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SECTION

OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISION 2 PAGE 1 OF 20 TCN 2-1

CONDENSER AIR REMOVAL SYSTEM

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CONDENSER AIR REMOVAL SYSTEM

1.0 OBJECTIVES

- 1.1 Aligning the Condensers Air Removal System.
- 1.2 Establishing condenser vacuum.
- 1.3 Placing the Air Ejectors in service.
- 1.4 Placing the Ammonia Strippers in service.
- 1.5 Removing the Ammonia Strippers from service.
- 1.6 Removing the Air Ejectors from service.
- 1.7 Breaking Condenser Vacuum.

2.0 REFERENCES

2.1 Other

2.1.1 TFM 1-85-ELE-001, Route E.Vacuum Pump motor power ONLY from 52-1130.

3.0 PREREQUISITES

3.1 Prior to use of an uncontrolled (pink) copy of this Site Document to perform work, verify that it is current by checking a controlled copy and any TCNs or by use of the method described in S0123-VI-0.9.

4.0 PRECAUTIONS

- 4.1 To prevent rotor bow, the turbine should not be allowed to stop more than momentarily when steam is being applied to the seals.
- 4.2 To prevent rupturing a condenser rupture disc, the vacuum breaker should remain OPEN prior to establishing a condenser vacuum, unless a vacuum pump is in operation.
- 4.3 Motor power to E.Vacuum Pump is from 52-1130. Control power to air TCN removal valves is still from 52-1117. (TFM 1-85-ELE-001)

5.0 CHECKLISTS

5.1 Condenser Air Removal Alignment

6.0 INSTRUCTIONS

- 6.1 Aligning the Condenser Air Removal System
 - 6.1.1 Use Attachment 1, Condenser Air Removal Alignment, to align the system for Startup.

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISION 2 PAGE 3 OF 20 TCN 2-1

CONDENSER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

- 6.2 Establishing Condenser Vacuum
 - NOTE: This section may be implemented by SO1-3-2, Plant Startup from Hot Standby to Minimum Load.
 - 6.2.1 Inspect all condenser steamside manways, doors, and drains to verify that they are closed.
 - 6.2.2 Start one Gland Steam Exhauster for each Gland Steam Condenser.
 - 6.2.3 Adjust the exhauster discharge valves as necessary to maintain a pressure of 7 to 15 inches of water on each Gland Steam Condenser.
 - 6.2.4 CRACK OPEN MSS-434, CV-96 Bypass valve, to warmup the system piping.
 - NOTE: All steam headers should be warmed slowly.
 - 6.2.5 When the Gland Steam System is warm, place the gland steam supply valve, CV-96, in service by slowly OPENING, MSS-430, CV-96 Inlet and CLOSING MSS-434, CV-96 Bypass valve.
 - 6.2.6 Check CV-96, Gland Steam Supply Valve, is regulating to maintain a header pressure of ~ 2-3 psig.
 - NOTE: If the header pressure is low, MSS-434, CV-96 Bypass, may be throttled open to assist in maintaining proper gland seal pressure.
 - NOTE: CV-97, Gland Steam Spillover, will open at ~ 7 psig.
 - 6.2.7 START the vacuum pump(s) and check for proper operation as follows:
 - .1 START the West Vacuum Pump from the Control Room,
 - .2 START the East Vacuum Pump from Number 1 480V Bus as follows:

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OFTRATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISION 2 PAGE 4 OF 20 TCN 2-1

CONDENSER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

- 6.2.7.2.1 CLOSE or verify CLOSED DC to 52-1130;
 - .2.2 Locally CLOSE 52-1:33 to Start East Vacuum Pump;
 - .2.3 With 52-1117 in "TEST" CLOSE DC to 52-1117 (breaker should close, causing air removal valves to transfer).
- 6.2.8 CLOSE CV-62, Condenser Vacuum Breaker, and verify that sealing water is applied to the vacuum breaker valve or the intake line is filled with condensate.
- 6.2.9 Walk down the Condensers, and the Turbine to check for vacuum leaks.
 - NOTE: Vacuum should increase in 15 to 30 minutes after starting the Vacuum Pump(s). Hissing noises are usually indicative of a vacuum leak.
- 6.2.10 After condenser vacuum has increased to ~ 25"Hg:
 - .1 Verify that the Hogging valve closes at approximately 25" Hg.
 - .2 The Air Ejectors may be placed in service per step 6.3.
- 6.3 Placing the Air Ejectors In Service
 - NOTE: This section may be implemented by SO1-3-2, Plant Startup from Hot Standby to Minimum Load.
 - 6.3.1 Verify CV-145, Air Ejector Steam Supply valve, is controlling air ejector inlet steam pressure less than 400 psig.

NOTE: This should be performed when steam pressure reaches 400 psig downstream of the 24" maintenance block valves.

6.3.2 To place the West Air Ejector in service, perform the following:

.1 OPEN CNA-371, YS-17 Drain valve.

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OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISION 2 PAGE 5 OF 20 TCN 2-1

CONDENSER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

- 6.3.2.2 THROTTLE OPEN CNA-369, West Air Ejector Steam Supply valve, to warmup the Air Ejector lines.
 - .3 When the water has been drained (~ 5 minutes) from the steam lines, CLOSE CNA-371, YS-17 Drain valve.
 - .4 THROTTLE CNA-369, West Air Ejector Steam (upply valve, to maintain ~ 350 psig steam pressure.
 - .5 Place the West Condenser Air Removal Valves in the AIR EJECTOR position.
 - .6 The Air Ejector Drains may be aligned to the condenser, with approval from Chemistry, as follows:
 - .6.1 CLOSE CNA-397, Ammonia Stripper Inlet Drain Valve.
 - .6.2 OPEN CNA-395, Ammonia Stripper Bypass to Condenser
- 6.3.3 To place the East Air Ejector in service, perform the following:
 - .1 OPEN CNA-372, YS-16 Drain Valve;
 - .2 THROTTLE OPEN CNA-370, East Air Ejector Steam Supply valve, to warmup the Air Ejector lines:
 - .3 When the water has been drained (~ 5 minutes) for the steam lines, CLOSE CNA-372, YS-16 Drain Valve;
 - .4 THROTTLE CNA-370, East Air Ejector Steam Supply valve, to maintain ~ 350 psig steam pressure;
 - .5 Place the East Condenser Air Removal Valves in the AIR EJECTOR position;
 - .6 The Air Ejector Drains may be aligned to the condenser, with approval from Chemistry, as follows:
 - .6.1 CLOSE CNA-398, Ammonia Stripper Inlet Drain valve;
 - .6.2 OPEN CNA-396, Ammonia Stripper Bypass to condenser.
- 6.3.4 When both Condenser Air Removal valves are in the AIR EJECTOR position, then perform the following:
 - .1 STOP the West Vacuum Pump from the Control Room.
 - .2 Verify CLOSED or CLOSE CNA-343 and CNA-345, the West Vacuum Pump Moisture Separator Outlet Check valves.

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OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISION 2 PAGE 5 OF 20 TCN 2-1

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CONDE SER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

- 6.3.4.3 STOP the East Vacuum Pump from Number 1 480V Bus as follows:
 - .3.1 OPEN 52-1130, Temporary Power to East Vacuum Pump.
 - .3.2 OPEN 52-1117 and OPEN DC to 52-1117.
 - .4 Verify CLOSED or CLOSE CNA-344 and CNA-346, the East Vacuum Pump Moisture Separator Outlet Check valves.
- 6.3.5 Monitor the system for proper operation until a stable steam pressure has been established in the secondary plant.
- 6.3.6 If necessary or desired to return to vacuum pump operation, then perform the following:
 - .1 START the vacuum pump(s) and check for proper operation as follows:
 - .1.1 START the West Vacuum Pump from the Control Room,
 - .1.2 START the East Vacuum Pump from Number 1 480V Bus as follows:
 - .1.2.1 CLOSE or verify CLOSED DC to 52-1130;
 - .1.2.2 Locally CLOSE 52-1130 to Start East Vacuum Pump;
 - .1.2.3 With 52-1117 in "TEST" CLOSE DC to 52-1117 (breaker should close, causing air removal valves to transfer).
 - .2 Place the associated Condenser Air Removal Valves in the VACUUM PUMP position.
- 6.4 Placing the Ammonia Strippers in Service
 - NOTE:

The Ammonia Strippers shall not be placed in service without the concurrence of the Chemistry Dept. and the SRO Operations Supervisor.

