

VCM EXPOSURE REDUCTION

ABERDEEN CHEMICAL PLANT

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VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTI. PURPOSE OF DESIGN

The purpose of this design is to reduce the possibility of VCM overexposure to personnel working with equipment in the old and new module recovery systems. Also, several drains where VCM contaminated water can be drained to an open sewer will be eliminated.

Routine dosimetry monitoring over the past two years shows that approximately 29% of the employee overexposures to vinyl chloride result when the operator or mechanic has worked with or in the area of the recovery systems. Of these recovery system overexposures, the operators or mechanics had been working with the recovery vacuum pumps and compressors in approximately 33% of the cases and with the new module south knockout pot and south recirculation pump in 15% of the cases. Listed are recovery systems related overexposures for the period of September 1981 through August 1983.

Vacuum pump and compressor related	= 17	33%
New module K.O. pot/recirculation pump related	= 8	15%
Seal water filter charge related	= 3	6%
Recovery exchanger related	= 4	7%
ERS tanks 702 & 703 related	= 2	4%
Blowdown tank strainers related	= 1	2%
Blowdown tank pumps related	= 2	4%
Blanks installed in recovery line	= 2	4%
Other recovery area related overexposures	= 13	25%
Total	52	100%

To reduce the possibility of overexposure to VCM while working with recovery system equipment, isolation valves, bleeders, and drains to the blowdown tank or batch water stripper will be added to the recovery system equipment where not already existing so that the equipment can be flushed or steam stripped prior to opening. In order to facilitate draining and flushing of resin from equipment and lines where resin could buildup, utility water at 100 PSIG minimum will be connected to the drain lines between two valves so that these drain lines can be flushed back to the equipment or to the blowdown tank or batch water strippers. This is the same type flushing set up that Oklahoma City has used on some of their recovery equipment with success.

The piping modifications have been designed so that the following procedures can be implemented for cleaning equipment prior to opening.

Compressors & Vacuum Pumps

1. Isolate the compressor or vacuum pump with manual valves on inlet and outlet.
2. Connect a flexible hose between one of the bleeders provided and the local recovery line to the blowdown tank or BWS.

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTI. PURPOSE OF DESIGN (Continued)Compressor & Vac Pumps (Continued)

3. Connect a second steam hose from the low pressure steam supply to the second bleeder on the opposite side of the compressor or vacuum pump.
4. Steam out the unit for several minutes. (Flush water to the double mechanical seals should be running. Inboard seal water to the vacuum pumps should not.)
5. After completing recovery install blinds at the inlet and outlet lines prior to opening.

Process Pumps

1. Isolate the pump on the inlet and outlet.
2. Connect a steam hose to the bleeder on the suction of the pump.
3. Line up the recovery drain line to the blowdown tank or batch water stripper.
4. Steam out the pump. (If the pump has double mechanical seals the flush should be running.)
5. After steaming, install blinds at the inlet and outlet of the pump prior to opening.

Filters

1. Isolate the filter on the inlet and outlet.
2. Connect a utility flush water hose to the bleeder provided.
3. Line up the recovery drain line to the blowdown tank or BWS.
4. Flush through the filter for several minutes. The utility water connection on drain line can be used to flush back to the filter to remove pluggages or to help flush solids to the blowdown tank or batch water stripper.
5. After flushing, connect a steam hose to the same bleeder and steam out the filter to remove any entrapped VCM.
6. Blind the filter inlet and outlet prior to opening the filter.

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTI. PURPOSE OF DESIGN (Continued)Heat Exchangers

1. Isolate the unit on the process inlet and outlet.
2. Connect a steam hose to the bleeder provided.
3. Line up the recovery drain line to the blowdown tank or BWS.
4. Steam out the exchanger.
5. After steaming install blinds on the inlet, outlet and drain lines of the exchanger prior to opening the heads.

Knockout Pots

1. Isolate the vessel at the process inlet and outlet, recirculation water outlet, and water spray inlet.
2. Flush and drain the vessel to the blowdown tank or batch water stripper.
3. Isolate the flush and drain lines.
4. Connect a steam hose to the bleeders provided and recover through the vacuum pumps and compressors.
5. After recovering, isolate and blind the vessel per the proper equipment entry procedure prior to entry.

