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2106-2.2
Revision 9
03/21/79

THREE MILE ISLAND NUCLEAR STATION
UNIT #2 OPERATING PROCEDURE 2106-2.2
CONDENSATE POLISHING SYSTEM

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Unit 1 Staff Recommends Approval

Approval _____ Date _____
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval _____ Date 3/21/79
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

_____ Date _____
Chairman of PORC

Unit 2 PORC Recommends Approval

_____ Date _____
Chairman of PORC

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Unit 1 Superintendent Approval

_____ Date _____

Unit 2 Superintendent Approval

_____ Date 3/21/79

Manager Generation Quality Assurance Approval _____ Date _____

TMI 55-A Rev 8/77

THREE MILE ISLAND NUCLEAR STATION

UNIT #2 OPERATING PROCEDURE 2106-2.2

CONDENSATE POLISHING SYSTEM

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THREE MILE ISLAND NUCLEAR STATION

UNIT #2 OPERATING PROCEDURE 2106-2.2

CONDENSATE POLISHING SYSTEM

2106-2.2A

1.0 REFERENCES

1.1 Drawings Applicable for Operation.

1.1.1 Make-Up Water Treatment and Condensate Polishing, B&R Dwg. 2006.

1.1.2 Condensate Demineralizer Mixed Bed Polisher System, L*A Water Conditioning Co. Dwg. 015-00-0405.

1.1.3 Condensate Demineralizer External Regen. System, L*A Water Conditioning Co. Dwg. 015-00-0406.

1.2 Operating Procedures Applicable for Operation.

1.2.1 2102-1.1 Unit Heat-Up.

1.2.2 2104-2.1 Cycle Make-Up Pretreatment.

1.2.3 2104-2.2 Demineralized Service Water.

1.2.4 2104-2.3 Instrument Air.

1.2.5 2104-2.8 Secondary Plant Sampling.

1.2.6 2104-2.9 Demineralizing System.

1.2.7 2106-2.1 Condensate.

1.2.8 2106-2.4 Feedwater.

1.2.9 2107-1.1 BOP Electrical.

1.3 Manufacturers Instruction Manuals.

1.3.1 L*A Water Purification System, Volumes I thru V B&R File # (15.00).

1.4 Applicable System Descriptions.

1.4.1 Feedwater and Condensate, Index No. 4A.

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1.4.2 Condensate Polishing, Index No. 4B.

1.4.3 Make-Up Water Treatment, Index No. 4C.

1.4.4 Secondary Plant Sampling, Index No. 12.

1.5 Curves, Tables, etc.

1.5.1 Table 1A, Service and Resin Transfer In - Remote Manual Operation.

2.0 LIMITS AND PRECAUTIONS

2.1 Equipment

2.1.1 Remove a polisher from service when an alarm annunciates high pressure drop across the resin trap, and ensure there has been no resin loss due to underdrain screen break. (Max. ΔP 5# across resin trap and Max. ΔP 40# across polisher at full flow.)

2.2 Administrative.

2.2.1 The Condensate Polishing System demineralizes feedwater which potentially contains radioactivite material should a Primary to Secondary Leak exist. Since these radioactivite materials would be concentrated in the mixed bed resin, the resin should be treated as potentially radioactive under this condition.

2.2.2 A polishing tank should be rinsed to drain for 5 minutes when initially placed in service to prevent contamination of feedwater.

2.2.3 A polishing tank should be taken out of service, and the exhausted resin regenerated, when an alarm annunciates polisher high effluent conductivity or gallonage exhaustion. This is necessary to prevent contamination of feedwater.

2.2.4 Ensure the heat tracing on the system components and piping is energized for both freeze protection and to prevent chemical crystallization.

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2.2.5 Observe safety precautions for strong chemicals when working with ammonium hydrozide, hydrazine, acid and caustic.

2.2.6 100% condensate flow must pass thru condensate polishing demineralizers prior to feeding OTSG's. If evidence of condenser tube leakage is observed, MSR drains will be routed directly to the Hot Well which will increase the rate of resin exhaustion in condensate polishing demineralizers.

2.2.7 While polishers are in service the local air switches for the inlet valves, inlet bypass valves and outlet valves should be placed in the OPEN position. When a polisher is removed from service or is in standby, the local air switches for these valves should be in AUTO.

3.0 PREREQUISITES

Initial Each Step

____3.1 Electrical power available (2107-1.1).

Component	Source	Unit
WT-P-19A	2-31A	10A
WT-P-19B	2-41A	7B

____3.2 Instrument air is in operation per 21042.3.

____3.3 Condensate polishing tanks filled with regenerated mixed bed resin.

____3.4 Valve line-up complete Appendix A.

____3.5 Service Air in operation per 2104-2.10.

____3.6 Demineralized water available 2104-2.2.

4.0 PROCEDURE

Initial Each Step.

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4.1 Start-up.

____4.1.1 Place the local control switches for the condensate polisher regeneration sump pumps in AUTO.

____4.1.2 When a condensate pump is started, vent the polishing tanks as necessary by opening and then closing vent valves M13, M23, M33, M43, M53, M63, M73 and M83.

CAUTION: Exercise care not to force resin out of vent as vents are not screened.

____4.1.3 After all polisher tanks are properly vented, CLOSE the EFFLUENT and INFLUENT valves for the polisher tank selected as standby.

____4.1.4 Shut CO-V12 and adjust the effluent valve positions of the in-service polishers to achieve equal flow through each tank as indicated on the Panel 304 flow recorders.

NOTE: Start-up recirculation back to the condenser will be provided by the Feedwater System normal startup valve line-up.

4.2 Normal Operation.

Monitor system parameters as necessary to insure proper operation. Periodically check all components in the Condensate Polishing System.

4.2.1 Shifting Polishers To and From Service.

NOTE: Valve numbers given in parenthesis are for example only and refer to polisher No. 1. Corresponding valves on other polishers are series numbered, i.e., M16 for polisher No. 1, M26 for polisher No. 2, M36 for polisher No. 3, etc.

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____4.2.1.1 Before starting to place a polisher in service, contact the Control Room to insure that there is adequate suction pressure to the Condensate Booster Pumps to permit rinsing of the polisher.

OPEN the standby polisher influent valve (M11) wait 3 minutes until both valves open, then open vent valve M-13 until water flows from vent. OPEN recycle valve (M16) and recycle header valve MC-1 to polisher sump for 5 minutes. Caution should be taken so as not to exceed 2500 gpm on that polishers flow indicator.

____4.2.1.2 OPEN effluent valve and close recycle valve to the polisher sump when the polisher to be put in service is rinsed in for 5 min. Shut MC-1.

____4.2.1.3 Remove the exhaus polisher from service by slowly closing its EFFLUENT valve while slowly opening the standby polisher EFFLUENT valve. Make applicable entries in the polisher Record Book.

NOTE: Flow change not to exceed rate of 25 gpm/sec.

____4.2.1.4 After the polisher is placed in service place the local air switch for the appropriate polisher inlet valve (M11), inlet bypass (M11BY), and outlet valve (M12) to the OPEN position. Place the local air switch for the polisher removed from service for the inlet valve (M11) inlet bypass (M11BY), and outlet valve (M12) back to the AUTO position.

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____4.2.1.5 Adjust effluent valve of polisher being placed on line to match flow of the in-service polisher tanks. CAUTION should be taken not to lose resin thru vent line, because the polisher vents are not screened.

4.3 Shutdown

____4.3.1 The Condensate Polishing System will be shut down when the Condensate System is shut down. CLOSE influent and effluent valves for all polisher tanks. Ensure polishers stay full so that resins do not dry out. Make necessary entries in Polisher Record Book.

4.4 Loading Aqueous Ammonia.

____4.4.1 Insure drum of water is available to vent tank into; the eyewash and shower stations in coagulator building are operational; and a washdown hose is hooked up to domestic water and is available for use.

____4.4.2 CLOSE WT-V321A, WT-V148, WT-149 and N_2 bottle isolation.

____4.4.3 Remove pipe cap from 2" vent hose and immerse in drum of water, than slowly open WT-V149 to vent tank into drum.

____4.4.4 Open WT-V72; check closed WT-V69. Remove blind flange and hook up truck transfer hose flange.

____4.4.5 Close WT-V72, Record tank level, then open WT-V69 and commence transfer.

____4.4.6 When transfer is complete, close WT-V69 and open WT-V72. Drain and remove transfer hose and rebolt blind flange in place.

_____4.4.7 Record new tank level and close WT-V149.

_____4.4.8 Open WT-V148 and N_2 isolation, to pressurize tank to ≈ 4-5 psi.

_____4.4.9 Replace pipe cap on vent hose and wash down any spillage.

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APPENDIX A

Valve Line-Up

System: Condensate Polishing Date

Condensate Polishing Tanks Manual Valves

Valve No.	Description	Position	Initial
WT-V324A	Recycle to Condenser Iso.	CL	
WT-V334B	Polisher (CO-K-1H) Effluent Iso.	OP	
M17A	Polisher (CO-K-1H) Effluent Dwnstr.Res.Trap Px	CL	
M17B	Polisher (CO-K-1H) Fluffing Air	CL	
WT-V414E	Polisher (CO-K-1H) Effluent Grab Sample	CL	
WT-V414F	Polisher (CO-K-1H) Effluent Press. Gauge Iso.	OP	
WT-V414G	Polisher (CO-K-1H) Effluent Stream Sample Iso.	OP	
WT-V414H	Polisher (CO-K-1H) Effluent Stream Sample Rate	*	
WT-V414I	Polisher (CO-K-1H) Influent Grab Sample	CL	
WT-V414J	Polisher (CO-K-1H) Influent Iso.	OP	
WT-V325A	Influent Header Stream Sample Rate	*	
WT-V325B	Influent Header Stream Sample Iso.	OP	
WT-V325C	Influent Grab Sample	CL	
WT-V325D	Influent Line Drain	CL	
WT-V325E	Influent Line Vent	CL	
WT-FV-10	Polisher CO-K-H Resin Trap Drain	CL	
WT-V326B	Polisher (CO-K-1G) Effluent Iso.	OP	
M27A	Polisher (CO-K-1G) Effluent Dwnstr.Res.Trap Px	CL	
M27B	Polisher (CO-K-1G) Fluffing Air	CL	
WT-V424E	Polisher (CO-K-1G) Effluent Grab Sample	CL	
WT-V424F	Polisher (CO-K-1G) Effluent Press. Gauge Iso.	OP	
WT-V424G	Polisher (CO-K-1G) Effluent Stream Sample Iso.	OP	
WT-V424H	Polisher (CO-K-1G) Effueent Stream Sample Rate	*	
WT-V424I	Polisher (CO-K-1G) Influent Grab Sample	CL	
WT-V424J	Polisher (CO-K-1G) Influent Iso.	OP	