CAUTION Condenser vacuum should not deviate as a result of this operation. If condenser backpressure begins to increase during this operation, the valve lineup should be verified immediately and the stripper removed from service if necessary.

OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT **REVISION 2** PAGE 7 OF 20 TCN 2-1

DENTER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

CAUTION	Air Ejector steam i liet pressure should be		
	monitored while admitting steam to Ammonia avoid starving the Air Ejectors.	Strippers	to

- 6.4.1 To place the West Ammonia Stripper in service perform the following:
 - CLOSE or verify CLOSED CNA-397 and CNA-395, West Ammonia .1 Stripper Inlet Drain valves (to waste and the condenser, respectfully):
 - OPEN CNA-391, West Ammonia Stripper Inlet valve; .2
 - . 3 OPEN CNA-401, the Ammonia Stripper Drain valve to the condenser.

OR

OPEN CNA-399, the Ammonia Stripper Drain to waste;

SLOWLY OPEN CNA-365, West Ammonia Stripper Steam Supply .4 valve, to establish ~ 20 psig.

NOTE: The Chemistry Department may recommend adjusting the pressure to the Ammonia Strippers for better performance.

- ADJUST CNA-369, Air Ejector Steam Supply, as necessary .5 to maintain ~ 350 psig.
- To place the East Ammonia Stripper in service perform 6.4.2 the following;
 - CLOSE or verify CLOSED CNA-398 and CNA-396, East Ammonia .1 Stripper Inlet Drain valves (to waste and the condenser, respectfully);
 - OPEN CNA-392, East Ammonia Stripper Inlet valve; .2
 - OPEN CNA-402, the Ammonia Stripper Drain valve to the . 3 condensers.

OR

OPEN CNA-400, the Ammonia Stripper Drain to waste;

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISION 2 PAGE 8 OF 20 TCN 2 -

CONDENSER AIR REM AL SYSTEM

6.0 INSTRUCTIONS (Continued)

6.4.2.4 SLOWLY OPEN CNA-366, East Ammonia Stripper Steam Supply -- valve, to establish ~ 25 psig.

> NOTE: The Chemistry Department may recommend adjusting the pressure to the Ammonia Strippers for better performance.

.5 ADJUST CNA-370, Air Ejector Steam Supply, as necessary to maintain ~ 350 psig.

6.5 Removing the Ammonia Stripper from Service

- 6.5.1 To remove the West Ammonia Stripper from service perform the following:
 - .1 CLOSE CNA-365, West Ammonia Stripper Steam Supply valve; *
 - .2 CLOSE or Verify CLOSED CNA-401 and CNA-399, the Ammonia Stripper Drain valves (to condenser and waste respectfully);
 - .3 CLOSE CNA-391, the Ammonia Stripper Inlet valve;
 - .4 OPEN CNA-397, the Ammonia Stripper Inlet Drain valve to waste,

OR

OPEN CNA-395, the Ammonia Stripper Bypass valve to the condenser;

- .5 OPEN CNA-399, the Ammonia Stripper Drain to waste;
- .6 CLOSE CNA-399, when flow stops.
- 6.5.2 To remove the East Ammonia Stripper from service perform the following:
 - .1 CLOSE CNA-366, East Ammonia Stripper Steam Supply valve;
 - .2 CLOSE or verify CLOSED CNA-402 and CNA-400, the Ammonia Stripper Drain valves (to condenser and waste respectfully);
 - .3 CLOSE CNA-392, the Ammonia Stripper Inlet valve;

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISION 2 PAGE 9 OF 20 TCN 2-1

CONFENSER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

6.5.2.4 OPEN CNA-398, the Ammonia Stripper Inlet Drain valve to waste,

OR

OPEN CNA-396, the Ammonia Stripper Bypass valve to the condenser;

- .5 OPEN CNA-400, the Ammonia Stripper Drain to waste;
- .6 CLOSE CNA-400, when flow stops.
- 6.6 Removing the Air Ejectors from Service
 - 6.6.1 To remove the West Air Ejectors from Service, perform the following:
 - .1 If the West Ammonia Stripper is in service, then remove it from service per step 6.5.
 - .2 If the air Ejector Drains are aligned to the condenser, then;
 - .2.1 CLOSE CNA-395, Ammonia Stripper Bypass to Condenser,
 - .2.2 OPEN CNA-397, Ammonia Stripper Inlet Drain Valve.
 - .3 CLOSE CNA-369, West Air Ejector Steam Supply Valve.
 - 6.6.2 To remove the East Air Ejector from service, perform the following:
 - .1 If the East Ammonia Stripper is in service, then remove it from service per step 6.5.
 - .2 If the Air Ejector Drains are aligned to the condenser, then;
 - .2.1 CLOSE CNA-396, Ammonia Stripper Bypass to Condenser,
 - .2.2 OPEN CNA-398, Ammonia Stripper Inlet Drain Valve.
 - .3 CLOSE CNA-370, East Air Ejector Steam Supply Valve.
- 6.7 Breaking Condenser Vacuum
 - 6.7.1 OPEN CV-62, Condenser Vacuum Breaker.
 - 6.7.2 Remove the Air Ejectors from service per step 6.6.

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISION 2 PAGE 10 OF 20 TCN 2-1

TCN

CONDENSER AIR REMOVAL SYSTEM

6.0 INSTRUCTIONS (Continued)

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- 6.7.3 STOP the vacuum pumps as follows:
 - .1 STOP the West Vacuum Pump from the Control Room.
 - .2 Verify CLOSED or CLOSE CNA-343 and CNA-345, the West Vacuum Pump Moisture Separator Outlet Check valves.
 - .3 STOP the East Vacuum Pump from Number 1 480V Bus as follows:
 - .3.1 OPEN 52-1130, Temporary Power to East Vacuum Pump.
 - .3.2 OPEN 52-1117 and OPEN DC to 52-1117.
 - .4 Verify CLOSED or CLOSE CNA-344 and CNA-346, the East Vacuum Pump Moisture Separator Outlet Check valves.
- 6.7.4 When the condenser is at atmosphere pressure, then;
 - .1 CLOSE MSS-430, CV-96 Inlet, to secure steam to the Turbine Gland Seals.
 - .2 STOP the running Gland Steam Exhausters.
 - .3 CLOSE the Gland Steam Exhausters Discharge Valves (CNA-453, CNA-455, CNA-454, CNA-456).

7.0 RECORDS

7.1 File the completed checklist in the NonSafety-Related System file. The preceding checklist may be discarded.

JWReynolds:2341g

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISON 2 PAGE 11 OF 20 ATTACHMENT 1 TCN 2-

CONDENSER AIR REMOVAL ALIGNMENT

- 1.0 PREREQUISITE
 - 1.1 Obtain the SRO Operations Supervisor's approval to perform this Checklist.

APPROVED BY Initials:

SRO	Ops.	Supv.	Date	Timo
			L'a Le	1 11164

2.0 INSTRUCTIONS

2.1 Deviations from indicated positions are allowed by approval of the SRO Operations Supervisor. Deviated positions shall be approved by circling the indicated position, writing the deviated position above, and initialing each deviated position by the SRO Operations Supervisor.

NOTE: This alignment may be performed in any order.

