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PLUTONIUM CONCENTRATION AND STORAGE
ENGINEERING STUDY FOR PUREX L-CELL PACKAGE REPLACEMENT

by

C. W. Smith
Process Design Engineering
Facilities Engineering
Chemical Processing Department

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D I S T R I B U T I O N

1. JB Fecht
2. WS Frank
3. DR Gustavson
4. MK Harmon
5. WM Harty
6. BF Judson
7. GR Kiel
8. RW McCullugh
9. LR Michels
10. HP Shaw
11. CW Smith
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13. 300 Files
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By J E Savelly 4-19-94

Verified By Gerri Maley
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PLUTONIUM CONCENTRATION AND STORAGE
ENGINEERING STUDY FOR PUREX L-CELL PACKAGE REPLACEMENT

I. INTRODUCTION

The Purex L-Cell Package is used for organic stripping and concentrating aqueous plutonium solutions from the final Pu solvent extraction decontamination cycle. At the present time the package is used only during times when the gamma activity of the final product is too high to permit routing the solution to N Cell for final ion-exchange purification or when N Cell is inoperative. The package can be used only to concentrate and then route solutions to the PR Room for loadout into PR cans for storage prior to rework via TK-E6. In addition, operating data have shown that the present package has a low boil-off capacity which is insufficient for both current and forecasted plant production rates. At the present time, flowsheet modifications and processing rate reductions are necessary when the package is in operation. Entry into L Cell and contact maintenance are required to maintain the present package which was installed in 1956. Repairs to the package were made in 1962, and information obtained at that time indicates that extensive repairs to the present package will be required in the near future.

In addition, production forecasts indicate that the Purex Plant will be processing enriched fuels and fuels containing plutonium which will have to be segregated from the plutonium from normal fuel. When higher enrichment fuels are processed, it will be difficult to recycle rework to the non-critically-safe TK-E6 as is the practice. Processing of these fuels requires flexibility, storage, and processing capacity which are not available with the present package.

The bases for the replacement package are that: 1) the package will concentrate and store two days' production of off-specification product; 2) a routing to the 2AF Tank (TK-J5) will be provided to permit rework of this material without having to return it to the head end of the process; 3) the package will be designed for a 4.0 capacity factor; and 4) space will be made available for storage of approximately 1,200 liters of concentrated product solutions when needed. A spare package is available which can be modified to provide the required flexibility and product storage capabilities.

II. PURPOSE

The purpose of this report is to present the engineering study for the required modifications to the package and to the Sample and Operating Galleries as a basis for project action.

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III. SUMMARY

The existing spare L-Cell Package will be modified and installed as described in this engineering study to provide the operability and flexibility required for the replacement L-Cell Package. The basic modifications to the package consist of: 1) fabrication of a new titanium bottom section with two tube bundles for E-L4; 2) removal of the present TK-L6 and replacing it with a 400-liter, annular, rework storage tank; 3) modification of the dunnage to provide support for two 650-liter concentrated product, annular storage tanks; 4) revisions to the samplers; and 5) necessary modifications to the piping.

The package is to be designed to permit remote installation of the two product storage tanks now or at a future date. The estimated total project cost for modifying the spare L-Cell Package to provide rework flexibility and product storage capability is about \$375,000. However, the estimated project cost for modifying the spare package to provide rework flexibility with provision for remote installation of product storage tanks at a later date is about \$216,000.

The described modifications to the spare package will provide:

- 1) In-canyon storage and flexibility for routing rework Pu solution to the 2AF Tank. This will reduce operator exposure since high gamma Pu solutions will no longer have to be sent to N Cell or the PR Room and will reduce the opportunity for loss of product since the rework will not have to be recycled to the head end of the process.
- 2) Boil-off capacity for operation at a plant capacity factor of 4.0, if needed.
- 3) Improved operability since pumps and DOV's will be remotely removable.
- 4) Space for providing about 1,300 liters of concentrated product storage in two tanks.

IV. DISCUSSION

A. Process Description (SK-2-21052 and SK-2-21046)

Feed to the package (2BP) is received in the 2BP Sample Pot (SPL-L3) and acid added to increase the HNO_3 to about 1.0 M before entering the stripper tower (T-L3). The HNO_3 addition is required to prevent

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Pu polymer formation and plugging in the stripper tower. In the stripper, T-L3, the feed is concentrated by about a factor of 2 to provide steam for stripping organic from the entering 2BP; concentrated bottoms then flow to E-L4. In E-L4, the product is concentrated to the required concentration and overflows into TK-L6. From TK-L6, the product can be sent to the 2AF Tank (TK-J5), to the PR Room (TK-L9), or recycled to the concentrator, E-L4. The process condensate and the steam condensate flow to TK-F10. Other streams enter the package from TK-L9, TK-L11, and the product storage tanks, TK-L15 and TK-L16. These streams can be routed to either the concentrator, E-L4, or the rework tank, TK-L6.

The product storage tanks, TK-L15 and TK-L16, receive feed only from TK-L10 in the PR Room. From these tanks, solution can be transferred from one tank to the other, to TK-L10, or to the rework package. Samplers are provided for the 2BP, concentrated rework, and the concentrated product.

B. Equipment Description

The existing spare L-Cell Package will be modified as required in Phase I to provide rework flexibility with provision for remote installation of product storage tanks. The installation of the product storage tanks, Phase II, could be performed either now or at a later date.

Phase I will consist of fabrication of a new titanium bottom section for E-L4 with two tube bundles, removal of the present TK-L6 and replacing it with a 400-liter annular tank, modification of the dunnage to provide support for TK-L15 and TK-L16, and the changes and additions to the permanent package piping required for both Phase I and Phase II. Changes in the building are three additional lines from L Cell to the PR Room via the Pipe Chase required for Phase II product solution routings and an additional sampling station for rework solutions. Rework sampling will be provided by modifying the 2BP (L3) Sample Station in the Sample Gallery. As a result of changes in the package, fabrication of four (4) jumpers is required for proper 2BW sampling as part of Phase I although no changes to the 2BW Sample Station in the Sample Gallery are required.