* Rate Set

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APPENDIX A

Valve Line-Up

System: Condensate Polishing Date

Condensate Polishing Tanks Manual Valves

Valve No.	Description	Position	Initial
WT-FV-11	Polisher (CO-K-G) Resin Trap Drain	CL	
WT-V327B	Polisher (CO-K-1F) Effluent Iso.	OP	
M37A	Polisher (CO-K-1F) Effluent Dwnstrm.Res.Trap Px	CL	
M37B	Polisher (CO-K-1F) Fluffing Air	CL	
WT-V434E	Polisher (CO-K-1F) Effluent Grab Sample	CL	
WT-V434F	Polisher (CO-K-1F) Effluent Press. Gauge Iso.	OP	
WT-V434G	Polisher (CO-K-1F) Effluent Stream Sample Iso.	OP	
WT-V434H	Polisher (CO-K-1F) Effluent Stream Sample Rate	*	
WT-V434I	Polisher (CO-K-1F) Influent Grab Sample	CL	
WT-V434J	Polisher (CO-K-1F) Influent Iso.	OP	
WT-FV-12	Polisher (CO-K-1F) Resin Trap Drain	CL	
WT-V328B	Polisher (CO-K-1E) Effluent Iso.	OP	
M47A	Polisher (CO-K-1E) Effluent Dwnstrm.Res.Trap Px	CL	
M47B	Polisher (CO-K-1E) Fluffing Air	CL	
WT-V444E	Polisher (CO-K-1E) Effluent Grab Sample	CL	
WT-V444F	Polisher (CO-K-1E) Effluent Press. Gauge Iso.	OP	
WT-V444G	Polisher (CO-K-1E) Effluent Stream Sample Iso.	OP	
WT-V444H	Polisher (CO-K-1E) Effluent Stream Sample Rate	*	
WT-V444I	Polisher (CO-K-1E) Influent Grab Sample	CL	
WT-V444J	Polisher (CO-K-1E) Influent Iso.	OP	
WT-FV-13	Polisher (CO-K-1E) Resin Trap Drain	CL	
WT-V329A	Influent "DPT" Iso.	OP	
WT-V329B	Effluent "DPT" Iso.	OP	
WT-V329C	Effluent Line Vent	CL	
WT-V329D	Effluent Line Grab Sample	CL	
WT-V329E	Effluent Line Drain	CL	194 228

* Rate Set

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System: Condensate Polishing Date

Condensate Polishing Tanks Manual Valves

Valve No.	Description	Position	Initial
WT-V329F	Effluent Header Stream Sample Iso.	OP	
WT-V329G	Effluent Header Stream Sample Rate	*	
WT-V330A	Resin Inlet Line Iso. to Polishers CO-K-1A to 1D	CL	
WT-V330B	Resin Inlet Line Iso. to Polishers CO-K-1E to 1H	CL	
WT-V331A	Air Inlet Line Iso. to Polishers CO-K-1E to 1H	CL	
WT-V331B	Air Inlet Line Iso. to Polishers CO-K-1A to 1D	CL	
WT-V332A	Resin Outlet Line Iso. from Polishers CO-K-1A to 1D	CL	
WT-V332B	Resin Outlet Line Iso. from Polishers CO-K-1E to 1H	CL	
WT-V333A	Sluice Water Inlet Iso. to Polishers CO-K-1A to 1D	OP	
WT-V333B	Sluice Water Inlet Iso. to Polishers CO-K-1E to 1H	OP	
WT-V334A	Polisher (CO-K-1D) Effluent Iso.	OP	
M57A	Polisher (CO-K-1D) Effluent Dwnstr.Res.Trap Px	CL	
M57B	Polisher (CO-K-1D) Fluffing Air	CL	
WT-V454D	Polisher (CO-K-1D) Effluent Grab Sample	CL	
WT-V454E	Polisher (CO-K-1D) Effluent Press. Gauge Iso.	OP	
WT-V454G	Polisher (CO-K-1D) Effluent Stream Sample Iso.	OP	
WT-V454F	Polisher (CO-K-1D) Effluent Stream Sample Rate	*	
WT-V454I	Polisher (CO-K-1D) Influent Grab Sample	CL	
WT-V454J	Polisher (CO-K-1D) Influent Iso.	OP	
WT-FV-14	Polisher (CO-K-1D) Resin Trap Drain	CL	
WT-FV-15	Polisher (CO-K-1C) Resin Trap Drain	CL	
WT-V335B	Polisher (CO-K-1C) Effluent Iso.	OP	
WT-M67A	Polisher (CO-K-1C) Effluent Dwnstr.Res.Trap Px	CL	
WT-M67B	Polisher (CO-K-1C) Fluffing Air	CL	
WT-V464D	Polisher (CO-K-1C) Effluent Grab Sample	CL	

*Rate Set

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System: Condensate Polishing Date

Condensate Polishing Tanks Manual Valves

Valve No.	Description	Position	Initial
WT-V464E	Polisher (CO-K-1C) Effluent Press. Gauge Iso.	OP	
WT-V464G	Polisher (CO-K-1C) Effluent Stream Sample Iso.	OP	
WT-V464F	Polisher (CO-K-1C) Effluent Stream Sample Rate	*	
WT-V464I	Polisher (CO-K-1C) Influent Grab Sample	CL	
WT-V464J	Polisher (CO-K-1C) Influent Iso.	OP	
WT-V336B	Polisher (CO-K-1B) Effluent Iso.	OP	
M77A	Polisher (CO-K-1B) Effluent Dwnstr.Res.Trap Px	CL	
M77B	Polisher (CO-K-1B) Fluffing Air	CL	
WT-V474D	Polisher (CO-K-1B) Effluent Grab Sample	CL	
WT-V474E	Polisher (CO-K-1B) Effluent Press. Gauge Iso.	OP	
WT-V474G	Polisher (CO-K-1B) Effluent Stream Sample Iso.	OP	
WT-V474F	Polisher (CO-K-1B) Effluent Stream Sample Rate	*	
WT-V474I	Polisher (CO-K-1B) Influent Grab Sample	CL	
WT-V474J	Polisher (CO-K-1B) Influent Iso.	OP	
WT-FV-16	Polisher (CO-K-1B) Resin Trap Drain	CL	
WT-V337B	Polisher (CO-K-1A) Effluent Iso.	OP	
M87A	Polisher (CO-K-1A) Effluent Dwnstr.Res.Trap Px	CL	
M87B	Polisher (CO-K-1A) Fluffing Air	CL	
WT-V484D	Polisher (CO-K-1A) Effluent Grab Sample	CL	
WT-V484E	Polisher (CO-K-1A) Effluent Press. Gauge Iso.	OP	
WT-V484G	Polisher (CO-K-1A) Effluent Stream Sample Iso.	OP	
WT-FV-17	Polisher (CO-K-1A) Resin Trap Drain	CL	
WT-V484F	Polisher (CO-K-1A) Effluent Stream Sample Rate	*	
WT-V484I	Polisher (CO-K-1A) Influent Grab Sample	CL	
WT-V484J	Polisher (CO-K-1A) Influent Iso.	OP	

* Rate Set

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Valve Line-Up

System: Condensate Polishing Date

Valve No.	Description	Condensate Polishing Tanks Automatic Valves	Position	Initial
M31	Polisher CO-K-1F Influent		A-OP	
M32	Polisher CO-K-1F Effluent		A-OP	
M33	Polisher CO-K-1F Vent		A-CL	
M34	Polisher CO-K-1F Transfer Air In		A-CL	
M35	Polisher CO-K-1F Resin In		A-CL	
M36	Polisher CO-K-1F Recycle to Condenser		A-CL	
M38	Polisher CO-K-1F Sluice Water In		A-CL	
M39	Polisher CO-K-1F Resin Out		A-CL	
M31 BY	Polisher CO-K-1F Influent Bypass		A-OP	
M41	Polisher CO-K-1E Influent		A-OP	
M42	Polisher CO-K-1E Effluent		A-OP	
M43	Polisher CO-K-1E Vent		A-CL	
M44	Polisher CO-K-1E Transfer Air In		A-CL	
M45	Polisher CO-K-1E Resin In		A-CL	
M46	Polisher CO-K-1E Recycle to Condenser		A-CL	
M48	Polisher CO-K-1E Sluice Water In		A-CL	
M49	Polisher CO-K-1E Resin Out		A-CL	
M41 BY	Polisher CO-K-1E Influent Bypass		A-OP	
M51	Polisher CO-K-1D Influent		A-OP	
M52	Polisher CO-K-1D Effluent		A-OP	
M53	Polisher CO-K-1D Vent		A-CL	
M54	Polisher CO-K-1D Transfer Air In		A-CL	
M55	Polisher CO-K-1D Resin In		A-CL	

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System: Condensate Polishing Date

Valve No.	Description	Condensate Polishing Tanks Automatic Valves	Position	Initial
M56	Polisher CO-K-1D Recycle to Condenser		A-CL	
M58	Polisher CO-K-1D Sluice Water In		A-CL	
M59	Polisher CO-K-1D Resin Out		A-CL	
M51 BY	Polisher CO-K-1D Influent Bypass		A-OP	
MC1	Drain to Cond. Polishers Regeneration Sump		A-CL	
MC2	Header Recycle to Condenser		A-CL	
M11	Polisher CO-K-1H Influent		A-OP	
M12	Polisher CO-K-1H Effluent		A-OP	
M13	Polisher CO-K-1H Vent		A-CL	
M14	Polisher CO-K-1H Transfer Air Inlet		A-CL	
M15	Polisher CO-K-1H Resin Inlet		A-CL	
M16	Polisher CO-K-1H Recycle to Condenser		A-CL	
M18	Polisher CO-K-1H Sluice Water Inlet		A-CL	
M19	Polisher CO-K-1H Resin Outlet		A-CL	
M11 BY	Polisher CO-K-1H Influent Bypass		A-OP	
M21	Polisher CO-K-1G Influent		A-OP	
M22	Polisher CO-K-1G Effluent		A-OP	
M23	Polisher CO-K-1G Vent		A-CL	
M24	Polisher CO-K-1G Transfer Air Inlet		A-CL	
M25	Polisher CO-K-1G Resin Inlet		A-CL	
M26	Polisher CO-K-1G Recycle to Condenser		A-CL	
M28	Polisher CO-K-1G Sluice Water Inlet		A-CL	
M29	Polisher CO-K-1G Resin Outlet		A-CL	

