and insoluble chemical compounds. The insoluble solids or sludge components include a wide range of transition, rare earth, and alkali metal oxides, carbonates, nitrates, sulfates, and phosphates. Solids entrained in the saltcake and supernate comprise a minor component of the wastewater feed, with anticipated concentrations on the order of 10-1,200 milligrams per liter of wastewater. The nominal solids concentration of the SWPF waste feed is assumed to be 600 milligrams per liter. Handling higher solids concentrations will reduce throughput and will negatively impact Filter Feed Tank-A (FFT-A) concentrated batch size.

Tank Farm caustic waste was dewatered for storage through both passive and active evaporation, resulting in supernate and saltcake. The latter retains approximately 22% interstitial liquid. The initial pH adjustment and subsequent dehydration resulted in the creation of very high pH values in the remaining super-saturated liquid waste. After dissolution and blending, the wastewater feed is expected to have an average pH of 13 ± 2.

Tank Farm waste includes several radioactive isotopes and hazardous metals. Tank Farm salt wastewater includes over 50 radioactive isotopes; however, more than 95% of the activity is contributed by ^{137}Cs and its short-lived daughter product, ^{137m}Ba. Hazardous metals present in the wastewater include arsenic, mercury, cadmium, chromium, lead, selenium, Ba, and silver.

SWPF effluents are transferred to either the DWPF for vitrification as glass or to the SPF for solidification into a grout matrix known as saltstone grout. Because the SWPF does not discharge to surface waters, traditional wastewater analytical parameters such as Biological Oxygen Demand and Chemical Oxygen Demand are not analyzed.

5.2 Wastewater Treatability

SWPF processes are designed to remove Cs through the CSSX process, and Sr and actinides through the ASP and Alpha Finishing Process (AFP). Removal of these radioactive isotopes from wastewater reduces the concentration of these radionuclides to levels low enough to allow disposal at the SDF after treatment at the SPF. The operational effectiveness of the SWPF process is defined as the ability to remove and concentrate Sr, actinides, and Cs radionuclides from the Tank Farm feed. Laboratory- and pilot-scale testing established that MST sorption combined with filtration effectively removes and concentrates Sr and actinides, and that the CSSX process effectively removes and concentrates Cs.

The effectiveness of MST sorption and the resultant DF for Sr and actinides has been confirmed through testing (e.g., WSRC-TR-2004-00145: *Monosodium Titanate Multi-Strike Testing*[8]). The current baseline design assumed a 0.4 g/L mixture of MST and waste and 12 hours sorption time for a single MST strike, and 6 hours of sorption time for multi-strike operation. Table 5-1 summarizes the DFs used in the baseline design, established for 0.4 g/L concentrations of MST at 6.44M Na^+.

Table 5-1. SWPF ASP Decontamination Factors

Radionuclide	Single Strike Decontamination Factor (12-hour Sorption Time)	Multi-Strike Decontamination Factor Values	
		First-Strike (6-hour Sorption Time)	Subsequent-Strike (6-hour Sorption Time)
Strontium	20	17	17
Actinides:			
Plutonium	5.5	4.7	3.9
Uranium	1.35	1.3	1.3
Americium	4.6	3.4	1.5
Neptunium	2.4	2.1	1.1

The SWPF can process industrial wastewater as many times as necessary by using the ASP/AFP. However, reliance on repeated MST strikes is less efficient and reduces throughput more than optimum blending of Tank Farm feed because blending ensures that the feed stream meets the SWPF WAC; blending of multiple waste streams removes waste from the Tank Farms, reducing overall risk, and places the waste into safer final storage.

Additionally, evaluation of sample analysis results performed by the Savannah River National Laboratory in 2003, from the SRS Tank Farm, shows that to meet the Saltstone Waste Acceptance Criteria for alpha-emitting transuranic radionuclides requires more than one MST strike for some tanks. In order to process these tanks without reducing throughput, and without requiring extensive blending, we have a separate strike capability.

The CSSX process has been extensively evaluated through bench-scale testing and demonstrated to effectively remove Cs from caustic solution with high concentrations of Na^+ (e.g., ANL-01/10: *Interim Report on a Multi-day Test of the Caustic-Side Solvent Extraction Flowsheet for Cesium Removal from a Simulated SRS Tank Waste*[9]; WSRC-TR-2001-00223:

Demonstration of Caustic-Side Solvent Extraction with Savannah River Site High Level Waste[10]; and ORNL/TM-2001/278: *Evaluation of Mass Transfer Performance for Caustic-Side Solvent Extraction of Cesium in a Conventional 5-cm Centrifugal Contactor*[11]).