2.2 East Air Ejector

_	Component Number	Description	Component Position	ALIGN
2.2.1	CNA-370	East Air Ejector Steam		
		Subbly	CLOSED	
2.2.2	CNA-372	YS-16 Drain	CLOSED	
2.2.3	CNA-366	East Ammonia Strippers		
		Steam Supply	CLOSED	
2.2.4	CNA-368	PI-1690 Root	OPEN	
2.2.5	CNA-364	PI-21 Root	OPEN	
2.2.6	CNA-356	East Second Stage Steam Supply	OPEN	
2.2.7	CNA-352	East Second Stage Ejector Vent	CLOSED	
2.2.8	CNA-354	East Second Stage Ejector Vent	CLOSED	
2.2.9	CNA-362	East Second Stage Steam Supply	OPEN	

ATTACHMENT 1 PAGE 1 OF 10

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISON 2 PAGE 12 OF 20 ATTACHMENT 1 TCN 2-1

2.0 INSTRUCTIONS (Continued)

	Component Number	Description	Component Position	ALIGN INITIALS
2.2.10	CNA-358	East Firs. Stage Steam Supply	OPEN	
2.2.11	CNA-348	East First Stage Ejector Vent	CLOSED	
2.2.12	CNA-334	PI-11 Root	OPEN	
2.2.13	CNA-338	PI-23 Root	OPEN	
2.2.14	CNA-350	East First Stage Ejector Vent	CLOSED	
2.2.15	CNA-360	East First Stage Steam Supply	OPEN	
2.2.16	CNA-302	East Air Ejector Leak Detector Bypass	OPEN	
2.2.17	CNA-322	East Air Ejector Sample	CLOSED	
2.2.18	CNA-320	East Air Ejector Leak Detector Inlet	CLOSED	
2.2.19	CNA-308	Low Flow Block	OPEN	
2.2.20	CNA-310	High Flow Block	CLOSED	
2.2.21	CNA-312	Low Flow Block	OPEN	
2.2.22	CNA-314	High Flow Block	CLOSED	
2.2.23	CNA-316	FI-1	CLOSED	
2.2.24	CNA-306	East Air Ejector Leak Detector Outlet	OPEN	
2.2.25	CNA-304	East Air Ejector Vent Header Vent	CLOSED	
2.2.26	CNA-330	East Vacuum Pump Suction	OPEN	
2.2.27	CNA-332	CV-59 Inlet	OPEN	
2.2.28	CNA-336	CV-46 Inlet	OPEN	
2.2.29	CNA-324	East Air Ejector Loop Seal Drain	CLOSED	

ATTACHMENT 1 PAGE 2 OF 10

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2.3

OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISON 2 PAGE 13 OF 20 ATTACHMENT 1 TCN 2-

2.0 INSTRUCTIONS (Continued)

	Component Number	Description	Component ALIG Position INITIA
2.2.30	CNA-394	East Ammoria Stripper Inlet Block	OPEN
2.2.31	CNA-392	East Ammonia Stripper Inlet	CLOSED
2.2.32	CNA-398	East Ammonia Stripper Inlet Drain	OPEN
2.2.33	CNA-396	East Ammonia Stripper Bypass	CLOSED
2.2.34	CNA-400	East Ammonia Stripper Drain	CLOSED
2.2.35	CNA-402	East Ammonia Stripper Outle	t CLOSED
2.2.36	CNA-374	DT-6 Inlet	OPEN .
2.2.37	CNA-376	DT-6 Outlet	OPEN
2.2.38	CNA-396	DT-6 Bypass	CLOSED
2.2.39	CNA-378	LG-1006 Upper Root	OPEN
2.2.40	CNA-380	LG-1006 Lower Root	OPEN
2.2.41	CNA-382	DT-956 Bypass	CLOSED
2.2.42	CNA-384	DT-956 Inlet	OPEN
2.2.43	CNA-386	DT-956 Outlet	OPEN
2.2.44	CNA-388	LG-1956 Upper Root	OPEN
2.2.45	CNA-390	LG-1956 Lower Root	OPEN
East Gla	nd Steam Con	ndenser	
2.3.1	CNA-454	West Exhauster Discharge	CLOSED
2.3.2	CNA-456	East Exhauster Discharge	CLOSED
2.3.3	CNA-458	Instrument Header Isolation	OPEN
2.3.4	CNA-462	East Gland Seal Condenser Vent	CLOSED
2.3.5	CNA-474	Instrument Header Drain	CLOSED

ATTACHMENT 1 PAGE 3 OF 10

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISON 2 PAGE 14 OF 20 ATTACHMENT 1 TCN 2-1

2.C INSTRUCTIONS (Continued)

		Component Number	Description	Component	ALIGN
	2.3.6	CNA-464	PI-224/PS-77 Root	OPEN	INITIALS
	2.3.7		PS-77 Isolation	OPEN	
	2.3.8		PI-224 Test Isolation	CLOSED	
	2.3.9	CNA-480	DT-28 Inlet	OPEN	
	2.3.10	CNA-482	DT-28 Outlet	OPEN	
	2.3.11	CNA-484	YS-942 Drain	CLOSED	
	2.3.12	CNA-476	East Gland Seal Condenser Drain	CLOSED	
2.4	East Va	acuum Pump			•
	2.4.1	CNA-452	YS-21 Drain	CLOSED	
	2.4.2	CNA-444	SV-43 Inlet	OPEN	
	2.4.3	CNA-442	SV-43 Outlet	OPEN	
	2.4.4	CNA-450	SV-43 Bypass	CLOSED	
	2.4.5	CNA-448	PI-104 Root	OPEN	
	2.4.6	CNA-446	East Vacuum Pump Seal Water Vent	CLOSED	
	2.4.7	CNA-434	PI-25 Root	OPEN	
	2.4.8	CNA-430	DPS-9 Root	OPEN	
	2.4.9	CNA-432	DPS-9 Root	OPEN	1111
	2.4.10	CNA-344	Vacuum Pump Moisture Separator Outlet Check	CLOSED	
	2.4.11	CNA-346	Vacuum Pump Moisture Separator Outlet Check	CLOSED	
	2.4.12	CNA-426	Evaporator Vacuum Pump Moisture Seperator Outlet	CLOSED	
2.5	West Vac	uum Pump			
	2.5.1	CNA-443	SV-44 Inlet	OPEN	

ATTACHMENT 1 PAGE 4 OF 10

2.6

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISON 2 PAGE 15 OF 20 ATTACHMENT 1 TCN 2-1

2.0 INSTRUCTIONS (Continued)

	Number	Description	Component	ALIGN
2.5.	2 CNA-441	SV-44 Outlet	OPEN	INITIALS
2.5.3	3 CNA-449	SV-44 Bypass	CLOSED	
2.5.4	CNA-447	PI-105 Root	OPEN	
2.5.5	CNA-445	West Vacuum Pump Seal Water Vent	CLOSED	
2.5.6	CNA-433	PI-26 Root	OPEN	
2.5.7	CNA-429	DPS-10 Root	OPEN	
2.5.8	CNA-431	DPS-10 Root	OPEN	
2.5.9	CNA-343	Vacuum Pump Moisture Separator Outlet Check	CLOSED	•
2.5.10	CNA-345	Vacuum Pump Moisture Separator Outlet Check	CLOSED	
2.5.11	CNA-425	Evaporator Vacuum Pump Moisture Separator Outlet	CLOSED	
2.5.12	CNA-493	DT-455 Inlet	OPEN	
West GI	land Steam Co	ndenser		
2.6.1	CNA-455	West Exhauster Discharge	CLOSED	
2.6.2	CNA-453	East Exhauster Discharge	CLOSED	
2.6.3	CNA-457	Instrument Header Isolation	OPEN	
2.6.4	CNA-465	East Gland Seal Condenser Vent	CLOSED	
2.6.5	CNA-461	DT-27 Vent	OPEN	
2.6.6	CNA-459	DT-27 Vent to Gland Seal Condenser		
2.6.7	CNA-467	PS-78 Isolation	CEOSED	
2.6.8	CNA-469	PI-225 Isolation	OPEN	
2.6.9		PI-225 Test Isolation	CLOSED	
2.6.10	CNA-479	DT-27 Inlet	OPEN	

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OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT REVISON 2 PAGE 16 OF 20 ATTACHMENT 1 TCN 2-1