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Valve No.	Description	Condensate Polisning Tanks Automatic Valves	Position	Initial
M21 BY	Polisher CO-K-1G	Influent Bypass	A-OP	
M61	Polisher CO-K-1C	Influent	A-OP	
M62	Polisher CO-K-1C	Effluent	A-OP	
M63	Polisher CO-K-1C	Vent	A-CL	
M64	Polisher CO-K-1C	Transfer Air In	A-CL	
M65	Polisher CO-K-1C	Resin In	A-CL	
M66	Polisher CO-K-1C	Recycle to Condenser	A-CL	
M68	Polisher CO-K-1C	Sluice Water In	A-CL	
M69	Polisher CO-K-1C	Resin Out	A-CL	
M61 BY	Polisher CO-K-1C	Influent Bypass	A-OP	
M71	Polisher CO-K-1B	Influent	A-OP	
M72	Polisher CO-K-1B	Effluent	A-OP	
M73	Polisher CO-K-1B	Vent	A-CL	
M74	Polisher CO-K-1B	Transfer Air In	A-CL	
M75	Polisher CO-K-1B	Resin In	A-CL	
M76	Polisher CO-K-1B	Recycle to Condenser	A-CL	
M78	Polisher CO-K-1B	Sluice Water In	A-CL	
M79	Polisher CO-K-1B	Resin Out	A-CL	
M71 BY	Polisher CO-K-1B	Influent Bypass	A-OP	
M81	Polisher CO-K-1A	Influent	A-OP	
M82	Polisher CO-K-1A	Effluent	A-OP	
M83	Polisher CO-K-1A	Vent	A-CL	
M84	Polisher CO-K-1A	Transfer Air In	A-CL	

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System: Condensate Polishing Date

Valve No.	Description	Position	Initial
	Condensate Polishing Tanks Automatic Valves		
M85	Polisher CO-K-1A Resin In	A-CL	_____
M86	Polisher CO-K-1A Recycle to Condenser	A-CL	_____
M88	Polisher CO-K-1A Sluice Water In	A-CL	_____
M89	Polisher CO-K-1A Resin Out	A-CL	_____
M81 BY	Polisher CO-K-1A Influent Bypass	A-OP	_____

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — External Regeneration Station Manual Valves — Date

Valve No.	Description	Position	Initial
WT-V316A	Caustic Storage Tank Drain	CL	
WT-V317A	Hot Water Tank Outlet Iso.	OP	
WT-V317B	Hot Water Tank Drain	CL	
WT-V317C	Hot Water Tank Inlet Iso.	CL	
WT-V318A	Caustic Dilution Water Line Iso.	OP	
WT-V318B	Acid Dilution Water Line Iso.	OP	
WT-V319A	Mixing & Storage Tank Drain	CL	
WT-V319B	Mixing & Storage Tank Conductivity Cell Rate	*	
WT-V319C	Mixing & Storage Tank Grab Sample	CL	
WT-V320A	Regeneration Tank Air to Vibrator Rate	*	
WT-V320B	Regeneration Tank Dilute Acid In	Locked CL	
WT-V320C	Regeneration Tank Grab Sample	CL	
WT-V320D	Regeneration Tank Conductivity Cell Rate	*	
WT-V320E	Regeneration Tank Drain	CL	
WT-V320F	Regeneration Tank Conductivity Cell Rate	*	
WT-V320G	Regeneration Tank Chemical Injection Line Drain	CL	
WT-FV-84	Resin Addition to Receiving Tank	CL	
WT-V320H	Sluice Water to Polishers Rate	*	
WT-V320I	Sluice Water to Polishers Iso.	OP	
WT-V320J	Sluice Water to Regeneration Station Iso.	OP	
WT-V321A	Aqueous Ammonia Storage Tank Drain	CL	
WT-V321B	Aqueous Ammonia Pump AM-P-4C Discharge Px	CL	
WT-V321C	Aqueous Ammonia Pump AM-P-4B Discharge Px	CL	
WT-V321D	Aqueous Ammonia Pump AM-P-4A Discharge Px	CL	

* Rate Set

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — External Regeneration Station Manual Valves — Date

Valve No.	Description	Position	Initial
WT-V321E	Aqueous Ammonia Pump AM-P-4B Discharge Iso.	OP	
WT-V321F	Aqueous Ammonia Pump AM-P-4B Surge Chamber Drain	CL	
WT-V321G	Aqueous Ammonia Pump AM-P-4A Discharge Iso.	OP	
WT-V321H	Aqueous Ammonia Pump AM-P-4A Surge Chamber Drain	CL	
WT-V321I	Aqueous Ammonia Pump AM-P-4C Discharge Iso.	OP	
WT-V321J	Aqueous Ammonia Pump AM-P-4C Surge Chamber Drain	CL	
WT-V321L	Demin. Water to Sulphite Feed Hdr.	CL	
WT-V321M	Sodium Sulphite Discharge Header Rate	*	
WT-V322A	Mixing & Motive Air to Pol. and Regen. St. Iso.	OP	
WT-V322B	Mixing Air to Reg. Station Iso.	OP	
WT-V322C	Sodium Sulphite Pump (WT-P-15A) Disch. Iso.	CL	
WT-V322D	Sodium Sulphite PUmp (WT-P-15B) Disch. Iso.	CL	
WT-V323A	Dilution Water to Sodium Sulphite Header Rate	*	
WT-V323B	Dilution Water to Aqueous Ammonium Header Rate	*	
WT-V323C	Sodium Sulphite Pump WT-P-15A Inlet Iso.	CL	
WT-V323D	Sodium Sulphite Pump WT-P-15B Inlet Iso.	CL	
WT-V323E	Sodium Sulphite Tank WT-H-1 Drain	CL	
WT-V323F	Sodium Sulphite Tank Demin. Water Rate	*	
WT-V323G	Dilute Caustic Line Grab Sample	CL	
WT-V323H	Dilute Acid Line Grab Sample	CL	
WT-FV-18	Dilute Caustic Conductivity Cell Rate	*	

* Rate Set

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — Date

External Regeneration Station Automatic Valves

Valve No.	Description	Position	Initial
S9	Mix & Storage Tank Backwash Water Inlet	A-CL	
S10	Mix & Storage Tank Backwash Outlet	A-CL	
S11	Mix & Storage Tank Sluice Water Inlet	A-CL	
C1	Regeneration Tank Resin In from Polishers	A-CL	
C2	Regeneration Tank Aqueous Ammonia Inlet	A-CL	
C3	Regeneration Tank Dilute Acid Inlet	A-CL	
C4	Regeneration Tank Rinse Waste Outlet	A-CL	
C5	Regeneration Tank Backwash Water Inlet	A-CL	
C6	Regeneration Tank Mixing Air Inlet	A-CL	
C7	Regeneration Tank Sluice Water Inlet	A-CL	
C8	Regeneration Tank Resin Transfer to Mix. & Storage Tank	A-CL	
C9	Regeneration Tank Dilute Caustic Inlet	A-CL	
C10	Regeneration Tank Sodium Sulphite Inlet	A-CL	
C11	Regeneration Tank Motive Air Inlet	A-CL	
C12	Regeneration Tank Vent	A-CL	
C13	Regeneration Tank Backflush Wastes Outlet	A-CL	
C14	Regeneration Tank Rinse Water	A-CL	
C15	Regeneration Tank Resin from Mix & Stg. Tk.	A-CL	
C16	Regeneration Tank Flush Water Inlet	A-CL	
C17	Regeneration Tank Aqueous Ammonia Inlet	A-CL	
R1P	Concentrated Acid Pump Discharge	A-CL	
R2P	Concentrated Acid Discharge to Dilute Acid "Tee"	A-CL	

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — External Regeneration Station Automatic Valves — Date

Valve No.	Description	Position	Initial
R3P	Concentrated Acid Discharge to "N" Tank	A-CL	
R4P	Dilution Water Discharge to Acid Mix "Tee"	A-CL	
R5P	Concentrated Caustic Pump Discharge	A-CL	
R6P	Concentrated Caustic Discharge to Dilute Caustic "Tee"	A-CL	
R7P	Concentrated Caustic Discharge to "N" Tank	A-CL	
R8P	Dilution Water Discharge to Caustic Mix "Tee"	A-CL	
R9P	Sodium Sulphite Pump Discharge to Mix "Tee"	A-CL	
R10P	Dilution Water Discharge to Sodium Sulphite Mix "Tee"	A-CL	
R11P	Aqueous Ammonia Pump Discharge to Mix "Tee"	A-CL	
R12P	Dilution Water Discharge to Aqueous Ammonia Mix "Tee"	A-CL	
X1	Sluicing Wastes to Drain Pot	A-CL	
X2	Regeneration Wastes to "N" Tank	A-OP	
PR-1	Mix & Motive Air Regulator	*	
PR-2	Mix Air Regulator	*	
BV-1	Caustic Dilution Water Blend	A	
S1	Mix & Storage Tk. Motive Air Inlet	A-CL	
S2	Mix & Storage Tk. Vent	A-CL	
S4	Backflush Waste to "N" Tk.	A-CL	
S5	Mix & Storage Tk. Rinse Water Inlet	A-CL	
S6	Mix & Storage Tk. Flush Wastes	A-CL	
S7	Mix & Storage Tk. Mixing Air Inlet	A-CL	
S8	Mix & Storage Tk. Resin Transfer to Polishers	A-CL	