Phase II will consist of the fabrication and remote installation of TK-L15 and TK-L16 with the jumpers and instrumentation that are required. To provide a sampling station for concentrated product solutions, the 2BW Sampling Station in the Sample Gallery will be modified and the XAW Sampling Station relocated to a new, separate sampling hood located just west of the end of the Sample Gallery Pipe Chase. The lines and the sample pot required for sampling concentrated product solutions are permanently installed in the package and will have to be installed as part of Phase I.

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1. Stripper E-L3 (H-2-56741)

The stripper is used without modification. The required boil-off duty, including heat losses, is about 190,000 BTU/hr to concentrate the feed by a factor of 2. Pressure drop through the system is within allowable limits.

2. Concentrator E-L4 (SK-2-21047)

The capacity of E-L4 is increased to handle the required boil-off rate at the high Pu and HNO_3 concentrations by replacing the present stainless steel bottom section with a new titanium bottom section which will accommodate two (2) tube bundles. The tube bundles, as shown on H-2-56715, are existing in Spare Parts. The increased heat transfer surface is required as a result of the high concentration bottoms that are produced. The concentrator duty required to concentrate the product to 100 grams Pu per liter is about 155,000 BTU/hr.

3. Condensers E-L5 and E-L8 (H-2-56742)

No modifications to the overhead condensers are planned. Each has adequate surface area (13.1 ft^2) and low pressure drop for the intended service. E-L5 has a required duty of 130,000 BTU/hr, and E-L8 has a required duty of 138,000 BTU/hr.

4. Product Receiver Tank TK-L6 (SK-2-21025)

The present product receiver tank will be removed and replaced with an annular tank having a capacity of 400 liters. The new tank is 3 feet 6 inches ID by 7 feet 3 inches tall with a maximum annulus thickness of 2 1/2 inches. The new tank is permanently mounted in the dunnage with only the pump and valves remotely removable. The tank is equipped with an air sparger, limited to 2.0 scfm air flow, and with cooling coils welded to the outside shell of the tank. The tank has 6 inches of normal concrete inside the annulus for neutron moderation and isolation of opposite sides of the tank.

5. Concentrated Product Storage Tanks (SK-2-21049)

The concentrated product storage tanks each have a working capacity of 650 liters of concentrated product. The tanks are 3 feet 6 inches ID by 12 feet tall with a maximum annulus thickness of 2 1/2 inches. The tanks are constructed similar to the product receiver tank but can be installed and removed from the package remotely. Therefore, if the necessary routings and connections are installed on the package, the tanks can be installed at a later time whenever they are needed.

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6. Sampler Revisions (SK-2-21027 and SK-2-21028)

At the present time there are four sample nozzles in the canyon in the vicinity of the L-Cell Package which can be used. These four nozzles terminate in two Type B samplers in the Sample Gallery. Currently, one nozzle is used for sampling 2BP and one for sampling 2BW (organic). The 2BW sample is taken above the elevation of the sample nozzle, and, as a result, there is gravity flow into the sampler hood once the flow has been started. In addition, the same sampler is used to sample XAW from N Cell via a single unencased line which comes through the floor from N Cell and along the wall to the 2BW Sampler. Both the 2BW organic sample and the XAW sample are discharged into the L8 Sample Pot which empties into TK-F10.

Installation of the proposed package requires four sample stations: 2BP, 2BW, rework, and concentrated product, in addition to the XAW Sample Station. The four sample stations for the canyon samples are to be provided by using the existing piping through the wall and by adding to each sample station a new sampler hood and the necessary valves, jets, and piping in the sampler valve pit.

A 2BW sample pot is to be built into the 2BW Jumper in the canyon to provide a sample point which is below the sampler wall nozzles and to provide for returning the sample to an organic stream. This change requires a total of four new jumpers. A new sample hood with the necessary valves, jets, and encased routings to and from N Cell is to be provided for the XAW Sample Station.

C. Chemical Safety Analysis

There are no chemical reactions taking place in this equipment, and therefore the only potential chemical safety problem is the potential formation of "red oil" as a result of incomplete stripping of organic from the 2BP. To preclude the formation of "red oil" should stripping of the 2BP be incomplete, the steam pressure is limited to 29 psig in both the stripper tube bundle and in the concentrator tube bundles. The steam supply is equipped with an automatic shut-off and safety valve should the steam pressure exceed this value.

D. Nuclear Safety Analysis

During normal operations, the maximum Pu concentration is 250 grams per liter with 5.0 to 8.0 M HNO_3 . However, to provide an adequate safety margin, the equipment design is based on a Pu concentration of 450 grams per liter with 2.0 M HNO_3 . The equipment sizes and

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locations shown on the drawings have been determined for this Pu concentration and must not be changed without approval by a Nuclear Safety Specialist, CPD. The types of critical safety hazards that are encountered primarily result from operating errors, equipment failures, or service failures.

Operating Errors - Some of the most likely operating errors are overconcentration of the solutions or overfilling a vessel. To prevent overconcentration, both the stripper and the concentrator are equipped with low-level weight factor alarms which will shut off the steam to the tube bundles if left unattended and with no feed. To prevent overfilling the vessels, all vessels will be equipped with high-level weight factor alarms.