2.0 INSTRUCTIONS (Continued)

		Component Number	Description	Component Position	ALIGN
	2.6.11	CNA-481	DT-27 Outlet	OPEN	1.1111023
	2.6.12	CNA-477	Drain	CLOSED	
	2.6.13	CNA-475	East Gland Seal Condenser Drain	CLOSED	
2.7	West At	ir Ejector A	rea		
	2.7.1	CNA-369	West Air Ejector Steam Supply	CLOSED	
	2.7.2	CNA-371	YS-17 Drain	CLOSED	
	2.7.3	CNA-365	West Ammonia Stripper Steam Supply	CLOSED	
	2.7.4	CNA-367	PI-1691 Root	OPEN	
	2.7.5	CNA-363	PI-22 Root	OPEN	
	2.7.6	CNA-355	West Second Stage Steam Supply	OPEN	
	2.7.7	CNA-351	West Second Stage Ejector Vent	CLOSED	
	2.7.8	CNA-353	West Second Stage Ejector Vent	CLOSED	
	2.7.9	CNA-361	West Second Stage Steam Supply	OPEN	
	2.7.10	CNA-357	West First Stage Steam Supply	OPEN	
	2.7.11	CNA-347	West First Stage Ejector Vent	CLOSED	
	2.7.12	CNA-333	PI-24 Root	OPEN	
	2.7.13	CNA-337	PI-12 Root	OPEN	
	2.7.14	CNA-349	West First Stage Ejector Vent	CLOSED	
	2.7.15	CNA-359	West First Stage Steam Supply	OPEN	

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OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISON 2 PAGE 17 OF 20 ATTACHMENT 1 TCN 2-1

.

2.0 INSTRUCTIONS (Continued)

	Component Number	Description	Component Position	ALIGN INITIALS
2.7.16	CNA-301	West Air Ljector Leak Detector Bypass	OPEN	
2.7.17	CNA-321	West Air Ejector Sample	CLOSED	
2.7.18	CNA-319	West Air Ejector Leak Detector Inlet	CLOSED	
2.7.19	CNA-307	Low Flow Block	OPEN	
2.7.20	CNA-309	High Flow Block	CLOSED	
2.7.21	CNA-311	Low Flow Block	OPEN	
2.7.22	CNA-313	High Flow Block	CLOSED	
2.7.23	CNA-315	FI-2	CLOSED	
2.7.24	CNA-306	West Air Ejector Leak Detector Outlet	OPEN	
2.7.25	CNA-329	West Vacuum Pump Suction	OPEN	
2.7.26	CNA-331	CV-49 Inlet	OPEN	
2.7.27	CNA-335	CV-58 Inlet	OPEN	
2.7.28	CNA-323	West Air Ejector Loop Seal Drain	CLOSED	
2.7.29	CNA-393	West Ammonia Stripper Inlet Block	OPEN	
2.7.30	CNA-391	West Ammonia Stripper Inlet	CLOSED	
2.7.31	CNA-397	West Ammonia Stripper Inlet Drain	OPEN	
2.7.32	CNA-395	West Ammonia Stripper Bypass	CLOSED	
2.7.33	CNA-399	West Ammonia Stripper Drain	CLOSED	
2.7.34	CNA-401	West Ammonia Stripper Outlet	CLOSED	
2.7.35	CNA-373	DT-10 Inlet	OPEN	

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2.

OPERATING INSTRUCTION SO1-7-10 SECONDARY PLANT REVISON 2 PAGE 18 OF 20 ATTACHMENT 1

2.0 INSTRUCTIONS (Continued)

		Component Number	Description	Component Position	ALIGN		
	2.7.36	CNA-375	DT-10 Out'et	OPEN			
	2.7.37	CNA-395	DT-10 Bypass	CLOSED .			
	2.7.38	CNA-377	LG-1008 Upper Root	OPEN			
	2.7.39	CNA-379	LG-1008 Lower Root	OPEN			
	2.7.40	CNA-381	DT-10 Bypass	CLOSED			
	2.7.41	CNA-383	DT-10 Inlet	OPEN			
	2.7.42	CNA-385	DT-10 Outlet	OPEN			
	2.7.43	CNA-387	LG-1010 Upper Root	OPEN			
	2.7.44	CNA-389	LG-1010 Lower Root	OPEN			
2.8	East Heater Deck						
	2.8.1	CNA-326	East Vacuum Pump Priming Isolation	CLOSED			
	2.8.2	CNA-328	East Vacuum Pump Flush Water	CLOSED			
	2.8.3	CNA-325	West Vacuum Pump Priming Isolation	CLOSED			
	2.8.4	CNA-327	West Vacuum Pump Flush Water	CLOSED			
2.9	Auxiliar	y Cooler Are	a				
	2.9.1	CNA-494	DT-954 Inlet	OPEN			
2.10	Feedwater Mezzinine						
	2.10.1	MSS-432	CV-96 Outlet	OPEN			
	2 10.2	MSS-438	PC-2 Root	OPEN			
	2.10.3	MSS-473	Turbine Seal Dump Header Vent	CLOSED			
	2.10.4	MSS-437	PC-3 Sensing Root	OPEN			

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* ON

OPERATING INSTRUCTION S01-7-10 SECONDARY PLANT KEVISON 2 PAGE 19 OF 20 ATTACHMENT 1 TCN 2-1

2.0 INSTRUCTIONS (Continued)

	Number	
431 CV-97 Inlet OPEN	MSS-431	2.10.5
435 CV-97 Bypass CLOSED	MSS-435	2.10.6
433 CV-97 Outlet OPEN	MSS-433	2.10.7
ine	Mezzinine	CV-145
345 CV-145 Outlet OPEN	MSS-345	2.11.1
353 PI-1659 Root OPEN	MSS-353	2.11.2
355 PC-11 Root OPEN	MSS-355	2.11.3
	cal	Electric
24 Exhauster K-11A FUSE INST. BKR. CLOSED	42-1324	2.12.1
25 Exhauster K-11AS FUSE INST. BKR. CLOSED	42-1325	2.12.2
20 Exhauster K-11B FUSE INST. BKR. CLOSED	42-1320	2.12.3
27 Exhauster K-11BS FUSE INST. BKR. CLOSED	42-1327	2.12.4
17 East Vacuum Pump TEST DC	52-1117	2.12.5
17 West Vacuum Pump RACKED IN DC CLOSED	52-1217	2.12.6
East and West Jet Heater CLOSED	8-304	2.12.7
East Vacuum Pump Motor Heater ON	B16-A	2.12.8
West Vacuum Pump Motor Heater ON	B16-B	2.12.9
0 East Vacuum Pump Temporary RACKED IN Power Supply DC CLOSED	52-1130	2.12.10
g - OFF if Vacuum Pump stopped. Indicate switch posi	running - OF	um Pump

ATTACHMENT 1 PAGE 9 OF 10

NUCLEAR GENERATION UNIT 1	SITE	OPERATING INSTRUCTI SECONDARY PLANT REVISON 2 ATTACHMENT 1 TCN 2 -	ON SO1-7-10 PAGE 20 OF 20
2.0 INSTRUCTIONS ((Continued)		
COMMENTS:			
PERFORMED BY:	Operator Signature	Initials Da	te Time
n Asigur a shi Masa a sa sa	Operator Signature	- Initialia - D	<u> </u>
Deficiencies and acti	on taken	interars Da	te Time
REVIEWED BY:			
SR	O Operations Supervisor		Date
APPROVED BY:			
Sh	ift Superintendent		Date