The EPC performed pilot-scale tests in 2003 to evaluate potential effects associated with going from bench-scale to engineering-scale and to optimize CSSX Conceptual Design. Using non-radioactive simulated wastewater, the CSSX pilot scale test: 1) demonstrated that DF values are in agreement with bench-scale results; 2) identified optimum flow, temperature, rotor speed, and weir height for the contactors; 3) identified minor design changes needed to mitigate effects of fluid aeration and enhance solvent recovery (i.e., addition of stilling tanks upstream of the coalescers); and 4) demonstrated that recovery from off-normal conditions is easily managed.

Full-scale CSSX tests, performed by the EPC with non-radioactive simulated wastewater, have been conducted since the second half of the 2005 calendar year and are continuing. These tests are being performed to: 1) demonstrate the effectiveness of the CSSX process at full scale, 2) further optimize operating parameters, and 3) evaluate process modifications that were based on the engineering-scale test performed in 2003.

The SWPF design objective is to obtain a DF of $\geq$ 40,000 for Cs removal. Full-scale Testing performed by the EPC is showing that the DF value is readily achievable when utilizing 16 extraction contactor stages.

Hazardous metals and organic compounds must also meet SPF WAC. The SWPF only affects the concentration of these species indirectly through the chemical adjustment processes performed in the ASP, CSSX, and Alpha Finishing Facility (AFF) (e.g., Na+ concentration adjustment, MST addition, and caustic addition). The Tank Farm will be responsible for blending individual waste tanks prior to staging for SWPF processing to ensure that the blended batches meet the SPF WAC for constituents not affected by SWPF processes. The SWPF WAC will establish limits on the concentration of metals and organic compounds in batches received from the Tank Farm to ensure that SWPF wastewater effluents will meet the SPF WAC.

5.3 Wastewater Effluent Characteristics and Flow Rate

The SWPF produces three wastewater effluent streams including decontaminated salt solution (DSS), MST/sludge, and strip effluent. The SWPF acts as an industrial wastewater pretreatment process between the Tank Farm and DWPF and the Tank Farm and SPF. None of the three SWPF wastewater effluents is discharged to surface waters.

The SWPF produces two effluent streams that are transferred to DWPF for vitrification; including the MST/sludge effluent and strip effluent (see Figure 4-1). The MST/sludge effluent consists of 5 wt% solids concentrated in the ASP and AFP. The ASP/AFP concentrate comprises MST solids containing sorbed Sr and actinides, and incidentally entrained Tank Farm sludge solids. The strip effluent comprises the concentrated Cs stream from the CSSX process, containing up to 66 Ci of Cs per gallon. The Cs concentration in the strip effluent is approximately 15 times that of the clarified salt solution (CSS).

Table 5-2 summarizes current understanding of the SWPF MST/sludge and strip effluent characteristics and flow rates.

Prior testing has confirmed that the DSS produced by the SWPF can meet the proposed SPF WAC. Table 5-3 summarizes the flow rates and waste effluent characteristics, based on mass balance calculations that incorporate DFs for the ASP/AFP and CSSX processes.

Table 5-2. SWPF MST/Sludge and Strip Effluent Characteristics

Nominal Quantities/Flow Rates		
	MST/Sludge	**Strip Effluent**
Effluent Quantity (gal/year)	131,000	603,000
Effluent Production Rate (gal/day)	360	1,700
Total Alpha (Ci/gal)	0.09	Negligible
^{90}Sr (Ci/gal)	4.25	Negligible
^{137}Cs (Ci/gal)	0.77	66
Batch Working Volume (gal)	4,000 (SSRT)	16,000 (SEHT)
Product Transfer Rate (gpm)	200	200
Physical Characteristics of Effluent		
	MST/Sludge	**Strip Effluent**
Temperature, °C	10 to 40	10 to 40
pH	13 ± 1	3 ± 1
Specific Gravity	1.44 ± 0.05	1.01 ± 0.01
Viscosity, Centipoise	2.0 ± 0.05	1.1 ± 0.2

C = Centigrade
Ci/gal = curies/gallon
Cs = Cesium
gal = gallon
gpm = Gallons per minute
MST = Monosodium Titanate
SEHT = Strip Effluent Hold Tank
Sr = Strontium
SSRT = Sludge Solids Receipt Tank

Table 5-3. SWPF DSS Effluent Characteristics

Effluent Quantities/Flow Rates	
Effluent Quantity (gal/year)	9,400,000(@5.2M Na)
Average Production Rate (gal/day)	26,000(@5.2M Na)
Batch Size (gal)	36,000 (working volume)
Product Transfer Rate (gpm)	100
Physical Characteristics of DSS Effluent	
Temperature, °C	10 to 40
pH	13.5 ± 2
Specific Gravity	1.25 ± 0.05
Viscosity, Centipoise	2.0 ± 0.05
Radionuclide Content (nCi/g):	
	DSS Effluent
Total Transuranic Alpha	<20
^{90}Sr	<229
^{137}Cs	<40

C = Centigrade
Cd = Cadmium
Cs = Cesium
Sr = Strontium
gpm = gallons per minute
M = Molar
nCi/g = nanocuries per gram

6.0 OTHER RELEASES TO THE ENVIRONMENT

The SWPF does not release any industrial wastewater effluent to the environment, but functions as an intermediate treatment facility between the F- and H-Area Tank Farms and the DWPF and SPF. The process does produce trace amounts of radioactive, toxic, criteria air emissions, and utility water effluents.