Solution Transfers - At the present time, all vessels which can receive concentrated Pu solutions from the L-Cell Package are critically favorable except the 2AF Tank, TK-J5. Also, the J-Cell sump, which will receive any solution which leaks from a jumper during a solution transfer from TK-L6 to TK-J5, is not critically favorable for concentrated Pu solutions. However, as a part of Project CGC-124, Modifications for Purex Flexibility, a new, critically favorable 2AF Tank is to be installed, and the J-Cell sumps are to be modified to increase the amount of concentrated Pu solution which can accumulate on the floor of J Cell. However, the trough in J Cell cannot be made critically favorable without stripping the cell, and therefore, an operating limit as to the volume of concentrated solution which can be transferred at one time will have to be established prior to startup of the package. Assuming that the modifications for Project CGC-124 are installed prior to installation of the L-Cell Package and that the package is operated within the limits established for solution transfers, no nuclear safety problems resulting from solution transfers are foreseen.

Precipitation - Precipitation of the plutonium should not be a problem. There are no precipitating or neutralizing chemicals connected to any of the lines entering the package. Likewise, water cannot enter the vessels directly but would have to enter through a small (10-gallon) tank in the Pipe and Operating Gallery.

Agitation - Agitation of the tank contents by air sparging should not create any problems such as air lifting the tank contents into the vessel vent system. The air flow to each sparger ring is limited by an orifice to 2.0 scfm which corresponds to a superficial air velocity in the annulus of about 0.93 feet per minute. In addition, the tanks are vented from the pump boot which will act as a knock-out pot should there be any solution carryover from the annulus.

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Equipment Failures - The types of failure of primary concern are leaks in the vessels, tube bundles, or cooling coils. All of the vessels will be equipped with low-level weight factor alarms to detect falling liquid levels in the vessels. However, should all of the vessels rupture simultaneously spilling the entire contents ($\sim 1,800$ l) on the floor of L Cell, the total solution depth would be only 1.3 inches above the lip of the trough in the cell. There is not enough interaction between the L-Cell sump (1-1/2 inches wide by 8-inches deep maximum) to be a nuclear safety hazard.

In the event of a leak in the tube bundle of a reboiler, which results in loss of steam pressure in the shell, the steam is automatically shut off and the steam shell pressurized with air.

In the event of a leak in the cooling coils for TK-L6, the water runs onto the floor of the cell, since the coils are welded to the outside of the tank. However, failure of the coils is extremely remote since they are not in contact with the process solution. Normal water flow to the coils is less than 1.0 gpm, and the capacity of L-Cell floor is about 550 gallons per inch of depth.

The loss of the built-in moderator is not considered to be a hazard. The moderator is completely encased in stainless steel and separated from the process vessel inner wall by 1/4 inch to allow process solution to drain away from the moderator encasement should the tank develop a leak.

Loss of Services - The loss of services (air, water, etc.) to the package does not present a serious hazard for the time required to regain control. There are no self-heating solutions requiring continuous cooling, and in the event of loss of air, cell lines and sample pots drain to E-L4 or TK-L6 to prevent possible contamination of stored product solutions.

E. Alternate Design Concepts

An alternative design involved combining the stripper (T-L3) and the concentrator (E-L4) into a single piece of equipment. This would reduce the canyon space required for the rework package and would permit the installation of a separate product storage package or other process equipment in the space made available. However, this alternative design provided poor operating characteristics and inadequate boil-off capacity for operation at a capacity factor of 4.0. For instance, it would not be possible to adjust the HNO_3 :Pu ratio across the package since only 2 to 3 percent of the HNO_3 would be boiled off in the overheads. Also, to obtain 2 days storage for rework solutions during startup, it would be necessary to recycle continuously a portion of the rework stream to the 2AF Tank, TK-J5, to keep the rework storage tank, TK-L6, from filling too rapidly.

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The alternative design would have provided remotely removable DOV's, pumps, and thermohms, whereas the thermohms in the proposed design are not all remotely removable. In addition, the alternative design would make about 5 feet of canyon space available for either product storage or some processing function.

The project cost for the rework and product storage capability with the alternative design was estimated to be \$500,000. Therefore, as a result of the poor operating characteristics and the increased cost of the separate new rework and product storage packages, modification of the existing spare package appeared to be the most desirable alternative.

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ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-I2-2	DOV-I2-2A	DOV-I3-1	DOV-I3-2
SERVICE	2BP to Package	2BP to TK-N1	STM to T-L3	2BP - HNO ₃ ADD
LOCATION	I-Cell	I-Cell	P & O Gallery	P & O Gallery
OPERATING CONDITIONS				
FLUID				
CORROSIVE COMPOUNDS	0.5M HNO ₃	0.5M HNO ₃	Steam	13.0M HNO ₃
OPERATING TEMPERATURE, °F	100	100	300	100
DESIGN TEMPERATURE, °F	150	150	400	150
OPER. UPSTREAM PRESSURE, PSIG	13		50	50
DESIGN PRESSURE, PSIG	150	150	150	150
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	On-Off	Control	Control
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	0.45	0.45		0.025
± % DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	+15 -50	+15 -50		+ 50
SPECIFIC GRAVITY AT OPER. COND.	1.02	1.02		1.35
VISCOSITY AT OPER. COND., CP	.704	.704		1.41
STEAM				
NORM. FLOW AT OPER. COND., LBS./ HR.			210	
± % DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.			+50	
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER	No			
WITH AIR FAILURE, VALVE	Closes	Closes	Closes	Closes
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	Note 2	Note 2	Existing Valve	Existing

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI ΔP. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

Note 2 - New, replaces existing valve.