Seal Water Separators

1. Isolate the vessel at the process inlet and outlets.
2. Flush and drain the vessel and level gauge to the blowdown tank or BWS. The old and new LRS separators have HPSW piped to them. The ERS separators T-702 & T-703 will have to have a flush water hose connected at the top of the vessel.
3. Connect a steam hose to the bleeder on the water outlet on the LRS's separators and on the top of T-702 & T-703 and recover. The LRS's separators have recovery lines piped to them but T-702 and T-703 will be recovered through the drain line.
4. After recovery, isolate and blind the vessel per the proper equipment entry procedure prior to entry.

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTII. DESCRIPTION OF DESIGN

For a description of this design refer to the P & I Diagrams in section VII of this design.

A major potential VCM overexposure problem area is the preparation and opening of the recovery vacuum pumps and compressors for maintenance. To reduce the potential for overexposure, this project will provide steam stripping connections and recovery drains and connections so that steam can be sparged through these vacuum pumps and compressors to the blowdown tank or BWS to remove trapped VCM prior to opening. When steam stripping one of these units the double mechanical seal flush water will be left running to prevent overheating the seals. Low pressure steam and recovery hose hookup points will be provided near the compressors and vacuum pumps. Manual block valves will also be added on the compressor and vacuum pumps inlets and outlets to prevent leakage.

Another major problem in the new module recovery system is PVC carry-over into the knockout pots. Resin and chunks of PVC are knocked out in these pots by circulating water. The resin and chunks plug the pump and knockout tanks. Currently, there is no method of removing solids and chunks from the system. The pumps plug often and must be taken out of service and cleaned out. Each time the pump is cleaned, there exists the potential for overexposure. A backflush filter to remove solids from the seal water system will be installed with the Recovery System Revisions Project under AFE 9771. However, there will still not be adequate means of flushing resin and chunks from the knockout pots. This design will install a 4 inch drain line from the bottom of the knockout pots to the blowdown tank. This line will gravity drain and will have utility water connections for flushing. The south knockout pot has a small standpipe in it on the suction to the recirculation pump. This standpipe will be extended to 24 inches and a 24 inch standpipe will be installed in the north knockout pot. With these measures, material can safely be routinely removed from the knockout pots with minimal possibility of overexposure.

Presently, on much of the recovery system equipment there are inadequate connections and drains for flushing and recovery prior to opening for maintenance. To facilitate draining and recovery of individual pieces of equipment, enclosed drains to the blowdown tank or BWS have been added where none existed. Also, to improve draining and flushing of equipment and lines where a potential for resin build up exists, utility water will be connected to the drain lines between two valves so that the lines can be flushed either back to the equipment to unplug the outlet or to the blowdown tank or BWS. Connections for flush water and steam will also be added to the new module seal water coolers, the old and new module recirculation coolers, the old and new module seal water pumps, the old and new modules seal water filters, the blowdown tank strainers, and T-702 and T-703 in the ERS so that they can be flushed or steamed through prior to being opened.

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTII. DESCRIPTION OF DESIGN (Continued)

The sight glasses on the seal water separators and knockout pots in the new module currently have inadequate means of flushing resin out of them. Utility water flushes will be installed as a means of safely cleaning these instruments with minimal possibility of overexposure.

The outlet of the old module seal water separators sight glasses will be piped to drain to the BWS.

The existing water makeup and flush to the new module knockout pots are a 2" process water connections. At times, the pressure in the knockout pots exceeds process water pressure and VCM has backed up into the process water header. In order to eliminate this problem and also improve solids flushing capabilities, two 1 inch utility water connections will be installed on each new module knockout pot. These connections will tie into each knockout pot tangentially at 180° apart and below the normal liquid level in the area where solids accumulate. This will aid in flushing solids and chunks of PVC out of the knockout pots.

The utility water for flushing will be supplied at 100 to 120 PSIG by the Utility Water System project to be AFE'd in the first quarter of 1984.

In the old and new module recovery systems there are several drains where contaminated water can be drained to an open sewer. With the improvements in enclosed drains to the blowdown tank and batchwater strippers these open drains will be eliminated.