* Rate Set

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — Date

Condensate Polishers Regeneration Waste Valves

Valve No.	Description	Position	Initial
WT-V103	Sump Disch. Hdr. Radiation Monitor Outlet Iso.	OP	
WT-V104	Sump Disch. Hdr. Radiation Monitor Inlet Iso.	OP	
WT-V105A	Sump Pump WT-P-19A Discharge Iso.	OP	
WT-V105B	Sump Pump WT-P-19B Discharge Iso.	OP	
WT-V115	Regeneration Sump Effluent Control to Blowdown	A-OP	
WT-V118	Regeneration Station Effluent Control to "N" Tank	A-OP	
WT-V119	Regeneration Station Effluent Control to Misc. Waste Hold-Up Tank	A-CL	
WT-V121	Regeneration Sump Effluent Control to Misc. Waste Hold-Up Tank	A-CL	
WT-V123A	Cond. Polishing Regeneration Wastes to Misc. Waste Hold-Up Tank Iso.	OP	
WT-V123B	Cond. Polishing Regeneration Sump Disch. to Misc. Waste Hold-Up Tank Iso.	OP	
WT-V131	Line Vent Con. Polisher to Misc. Waste Tank	CL	
WT-V132	Line Vent Iso. Cond. Polisher to Misc. Waste Tank	CL	

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APPENDIX A

Valve Line-Up

System: Condensate Polishing — Ammonia & Hydrazine Feed — Date

Valve No.	Description	Manual Valves	Position	Initial
WT-V338A	Ammonium Hydroxide Pump (AM-P-2) Inlet Iso.		OP	
WT-V338B	Ammonium Hydroxide Tank (AM-T-1) Drain		CL	
WT-V338C	Ammonium Hydroxide Tank Condensate Fill		CL	
WT-V338D	Ammonium Hydroxide Measuring Tank (AM-T-4) Drain		CL	
WT-V338E	Ammonium Hydroxide Pump (AM-P-2) Discharge Iso.		OP	
WT-V339A	Hydrazine Pump (AM-P-1B) Inlet Iso.		OP	
WT-V339B	Hydrazine Pump (AM-P-1A) Inlet Iso.		OP	
WT-V339C	Hydrazine Tank (AM-T-2) Drain		CL	
WT-V339D	Hydrazine Tank Condensate Fill		CL	
WT-V339E	Hydrazine Measuring Tank (AM-T-5) Drain		CL	
WT-V339F	Hydrazine Pump (AM-P-1B) Discharge Iso.		OP	
WT-V339G	Hydrazine Pump (AM-P-1A) Discharge Iso.		OP	
WT-V93	Ammonium Hydroxide Injection Iso.		OP	
WT-V94	Hydrazine Injection Iso.		OP	

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APPENDIX A

Valve Line-Up

System: Condensate Polishing

Valve No.	Description	Position	Date Initial
WT-IV-47	WT-PT-7395 Iso.	OP	
WT-IV-48	WT-PT-7395 Iso.	OP	
WT-IV-49	WT-PT-7395 Equilizing Vlv.	CL	
WT-IV-50	WT-FT-7394 Iso.	OP	
WT-IV-51	WT-FT-7394 Iso.	OP	
WT-IV-52	WT-FT-7394 Equilizing Vlv.	CL	
WT-IV-53	WT-DPT-7394 Iso.	OP	
WT-IV-54	WT-DPT-7394 Iso.	OP	
WT-IV-55	WT-DPT-7394 Equilizing Vlv.	CL	
WT-IV-7	WT-FT-7393 Iso.	OP	
WT-IV-8	WT-FT-7393 Iso.	OP	
WT-IV-9	WT-FT-7393 Equilizing Vlv.	CL	
WT-IV-10	WT-PI-2044 Gauge Iso.	OP	
WT-IV-11	Test Connection	CL	
WT-IV-12	WT-FT-7392 Iso.	OP	
WT-IV-13	WT-FT-7392 Iso.	OP	
WT-IV-14	WT-FT-7392 Equilizing Vlv.	CL	
WT-IV-15	WT-PI-2043 Gauge Iso.	OP	
WT-IV-16	Test Connection	CL	
WT-IV-17	WT-FT-7391 Iso.	OP	
WT-IV-18	WT-FT-7391 Iso.	OP	
WT-IV-19	WT-FT-7391 Equilizing Vlv.	CL	

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APPENDIX A

Valve Line-Up

System: Condensate Polishing

Valve No.	Description	Position	Date Initial
WT-IV-20	WT-PI-2042 Gauge Iso.	OP	
WT-IV-21	Test Connection	CL	
WT-IV-22	WT-FT-7390 Iso.	OP	
WT-IV-23	WT-FT-7390 Iso.	OP	
WT-IV-24	WT-FT-7390 Equilizing Vlv.	CL	
WT-IV-25	WT-PI-2041 Gauge Iso.	OP	
WT-FV-19	Polisher CO-K-1H DPSI 7386 Isolation	OP	
WT-FV-20	Polisher CO-K-1H DPSI 7386 Isolation	OP	
WT-FV-21	Polisher CO-K-1G DPSI 7387 Isolation	OP	
WT-FV-22	Polisher CO-K-1G DPSI 7387 Isolation	OP	
WT-FV-23	Polisher CO-K-1F DPSI 7388 Isolation	OP	
WT-FV-24	Polisher CO-K-1F DPSI 7388 Isolation	OP	
WT-FV-25	Polisher CO-K-1E DPSI 7389 Isolation	OP	
WT-FV-26	Polisher CO-K-1E DPSI 7389 Isolation	OP	
WT-FV-27	Polisher CO-K-1D DPSI 7390 Isolation	OP	
WT-FV-28	Polisher CO-K-1D DPSI 7390 Isolation	OP	
WT-FV-29	Polisher CO-K-1C DPSI 7391 Isolation	OP	
WT-FV-30	Polisher CO-K-1C DPSI 7391 Isolation	OP	
WT-FV-31	Polisher CO-K-1B DPSI 7392 Isolation	OP	
WT-FV-32	Polisher CO-K-1B DPSI 7392 Isolation	OP	
WT-FV-33	Polisher CO-K-1A DPSI 7393 Isolation	OP	
WT-FV-34	Polisher CO-K-1A DPSI 7393 Isolation	OP	

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APPENDIX A

Valve Line-Up

System: Condensate Polishing

Valve No.	Description	Date Position	Initial
WT-FV-35	WT-FT-7396 Iso.	OP	
WT-FV-36	WT-FT-7396 Iso.	OP	
WT-FV-37	WT-FT-7396 Equilizing Vlv.	CL	
WT-FV-56	CO-K-1G Resin Sample Iso.	T	
WT-FV-57	CO-K-1G Test Conn.	CL	
WT-FV-58	CO-K-1G Test Conn	CL	
WT-FV-59	CO-K-1H Resin Sample Iso.	T	
WT-FV-60	CO-K-1H Test Conn	CL	
WT-FV-61	CO-K-1H Test Conn	CL	
WT-FV-62	Influent Resin Sample Iso.	T	
WT-FV-63	Influent Test Conn	CL	
WT-FV-64	Influent Test Conn	CL	
WT-FV-65	Effluent Resin Sample Iso.	T	
WT-FV-66	Effluent Test Conn	CL	
WT-FV-67	EFfluent Test Conn	CL	
WT-V-137A	CO-K-1A Sample Drain Vlv	OP	
WT-V-137B	CO-K-1B Sample Drain Vlv	OP	
WT-V-137C	CO-K-1C Sample Drain Vlv	OP	
WT-V-137D	CO-K-1D Sample Drain Vlv	OP	
WT-V-137E	CO-K-1E Sample Drain Vlv	OP	
WT-V-137F	CO-K-1F Sample Drain Vlv	OP	
WT-V-137G	CO-K-1G Sample Drain Vlv	OP	

APPENDIX A

Valve Line-Up

System: Condensate Polishing

Valve No.	Description	Position	Initial
WT-V-137H	CO-K-1H Sample Drain Vlv	OP	
WT-V-137J	Influent Sample Drain Vlv	OP	
WT-V-137K	Effluent Sample Drain Vlv	OP	
WT-FV-38	CO-K-1A Resin Sample Iso.	T	
WT-FV-39	CO-K-1A Test Conn	CL	
WT-FV-40	CO-K-1A Test Conn	CL	
WT-FV-41	CO-K-1B Resin Sample Iso.	T	
WT-FV-42	CO-K-1B Test Conn	CL	
WT-FV-43	CO-K-1B Test Conn	CL	
WT-FC-44	CO-K-1C Resin Sample Iso.	T	
WT-FV-45	CO-K-1C Test Conn	CL	
WT-FV-46	CO-K-1C Test Conn	CL	
WT-FV-47	CO-K-1D Resin Sample Iso.	T	
WT-FV-48	CO-K-1D Test Conn	CL	
WT-FV-49	CO-K-1D Test Conn	CL	
WT-FV-50	CO-K-1E Resin Sample Iso.	T	
WT-FV-51	CO-K-1E Test Conn	CL	
WT-FV-52	CO-K-1E Test Conn	CL	
WT-FV-53	CO-K-1F Resin Sample Iso.	T	
WT-FV-54	CO-K-1F Test Conn	CL	
WT-FV-55	CO-K-1F Test Conn	CL	

APPENDIX B

Signatures of those performing/supervising valve line-up

Valve Line-up Signature Sheet

Operator Initials	Operator Signature	Shift	Date	Shift Foreman or Supervisor Sig.

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THREE MILE ISLAND NUCLEAR STATION

UNIT #2 OPERATING PROCEDURE 2106-2.2

CONDENSATE POLISHING SYSTEM

Regeneration Section

2106-2.2B

1.0 REFERENCES

1.1 Drawings Applicable for Operation.

1.1.1 Make-Up Water Treatment and Condensate Polishing, B&R Dwg. 2006.

1.1.2 Condensate Demineralizer Mixed Bed Polisher System, L*A Water Conditioning Co. Dwg. 015-00-0405.

1.1.3 Condensate Demineralizer External Regeneration System, L*A Water Conditioning Co. Dwg. 015-00-0406.

1.2 Operating Procedures Applicable for Operation.

1.2.1 2104-2.1 Cycle Make-Up Pretreatment.

1.2.2 2104-2.2 Demineralized Service Water.

1.2.3 2104-2.3 Instrument Air.

1.2.4 2104-2.9 Demineralizing System.

1.2.5 2104-2.10 Service Air.

1.2.6 2106-2.1 Condensate.

1.2.7 2106-2.4 Feedwater.

1.2.8 2107-1.1 BOP Electrical.