	570
REFERENCE: \$0123-VI-1.0.1	
	ENCODE NO. ACTOAC
TEMPORARY CHANGE NOTICE	(WHEN FORM FILLED OUT) Page 1 of 3
TECHNICAL SPECIFICATION VIOLATION IF NOT COMPLETED WITHIN 14 DAYS	TCH NO. 1-4
Site Document No SO1-7-20 Revision No. /	(For COM use only)
Site Document Title AUXILIARY FEEDWATED SUSTEM A	SIMULE USE ICH TES NO
1. PREPARED BY: S. TAHAN PAX: 52658 ORGANIZATION:	OPG-1
2. DATE/TIME ORIGINATED: 8-27-85/1802 3. ISSUANCEAL	16 27 1985 CDM (COM USE ONLY)
4. SINGLE USE TCH cancels on: (CDH USE ONLY)	C AL IOUT ODITICUM USE UNLET)
5. If required, TCN Deviation Approval: CFDM (or designee):	
6. Check appropriate box 1 559 Signature/If by	telecon print name and so state Date/Time
Superseded/Incorporated TEN(s):	Attached None (Not applicable
No. (if none, so state) 7. This change cannot wait until the next revision of the Size Deciment and d	RECEIVED CON
A. To implement facility design change (PFC, NCR, TFR, etc.)	SEP 05 1005
Facility design change identifier	521 03 1985
Indicate PFC, NCR, TFM etc. Implementation of the facility design change has been determined. (If NO, a TCN cannot be approved until the facility design change i 0ther (e.g., CAR, Licensing Commitments) Specific Reason:	Identifier SITE FILE COPY
Changed positions of AFW-313 and AF	EW-334 to CLOSED.
Changed Value auntras of Himiflow hear	der Vents.
8. Is the document being TCN'd QA Affecting? YES MO (If YES, complete (This is indicated on the Table of Contents page of the Site Document If	e the boxes below.) (If NO, see * below.)
 C. Is the intent of the original document altered? YES NO D. Is the document to be changed an Emergency Operating Instruction? E. Does this change pose an unreviewed safety question per 10 CFR 50.59, probability of occurrence or the consequences of an accident; create accident; or reduce the Tech. Spec. margin of safety? YES NO (IF THE ANSWER TO A, B, C, D or E IS YES, A TCH 	YES NO . i.e., does it increase the the dossibility of a different TS NOT AUTHORIZED.)
9. Does this change affect licensing commitment requirements? YES NO	
10. Copy forwarded to the Nuclear Safety Group. PERFORMED BY:	NIA Date: 9.5.85
11. The entire document was reviewed in conjunction with this TCN. REVIEWED AND APPROVED BY:	41/A
	CFDM or Designee Date
12. SIGNATURES REQUIRED:	
REVIEWED AND APPROVED BY (AT IFAST ONE (1) SPO ON THE UNIT APPROVED	
1) A.J. SCHPAMM FERTILION Storman chile was	
Flant Management Staff - Unit 1 Date Time Plant Ranage	ment Staff - Units 263 Date Time
Could this TCN affect or doas it represent a change to a plant Could this TCN operation is pogras? ysaw NO a plant operat	affect or does it represent a change to
3) 54 July - 4 The 8/27/85 1816 4)	
	Date Time
S) Cognizant Functional Division Hanager Date () () () () () () () () () (E. Bland 9/3/85-
 If a document is Not QA affecting, obtain initial approval from the Cognizan on the affected Unit(s) (signs on Plant Management Staff line(s)) and final to CDM. No other signatures are required. 	nt Supervisor(s) approval from the CFDM prior to submittal
If QA Affecting, approval shall be by two members of the Plant Management St affected, at least one of whom holds an SRO License on the unit or units aff the Plant Management Staff are defined as the supervisor in charge of the sh the CFDM, exercising responsibility in the specific area and units.	taff knowledgeable in the areas fected. (For TCM approval, members of hift, or as designated in writing by
If YES, the Shift Superintendent shall provide the country of the	see by the change.)
and the start provide the required SKU approval.	Tracture

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OPERATING INSTRUCTION SO1-7-20 SECONDARY PLANT REVISION 1 ATTACHMENT 1 CHECKLIST 1 PAGE 5 OF 15 TW1-4

PAGE 20F3

2.0	INSTRUCTIONS	(Continued)			PAGE	2 of 3
	Valve Number	 Description	Valve Position	Align Init	Verify Init	
2.1.6	AFW-475	AFW Pumps Suction Header Crosstie	CLOSED .	_		
2.1.7	AFW-468	Steam Driven AFW Pump Suction HDR Isol	LOCKED			
2.1.8	AFW-469	Mtr. Driven AFW Pump Suction HDR Isol -	LOCKED			
2.1.9	AFW-506	Steam Driven AFW Pump Hose Suction	CLOSED			1
2.1.10	AFW-508	Steam Driven AFW Pump Hose Suction Drain	CLOSED			A
2.1.11	AFW-507	Motor Driven AFW Pump Hose Suction	CLOSED		2	
2.1.12	AFW-327	SV-3205 Inlet	OPEN			
2.1.13	AFW-331	Mtr. Driven AFW Pump Flush Water	CLOSED			R
2.1.14	AFW-333	Mtr. Driven AFW Pump Flush Water	CLOSED -			TCN
2.1.15	AFW-338	Mtr. Driven AFW Pump Miniflow	OPEN			
2.1.16	AFW-342	Mtr. Driven AFW Pump Miniflow	OPEN			
2.1.17	AFW-343	MOV-1204 Downstream Drain	CLOSED			
2.1.18	AFW-334	Steam Driven AFW Pump Flush Water	CLOSED			TCN
2.1.19	AFW-336	Steam Driven AFW Pump Flush Water	CLOSED			R
2.1.20	AFW-337	Steam Driven AFW Pump Miniflow	OPEN			
2.1.21	AFW-341	Steam Driven AFW Pump Miniflow	OPEN			

1.

ATTACHMENT 1 PAGE 2 OF 12

OPERATING INSTRUCTION SO1-7-20 SECONDARY PLANT REVISION 1 ATTACHMENT 1 CHECKLIST 1 PAGE 6 OF 15 TCN 1-4

PAGE 3 qF 3

2.0 <u>I</u>	NSTRUCTIONS	(Continued)			1-40.	qF 3
	Valve Number	Description	Valve Position	Align Init	Verify Init	
2.1.22	AFW-488	Steam Driven AFW Pump Miniflow Hdr. Isol.	OPEN	<u> </u>		
2.1.23	AFW-489	Mtr. Driven AFW Pump Miniflow Hdr. Isol.	OPEN	- September 1		
2.1.24	AFW-492	AFW Pumps Miniflow Header Crosstie	CLOSED		<u></u>	
2.1.25	491 AFW-483	Motor Driven AFW Pump Miniflow Hdr. Vent	CLOSED		and the second s	TCN
2.1.26	490 AFW-484	Steam Driven AFW Pump Miniflow Hdr. Vent	CLOSED			Ten
2.1.27	AFW-345	Steam Driven AFW Pump Discharge Drain	CLOSED	-		
2.1.28	AFW-346	AFW to 1st Point Heater Inlet	LOCKED CLOSED			
2.1.29	AFW-347	Steam Driven AFW Pump Drain	CLOSED			
2.1.30	AFW-348	Steam Driven AFW Pump Vent	CLOSED			
2.1.31	AFW-349	PI-1724 Root (Stm Drvn AFW PP Suction	OPEN			
2.1.32	AFw-350	PI-1725 Root (Mtr Drvn. AFW PP Suction	OPEN			
2.1.33	AFW-351	Steam Driven AFW Pump Steam Inlet Drain	CLOSED			
2.1.34	AFW-352	Vent Stack Drain	OPEN			
2.1.35	AFW-353	CV-3201 Bypass	CLOSED			
2.1.36	AFW-354	SV-3200 Bypass	CLOSED			
2.1.37	AFW-355	SV-3211 Bypass	CLOSED			
2.1.38	AFW-356	CV-3201 Inlet	OPEN			
2.1.39	AFW-357	CV-3201 Outlet	OPEN			

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Attach additional pages if required

NUCLEAR GENERATION SITE UNIT 1 COMPLETE REVISION EFFECTIVE DATE May 21, 1985

OPERATING INSTRUCTION S01-9-4 ELECTRICAL REVISION 2 PAGE 1 OF 19 TCN

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

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OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 TCN 2 - .