6.1 Utility Water Effluents

The SWPF Heating, Ventilating, and Air Conditioning chiller and air compressor systems will generate condensation from atmospheric humidity and cooling water blowdown from evaporative coolers. These waste streams will be discharged to the sanitary sewer system under SCDHEC Permit Number: 19157-IW.

6.2 Air Emissions

6.2.1 Radiological Air Emissions

Radiological emissions from the SWPF have been modeled in accordance with 40 CFR 61, Subpart H (*National Emission Standards for Radionuclides Other Than Radon from Department of Energy Facilities*[12]) and were determined to be below the exemption threshold of 0.1 millirem per year to the Maximally Exposed Off-Site Individual. Results of radiological air modeling are documented in the calculation Q-CLC-J-00001 (*SWPF Radionuclide Emissions during Normal Operations of Vented Process Vessels: Source Term Derivation, Air Dispersion and Total Effective Dose Rate Calculations Performed Pursuant to 40 CFR 61.96(b)*[13]).

6.2.2 Toxic and Criteria Pollutant Emissions

SWPF emissions of toxic and criteria pollutants were determined to be below exemption threshold emission rates established in TV-0080-0041 (*Savannah River Site Part 70 Air Quality (Title V Operating) Permit*[14]), as well as emission rate thresholds established in SCR 61-62 (*Air Pollution Control Regulations and Standards*[15]) for toxic and criteria air pollutants. Mercury, HNO_3, and methanol were shown to have maximum emission rates under 0.05 pounds per hour (lb/hr), the exemption threshold for toxic air pollutants. Nitrogen dioxide and ozone (volatile organic compounds as an ozone precursor) were shown to have emission rates below 0.5 lb/hr, the exemption threshold emission rate for criteria pollutants in TV-0080-0041. The results of emission calculations are contained in Q-PER-J-00001 (*SWPF: Air Quality Permit Exemption Request for Toxic Air and Criteria Pollutant Emissions: Engineering Report*[16]).

The above SWPF emission calculations and supporting reports demonstrating that emission rates are below exemption thresholds have been submitted to the SRS Permit custodians for review and concurrence. These calculations and reports are available to SCDHEC for review.

6.3 Title V Operating Permit

A DG and 10,000-gallon fuel supply tank will be installed and operated only when 1) power is lost, and 2) to conduct periodic preventive maintenance. The preventive maintenance will utilize less than 100 hours/year. The DG and fuel tank will require a modification to TV-0080-0041 (*Savannah River Site Part 70 Air Quality [Title V] Operating Permit*[17]). This modification will be filed prior to the date of placing the DG into service.

7.0 REFERENCES

[1] SCR 61-67, *South Carolina Standards for Wastewater Facility Construction.* South Carolina Department of Health and Environmental Control, Columbia, South Carolina. May 24, 2002.

[2] SCR10H152, Coverage granted under SCR100000 on September 14, 2007; expires September 14, 2012. (SWPF-specific coverage number under SCR1000000). Coverage

grant contained in a letter from Martens, Jan (Stormwater, Dams & Agricultural permitting Section, SCDHEC) to David B. Amerine (Parsons): Subject: "Salt Waste Processing Facility, J-Area, Aiken, County: File number: 02-07-08-07". Dated September 14, 2007.

[3] Permit No. SCR100000, *South Carolina NPDES General Permit For Storm Water Discharges From Large and Small Construction Activities*. South Carolina Department of Health and Environmental Control, Bureau of Water, Columbia, South Carolina. Issued April 1, 2006; Effective September 1, 2006; Expires August 31, 2011.

[4] WSRC-TR-94-0608, *Approved Site Treatment Plan*, Revision 13. Westinghouse Savannah River Company, Aiken, South Carolina. November 2005.

[5] WSRC-OS-94-92, *Federal Facility Agreement for the Savannah River Site*. Administrative Docket No. 89-05-FF. Westinghouse Savannah River Company, Aiken, South Carolina. Effective date August 16, 1993.

[6] DOE/EIS-0082-S2, *Savannah River Site Salt Processing Alternatives Final Supplemental Environmental Impact Statement*. U.S. Department of Energy, Savannah River Operations Office, Aiken, South Carolina. June 2001.