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTIII. SAFETY EVALUATION

The purpose of this design is to provide adequate connections and drains so that recovery system equipment can be flushed, stripped, and drained to prevent possible VCM overexposure when the equipment is opened. Safety is the main consideration in making the modifications of this design. Major design safety considerations are:

1. Providing sufficient isolation valves, flush water/steam connections, and drains to the batch water strippers or the blowdown tank so that individual pieces of equipment can be isolated, flushed, steam stripped, and drained prior to being opened for maintenance.
2. Providing utility water flushes and isolation valves on drains so that pluggages can be flushed either back to the equipment or to the blowdown tank or batch water strippers.
3. Enlarging the new module knockout pot drains to 4 inches diameter, installing standpipes on the suction to the recirculation pumps and installing tangential flush nozzles to allow resin and chunks to be flushed and drained routinely so that these pots or downstream equipment will not have to be opened for cleanout of pluggage.
4. Providing utility water flushes for several level instruments so that resin buildup can be safely cleaned with minimal possibility of overexposure.
5. Eliminating several drains where VCM contaminated water can be drained to an open sewer.

With this design, attention should be given to the following items in order to maintain personnel safety.

- A. Proper lift techniques should be followed when handling flush water and steam hoses.
- B. Avoid contact with hot surfaces during steam stripping of equipment.
- C. Care should be taken to maintain a low pressure on the Bingham vacuum pumps in both recovery systems, since these units have only been hydrotested to 35 PSIG when constructed.



ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET
CONTROL VALVES
 DATE 10-18-83 S. M. NO. _____
 A. F. E. NO. _____
 W. Q. NO. _____ INQ. NO. _____
 REQ. NO. _____ P. O. NO. _____
 MADE BY SEN APP'D BY VEM

 PLANT ALDERDEEN CHEMICAL PLANT PROJECT VALVE/PRESSURE REDUCTION

GENERAL		CV-101		CV-201					
1	ITEM NO. & TAG	CV-101		CV-201					
2	SERVICE	STEAM		STEAM					
3	LINE SIZE	1"		1"					
4	MANUFACTURER	FISHER		FISHER					
5	MODEL NO.	95 L		95 L					
6									
SERVICE CONDITIONS		STEAM		STEAM					
7	FLUID	STEAM		STEAM					
8	TEMP. °F	NORMAL	MAX.	260	366	260	366		
9	PRESS., INLET, °F	NORMAL	MAX.		150		150		
10	Δ P	MIN.	NORMAL	MAX.					
					130		130		
11	MOLECULAR WEIGHT	A.P.I.		18		18			
12	SP. GR. @ 60°F.	6 F.T.			0.001		0.001		
13	WEIGHT % VAPOR IN	OUT			100		100		
14	VISCOSITY @ F.T. & P.								
15	RATE, NOR., LB/HR. (SCFH) GPM								
16	RATE, MAX., LB/HR. (SCFH) GPM								
17	NORMAL FLOW Cv								
18	OUTLET PRESSURE	20 PSIG		20 PSIG					
BODY									
19	BODY SIZE	PORT SIZE		1"		1"			
20	TYPE (ANGLE OR GLOBE)			(1)		(1)			
21	MATERIAL			SS		SS			
22	END CONNECTIONS			1" SCREWED		1" SCREWED			
23	BONNET								
24	Cv								
25	LUBRICATOR	ISO. VAL.							
26	PACKING								
27	TRAVEL INDICATOR								
28									
TRIM									
29	TYPE INNER VAL.	NO. OF PORTS							
30	PLUG & SEAT MATERIAL								
31									
ACTUATOR									
32	TYPE								
33	FAILURE POSITION								
34									
POSITIONER									
35	INPUT SIGNAL	OUTPUT SIGNAL							
36	BYPASS	GAUGES							
37	MANUFACTURER								
38	MODEL NO.								
ACCESSORIES									
39									

NOTES: (1) TO BE A SELF OPERATED STEAM REDUCING REGULATOR

() INDICATES ITEM CHANGED ON LATEST REVISION.

(X) INDICATES MANUFACTURER TO GIVE REQUESTED INFORMATION IN HIS QUOTATION.