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DIAPHRAGM OPERATED VALVES
Process Information

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ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-L3-3	DOV-L4-1	DOV-L4-2	DOV-L4-3
SERVICE	T-L3 STM COND	STM to E-L4	E-L4 Letdown	STM to E-L4
LOCATION	L Cell	P & O Gallery	I Cell	P & O Gallery
OPERATING CONDITIONS				
FLUID	STM COND.			
CORROSIVE COMPOUNDS		Steam	5.0 M HNO ₃	Steam
OPERATING TEMPERATURE, °F	275	300	240	300
DESIGN TEMPERATURE, °F	350	400	300	400
OPER. UPSTREAM PRESSURE, PSIG	29	50	1.0	50
DESIGN PRESSURE, PSIG	150	150	150	150
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	Control	Control	Control
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	0.4		0.03	
±% DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	+50		+50	
SPECIFIC GRAVITY AT OPER. COND.	.93		1.2	
VISCOSITY AT OPER. COND., CP	.21		.352	
STEAM				
NORM. FLOW AT OPER. COND., LBS./HR.		100		100
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.		+100 -50		+100 -50
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)			Yes	
VALVE POSITIONER			Opens	Closes
WITH AIR FAILURE, VALVE	Opens	Closes		
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	New	Existing	Note 2	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI ΔP. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

Note 2 - Replaces existing valve.

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DIAPHRAGM OPERATED VALVES PROCESS SPECIFICATIONS

ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-I4-4	DOV-I4-5	DOV-I4-6	DOV-I4-7
SERVICE	E-I4 STM COND.	E-I4 STM COND.	XCP to E-I4	Air to J-I4
LOCATION	L Cell	L Cell	L Cell	P & O Gallery
OPERATING CONDITIONS				
FLUID	STM COND	STM COND		100 psig Air
CORROSIVE COMPOUNDS	Steam	Steam	HNO ₃	
OPERATING TEMPERATURE, °F	275	275	100	100
DESIGN TEMPERATURE, °F	350	350	150	150
OPER. UPSTREAM PRESSURE, PSIG	29	29	5	100
DESIGN PRESSURE, PSIG	150	150	150	150
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	Control	On-Off	Control
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	0.2	0.2	0.15	
±% DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	+100 -50	+100 -50	+50	
SPECIFIC GRAVITY AT OPER. COND.	.93	.93	1.03	
VISCOSITY AT OPER. COND., CP	.21	.21	.71	
STEAM				Air
NORM. FLOW AT OPER. COND., LBS./HR.				100
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.				+50
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE	Opens	Opens	Closes	Closes
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	New	New	New	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI Δ P. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

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PROCESS SPECIFICATIONS

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ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-I5	DOV-I6-1	DOV-I6-2	DOV-I6-3
SERVICE	Water to E-I5	Rework to TK-J5	Rework to SPI-I6	Water to TK-I6 Coil
LOCATION	P & O Gallery	Canyon	Canyon	P & O Gallery
OPERATING CONDITIONS				
FLUID	Raw Water			Raw Water
CORROSIVE COMPOUNDS		HNO ₃	HNO ₃	
OPERATING TEMPERATURE, °F	70	100	100	70
DESIGN TEMPERATURE, °F	150	150	150	150
OPER. UPSTREAM PRESSURE, PSIG	100	Pump Discharge	Pump Discharge	100
DESIGN PRESSURE, PSIG	150			150
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	Control	Control	Control
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	12.0	1.0	1.0	2.0
± % DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	+50	+100 -75	+100 -75	+50 -75
SPECIFIC GRAVITY AT OPER. COND.	1.0	1.31	1.31	1.0
VISCOSITY AT OPER. COND., CP	0.8	1.0	1.00	0.8
STEAM				
NORM. FLOW AT OPER. COND., LBS./ HR.				
± % DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.				
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE		Closes	Closes	
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	Existing	New	New	Existing

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI Δ P. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

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DIAPHRAGM OPERATED VALVES Process Information

DOV-I6-7

ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-I6-4	DOV-I6-5	DOV-I6-6	DOV-I7-1
SERVICE	SPL-I6 Flush	SPL-I6 Drain	TK-I6 Air Sparge	SPL-I7 Drain
LOCATION	P & O Gallery	Canyon	P & O Gallery	Canyon
OPERATING CONDITIONS				
FLUID			Compressed Air	
CORROSIVE COMPOUNDS	HNO ₃	HNO ₃		HNO ₃
OPERATING TEMPERATURE, °F	100	100 ³	100	100 ³
DESIGN TEMPERATURE, °F	150	150	150	150
OPER. UPSTREAM PRESSURE, PSIG	60		25	
DESIGN PRESSURE, PSIG	150		150	
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	On-Off	Control	On-Off
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	1.0	2.0		2.0
±% DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	0-100	+0, -100		+0, -100
SPECIFIC GRAVITY AT OPER. COND.	1.35	1.31		1.31
VISCOSITY AT OPER. COND., CP	1.41	1.0		1.0
STEAM				
NORM. FLOW AT OPER. COND., LBS./HR.			2.0 cfm	
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.			+0, -75	
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE	Closes	Opens	Closes	Opens
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	New	New	New	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI ΔP. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

DECLASSIFIED

DIAPHRAGM OPERATED VALVES

PROCESS SPECIFICATIONS

ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-L7-2	DOV-L7-3	DOV-L8	DOV-L15-1
SERVICE	Product to TK-L10	SPI-L7 Flush	Water to E-L8	Product to TK-L15
LOCATION	Canyon	P & O Gallery	P & O Gallery	Canyon
OPERATING CONDITIONS				
FLUID			Raw Water	
CORROSIVE COMPOUNDS	HNO ₃	HNO ₃		HNO ₃
OPERATING TEMPERATURE, °F	100	100	100	100
DESIGN TEMPERATURE, °F	150	150	150	150
OPER. UPSTREAM PRESSURE, PSIG		60	100	
DESIGN PRESSURE, PSIG		150	150	
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	On-Off	Control	Control	On-Off
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM	2.0	1.0	12.0	2.0
± % DEVIA. FROM NORM FLOW, NORM. PLANT OPER.	+0 -100	0 - 100	+50	+0 -100
SPECIFIC GRAVITY AT OPER. COND.	1.31	1.35	1.0	1.31
VISCOSITY AT OPER. COND., CP	1.0	1.41	0.8	1.0
STEAM				
NORM. FLOW AT OPER. COND., LBS./ HR.				
± % DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.				
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE	Closes	Closes		Closes
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	New	New	Existing	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI Δ P. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