PAGE 2 OF 19

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

1.0 OBJECTIVES

- Place the Main Transformer and either or both A and B auxiliary 1.1 transformers In Service.
 - 1.1.1 Place A and/or B auxiliary transformer fans in service.
 - Place the Main Transformer oil pumps and cooling fans in 1.1.2 service.
- Place C Auxiliary Transformer in service. 1.2
- Provide transformer temperature limits for operation. 1.3
 - Provide guidance on making the sudden pressure relay 1.3.1 "Non Automatic" during gas bottle changing.
- Remove the Main transformer and A and B Auxiliary Transformers from 1.4 service.
 - Remove A and B fans. 1.4.1
 - 1.4.2 Remove Main oil pumps/fans.
- Remove C Auxiliary Transformer from service. 1.5
- Provide direction in the event of a power transformer failure. 1.6

2.0 REFERENCES

2.1 Licensing Commitment

> Unit 1 Technical Specifications 2.1.1

- 2.2 Procedure
 - 2.2.1 SO1-14-12, Equipment Control Implementation
- 2.3 Other
 - 2.3.1 System Operating Bulletin No. 33, Energizing Power Transformers After a Relay Operation
 - System Operating Bulletin No. 100, General Instruction 2.3.2 to Transmission and Subtransmission Switching Centers

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3.0 PREREQUISITES

Prior to use of an uncontrolled (pink) copy of this Site Document 3.1 to perform work, verify that it is current by checking a controlled copy and any TCNs or by use of the method described in SO123-VI-0.9.

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OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 3 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

3.0 PREREQUISITES (Continued)

- 3.2 Prior to returning a transformer to service, all personal Grounds must be removed and all work authorizations must be released.
- 3.3 Prior to removing a transformer from service, alternate supplies must be in service to carry the Unit auxiliary load.
- 3.4 Prior to placing transformer cooling systems in service, all applicable work authorizations must be released and fans must be intact with fan guards installed.

4.0 PRECAUTIONS

- 4.1 In Modes 1-4 the following, as a minimum, shall be Operable:
 - 4.1.1 One Southern California Edison Company and one San Diego Gas & Electric Company high voltage transmission line to the switchyard and two transmission circuits from the switchyard, one immediate and one delayed access, to the onsite Safety-related distribution system.
 - 4.1.2 Two separate and independent diesel generators.
 - 4.1.3 4160 Volt bus 1C and 2C.
 - 4.1.4 480 Volt Buses 1, 2 and 3. (Technical Specification 3.7.I.A)
- 4.2 In Modes 5-6 the following, as a minimum, shall be Operable:
 - 4.2.1 One Southern California Edison Company or San Diego Gas & Electric Company high voltage transmission line to the switchyard and one transmission circuit from the switchyard, immediate or delayed access, to the onsite Safety-related distribution system.
 - 4.2.2 One diesel generator (capable of automatic start).
 - 4.2.3 The electrical Buses associated with the operable power sources as follows:
 - .1 One 4,160 Volt AC Bus
 - .2 One 480 Volt AC Bus (Technica) Specification 3.7.III.A)
- 4.3 The drop and pickup method of transferring 1C or 2C 4kV Bus must be done quickly or the undervoltage relays will trip the 4kV ACBs for equipment being supplied by the Bus.

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 4 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

4.0 PRECAUTIONS (Continued)

- 4.4 If the Main generator is motoring or the Motor Operated Disconnect (MOD) is closed with the unit off the line or C Auxiliary Transformer is not paralleled with the Main transformer at the 220 kV buses, then the paralleling method of switching kV buses between A or B Auxiliary Transformer and C Auxiliary Transformer shall not be used.
- 4.5 Sudden pressure relays on transformers of all voltage levels shall be made non-automatic when taking gas or oil samples or changing gas bottles.

5.0 CHECKLISTS

5.1 Attachment 2, Main Generator, Main and Auxiliary A & B Transformers Relay Protections.

Attachment 3, C Auxiliary Transformers Relay Protection. 5.2

6.0 INSTRUCTIONS

- 6.1 Placing the Main Transformer and Either or Both A and B Auxiliary Transformers In Service
 - 6.1.1 Make a thorough inspection of the Main Transformer and A and B Auxiliary Transformers before energizing them. This inspection shall include at least:
 - .1 Oil levels normal.
 - .2 Generator Motor Operated Disconnect open.
 - .3 Personal grounds not applied.
 - .4 Personnel and equipment won't be jeopardized by energizing equipment.
 - NOTE: In unusual circumstances it is possible to return the Main Transformer and only one of the A or B Auxiliary Transformers to service, provided the 18 kV links are removed from the Auxiliary Transformer to remain demengized.
 - 6.1.2 Verify or place Main transformer and A and B Auxiliary Transformer relay protection in service by completing Attachment 2, "Main Generator, Main and Auxiliary A and B Transformers Relay Protection".
 - 6.1.3 Verify or place A and B Auxiliary Transformer Cooling Systems in service as follows:

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TCN 12-1

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 5 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

- 6.0 INSTRUCTIONS (Continued)
 - 6.1.3.1 PLACE or check MAN-OFF-AUTO control switch 43 in OFF position at the Transformer Control Cabinet.
 - .2 OPEN or check open radiator valves one per radiator.

NOTE: To open valve, the capscrew is removed and the valve handle moved approximately 90° counterclockwise. The capscrew is then tightened. The operatig arm of the radiator valve is marked to indicate the closed direction.

- .3 CLOSE 480 V ACB 8-1333B to A Auxiliary Transformer Cooling Fans.
- .4 CLOSE 480 V ACB 8-1360B to B Auxiliary Transformer Cooling Fans.
- .5 CLOSE the 15 amp circuit breaker inside each Transformer Control Cabinet.
- .6 START the fans by placing A Auxiliary Transformer control switch 43 in the MAN position.
- .7 CHECK fans for normal operation and signs of distress.
- .8 PLACE A Auxiliary Transformer control switch 43 in the AUTO position.

NOTE: Fans should turn off unless transformer temperature is high.

- .9 START the fans by placing B Auxiliary Transformer control switch 43 in the MAN position.
- .10 CHECK fans for normal operation and signs of distress.
- .11 PLACE B Auxiliary Transformer control switch 43 in the AUTO position.
 - NOTE: Fans should turn off unless Transformer temperature is high.

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 6 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

- 6.0 INSTRUCTIONS (Continued)
 - 6.1.4 Verify or place the Main Transformer Cooling System in service as follows:

CAUTION The Main Transformer requires at least one group of Cooling Equipment in operation any time the Main Transformer is energized.

NOTE: The control switches and circuit breakers for the Cooling Equipment are located inside the Main Transformer Control Cabinet.

- 6.1.4.1 TURN or verify the backup cooling equipment MAN-OFF-AUTO Switch in the AUTO position.
 - .2 TURN OFF or verify OFF the cooling equipment Control Switch.
 - .3 CLOSE or verify closed ACB 8-1179, MCC1 power to Cooling Equipment Group No. 2.
 - .4 CLOSE or verify closed ACB 8-1204, MCC2 power to Cooling Equipment Group No. 1.
 - .5 CLOSE or verify closed circuit breakers 8-1 through 8-10 at the Control Cabinet.
 - .6 TURN selector switch 43C to position 1 or position 2 to select the lead cooler group.
 - .6.1 Position 1 makes Group 1 the Lead Group and Group 2 the Backup Group.
 - .6.2 Position 2 makes Group 2 the Lead Group and Group 1 the Backup Group.
 - .7 TURN selector switch 43C-1 to position 1 or position 2 to select the power supply to the cooler groups. Position 1 is preferred. If Position 2 is selected, the cooling power failure alarm will remain ON.
 - .7.1 Position 1 makes MCC 2 the preferred supply and MCC 1 the backup.
 - .7.2 Position 2 makes the MCC 1 the preferred supply and MCC 2 the backup.

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 7 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

6.0 INSTRUCTIONS (Continued)

NOTE: If the cooling equipment was previously stopped by the Transformer Sudden Pressure Trip relay or the Unit Differential Trip relay, RESET the TOP (Transformer Oil Pump) switch.