[7] *Record of Decision: Savannah River Site Salt Processing Alternatives*. U.S. Department of Energy, Washington, D.C. Published in the Federal Register: October 17, 2001 (Volume 66, Number 201, Page 52752), and amended as published in the Federal Register: January 24, 2006 (Volume 71, Number 15, Page 3834).

[8] WSRC-TR-2004-00145, *Monosodium Titanate Multi-Strike Testing*, Revision 0. Authors: Barnes, M.J., F.F. Fondeur, D.T. Hobbs, and S.D. Fink. Westinghouse Savannah River Company, Aiken, South Carolina. April 29, 2004.

[9] ANL-01/10, *Interim Report on a Multi-day Test of the Caustic-Side Solvent Extraction Flowsheet for Cesium Removal from a Simulated SRS Tank Waste*. Argonne National Laboratory, Argonne, Illinois. April 2001.

[10] WSRC-TR-2001-00223, *Demonstration of Caustic-Side Solvent Extraction with Savannah River Site High Level Waste*, Revision 0. Westinghouse Savannah River Company, Aiken, South Carolina. April 2001.

[11] ORNL/TM-2001/278, *Evaluation of Mass Transfer Performance for Caustic-Side Solvent Extraction of Cesium in a Conventional 5-cm Centrifugal Contactor*. Oak Ridge National Laboratory, Oak Ridge, Tennessee. January 2002.

[12] 40 CFR 61, Subpart H, Protection of Environment: Chapter I, Environmental Protection Agency: National emission standards for hazardous air pollutants: *National Emission*

Standards for Radionuclides Other Than Radon from Department of Energy Facilities. Revised July 1, 2007.

[13] Q-CLC-J-00001, *Salt Waste Processing Facility Project Radionuclide Emissions during Normal Operations of Vented Process Vessels: Source Term Derivation, Air Dispersion and Total Effective Dose Rate Calculations Performed Pursuant to 40 CFR 61.96(b)*, Revision 0. Parsons, Aiken, South Carolina.

[14] TV-0080-0041, *Savannah River Site Part 70 Air Quality (Title V Operating) Permit.* South Carolina Department of Health and Environmental Control, Columbia, South Carolina. Issued February 19, 2003.

[15] SCR 61-62, *Air Pollution Control Regulations and Standards.* Bureau of Air Quality, South Carolina Department of Health and Environmental Control, Columbia, South Carolina. Effective June 27, 2007.

[16] Q-PER-J-00001, *Salt Waste Processing Facility Project: Air Quality Permit Exemption Request for Toxic Air and Criteria Pollutant Emissions: Engineering Report.* Parsons, Aiken, South Carolina.

[17] TV-0080-0041, *Savannah River Site Part 70 Air Quality (Title V Operating) Permit.* South Carolina Department of Health and Environmental Control, Columbia, South Carolina. Issued February 19, 2003, as amended.

Attachment A. Process Building General Arrangement

1. G-P1-J-00001, *SWPF Process Building General Arrangement Drawing Index, Symbols, Abbreviations, Equipment Designations and General Notes (U)*

NOTE **The following drawings withheld due to sensitive information determined by DOE Security to be unsuited for release to the public.**

2. P-PG-J-0002, *SWPF Process Building General Arrangement Index Key Plan (U)*
3. P-PG-J-0003, *SWPF Process Building General Arrangement Central Process Area Plan at Elevation 100'-0" (Unless Otherwise Noted) (U)*
4. P-PG-J-0004, *SWPF Process Building General Arrangement Cold Chemicals Area Plan at Elevation 100'-0" (U)*
5. P-PG-J-0005, *SWPF Process Building General Arrangement Northern Facility Support Area Plan at Elevation 100'-0" (U)*
6. P-PG-J-0006, *SWPF Process Building General Arrangement Eastern Facility Support Area Plan at Elevation 100'-0" (U)*
7. P-PG-J-0007, *SWPF Alpha Finishing Facility General Arrangement Alpha Finishing Facility Plan at Elevation 100'-0" (Unless Otherwise Noted) (U)*
8. P-PG-J-0008, *SWPF Process Building General Arrangement Central Process Area Plan at Elevation 116'-0" (Unless Otherwise Noted) (U)*
9. P-PG-J-0009, *SWPF Process Building General Arrangement Central Process Area Plan at Elevation 124'-0" (U)*
10. P-PG-J-0010, *SWPF Process Building General Arrangement Central Process Area Plan at Elevation 139'-0" (U)*

S. C. DEPT. OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WATER

WASTEWATER FACILITIES
APPROVED FOR CONSTRUCTION

(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT.)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM THIS OFFICE AFTER COMPLETION OF CONSTRUCTION.

PERMIT NO. 19,219-IW DATE Aug. 6, 2008

DIRECTOR, WATER FACILITIES PERMITTING DIVISION