DECLASSIFIED

DIAPHRAGM OPERATED VALVES
PROCESS SPECIFICATIONS

ITEM NO. (FLOW DIAGRAM SYMBOL)	DOV-L15-2	DOV-L16-1	DOV-L16-2	DOV-L6-7
SERVICE	TK-L15 Air Sparge	Product to TK-L16	TK-L16 Air Sparge	Rework to TK-L9
LOCATION	P & O Gallery	Canyon	P & O Gallery	Canyon
OPERATING CONDITIONS				
FLUID	Comp. Air		Comp. Air	
CORROSIVE COMPOUNDS		HNO ₃		HNO ₃
OPERATING TEMPERATURE, °F	100	100 ³	100	100 ³
DESIGN TEMPERATURE, °F	150	150	150	150
OPER. UPSTREAM PRESSURE, PSIG	25		25	
DESIGN PRESSURE, PSIG	150		150	
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	Control	On-Off	Control	On-Off
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM		2.0		2.0
± % DEVIA. FROM NORM FLOW, NORM. PLANT OPER.		+0, -100		+0, -100
SPECIFIC GRAVITY AT OPER. COND.		1.31		1.31
VISCOSITY AT OPER. COND., CP		1.0		1.0
STEAM				
NORM. FLOW AT OPER. COND., LBS./HR.	2.0 cfm		2.0 cfm	
± % DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.	+0, -100		+0, -100	
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE	Closes	Closes	Closes	Closes
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	New	New	New	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI ΔP. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

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DIAPHRAGM OPERATED VALVES
PROCESS SPECIFICATIONS

INFORMATION ONLY

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ITEM NO. (FLOW DIAGRAM SYMBOL)	PRV-I3-1	PRV-I4-1	PRV-I4-2	PRV-I15
SERVICE	STM to T-I3	STM to E-I4	STM to E-I4	Air Spargers
LOCATION	P & O Gallery	P & O Gallery	P & O Gallery	P & O Gallery
OPERATING CONDITIONS				
FLUID	Steam	Steam	Steam	Comp. Air
CORROSIVE COMPOUNDS				
OPERATING TEMPERATURE, °F	340	340	340	100
DESIGN TEMPERATURE, °F	500	500	500	150
OPER. UPSTREAM PRESSURE, PSIG	100	100	100	100
DESIGN PRESSURE, PSIG	150	150	150	150
PRESS. DROP ACROSS VALVE AT MAX. FLOW, PSI	50	50	50	75
PRESS. DROP ACROSS VALVE AT MIN. FLOW, PSI				
PRESS. DROP ACROSS VALVE AT NORM. FLOW, PSI				
LIQUID				
NORM. FLOW AT OPER. COND., GPM				2.0 scfm
±% DEVIA. FROM NORM FLOW, NORM. PLANT OPER.				+300, -100
SPECIFIC GRAVITY AT OPER. COND.				
VISCOSITY AT OPER. COND., CP				
STEAM				
NORM. FLOW AT OPER. COND., LBS./HR.	210	100	100	
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.	+50	+50	+50	
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
FLOW COEFF. REQUIRED (SEE NOTE 1)				
VALVE POSITIONER				
WITH AIR FAILURE, VALVE				
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS	Existing	Existing	New	New

NOTE 1 - FLOW COEFF. = WATER FLOW, GPM, THROUGH WIDE OPEN VALVE WITH 1 PSI Δ P. IF VALVE SIZES AVAILABLE DO NOT HAVE COEFF. BETWEEN 90 AND 100% OF FIGURE GIVEN, SUPPLY NEXT LARGEST SIZE VALVE.

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DIAPHRAGM OPERATED VALVES
PROCESS SPECIFICATIONS

ITEM NO. (FLOW DIAGRAM SYMBOL)	FT-I2-2	FE-L3	FT-L3	FE-I4-1
NEW INSTRUMENT PARTS REQUIRED	Primary Element	Existing	Existing	Existing
SERVICE	2BP to Package	STM to T-L3	2BP-HNO ₃ Add	STM to E-L4
LOCATION	L Cell	P & O Gallery	P & O Gallery	P & O Gallery
OPERATING CONDITIONS				
FLUID		Steam		Steam
CORROSIVE COMPOUNDS	HNO ₃		HNO ₃	
OPERATING TEMPERATURE, °F	100	300	100	300
DESIGN TEMPERATURE, °F	150	400	150	400
OPERATING PRESSURE, PSIG	13	50	60	50
DESIGN PRESSURE, PSIG	150	150	150	150
LIQUID				
FLOW AT FULL METER DIFF. & OPER. COND. GPM				
NORMAL FLOW AT OPER. COND. GPM	0.5		0.025	
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.	+15, -50		+50	
SPECIFIC GRAVITY AT OPER. COND.	1.02		1.35	
VISCOSITY AT OPER. COND., CP	.704		1.41	
STEAM				
FLOW AT FULL METER DIFF. & OPER. COND., LBS/HR				
NORMAL FLOW AT OPER. COND., LBS/HR		210		100
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.		+50		+50
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
TYPE OF PRIMARY ELEMENT	Rotameter	Orifice	Rotameter	Orifice
TYPE OF INSTRUMENT				
TYPE OF CONTROL ACTION				
DIFF. RANGE, INCHES WATER, DRY				
TRANS. TO BOARD OR LOCAL				
WITH AIR FAILURE, VALVE				
WITH INCREASE IN FLOW, VALVE				
LINE SIZE, INCHES				
JUMPER NO.				
ORIFICE BETA				
SPECIAL REQUIREMENTS				