- 6.1.4.8 TURN ON the cooling equipment Control Switch. This starts the Lead Group of cooling equipment.
 - .9 TURN the MAN-OFF-AUTO Switch to MAN. This starts the Backup Group of cooling equipment.
 - .10 CHECK all Fans and Oil Pumps for proper operation, e.g., no oil leakage, Oil Pump flow indication, Fans air flow, noise, etc.
 - .11 TURN the backup Cooling Equipment MAN-OFF-AUTO Switch to the AUTO position.
 - NOTE: This action stops the backup Cooling Equipment and allows it to start at > 70°C at the Transformer Hot Spot.
 - CAUTION Before closing 220 kV CBs to both 220 kV buses, verify that the buses are already in parallel unless otherwise directed by the Switching Center.
- 6.1.5 If the Main and A and B Auxiliary Transformers have been isolated with disconnect switches, then perform switching as directed by Mira Loma Switching Center to close the necessary disconnects. Inform Unit 2/3 Common Control Operator of the impending switching.
- 6.1.6 Contact Mira Loma Switching Center and receive orders to close 220 kV CBs 4012 and 6012.

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 TCN 2-2

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MAIN AND AUXILIARY TRANSFORMER OPERATIONS

- 6.0 INSTRUCTIONS (Continued)
 - CLOSE 220 kV CBs 4012 and 6012 energizing the Main 6.1.7 Transformer and A and B Auxiliary Transformers and report the operation to Mira Loma Switching Center.

The Main Transformer in this configuration NOTE: is a source of ground fault current for 220 kV lines ground relay protection and Auxiliary Transformers A' and B are available as an alternate source of Auxiliary Power.

- If A Auxiliary Transformer is connected to the 18 kV 6.1.8 bus and will be returned to service, then RACK IN and CLOSE DC to ACB 152-11A04.
- If B Auxiliary Transformer is connected to the 18 kV 6.1.9 bus and will be returned to service, then RACK IN and CLOSE DC to ACB 152-11B04.
- 6.1.10 If C Auxiliary Transformer and the Main transformer are paralleled, then perform the following (parallel method):
 - If A Auxiliary Transformer is being placed in service. .1 then CLOSE ACB 152-11A04. VERIFY that the ACB is closed by observing a shift in transformers load and immediately OPEN ACB 152-11A02.
 - If B Auxiliary Transformer is being placed in service, .2 then CLOSE ACB 152-11804, VERIFY that the ACB is closed by observing a shift in transformers load and immediately OPEN ACB 152-11802.
- 6.1.11 If C Auxiliary Transformer and the Main Transformer are not paralleled, then perform the following (drop and pick up method):
 - If A Auxiliary Transformer is being returned to .1 service, then OPEN ACB 152-11A02 and immediately CLOSE ACB 152-11A04.
 - If B Auxiliary Transformer is being returned to .2 service, then OPEN ACB 152-11B02 and immediately CLOSE ACB 152-11804.

OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 9 OF 19 TCM 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

- 6.0 INSTRUCTIONS (Continued)
 - 6.2 Placing C Auxiliary Transformer In Service
 - 6.2.1 Make a thorough inspection of C Auxiliary Transformer before energizing the transformer. This inspection shall include at least:
 - .1 Oil levels normal.
 - .2 Personal grounds not applied.
 - .3 Personnel and equipment will not be jeopardized by energizing the equipment.
 - 6.2.2 Verify or place C Auxiliary Transformer Relay protection in service by completing Attachment 3, C Auxiliary Transformer Relay Protection.
 - 6.2.3 If C Auxiliary Transformer has been isolated with disconnect switches, then perform switching as directed by Mira Loma Switching Center to close the necessary disconnects. Inform Unit 2/3 Common Control Operator of the impending Switching
 - 6.2.4 Contact Mira Loma Switching Center and receive orders to CLOSE 220 kV CBs 4032 and 6032.
 - 6.2.5 CLOSE either or both 220 kV CBs 4032 and 6032 energizing C Auxiliary Transformer and report the operation to Mira Loma Switching Center.
 - 6.2.6 If it is desired to transfer 1C and 2C 4 kV Buses to C Auxiliary Transformer, then do the transfer in accordance with SO1-9-2, 4160 V System Operations.

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- 6.3 Normal Operation of Main and Auxiliary Transformers
 - NOTE: Station Service Transformer Temperature limits are in SO1-9-6, Station Service Transformer Operations.
 - 6.3.1 During operation of the main and auxiliary transformers, do not exceed the limits listed in Attachment 1.
 - 6.3.2 If the maximum continuous temperature of any Station Transformer is approached, then the SRO Operations Supervisor is to be notified and action taken to prevent exceeding the values tabluated in Attachment 1.
 - 6.3.3 If, due to energency conditions, it becomes necessary to exceed maximum continuous values, then a two-hour absolute maximum value is also given.

OPERATING INSTRUCTION S01-9-4 ELECTRICAL REVISION 2 PAGE 10 OF 19 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

- 6.0 INSTRUCTIONS (Continued)
 - 6.3.3.1 If requirements force operation in this region, then the Unit Superintendent is to be notififed.

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NOTE: There are no two (2) hour maximum values given for Auxiliary Transformer "C".

6.3.4 <u>IF</u> the nitrogen bottles on either the Main or Aux. "C" transformers are to be changed out or <u>if</u> nitrogen is to

be added to Aux. "A or B" transformers, then perform the following:

- .1 Obtain approval from the Mira Loma Switching Center to make the transformer Sudden Pressure Relay NON-AUTOMATIC.
- .2 Request a Test Technician to make the Sudden Pressure Relay "Non-Automatic".
- .3 Change the Nitrogen Gas Bottle and place the new bottle in service.
- .4 Verify the gas pressure indicator on the transformer is stable.
- .5 Request a Test Technician to return the Sudden Pressure Relay to "AUTOMATIC".
- .6 Notify Mira Loma Switching Center that the transformer Sudden Pressure Relay has been returned to AUTOMATIC.
- 6.4 Removing the Main Transformer and A and B Auxiliary Transformers From Service
 - NOTE: The Main Transformer and A and B Auxiliary Transformers may be de-energized as a cost saving measure during long Unit shutdowns or they may be de-energized and switched out of service for maintenance activities.
 - 6.4.1 Obtain an approved C Outage, or, in an emergency, notify Mira Loma Switching Center that it is necessary to de-energize the Main Transformer and A and B Auxiliary Transformers.

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OPERATING INSTRUCTION SO1-9-4 FLECTRICAL



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MAIN AND AUXILIARY TRANSFORMER OPERATIONS

6.0 INSTRUCTIONS (Continued)

A or B Auxiliary Transformer shall not be CAUTION paralleled with C Auxiliary Transformer if ----the Generator is motoring or the MOD is closed with the Unit off-line or C Auxiliary Transformer and the Main Transformer are not paralleled at the 220 kV buses.

- Transfer 1A and 1B 4 kV buses to 1C and 2C 4 kV buses by 6.4.2 paralleling and opening or by drop and pickup as appropriate in accordance with SO1-9-2, 4160 V system operations.
- Contact Mira Loma Switching Center and receive orders to 6.4.3 open 220 kV CBs 4012 and 6012 which will de-energize the Main Transformer and A and B Auxiliary Transformers. Inform the Units 2/3 Common Control Operator of the impending switching.
- OPEN 220 kV CBs 4012 and CB 6012 and report the 6.4.4 operation to Mira Loma Switching Center.
- If it is desired to switch out the Transformers, then 6.4.5 continue with step 6.4.6.
- Contact Mira Loma Switching Center and receive switching 6.4.6 orders to disconnect the Main Transformer and Auxiliary Transformers A and B and to ground the Main Transformer.
 - NOTE: Operating Instruction S01-9-1, 220 kV Switching Operations contains facsimile switching orders as examples of how to perform the switching.
- Perform the required switching and report to Mira Loma 6.4.7 Switching Center.
- Issue a Work Authorization to a qualified workman in 6.4.8 accordance with SO1-14-12. Equipment Control Implementation.