1.3 Manufacturers Instruction Manual.

1.3.1 L*A Water Purification System, Volumes I thru V B&R File # (15.00).

1.4 Applicable System Descriptions.

1.4.1 Feedwater and Condensate, Index No. 4A.

1.4.2 Condensate Polishing, Index No. 4B.

1.4.3 Make-Up Water Treatment, Index No. 4C.

1.5 Curves, Tables, etc.

1.5.1 Table No. 2B Remote Regeneration Station - Automatic/Manual Valve Sequence, Page 6.0.

2.0 LIMITS AND PRECAUTIONS

2.1 Equipment.

2.1.1 Visually inspect through the sight glasses the applicable polisher tank or external regeneration tank before and after each resin transfer.

2.2 Administrative.

2.2.1 The Condensate Polishing System demineralizes feedwater which potentially contains radioactive material should a Primary to Secondary Leak Exist. Since this radioactivite material would be concentrated in the mixed bed resin, the resin must be treated as potentially radioactive under this condition.

2.2.2 Ensure the heat tracing on the system components and piping is energized for both freeze protection and to prevent chemical crystallization.

CAUTION: The heat tracing temperature for 50% caustic lines is 75°F to prevent crystallization and caustic stress cracking of piping.

2.2.3 Adequate safety precautions for strong chemical solutions must be observed when working with caustic or acid.

2.2.4 While polishers are in service the local air switches for the inlet valves, inlet bypass valves and outlet valves should be

placed in the OPEN position. When a polisher is removed from service or is in standby, the local air switches for these valves should be in AUTO.

2.2.5 Each step of the regeneration procedure should be initialed as performed. Each operator who works on a regeneration step and initials it should initial and sign Data Sheet 51 in the place provided. After completed regeneration cycle the initialed procedure and data sheet for the appropriate bed should be forwarded to the Operations Engineer.

3.0 PREREQUISITES

Initial Each Step.

_____3.1 Electrical power available per 2107-1.1.

Component	Source	Unit
WF-P-13	2-31D	3D
WT-P-14	2-31D	3E
AM-P-4A/B/C	2-31D	4B/4C/4D
WT-P-15A/B	2-31D	3F/4A
WT-P-19A	2-31A	10A
WT-P-19B	2-41A	7B

_____3.2 Instrument Air in operation per 2104-2.3.

_____3.3 Service Air in operation per 2104-2.10.

_____3.4 Demineralized Water in operation per 2104-2.2.

_____3.5 Condensate polisher regeneration sump pumps (WT-P-19A/B) in AUTO.

_____3.6 Neutralization tank (WT-T-9) and neutralized effluent disposal pumps (WT-P-8A/B) in operation per 2104-2.9.

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_____3.7 Check the level in the neutralizing tank. <7000 gallons

_____3.8 Acid storage tank (WT-T-7), caustic storage tank (WT-T-8), and aqueous ammonia storage tank (AM-T-6), filled to minimum level.

_____3.9 Valve line-up complete per 2106-2.2A, Appendix A.

_____3.10 Demineralizer Water available from Unit #1.

4.0 PROCEDURE

Initial Each Step.

4.1 Regeneration

4.1.1 At Panel 304 place extension controls in the following position.

S1	AUTO ____	C8	AUTO ____
S2	AUTO ____	C9	AUTO ____
S4	AUTO ____	C11	AUTO ____
S6	AUTO ____	C12	AUTO ____
S7	AUTO ____	C13	AUTO ____
S11	AUTO ____	C14	AUTO ____
R1,2,3	AUTO ____	C15	AUTO ____
R4	AUTO ____	C16	AUTO ____
R5,6,7	AUTO ____	C17	AUTO ____
R8	AUTO ____	S5A	AUTO ____
R9	AUTO ____	S5B	AUTO ____
R10	AUTO ____	X1-X2	AUTO ____
R11	AUTO ____	Hot Water Heater	ON ____
R12	AUTO ____	Vibrator	AUTO ____
C2	AUTO ____	WT-P-13	OFF ____
C3	AUTO ____	WT-P-14	AUTO ____
C4	AUTO ____	AM-P-4A	OFF ____
C5	AUTO ____	AM-P-4B	OFF ____
C6	AUTO ____	AM-P-4C	OFF ____
C7	AUTO ____		

4.1.2 At Panel 304 set the timers as follows:

MODULE			
C	Step 10	0 Min	_____
C	Step 11	0 Min	_____
C	Step 12	0 Min	_____
C	Step 13	0 Min	_____
C	Step 14	20 Min	_____
C	Step 15	20 Min	_____
D	Step 16	0 Min	_____
D	Step 16A	0 Min	_____
D	Step 17	0 Min	_____
D	Step 18	0 Min	_____
D	Step 19	65 Min	_____
D	Step 20	60 Min	_____
F	Step 21	15 Min	_____
F	Step 21A	0 Min	_____
F	Step 21B	10 Min	_____
F	Step 22	30 Min	_____
G	Step 23	5 Min	_____
G	Step 24	20 Min	_____
H	Step 25	30 Min	_____
H	Step 26	0 Min	_____
H	Step 27	30 Min	_____
E	Step 28	120 Min	_____
E	Step 29	30 Min	_____

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4.1.3 Place Logic Module Selector Switches in the following positions:

Mode of Operation	AUTO	_____
Extend Cycle Step Control	TIME	_____
Module C	STOP/ALARM	_____
Module D	STOP/ALARM	_____
Module E	STOP/ALARM	_____
Module F	STOP/ALARM	_____
Module G	STOP/ALARM	_____
Module H	STOP/ALARM	_____

Valve number given for the operation of the polishers are for example only, and refer to polisher #1. Corresponding valves on other polishers are series numbered; i.e., M-16 for polisher #1, M-26 for polisher #2, etc.

When any step timer is used all valves and pumps associated with that step must be in AUTO.

Table 2B is your reference for all valve positions and flow rates associated with a particular automatic step. Any other pertinent information is in the remarks section.

_____4.1.4 Resin Transfer From Polisher To Receiving Tank

_____A. Set up Receiving Tank to receive exhausted resin;

_____1. OPEN valves C-1, C-4, and C-12.

_____2. Place X1-X2 switch to AUTO.

_____3. Put the "A" conductivity recorder to HAND.

_____4. Inspect tank to assure it is empty.

_____B. Set up Unit 2 Demin Water for Transfer:

_____1. OPEN DW-V 453 all the way.

_____2. CHECK open DW-V499.

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____C. Set up fluffing air: OPEN SA-V401.

____D. Set up resin Sluice Line:

____1. If transferring from Polisher #1 - #4, OPEN WT-V332B, CLOSE WT-V332A.

____2. If transferring from Polisher #5 - #8, OPEN WT-V322A, CLOSE WT-V332B.

____E. Transfer Exhausted Resin to Receiving Tank As Follows:

____1. OPEN Polisher Vent M-13, wait until pressure is vented off.

____2. OPEN Demin Water Inlet M-18, flow should be 60 ± 10 GPM.

____3. Assure resin is swirling, wait until water is flowing from Polisher Vent. Allow to swirl for approximately 30 minutes. Every 10 minutes give the bed a bump with fluffing air (WT-17B valve).

____4. OPEN Resin Outlet M-19, and CLOSE Vent M-13.

____5. Resin will be transferred at first using only Sluice Water. Check Sluice Line Sight Glass and Receiving Tank to verify resin is transferring.

____6. Continue transfer when top of Resin Bed is visible in lower sight glass CLOSE Sluice Water M-18 and OPEN Fluffing air WT-V-17B.

____7. Watch in bottom sight glass as water level goes below bottom laterals - then OPEN Vent M-13 and Sluice Water M-18. CLOSE Resin outlet M-19.

____8. Allow bubbling water/resin mixture to rise to top of bottom sight glass then CLOSE M-13, M-18 and OPEN M-19.

____9. Watch in bottom sight glass as tank drains. There must be no resin mounds above tank laterals. If there are then repeat steps 4.1.4.E 7-9. This time OPEN and CLOSE fluffing air valve while refilling tank to top of bottom sight glass. Repeat at least 3 times or more is needed.

____10. When transfer is complete close WT-V17B OPEN M-13 to vent polisher then CLOSE M-13 and M-19.

____F. On Receiving Tank CLOSE C-1 and C-4. OPEN C-14 to 120 GPM position to refill tank. When water comes out Vent CLOSE C-14 and C-12.

____G. CLOSE SA-V401.

____H. CLOSE DW-V453.

____I. Begin to fill out both Regeneration Data Sheets.

____4.1.5 Transfer Resin From Storage Tank To Polisher

____A. Vent and drain desired Polisher as follows:

____1. Open M-13, M-16 and MC-1. Drain until polisher is dry. (Valves are for #1 Polisher use corresponding Valves for #2 thru #8).

____B. If transferring to Polisher #5 - #8, shut WT-V330A and open WT-V330B.

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____C. If transferring to Polishers #1 - #4, shut WT-V330B and open WT-V330A.

____D. Line-up Polisher to receive resin by opening M-13, M-16, M-15 and MC-1.

____E. Line-up Demin Water from Unit #1 by verifying the pump is running and open DW-V172.

____F. Open SA-V238.

____G. Line-up storage tank to transfer resin by opening S-2, S-11.

____H. Verify resin is swirling in bottom sight glass and there is flow (~75 GPM) indicated on local flow indicator. Do this quickly so the resin will not separate.

NOTE: If no Demin Water flow check source Unit #1. If water available, cycle mixing Air Valve S-7 to loosen resin.

____I. To Transfer:

____1. OPEN S-8

____2. CLOSE S-2 "In This Order"

____3. OPEN S-7

Check correct flows per Table 2B.

____J. After Resin Level passes well below Lower Sight Glass on Storage Tank, Close Polisher Drain Valve M-16.

____K. Let transfer continue until water flows from Polisher Vent. Then Close S-7, S-8, and S-11 by placing them to AUTO. Open S-2 to vent the Storage Tank.

____L. Close M-13, M-15 and MC-1 to isolate the Polisher.

____M. Close SA-V238 if not continuing with 4.1.6.

____N. Verify Resin Level in the Regenerated Polisher is in the Upper Sight Glass.

____O. Enter Regeneration in Polisher Record Log Book.

____P. The next step is to Regenerate the bed now in the receiving tank. To do this go to Step 4.1.6.

____4.1.6 Mechanical Cleaning

NOTE: If regeneration is short Regen. see Appendix C.