DECLASSIFIED

FLOWMETERS AND FLOWCONTROLLERS
PROCESS SPECIFICATIONS

INFORMATION ONLY

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ITEM NO. (FLOW DIAGRAM SYMBOL)	FE-L4-2	FE-L5	FI-L6	FT-L6
NEW INSTRUMENT PARTS REQUIRED	All	Existing	Rotameter	Rotameter
SERVICE	STM to E-L4	Water to E-L5	Flush to SPL-L6 & L7	Rework from TK-L6
LOCATION	P & O Gallery	P & O Gallery	P & O Gallery	L Cell
OPERATING CONDITIONS				
FLUID	Steam	Raw Water		
CORROSIVE COMPOUNDS			HNO ₃	HNO ₃
OPERATING TEMPERATURE, °F	300	70	100	100
DESIGN TEMPERATURE, °F	400	150	150	150
OPERATING PRESSURE, PSIG	50	100	60	
DESIGN PRESSURE, PSIG	150	150	150	
LIQUID				
FLOW AT FULL METER DIFF. & OPER. COND. GPM				
NORMAL FLOW AT OPER. COND. GPH		12.0	1.0	1.0
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.		+50	0-100	+100, -75
SPECIFIC GRAVITY AT OPER. COND.		1.0	1.35	1.31
VISCOSITY AT OPER. COND., CP		0.8	1.41	1.00
STEAM				
FLOW AT FULL METER DIFF. & OPER. COND., LBS/HR				
NORMAL FLOW AT OPER. COND., LBS/HR	100			
±% DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.	+50			
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
TYPE OF PRIMARY ELEMENT	Orifice	Orifice	Rotameter	Rotameter
TYPE OF INSTRUMENT				
TYPE OF CONTROL ACTION				
DIFF. RANGE, INCHES WATER, DRY				
TRANS. TO BOARD OR LOCAL				
WITH AIR FAILURE, VALVE				
WITH INCREASE IN FLOW, VALVE				
LINE SIZE, INCHES				
JUMPER NO.				
ORIFICE BETA				
SPECIAL REQUIREMENTS				

DECLASSIFIED

FLOWMETERS AND FLOWCONTROLLERS
PROCESS SPECIFICATIONS

INFORMATION ONLY

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ITEM NO. (FLOW DIAGRAM SYMBOL)	FE-L8			
NEW INSTRUMENT PARTS REQUIRED	Existing			
SERVICE	Water to E-L8			
LOCATION	P & O Gallery			
OPERATING CONDITIONS				
FLUID	Raw Water			
CORROSIVE COMPOUNDS				
OPERATING TEMPERATURE, °F	70			
DESIGN TEMPERATURE, °F	150			
OPERATING PRESSURE, PSIG	100			
DESIGN PRESSURE, PSIG	150			
LIQUID				
FLOW AT FULL METER DIFF. & OPER. COND. GPM				
NORMAL FLOW AT OPER. COND. GPH	12.0			
±% DEVI. FROM NORM. FLOW, NORM. PLANT OPER.	+50			
SPECIFIC GRAVITY AT OPER. COND.	1.0			
VISCOSITY AT OPER. COND., CP	0.8			
STEAM				
FLOW AT FULL METER DIFF. & OPER. COND., LBS/HR				
NORMAL FLOW AT OPER. COND., LBS/HR				
±% DEVI. FROM NORM. FLOW, NORM. PLANT OPER.				
QUALITY AT OPER. COND., %				
SUPERHEAT AT OPER. COND., °F				
GENERAL				
TYPE OF PRIMARY ELEMENT	Orifice			
TYPE OF INSTRUMENT				
TYPE OF CONTROL ACTION				
DIFF. RANGE, INCHES WATER, DRY				
TRANS. TO BOARD OR LOCAL				
WITH AIR FAILURE, VALVE				
WITH INCREASE IN FLOW, VALVE				
LINE SIZE, INCHES				
JUMPER NO.				
ORIFICE BETA				
SPECIAL REQUIREMENTS				

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FLOWMETERS AND FLOWCONTROLLERS
PROCESS SPECIFICATIONS

ITEM NO. (FLOW DIAGRAM SYMBOL)	J-14	J-111-2		
SERVICE	T-13 & E-14 MT OUT	TK-111 Neton		
LOCATION	L Cell	PR Room		
OPERATING CONDITIONS				
FLUID				
CORROSIVE COMPOUNDS	HNO ₃	HNO ₃		
OPERATING TEMPERATURE, °F	100°F	100°F		
DESIGN TEMPERATURE, °F	300°	150		
Δic PRESSURE, PSIG	100	100		
BACK PRESSURE, PSIG				
DESIGN PRESSURE, PSIG	150	150		
SUCTION HEAD AT NORM. FLOW, FT.				
SUCTION HEAD MAX. , FT.	-8'	-16'		
SUCTION HEAD AT MIN. FLOW, FT.				
LIQUID				
NORM. FLOW AT OPER. COND., GPM ~	0.5	0.5		
± % DEVIA. FROM NORM. FLOW, NORM. PLANT OPER.				
SPECIFIC GRAVITY AT OPER. COND.	1.31	1.31		
VISCOSITY AT OPER. COND., CP	1.00	1.00		
VAPOR PRESSURE AT OPER. COND., PSIA ~	1.0	1.0		
GENERAL				
LINE SIZE, INCHES				
JUMPER NO.				
SPECIAL REQUIREMENTS				

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STEAM EJECTORS
PROCESS SPECIFICATIONS