SHEET _____ OF _____ REV. _____

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/4/83 Made By SCA
Project VCM EXPOSURE REDUCTION
Plant ABERDEEN CHEMICAL PLANT

NEW MODULE = 100 OLD MODULE = 200

Line Designation	Service		V	Flow Rate Lb/Hr (GPM)	Normal		At T and P		Press Drop PSI/ 100'	Velocity Ft/Sec	Remarks
	From	To			°F	PSIG	Lb/CF (Sp Gr)	Visc Cp			
4-HM-101-S-A2-3	NEW MODULE NORTH K.O. POT	BLOW DOWN TANK	1/2		100	20	62.4	1.0			CAN HAVE SOLIDS
4-HM-102-S-A2-3	NEW MODULE SOUTH K.O. POT	4-HM-101	1/2		100	20	62.4	1.0			CAN HAVE SOLIDS
2-HM-103-S-A2-3	SEAL H ₂ O PUMP	EXISTING DRAIN LINE TO BLOWDOWN TANK	1/4		70 366	150	62.4	1.0			FLUSH H ₂ O/STEAM/VAPORS
2-HM-104-S-A2-3	SEAL H ₂ O PUMP DISCH.	EXISTING DRAIN LINE TO BLOWDOWN TANK	1/4		70 366	150	62.4	1.0			"
3/4-HM-105-S-A2-3	SEAL WATER PUMP CHECK VALVE	... BYPASS	1/4		70 366	150	62.4	1.0			"
3/4-HM-106-S-A2-3	SEAL WATER PUMP CHECK VALVE	... BYPASS	1/4		70 366	150	62.4	1.0			"
1-HM-124-S-A2-3	SOUTH BLOWDOWN TANK STRAINER	4-HM-101	1/4		70 366	150	62.4	1.0			"
1-HM-125-S-A2-3	NORTH BLOWDOWN TANK STRAINER	1-HM-124	1/4		70 366	150	62.4	1.0			"
1-HM-126-S-A2-3	SOUTH BLOWDOWN TANK TRIMMED PUMP	1-HM-124	1/4		70 366	150	62.4	1.0			"
1-HM-127-S-A2-3	NORTH BLOWDOWN TANK TRIMMED PUMP	1-HM-126	1/4		70 366	150	62.4	1.0			"
2-WP-107-S-A2-3	TRANSFER PUMP	NEW MODULE NORTH K.O. POT	L		70	120	62.4	1.0			UTILITY FLUSH WATER
2-WP-108-S-A2-3	2-WP-107	4-HM-101	L		70	120	62.4	1.0			"
1-WP-109-S-A2-3	2-WP-107	NEW MOD. NORTH K.O. POT	L		70	120	62.4	1.0			"
2-WP-110-S-A2-3	2-WP-107	NEW MOD. SOUTH K.O. POT	L		70	120	62.4	1.0			"
1-WP-111-S-A2-3	2-WP-110	4-HM-102	L		70	120	62.4	1.0			"
1-WP-112-S-A2-3	2-WP-110	NEW MOD. SOUTH K.O. POT	L		70	120	62.4	1.0			"
1-WP-113-S-A2-3	2-WP-110	NEW MOD. SOUTH K.O. POT	L		70	120	62.4	1.0			"
1-WP-114-S-A2-3	1-WP-113	SOUTH K.O. POT LEVEL GAUGE	L		70	120	62.4	1.0			"
1-WP-115-S-A2-3	1-WP-113	SOUTH SEPARATOR LEVEL GAUGE	L		70	120	62.4	1.0			"
1-WP-116-S-A2-3	1-WP-115	N. SEALW. SEP. LEVEL GAUGE	L		70	120	62.4	1.0			"

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/5/83 Made By SC 14
Project PC4 EXPOSURE REDUCTION
Plant ABGR-DEEN

NEW MODULE = 100 OLD MODULE = 200

Line Designation	Service		V	Flow Rate Lb/Hr (GPM)	Normal		At T and P		Press Drop PSI/100'	Velocity Ft/Sdc	Remarks
	From	To			°F	PSIG	Lb/CF	Visc Cp			
1-WP-117-S-A2-3	1-WP-118	E. SW. COOLER DRAIN LINE	L		70	120	62.4	1.0			UTILITY FLUSH WATER
1-WP-118-S-A2-3	2-WP-123	N. SEAL W. SEPT. DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-119-S-A2-3	1-WP-118	NORTH SW. FILTER DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-120-S-A2-3	1-WP-121	WEST SW. COOLER DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-121-S-A2-3	2-WP-123	S. SEAL H. SEPT. DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-122-S-A2-3	1-WP-121	N. SEAL W. D. FILTER DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-123-S-A2-3	UTILITY WATER PUMP	NEW MODULE RECOVERY AREA	L		70	120	62.4	1.0			" " "
1-WP-128-S-A2-3	2-WP-123	1-HM-124	L		70	120	62.4	1.0			" " "
1-WP-129-S-A2-3	2-WP-107	RECIRC. COOLER DRAIN LINE	L		70	120	62.4	1.0			" " "
1-WP-132-S-A2-3	2-WP-107	RECIRC. PUMP DRAIN LINE	L		70	120	62.4	1.0			" " "
1-HM-130-S-A2-3	RECOVERY VAC PUMP AREA	EXISTING DRAIN LINE	V		260	20					LIMIT STEAM PRESS.
1-HM-131-S-A2-3	RECOVERY COMPRESSOR AREA	1-HM-130	V		260	20					" " "
1-SL-133-H-A2-3	STEAM HEADER	RECOVERY VAC PUMP COMP. AREA	V		306	150					" " "