____A. Set up Module H Timer as follows:

Step 25 - 30 minutes

Step 26 - 0 minutes

Step 27 - 30 minutes

____B. Put vibrator to HAND.

____C. Open SA-V238 and initiate Module H.

____1. While in Step 25, turn C-5 to the 28 GPM position and adjust flow to 28 GPM using the correct air regulator.

____2. Watch Air Flow Gage. If it drops to 100 SCFM the screen must be backwashed as follows: Put C-6 and C-12 to OFF, C-16 and C-4 to HAND for 30 seconds; then place C-16, C-4, C-12, and C-6 to AUTO. Repeat as necessary to maintain air flow.

____3. At the end of Step 25 place C-5 in AUTO and CLOSE SA-V238.

____4. When the second part of Step 27 starts insure that the flow does not exceed 100 gpm to prevent unnecessary loss of resin.

____D. Repeat Steps A, B, C of this procedure 2 or 3 times. If water is still dirty the backwash of Section 4.1.6 will flush out the remainder.

____E. Put vibrator to AUTO.

____4.1.7 Backwash

____A. Set up Module C Timers as follows:

Step #10 - 0 Minutes

Step #11 - 0 Minutes

Step #12 - 0 Minutes

Step #13 - 0 Minutes

Step #14 - 20 Minutes

Step #15 - 20 Minutes

Switch next to #15 Timer to the "15 - 14" Position.

____B. Initiate Module C

____1. Timer #14 will operate first. However, it will now be timing Step #15 which is the screened backwash.

____2. Adjust C-5 Regulator for 140 ± 10 GPM.

____3. Time #15 will operate next after a 3 minute time delay. But, it will be timing Step #14 which is the unscreened backwash.

____4. Adjust C-5 Regulator for 100 ± 10 GPM.

____C. If Backwash Water of Step #14 (Timer #15) is not clean, place Module C to EXTEND until it clears.

____D. After backwash is complete and resin has settled for 10 minutes check for resin bed separation (interface) See Fig. 4.3-1 and correct resin levels per 2106-2.2 - 4.3. Then adjust resin levels as necessary. See 4.2 and 4.3 for instructions.

____4.1.8 Hotwater Tank Line-Up

____A. Insure Unit #1 has Demin. Water lined-up to Unit #2.

____B. Open WT-V-317C (Hotwater Tank Inlet).

____C. Open R-8, C-9 and C-12 by placing in HAND. Adjust dilution water to 32 GPM by throttling WT-V-318A.

____D. Line-up steam to heat exchanger by opening AS-V-250, check open AS-V-251, then throttle open AS-V-252 until Hot Water Outlet of heat exchanger can be touched for only a few seconds.

____1. Do not exceed 200°F on Hotwater Tank.

____E. Adjust blend valve until temperature is 120°F ± 10°.

____4.1.9 Caustic Injection

____A. Open A-2, Interface Valve located on Ammonex Panel.

____B. Close C-12 by placing in AUTO.

____C. Check dilution flow at 32 GPM (Throttle WT-V-318A if necessary).

____D. Check dilution temp at 120°F ± 10°.

____E. Place control switch for C-5 to the 28 GPM position. Adjust air control valve 5C inside master panel at skid, for an additional 25 GPM. Total flow should now be 57 GPM. (32 GPM dilution + 25 GPM blocking water).

____F. Place X-1; X-2 valve to X-2 and the "A" conductivity recorder to HAND.

____G. Place control switch for R5/6/7 in HAND. R5 and 6 open, R-7 closes.

____H. Place control switch for WT-P-13 in HAND. Stroke on pump will be on ~90%.

NOTE: WT-P-12 may be substituted for WT-P-13 by starting WT-P-12 from the L.A.W.T. Panel and placing WT-P-13 in OFF.

____I. A reading of 4.0% - 5.0% on the dilute caustic conductivity recorder (Red Pen) should be observed. Adjust pump stroke as necessary.

____J. Continue caustic injection for 45 minutes; monitoring dilution flow, blocking flow, caustic concentration and dilution temperature.

____K. After 45 minutes have elapsed stop WT-P-13 and place control switch for R5/6/7 in AUTO; R5 and 6 will shut, R-7 will open.

____4.1.10 Caustic Displacement

____A. Continue as in Step 4.1.8.J. with the exception that caustic is no longer being injected. Maintain dilution flow and temperature as in Steps 4.1.8.C., D, and E.

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____B. After 40 minutes have elapsed, place control switches for C-9 and R-8 in AUTO.

____4.1.11 Securing Steam and Hotwater Tank

____A. Shut AS-V-250 and AS-V-252.

____B. Shut WT-V-317C (Hotwater Tank Inlet Valve).

____4.1.12 Caustic Rinse

____A. Place Control Switch for C-14 in the 120 GPM position. Adjust C-14 Regulator in panel to obtain 120 ± 5 GPM.

____B. OPEN WT-V323H (sample valve off interface piping in rear of receiving tank). OPEN 1/2 turn to get flow through tubing to sump.

____C. Place the "B" Conductivity Recorder to HAND and the X1-X2 valve control to AUTO.

____D. Monitor the "Receiving Tank interface conductivity" (Green Pen). When conductivity is <20 μmho (<0.2 on scale) the Rinse may be terminated.

____E. If bed doesn't rinse to <20 μmho in 40 min. notify Chemistry Foreman.

____F. Upon completion of Rinse, Place C-14 to AUTO and "B" conductivity Recorder to OFF and C-5 in AUTO.

____G. Close A-2 Ammonex Panel.

____H. Close WT-V323H.

____4.1.13 Ammonex

If mini-ammonex is called for see Appendix D.

____A. Check Ammonia Tank AM-T-6 for a positive pressure of 4-9 psi. (Tank MUST be pressurized if outside temperatures are above 75°F.)

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____B. Check X-1, X-2 valves; X-2 must be OPEN.

____C. Open R-11P, C-17 and A-2 by placing switches to the ON position. (These valves are located on the Ammonex Panel.)

____D. Turn on an Ammonia pump AM-P-4A, B, or C by placing switch to HAND (located on Cond. Polisher Panel) and run for 10 minutes.

____E. Stop Ammonia pump by placing switch to OFF.

____F. Close R-11P, C-17 and A-2 by placing switches to OFF.

____G. Turn on Ammonex conductivity equipment by placing meter switches to MEASURE. Turn on recorder chart drive by pulling out recorder, on-off switch is on right side. Label chart with Bed number and date.

____H. Open conductivity cell isolation valves WT-V480 and WT-V471 all the way.

____I. Check open WT-V-473, recycle pump suction valve.

____J. Open A-1 by placing switch to ON (located on Ammonex Panel).

____K. Turn on Ammonex Recycle Pump by placing switch to ON (located on Ammonex Panel).

____L. Throttle Pump Discharge valve WT-V-475 to obtain a recirc. flow rate of 90 ± 5 GPM on Recycle Flow Gauge.

____M. After 30 minutes of recirc. both the Ammonex Hi and Ammonex Lo conductivities should be stable. The Ammonex Lo should be in the range of 300 - 500 μmho.

NOTE 1: If Ammonex Lo (Red Pen) is >500 µmho - no action required.

NOTE 2: If Ammonex Lo (Red Pen) is <300 µmho - Repeat 4.1.12 A-M until the 300 - 500 µmho range has been reached. A time adjustment in Step 4.1.12.D will be necessary: 2 minutes = 100 µmho INCREASE.

____N. Continue Ammonex recirc. until the difference (Green Pen) stops dropping and has been stable for 1 hour.

____O. Notify Chemistry to take Hi and Lo samples for Sodium Analysis. WT-V-323H and WT-V482. Acceptance criteria is that Hi and Lo Na be within .5 ppm of each other.

____P. After Sodium is inspected turn off recycle pump by placing switch to OFF.

____Q. Close A-1 by placing switch to OFF.

____R. To Rinse Bed; open C-14 and C-4 by placing switches to ON (Ammonex Panel) then adjust rinse flow to 120 ± 10 GPM using C-14 Regulator. Rinse for 15 minutes.

____S. Close C-14 and C-4 by placing switches to OFF.

____T. Turn off conductivity equipment by placing meter switches and chart drive to OFF.

____U. Close conductivity cell isolation valves WT-V480 and WT-V471.

____4.1.14 ACID INJECTION SECTION I

Acid Injection and Rinse (Module D, Steps 19 and 20)

NOTE: If using Milroyal Pump see Acid Injection Section 2.

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____A. Check A-2 in OFF, X-1; X-2 in AUTO and "A" conductivity recorder in HAND.

____B. Check timers for Steps 16, 16A, 17 and 18 on Module D are timed out.

____C. Set Step 19 and 20 to:

Step 19 - 65 Minutes

Step 20 - 60 Minutes

____D. Initiate Module D.

____E. If acid dilution water is not 54 GPM throttle with WT-V318B.

NOTE: If dilution water is below 45 GPM Acid Pump WT-P-14 will not start.

____1. Stroke on acid pump will be $\approx$ 60%.

____F. Open C-17 and R-12 by placing in HAND, throttle WT-V323B to 20 GPM over acid dilution water flow rate (20 GPM + 54 GPM $\approx$ 74 GPM).

____G. A reading of 8.0% to 10.0% on the dilute acid conductivity recorder (A, Blue Pen) should be observed, if not, adjust pump stroke.

____H. After automatic sequence has switched to Step 20 allow acid to displace for 15 minutes. Then close C-3 and R-4 by placing each in OFF, and close C-17 and R-12 by placing in AUTO.

____I. Open C-14 to the 120 GPM position and adjust the air to obtain a rinse flow of 140 GPM $\pm$ 10 on local flow indicator.

____J. Place the "B" Conductivity Recorder in HAND.

____K. Allow bed to rinse at this rate until conductivity at receiving tank drain (Red Pen) is <20 µmho (2 on scale). This may involve putting step into EXTEND.

____L. After bed is <20 µmho readjust C-14 air regulator to 120 GPM ± 10. Put Step 20 back into TIME. When timer is timed out put C-14 to AUTO. Place "B" conductivity recorder to OFF and place C-3 and R-4 to AUTO.