INFORMATION ONLY

PROCESS PUMP INFORMATION

Item No	P-L6	P-L15	P-L16
Service	Rework	Conc. Prod.	Conc. Prod.
Location	L Cell	L Cell	L Cell
Operating Conditions			
Liquid	Rework Solutions	Product Solutions	Product Solutions
Phase	Aqueous	Aqueous	Aqueous
Corrosive Compounds	HNO ₃	HNO ₃	HNO ₃
Operating Temperature °F	100 ³	100 ³	100 ³
Design Temperature °F	150	150	150
Operating Pressure, psig			
Design Pressure, psig			
Vapor Pressure, psia	1.0	1.0	1.0
Liquid			
Flow Rate, gpm	2.0	2.0	2.0
+/- Deviation	+0, -75	+0, -75	+0, -75
Specific Gravity	1.31	1.31	1.31
Viscosity	1.00	1.00	1.00
General			
Type	Vertical Turbine	Vertical Turbine	Vertical Turbine
Special Requirements	Note 1 & 2	Note 1 & 2	Note 1 & 2
Group Number	New	New	New
Used On	TK-L6	TK-L15	TK-L16

Note 1 - Pumps to be remotely installed canyon-type pumps. Motors to be non-overloading for full capacity of pumps.

Note 2 - Pumps must be installed remotely in 5-inch maximum ID pump boot.

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STREAM NUMBER	(1)	(2)	(3)	(4)	(5)	(6)	(7)
STREAM DESIGNATION	2BP	2BP-HNO ₃	1PD	1PC	2PD	2PC	2FC
FLOW RATE							
FLOWS	3.0	0.15	1.54	1.58	1.28	0.18	0.19
LITERS/MINUTE	1.97	0.10	1.01	1.03	0.84	0.12	0.12
SPECIFIC GRAVITY (25°C)	1.01	1.35	1.00	1.07	1.16	1.26	1.26
VISCOSITY cp (25°C)	0.91	1.66	0.87	0.96	0.96	1.33	1.33
TEMPERATURE °C	~ 45	~ 45	~ 100	103	101	115	~ 45
COMPOSITION							
HNO ₃ , M	0.46	12.5	~0.02	2.04	1.5	5.8	5.8
PV GMS/LITER	6.4	—	—	12.8	—	100	100

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MATCH LINE
SK-2-21046 SHEET-2

HNO₃ FLUSH
 L5 PROC.
 COND.
 L5 COOLING
 H₂O
 IPC
 XCP
 L-3 STM. COND.

ENGINEERING
FLOW DIAGRAM
1 - CELL

PRODUCT REWORK & STORAGE	
BLDG. NO. 202-A	INSTR. NO. 7001
DATE. NO. SK-2-21046	1

9	SK2-21051	SH 182 HYDRAULIC SCHEMATIC
8	SK2-21052	PPD L CELL PACKAGE
7	SK2-21050	L CELL ARRANGEMENT
6	SK2-21025	AUJUALU STORAGE TANK
5	H-256741	PRODUCT STRIPPER T-13
4	H-256742	PRODUCT CONDENSER E-5654
3	SK2-21048	DUNNAGE MODIF. L CELL PKG
2	SK2-21047	PRODUCT CONCENTRATOR
1	SK2-21046	SHT 28 3 - EFD L CELL
REF.		
	DWG. NO.	DRAWING TITLE
REFERENCE DRAWINGS		

[illegible]

NO.	DESCRIPTION	REV BY	APPO BY	FOR	DATE
REVISIONS					

JET VENT
 100 PSIG AIR
 100 PSIG STEAM
 RAW WATER
 STM SUB. HOR.
 TUBE BUNDLE VENT
 AIR TO T-13

GALLERY WALL?

COND. VENT

HNO₃ FLUSH

L3 PROC. CONDO

L3 COOLING H₂O

IPC RCP?

L3 STM CONDO

TRENCH WALL

MATCH LINE
 SK-2-21046 SH.1

TO TK-FIO VIA 2"
 ACID WASTE HOR.

TO CONDENSER
 VENT HEADER

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NOTE
FOR GENERAL NOTES SEE
SHEET 3 THIS DRAWING

SK-2-21046 2/3 0

MATCH LINE
FOR CONTINUATION SEE SHEET 3

FOR ALTERNATE ROUTINGS
SEE SKETCH ON SHEET 3

TO VESSEL VENT HDR.				TK-J5				(H-2-54160)				U. S. ATOMIC ENERGY COMMISSION HANFORD ATOMIC PRODUCTS OPERATION GENERAL ELECTRIC			
9 SK-2-21051 SH-112 HYDRAULIC SCHEMATIC				CHECK POINT COMMENT				APPROVED FOR CONST.				U. S. ATOMIC ENERGY COMMISSION HANFORD ATOMIC PRODUCTS OPERATION GENERAL ELECTRIC			
8 SK-2-21052 PFD 'L' CELL PACKAGE				DATE 3-21-64				APPROVED FOR PURCHASE				BY DATE			
7 SK-2-21050 'L' CELL ARRANGEMENT				SCALE NONE				APPROVED FOR DESIGN				BY DATE			
6 H-2-56741 PRODUCT STRIPPER T-L3				DRAWN BY				CHECKED BY				DATE			
5 H-2-56742 PRODUCT CONDENSER				ISSUED				REVISED				DATE			
4 SK-2-21048 DUNNAGE MODIF 'L' CELL PKG				DATE				DATE				DATE			
3 SK-2-21047 PRODUCT CONCENTRATOR				DATE				DATE				DATE			
2 SK-2-21046 SH-112 EFD 'L' CELL				DATE				DATE				DATE			
1 SK-2-21025 ANNULAR STORAGE TANK				DATE				DATE				DATE			
DRAWING TITLE				CLASSIFICATION				DATE				DATE			
REFERENCE DRAWINGS				DATE				DATE				DATE			
NEXT USED ON				DATE				DATE				DATE			
NO. DESCRIPTION				REV. BY DATE				APPD BY				FOR DATE			
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GENERAL NOTES :