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/5/83 Made By SCH
Project VCM EXPOSURE REDUCTION
Plant ASERDEEN

NEW MODULE = 100 OLD MODULE = 200

Line Designation	Service		V	Flow Rate Lb/Hr (GPM)	Normal		At T and P		Press Drop PSI/100'	Velocity Ft/Sdc	Remarks
	From	To			°F	PSIG	Lb/CF (Sp Gr)	Visc Cp			
Z-HM-201-S-A2-3	Q.M. SOUTH S.W. FILTER DISCHARGE	DRAIN LINE TO BWS	L		70/366	120/150	62.4	1.0			FLUSH/STEAM/VCM H ₂ O
Z-HM-202-S-A2-3	SOUTH SEAL H ₂ O LINE DISCHARGE	Z-HM-201	L		70/366	120/150	62.4	1.0			"
Z-HM-203-S-A2-3	NORTH SEAL H ₂ O FILTER DISCHARGE	Z-HM-201	L		70/366	120/150	62.4	1.0			"
Z-HM-204-S-A2-3	NORTH S.W. PUMP DISCHARGE	Z-HM-203	L		70/366	120/150	62.4	1.0			"
Z-HM-205-S-A2-3	NORTH S.W. COOLER	EXISTING DRAIN TO BWS	L		70/366	120/150	62.4	1.0			"
Z-HM-206-S-A2-3	SOUTH S.W. COOLER	EXISTING DRAIN TO BWS	L		70/366	120/150	62.4	1.0			"
Z-HM-207-S-A2-3	RECIRC. COOLER DISCHARGE	DRAIN LINE TO BWS	L		70/366	120/150	62.4	1.0			"
3/4-HM-208-S-A2-3	SEAL H ₂ O SEP. LEVEL DRAIN	DRAIN LINE TO BWS	L		70	120	62.4	1.0			FLUSH WATER DRAIN
Z-HM-209-S-A2-3	T-702 OUTLET	T-703 DRAIN LINE	L		100	15	62.4	1.0			
1-HM-210-S-A2-3	LRS VAL PUMP COMP AREA	DRAIN LINE TO BWS	V		210	20					LIMIT STEAM PRESS.
1-WP-211-S-A2-3	2-WP-214	Z-HM-206	L		70	120	62.4	1.0			UTILITY FLUSH WATER
1-WP-212-S-A2-3	1-WP-211	Z-HM-201	L		70	120	62.4	1.0			"
1-WP-213-S-A2-3	Z-WP-214	Z-HM-209	L		70	120	62.4	1.0			"
Z-WP-214-S-A2-3	UTILITY WATER PUMP	OLD MODULE RECOVERY AREA	L		70	120	62.4	1.0			"
1-WP-215-S-A2-3	2-WP-214	NORTH SEAL W. SEPARATOR DRAIN	L		70	120	62.4	1.0			"
1-WP-216-S-A2-3	1-WP-215	SOUTH SEAL W. SEPARATOR DRAIN	L		70	120	62.4	1.0			"
1-WP-217-S-A2-3	2-WP-214	KO POT DRAIN	L		70	120	62.4	1.0			"

date 10/5/83 Made By SCH
Project VCM EXPOSURE REDUCTION
plant ABERDEEN

NEW MODULE = 100 OLD MODULE = 200

[illegible]