ACID INJECTION SECTION II

Acid Regen. Using Temporary Milroyal Pump

____A. Prior to continuing with ACID regeneration perform following valve lineup for temporary pump

		Initial
TF-WT-V-1	Closed	_____
TF-WT-V-2	Open	_____
TF-WT-V-3	Closed	_____
TF-WT-V-4	Open	_____
TF-WT-V-5	Open (To pressure gauge)	_____
TF-WT-V-6	Closed	_____
WT-V-314Q	Closed	_____
WT-V-314O	Open	_____
WT-V-314L	Closed	_____
WT-V-314N	Open	_____
WT-V-314M	Closed	_____

____B. Check A-2 in OFF, X-1; X-2 in AUTO and "A" conductivity recorder in Hand.

____C. Check timers for Steps 16, 16A, 17 and 18 on MODULE "D" are timed out.

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____D. Set Step 19 to 65 minutes.

Set Step 20 to 60 minutes.

____E. At polisher control panel, place WT-P-14 control switch to OFF.

____F. Initiate Module D.

____G. If acid dilution water is not 54 GPM, throttle with WT-V318B.

NOTE: If dilution water is below 45 GPM, temp Milroyal pump will not start.

____H. Open C-17 and R-12 by placing in HAND, throttle WT-V323B to 20 GPM over acid dilution water flow rate (20 + 54 ≈ 75 GPM).

____I. At LAHT panel, place WT-P-11 control switch in "POL AUTO" position. This electrically aligns Milroyal to run in place of WT-P-11 which has been removed.

____J. A reading of 8.0% to 10.0% on the dilute acid conductivity recorder (A, Blue Pen) should be observed, if not, adjust Milroyal pump stroke by using stroke adjustment knob on control panel mounted above pump (the present set up finds pressure gauge at 11 psi and stroke ≈ 60%.

CAUTION: Adjust pump stroke very slowly.

____K. After automatic sequence has switched to Step 20 allow acid to displace for 15 minutes. Then close C-3 and R-4 by placing each in OFF, and close C-17 and R-12 by placing in AUTO.

____4.1.16 Resin Transfer And Mix (Module F Steps 21, 21B, and 22)

____A. Check Timers:

Step 21 - 15 Minutes

Step 21A - C Minutes

Step 21B - 10 Minutes

Step 22 - 30 Minutes

____B. Initiate Module F - Check Table 2B for correct flows and valve operations.

____C. Open S-4 by placing it in HAND.

____D. As soon as Step 21B starts put Module to EXTEND and close S-7, Open S-6 (S-4 will still be open).

____E. Drain the storage tank for 5 minutes, then place S-4, S-6 and S-7 to AUTO and put Module back to TIME.

____F. Watch Resin Bed while in Step 22, when it stops moving in upper sight glass then time out Step 22.

____G. For a good transfer the Resin Level should be visible at about the center of the upper sight glass.

____H. Drain the receiving tank by placing C-4 and C-11 to HAND. When the tank is drained, place C-4 and C-11 switches to AUTO.

____I. Close SA-V238.

____4.1.17 Final Rinse (Module G Steps 23 and 24)

____A. Set up module G as follows:

____1. Step #23 - 5 Minutes

Step #24 - 20 Minutes

____2. Place "B" Conductivity Recorder to HAND.

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____B. Initiate Module G.

____1. Adjust S-5 Air Regulator for 200 GPM ± 10.

____C. Watch "Storage Tank drain conductivity" (Blue Pen) the bed should rinse in to 0.1 - 0.5 μmho. If it doesn't notify Chemistry Foreman.

____D. When Module G is complete place "B" conductivity Recorder to OFF.

You now have completed the Regeneration. Go to 4.1.4 when ready to transfer.

____4.2 Adding Anion and Cation To The Receiving Tank

____A. Anion and Cation comes in 7 ft^3 drums. During the normal course of polisher operations it may be necessary to add either cation or anion.

Prior to resin addition insure no resin transfer from the polishers or the storage tank is taking place. Have a temporary demineralized water supply to the resin hopper in the 305' elevation of the turbine building. (From Coagulator Building)

____B. Open C-1, WTV-84 and C-4.

____C. Add resin slowly to hopper with a continous sluice water flow to the receiving tank.

____D. When addition is finished Close WT-V-84 and place C-1 and C-4 to CLOSE and AUTO.

____E. Refill receiving tank, Open C-12 and C-14 to the 120 GPM position, by placing to HAND.

____F. When water comes out vent Close C-12 and C-14 by placing to AUTO.

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G. Go through 4.1.7 Backwash to separate new Resin.

4.3 Resin Levels And Additions

A. A Resin charge is made up of ∿ 100 cu. ft. of Cation Resin (Amberlite 200 C) and ∿ 66 cu. ft. of Anion Resin (Amberlite 900 C). Resin levels and quantities are vey important for ion exchange in service and correct orientation in Receiving Tank during Regeneration.

B. After a Backwash the Cation (200 C) will be on the bottom of the Receiving Tank and the Anion (900 C) will be above.

C. The Interface (point where Cation and Anion Resins meet) must not be more than 11 inches above the bottom of the Lower Sight Glass or less than 9 inches from same point.

D. The amount of Cation Resin needed will have to be calculated first to adjust the interface and then the needed Anion Resin must be calculated taking into account how much space the additional Cation Resin will occupy.

E. The top of the Resin Bed must not be more than 10 inches above the bottom of the upper sight glass or less than 7 inches from same point.

F. The Receiving Tank will hold 2.0 cu. ft. of Resin per inch of vertical tank height.

1 inch = 2.0 cu. ft. Resin

G. Do not adjust Resin levels less than 3.5 cu. ft. (1/2 Drum) or 1 1/2 inches of one type of Resin.

H. Add Resin per 2106-2.2 - 4.2.

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____L. Open C-14 to the 120 GPM position and adjust the air to obtain a rinse flow of 140 GPM ± 10 on local flow indicator.

____M. Place the "B" Conductivity Recorder in HAND.

____N. Allow bed to rinse at this rate until conductivity at receiving tank drain (Red Pen) is <20 µmho (2 on scale). This may involve putting step into EXTEND.

____O. After bed is <20 µmho readjust C-14 air regulator to 120 GPM ± 10. Put Step 20 back into TIME. When timer is timed out put C-14 to AUTO. Place "B" conductivity recorder to OFF and place C-3 and R-4 to AUTO.

____P. On LAWT panel place WT-P-11 control switch to OFF.

____Q. Continue with regeneration cycle using Step 4.1.15 of OP 2106-2.2B.

____4.1.15 Storage Tank Drain

____A. Open SA-V238, Place X-1; X-2 to waste (far right).

____B. Place S-2 to AUTO.

____C. Place S-6 and S-1 in HAND. Both valves will OPEN.

____D. When vessel is empty, place control switch for S-6 and S-1 in AUTO.

____E. Place control switch for S-2 in HAND and allow tank to vent off. After tank is vented, return S-2 to AUTO.

TROUBLE SHOOTING AND HELPFUL HINTS

1. Always check value position before starting each step.
2. When doing steps which use the Automatic Modules, always check the lineup at the back of the procedure (Table 2B) to insure that proper valves open and close.

   If they don't, check if they are in AUTO at local air switches and at panel. Also check to see that applicable valves have not been overridden at Ammonex Panel.
3. No water flow
   a. Check that you have an open path for the water (inlet to tank and outlet from tank).
   b. Check if water is still coming from Unit #1.
   c. Check if 50 K tank or hotwell is being filled.
4. READ THE PROCEDURE CAREFULLY. Don't take shortcuts, follow guides indicated in procedure.
5. Acid or caustic concentration problems.
   a. Have Chemistry take specific gravity to see if recorder and probe is working properly.
   b. Make sure proper valves are opened (visually at valve if necessary).
   c. Check if pump is pumping properly (listen for ball check valves slapping good and hard at both ends of stroke, if not, beat on check valves to loosen balls (not too hard though).
   d. Check levels of acid and caustic tanks.
6. Hotwater problems for caustic injection.
   a. Blow down steam traps to insure steam flow is getting to heater.

b. Raise average temperature in hotwater tank to ≈ 180 before starting.

c. Outside water maybe too cold.

7. Transferring Resin

a. Make sure you have water flowing, otherwise, resin will pack tightly in lines.

b. From polisher to receiving tank make sure you have bed swirling for the indicated 30 minutes with the air bump every 10 minutes. Be sure it swirls when air isn't on.

c. From Storage Tank to Polisher be sure air pressure doesn't overcome water pressure and stop water flow. (This is why we now use the fluffing air instead of the transport air to move the resin, it keeps the resin mixing.)

8. Always check that the flow rates are as required, otherwise resin loss and even internal damage might occur.

9. Hot water tank - if heater is in ON position at panel but not on, and temperature is low (less than 80^{0}), have electrical maintenance check fuses in breaker for heater. It has a tendency to blow them.

10. Ammonex - if conductivity doesn't come in after about 35 minutes, try again with a different ammonia pump, then go to tank and verify pump is pumping. Check valve flutter, accumulation pressure and also vent the accumulation to make sure pump is pumping. When doing this, do it slowly and be careful.

a. If Chemist has trouble getting sample off WT-V482, isolate conductivity cell, this should force flow thru WT-V482. If this doesn't work milk rubber hose to establish a siphorn effect, this usually works. After you get the sample put the conductivity cell back in service.