1. HEAVY LINES (——) INDICATE NEW INSTALLATION. INSTRUMENTATION WILL HAVE TO BE REENUMBERED AT TIME OF PACKAGE INSTALLATION TO REFLECT NEW SERVICES AS SHOWN ON THIS DRAWING.
2. PACKAGE TO BE CRITICALLY SAFE FOR SOLUTIONS CONTAINING 450 GRAMS P_1 PER LITER WITH A MINIMUM OF 2.0 M H₂O.
3. FOR REVISED SAMPLER DRAWINGS SEE SK-2-21027 & SK-2-21028
4. NEITHER STEAM NOR WATER SHALL BE SUPPLIED TO J-14 BECAUSE OF POSSIBLE P_1 POLYMER FORMATION.
5. THESE VALVES SHOULD BE PLACED NEAR OUTSIDE OF PACKAGE FOR MANUAL OPERATION

<u>LEGEND</u>	<u>FUNCTION</u>
A _____	AMMETER
DPI _____	DIFFERENTIAL PRESSURE INDICATOR
FE _____	FLOW ELEMENT
FI _____	FLOW INDICATOR
FIX _____	FLOW INTEGRATOR
FR _____	FLOW RECORDER
FRC _____	FLOW RECORDER CONTROLLER
FT _____	FLOW TRANSMITTER
J _____	JET
JBV _____	JET BLOCK VALVE
JGV _____	JET GANG VALVE
MK _____	MICROPHONE
MS _____	MOTOR CONTROL SWITCH
P _____	PUMP
PI _____	PRESSURE INDICATOR
PIAS _____	PRESSURE INDICATOR ALARM SWITCH
SGI _____	SPECIFIC GRAVITY INDICATOR
SGR _____	SPECIFIC GRAVITY RECORDER
SP _____	SEAL POT
SPKR _____	SPEAKER
SPLP _____	SAMPLE POT
SV _____	SAFETY VALVE
TE _____	TEMPERATURE ELEMENT
TI _____	TEMPERATURE INDICATOR
TR _____	TEMPERATURE RECORDER
VC _____	VALVE CONTROLLER
VS _____	VALVE SWITCH
WFA5 _____	WEIGHT FACTOR ALARM SWITCH
WFI _____	WEIGHT FACTOR INDICATOR
WFIA _____	WEIGHT FACTOR INDICATOR ALARM
_____	MOUNTED ON PANEL BOARD
_____	MOUNTED LOCALLY

ALTERNATE ROUTE SKETCH

NOTE: DASH LINES (----) INDICATE
ALTERNATE ROUTES.

- ① THESE (3) JUMPERS WILL BE REMOVED FOR INSTALLING ALTERNATE ROUTES.
- ② THIS CONNECTOR MUST BE BLANKED WHEN JUMPER IS REMOVED.
- ③ THIS ROUTE MAY BE USED FOR DIRECT 3B PRODUCT RECYCLE TO THE 2AF TANK, TRU'S BY REMOVING THE XAW TO JS JUMPER.

1	SK2-21031	SH1/L HYDRAULIC SCHEMATIC
10	H-2-56738	EFD L-CELL PKG (SPARE)
1	H-2-56737	GFD L-CELL PKG (SPARE)
8	SK2-21082	PFD L-CELL PACKAGE
7	SK2-21090	L-CELL ARRANGEMENT
6	H-2-56744	PRODUCT STRIPPER T-L3
5	H-2-56742	PRODUCT CONDENSER
4	SK2-21048	DRAINAGE MODIF. L-CELL PKG
3	SK2-21047	PRODUCT CONCENTRATOR
2	SK2-21046	SMT 1/2 EFD-L-CELL
1	SK2-21026	ANNUAL STORAGE TANK
REV	DATE	DRAWING TITLE
REFERENCE DRAWINGS		
NEXT USED ON		

CHECK POINT		ORIGIN POINT		APPROVED FOR CONST.	
BY		DATE		BY	
DATE		REUSE DATE		DATE	
SCALE		NONE		APPROVED FOR PURCHASE	
BY		DATE		BY	
DATE		REUSE DATE		DATE	
APPROVED FOR DESIGN		BY		DATE	
BY		DATE		BY	
DATE		REUSE DATE		DATE	
APPROVED FOR CONSTRUCTION		BY		DATE	
BY		DATE		BY	
DATE		REUSE DATE		DATE	
CLASSIFICATION		BY		DATE	
NONE		BY		DATE	

U. S. ATOMIC ENERGY COMMISSION
HANFORD ATOMIC PRODUCTS OPERATION
GENERAL ELECTRIC

ENGINEERING
FLOW DIAGRAM
'L' CELL

PRODUCT REWORK & STORAGE

PLK 202-A INVENT 7001

SK-2-21046 3 3

EXISTING PERMANENT CROSS CELL PIPING

HW-83975
Page 36

SK-2-21051 2/20

CHECKED DATE DESIGNED DATE SCALE: NONE DRAWN: [Signature] CHECKED: [Signature] REVISIONS: [Signature]		APPROVED FOR CONST. BY: [Signature] APPROVED FOR PURCHASE BY: [Signature] APPROVED FOR DESIGN BY: [Signature]		U. S. ATOMIC ENERGY COMMISSION MANFORD ATOMIC PRODUCTS OPERATION GENERAL ELECTRIC HYDRAULIC SCHEMATIC PRODUCT REWORK & STORAGE 202-A 8512 SK-2-21051 2/2	
NO. DESCRIPTION REVISIONS		REV. BY DATE APP'D BY PGE DATE NEXT USED ON		REFERENCE DRAWINGS 1 SK-21048 EFD 'L' CELL PACKAGE 3084 DATE: [Signature]

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