VCM EXPOSURE REDUCTIONABERDEEN CHEMICAL PLANTVI. TIE-IN LIST

1. Replace the existing 2 inch drain nozzles on the new module knockout pots with 4 inch nozzles and run lines 4-HM-101 and 4-HM-102 from the knockout pots to the blowdown tank. These lines should be made free draining as possible since solids could accumulate.
2. Install two tangential nozzles on each new module knockout pot at 6 inches above the bottom straight wall and connect lines 2-WP-107, 1-WP-109, 2-WP-110, and 1-WP-112. These nozzles should be 180° apart and in the opposite direction of the process inlet. Remove the existing process water connections.
3. Tie lines 1-WP-113 and 1-WP-114 into the new module knockout pots level gauges and tie the drains from these instruments into lines 4-HM-101 and 4-HM-102.
4. Tie the following 1 inch utility water flush lines into the drain lines for the following equipment:
 - a. Line 1-WP-129 to new module recirculation cooler drain.
 - b. Line 1-WP-117 to new module east seal water cooler drain.
 - c. Line 1-WP-118 to new module north seal water separator drain.
 - d. Line 1-WP-119 to new module north seal water filter drain.
 - e. Line 1-WP-120 to new module west seal water cooler drain.
 - f. Line 1-WP-121 to new module south seal water separator drain.
 - g. Line 1-WP-122 to new module south seal water filter drain.
 - h. Line 1-WP-218 to old module recirculation pumps drain.
 - i. Line 1-WP-216 to old module south seal water separator drain.
 - j. Line 1-WP-215 to old module north seal water separator drain.
 - k. Line 1-WP-217 to old module knockout pots drain.
 - l. Line 1-WP-132 to new module recirculation pumps drain line.
5. Install drain lines 2-HM-103 and 2-HM-104 from the north and south seal water pump, respectively, to the existing drain line to the blowdown tank.
6. Install drain lines 1-HM-124, 1-HM-125, 1-HM-126 and 1-HM-127 from the blowdown strainers and transfer pumps to line 4-HM-101.
7. Install drain lines 1-HM-130 and 1-HM-131 from the new module vacuum pumps and compressors area to the existing drain line to the blow-down tank.

VCM EXPOSURE REDUCTION
ABERDEEN CHEMICAL PLANT

VI. TIE-IN LIST (Continued)

8. Install isolation valves on the following lines:
 - a. The process inlet and outlet to the N.M. recirculation cooler.
 - b. The drain line from the N.M. east seal water cooler.
 - c. The drain line from the N.M. west seal water cooler.
 - d. The drain line from the N.M. east seal water filter.
 - e. The drain line from the N.M. west seal water filter.
 - f. The process outlet from the N.M. east seal water filter.
 - g. The process outlet from the N.M. west seal water filter.
 - h. The process outlet from the O.M. south seal water separator.
 - i. The process outlet from the O.M. north seal water separator.
 - j. The old module knockout pots 2 inch drain line.
 - k. The process inlet to the O.M. north seal water filter.
 - l. The process inlet to the O.M. south seal water filter.
 - m. The process outlet to the O.M. recirculation cooler.
 - n. The drain from the ERS tank T-703.
9. Install 1 inch bleeder connections on the following lines:
 - a. The new module recirculation cooler process inlet.
 - b. The old module seal water separators outlets.
 - c. The old and new module seal water pumps inlets.
 - d. The old and new units seal water filters.
 - e. The blowdown tank strainers outlets.
 - f. The new module recovery compressors inlets and outlets.
 - g. The new module recovery vacuum pumps outlets.
 - h. The old module recovery compressors outlets.
 - i. The old module recovery vacuum pumps inlets and outlets.
 - j. T-702 and T-703 in the emission recovery system.
10. Tie in the following drain lines in the old module to the existing drain to the batch water strippers.
 - a. Line 3/4-HM-208 from the seal water separators level instrument drains.
 - b. Lines 2-HM-201 and 2-HM-203 from the seal water filter outlets.
 - c. Line 2-HM-207 from the recirculation cooler outlet.
 - d. Line 1-HM-210 from the LRS vac pumps and compressors area.
 - e. Line 2-HM-209 from ERS separator T-702.
 - f. Lines 2-HM-202 and 2-HM-204 from the seal water pumps.
 - g. Lines 2-HM-205 and 2-HM-206 from the seal water coolers.
11. Connect utility flush water lines 1-WP-115 and 1-WP-116 to the new module seal water separators level gauges.
12. Remove the drains to open sewers from the following equipment.
 - a. New module recirculation cooler.
 - b. New module seal water coolers.
 - c. New module seal water separators.
 - d. New module seal water filters.
 - e. Old module seal water separators level instruments.
 - f. New module knockout pots.