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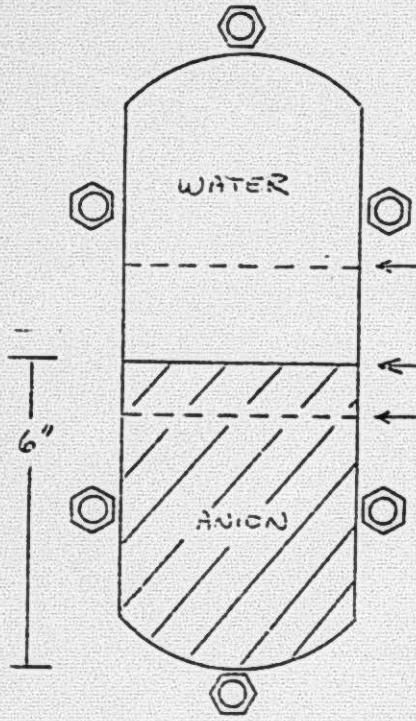
Figure 4.3-1



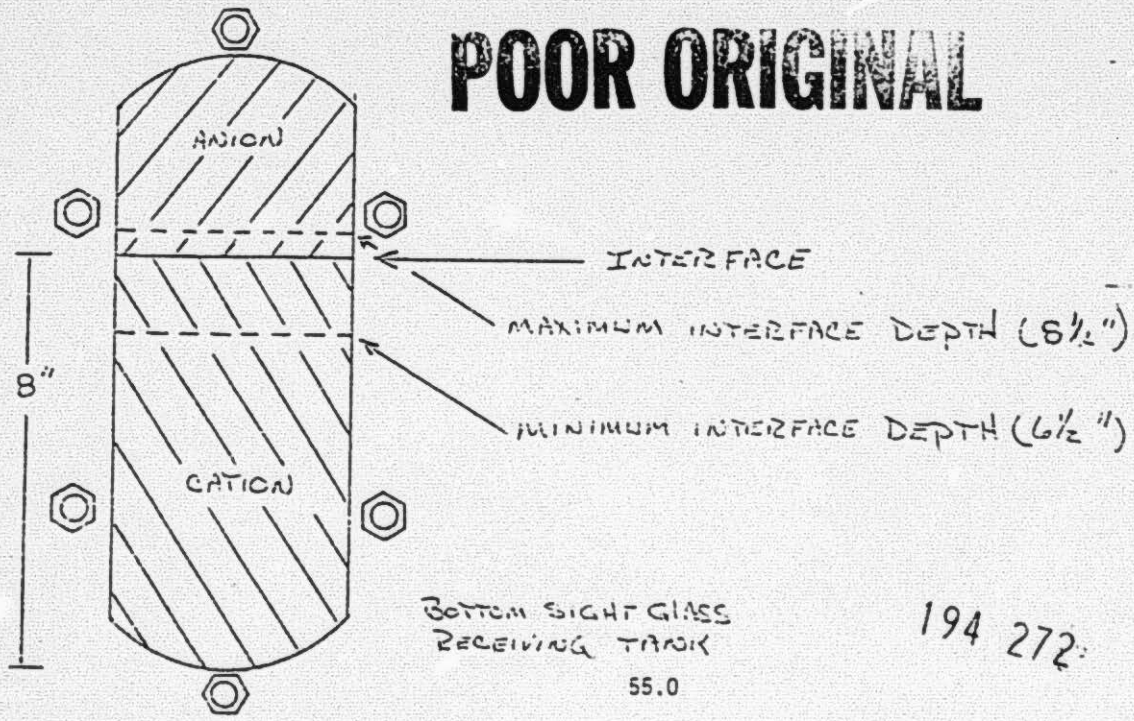


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TABLE 1A

SERVICE AND RESIN TRANSFER IN - REMOTE MANUAL OPERATION

STEP SEQUENCE NO.	UNIT & STEP FUNCTION	VALVES OPENED	FLOW WATER GPM	FLOW AIR SCFM	TIME MIN.
1.	In Service to exhausted Polisher	M11, M12	2490		Exhausted
2.	To Recycle, Polisher	M21B, M21, M26, MC1	600		6 minutes
3.	To Service, Polisher	M21B, M21, M22	2490		To sub-quality
4.	Out of Service, Polisher	All valves closed			
5.	Relieve Pressure, Polisher	M13			
6a.	Set Up Receiving Tank	C12, C4, X1, C1			
6b.	Resin Transfer to Receiving Tank	See 4.1.4 of Procedure			
7.	Drain Polisher	M13, M16, MC1			
8.	Resin Transfer to Polisher	See 4.1.5 of Procedure			
9.	Flush Storage Tank & Refill Polisher to Standby Condition	M13, M15, S8, S11, S1	75		15

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TABLE 2B

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MODULE	STEP	FUNCTION	TIME (MINS)	OPEN	CLOSE	FLOW (GPM)	REMARKS
C	14 (15 Timer)	Slow Backwash (Remove Fines)	20	C5 C13 X1	 X2	100	If fines are not removed within 20 minutes, place extend cycle step control switch in "Extend" and allow backwash to continue until fines are removed. Then place switch back to "TIME" position and allow timer to Time Out. NOTE: Be carefull not to exceed 100 GPM in order to prevent resin loss as Outlet for this backwash is un-screened.
C	15 (14 Timer)	Fast Backwash	20	C5 C12 X1	 X2	140	Resin separation takes place during this step. Anion on top, cation on bottom. Vibrator energized to prevent resin from blocking flow at screened outlet.
		Inject Caustic NOTE: This Step in Manual. Follow 4.1.8	45	C5 C9 R5 R6 R8 X2 A2	R7 X1	Dilution 32.0 Blocking 25.0	Caustic concentration: 4% - 5%, Use dilute caustic conductivity recorder (Red Pen). Reading should be 4.0 - 5.0. Dilution Temp - 120°F ± 10.
		Displace Caustic NOTE: This Step is manual. Follow 4.1.9	40	C5 C9 R8 R7 X2 A2	R5 R6 X1	Dilution 32.0 Blocking 25.0 will	Dilution Temperature 120°F. X1 and X2 will cycle when waste outlet conductivity reaches 50 µmho (Green Pen on 'A' conductivity recorde If cycling is excessive place control switch for X1 and X2 in the middle position. This keep X2 open and X1 Closed. Leave this way until conductivity is below 50 umho and then return switch to "AUTO" X1 should stay open now and X2 should stay Closed.

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TABLE 2B

MODULE	STEP	FUNCTION	TIME (MINS)	OPEN	CLOSE	FLOW (GPM)	REMARKS
		Rinse		C14			Normal rinse time is 25 minutes.
		Caustic	40	X1	X2	120	Use Green Pen on 'B' Conductivity Recorder.
		NOTE: This Step is manual. Follow 4.2.11		A2 WT-V323H			
		Inject	65	R1		Dilution	Acid Concentration: 5%, Use Dilute acid
D	19	Acid		R2	R3	54 GPM	conductivity recorder (Blue Pen). Reading
				R4	A2	Blocking	should be 8.0 - 10.0 Adjust WT-P-14 stroke
				C3		20 GPM	as necessary to obtain correct concentration.
				C4			If recorder is not working have Chem Tech
				X2	X1		sample specific gravity and adjust for 1.045-
				R-12			1.059. Throttle WT-V-318B to obtain 54 GPM
				C-17			Dilution Flow as read on Rotometer (F1-3)
							next to storage tank. WT-P-14 will automatical start at beginning and stop at end.
				R-12			
				R-14			
		Displace	60	C-14	R1	First 15	Refer to 4.1.13 H and 4.1.13 I.
D	20	Acid		R4	R2	Mins. 74	
				C3	A2	Remainder	
				C4		130-140	
				X2	X1		
				C5		25 GPM	
		Air Lance		C6		145	Mechanical Cleaning (Scrubbing).
H	25	Receiving Tank	30	C12		SCFM	Screen Plugging See 4.1.6.C.2
		Backwash	0	C5		0	Backwash Impurities removed from Air Lance
H	26	Vibrate Screen		C12			

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TABLE 2B

MODULE	STEP	FUNCTION	TIME (MINS)	OPEN	CLOSE	FLOW (GPM)	REMARKS
H	27	Backwash Screen	5	C16 C4 X1	X2	70	Unit will automatically shift from backflush to backwash after 5 minutes.
		Unscreened Backwash	25	C5 C13 X1	X2	100	Be carefull not to exceed 100 GPM during unscreened backwash in order to prevent loss of resin
F	21	Transfer Resin to Storage Tank	15	S4 S2 S6 C11 C8 C7 X1	X2	Sluice 75 Air 56 SCFM	Open S-4 Manually
F	21A	Partial Refill Storage Tank	0	S11 S2		75	
F	21B	Air Mix	10	S2 S7		145 SCFM	Mix anion and cation resins
F	22	Air Mix Drain Storage Tank	30	S2 S4 S7 X1	X2	145 SCFM	
G	23	Refill Storage Tank	5	S2 S5		200	Fill for 5 minutes or until water issues from vent.
G	24	Final Rinse	20	S5 S6 X1	X2	200	Final conductivity rinse to remove trace chemicals to .1 - .5 μmho

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CHEMISTRY DATA SHEET

_____ Bed Letter

_____ Vessel Removed From Date/Time_____

_____ Date/Time In Service

_____ Date/Time Out of Service

_____ How Many Mechanical Clean Cycles?

_____ Caustic Concentration Reading

_____ Caustic Rinse Conductivity

_____ Ammonex: Low Conductivity Reading

_____ Ammonex: High Sodium Result

_____ Ammonex: Low Sodium Result

_____ Ammonex: Time to Complete

_____ Acid Concentration Reading

_____ Acid Rinse Conductivity

_____ Final Rinse Conductivity

Resin:

_____ Added Amberlite 200 C-H (How Much?)

_____ Added Amberlite 900 C-OH (How Much?)

Please return this Data Sheet to OPERATIONS ENGINEER.

Initial _____ _____ Signature

Initial _____ _____ Signature

Initial _____ _____ Signature

Initial _____ _____ Signature

Initial _____ _____ Signature

Initial _____ _____ Signature

4.2

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CONDENSATE POLISHER RESIN DATA SHEET

_____ BED LETTER DESIGNATION

Date/Time	Vessel Number	ΔP	Flow	Cation Cond.	Totalizer	Date/Time In Service	Date/Time Out of Service

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APPENDIX C

Procedure For Short Regen. (Acid Only)

1. Do Step 4.1.6 (A → E) Mechanical clean.
2. Mini Ammonex is next.
   a. Do Step 4.1.13 except run pump for 20 minutes instead of 10 minutes.
   b. Do all steps up thru "L".
   c. Terminate recycle as soon as low conductivity (Red Pen) gets to 200 → 300 μmhos.
   d. Go to Step "P" and complete remainder of Section 4.1.13.
3. Do Step 4.1.7 (complete thru D) skip to 4.1.14 next.
4. Do regular acid Step 4.1.14.
5. Complete remainder of Regen. in order.

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APPENDIX D

MINI AMMONEX PROCEDURE

1. Complete Regen. up thru 4.1.6 MECH CLEAN.
2. Then go to Step 4.1.13 of procedure.
3. Complete Steps A → L as written except on Step D - run the pump for 20 minutes instead of 10 minutes.
4. Terminate the recycle as soon as the red pen reaches 300 - No sampling is required by the Chemistry Dept. during the Mini Ammonex.
5. Go to Step 4.1.13 - P and complete the remainder of 4.1.13.
6. Go back to Step 4.1.7 - Backwash - and do the remainder of the regeneration from that point on as written.

TMI DOCUMENTS

DOCUMENT NO: TM-024

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