OPERATING INSTRUCTION S01-9-4 ELECTRICAL REVISION 2 PAGE 12 OF 19 TCN 2 - 2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

6.0 INSTRUCTIONS (Continued)

- 6.4.9 If the holder of the Work Authorization requests that the 4 kV side of the Auxiliary Transformers be grounded and the Electrical Foreman and Shift Superintendent concur, then INSTALL the Grounding Device(s) in accordance with SO123-I-1.28, Operation Of The 4 kV and 6.9 kV Personnel Grounding Devices. LOG the Personal Ground in the Control Operator log book with the ground symbol in the margin.
- 6.4.10 If the holder of the Work Authroization installs Personal Grounds on the 18 kV side of the Main and Auxiliary Transformers, then log the 18 kV Personal Ground in the Control Operator log book with the ground symbol in the margin.

6.5 Removing C Auxiliary Transformer From Service

6.5.1 Obtain an approved C Outage, or, in an emergency, notify the Mira Loma Switching Center Operator and the Energy Resources Supervisor that it is necessary to de-energize and disconnect C Auxiliary Transformer.

CAUTION	A or B Auxiliary Transformer shall not be
	paralleled with C Auxiliary Transformer if
	these Transformers are not paralleled at
	the 220 kV Buses.

- 6.5.2 Transfer 1C and 2C 4 kV buses to 1A and 1B 4 kV buses by paralleling and opening or by drop and pickup as appropriate in accordance with SO1-9-2, 4160 V system operations.
- 6.5.3 Contact Mira Loma Switching Center and receive orders to open 220 kV CBs 4032 and 6032 which will de-energize C Auxiliary Transformer. Inform the Unit 2/3 Common Control Operator of the impending switching.
- 6.5.4 OPEN 220 kV CBs 4032 and CB 6032 and report the operation to Mira Loma Switching Center.
- 6.5.5 If desired to switch out C Auxiliary Transformer, then continue with step 6.5.6.
- 6.5.6 Receive switching orders from Mira Loma Switching Center to disconnect and ground the C Auxiliary Transformer.

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MAIN AND AUXILIARY TRANSFORMER OPERATIONS

6.0 INSTRUCTIONS (Continued)

Operating Instruction SO1-9-1, 220 kV NOTE: Switching Operations contains facsimile switching orders as examples of how to perform the switching.

- Perform the required switching and report to Mira Loma 6.5.7 Switching Center.
- Issue a Work Authorization to a qualified workman in 6.5.8 accordance with SO1-14-12, Equipment Control Implementation.
- 6.5.9 If the holder of the Work Authorization requests that the 4 kV side of the C Auxiliary Transformer be grounded and the Electrical Foreman and Shift Superintendent concur, then INSTALL the Grounding Device(s) in accordance with SO123-I-1.28, Operation Of The 4 kV and 6.9 kV Personnel Grounding Devices. LOG the Personal Ground in the Control Operator log book with the ground symbol in the margin.

Failure of a Main, A, B or C Transformer 6.6

- 6.6.1 If in Modes 1-3 and the Main, A, B or C Transformer trips or is tripped, then TRIP or VERIFY TRIPPED the Unit and GO TO SO1-1.0-10, Reactor Trip or Safety Injection.
- If in Mode 4 and the Main, A, B or C Transformer 6.6.2 trips, then use any available source of power to energize 1C and 2C 4 kV Buses and 480 Volt Buses 1, 2 and 3 per this Instruction; SO1-9-2, 4160 V System Operations; and SO1-9-3, 480 V System Operations.
- 6.6.3 If in Modes 5-6 and the Main, A, B or C Transformer trips, then use any available source of power to energize at least one 4 kV Bus and at least one 480 Volt Bus per this Instruction: SO1-9-2, 4160 V System Operations; and SO1-9-3, 480 V System Operations.
- 6.6.4 Notify the Energy Resources Supervisor.
- 6.6.5 Notify the Site Maintenance Supervisor and request that appropriate Tests and inspections of the Transformer be made per System Operation Bulletin No. 33, Energizing Power Transformers After a Relay Operation.

OPERATING INSTRUCTION S01-9-4 ELECTRICAL REVISION 2 PAGE 14 OF 19 TCN 2-0

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

7.0 RECORDS

- 7.1 Make log entry recording the completion of this system alignment.
- 7.2 File completed Checklist in the Nonsafety-related System Alignment File. The preceding Checklist may be discarded.

TRANSFORMER TEMPERATURE LIMITS

Transformer	Manu-			Full Load	Max, Co	nt, Temp,	Alarm Se	t Point	Max, Tem	p. 2 Hrs.
Designation	recturer	voitage	RYA	AMPS	100 011	HOL SPOL	TOP UTT	HOL SPOL	Top UTT	not spot
Main	Westing- house	230,000 Y 18,000	485,000	1,217	85°C	95°C	90°C	100°C	95°C	105°C
Spare (one at ElSegundo-one at_Alamitos)	Westing- house	<u>230,000 Y</u> 18,000	380,000	<u>954</u> 12,189	85°C	95°C	85°C	100°C	95°C	105°C
Auxiliary, A and B	Westing- house	18,000 4,360 Y	12,500	400,9	85°C		90°C		95°C	
Auxillary, C	Westing- house	<u>230,000</u> 4360-4360	30,000	75.3 1986-1986	90°C	120°C	90°C	117°C		
Auxillary, C (Spare)	Westing- house	230,000	30,000	75.3 1986-1986	90°C	120°C	90°C	117°C		

NULE: All tabulated temperatures are indicated locally, and the main transformer top oil and hot spot are recorded in the Control Room. The lighting transformers are designed for a 150°C rise.

ATTACHMENT 1 PAGE 1 OF 1

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OPERATING INSTRUCTION SO1-9-4 ELECTRICAL PAGE 16 OF 19 **REVISION 2** ATTACHMENT 2 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

MAIN GENERATOR, MAIN AND AUXILIARY A & B TRANSFORMERS RELAY PROTECTIONS

1.0 PREREQUISITES

1.1 Obtain the SRO Operations Supervisor approval to perform this Checklist.

APPROVED BY Initials: SRO Ops. Supv. Date Time

2.0 INSTRUCTIONS

2.1 Deviations from indicated positions are allowed by approval of the SRO Operations Supervisor. Deviated positions shall be approved by circling the indicated position, writing the deviated position above, and initialing each deviated position by the SRO Operations Supervisor.

NOTE: This alignment may be performed in any order.

	DESCRIPTION	DC CUTOUT SWITCH POSITION	ALIGN INITIAL
2.2	Generator Differential Relays	CLOSED	
2.3	Gen. Negative Phase Sequence Relay	CLOSED	
2.4	Stator Ground Relay	CLOSED	
2.5	Generator Anti-Motoring Relay	CLOSED	
2.6	Loss of Field Relay	CLOSED	Ton
2.7	Unit Differential Relay	CLOSED	
2.8	Main Transformer Sudden Pressure Relay	CLOSED	<u></u>
2.9	Out of Step Relay	CLOSED	Tev
2.10	Generator Backup Overspeed Relay	CLOSED	
2.11	Auxiliary Transformer "A" Differential Relay	CLOSED	<u>1000</u> - 1
2.12	Auxiliary Transformer "A" Sudden Pressure Relay	CLOSED	
2.13	Auxiliary Transformer "A" 18kV Overcurrent Relay	CLOSED	<u>226.</u> (d)

ATTACHMENT 2 PAGE 1 OF 2

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OPERATING INSTRUCTION S01-9-4 ELECTRICAL REVISION 2 PAGE 17 OF 19 ATTACHMENT 2 TCN 2 2

2.0 INSTRUCTIONS (Continued)

	DESCRIPTION	DC CUTOUT SWITCH POSITION	ALIGN INITIAL
2.14	Auxiliary Transformer "A" 4kV Overcurrent Relay	CLOSED	
2.15	Auxiliary Transformer "B" Differential Relay	CLOSED	
2.16	Auxiliary Transformer "B" Sudden Pressure Relay	CLOSED	
2.17	Auxiliary Transformer "B" 18kV Overcurrent relay	CLOSED	<u></u>
2.18	Auxiliary Transformer "B" 4kV Overcurrent Relay	CLOSED	
2.19	Generator Overspeed Relay	CLOSED	
COMMENTS:			
PERFORMED B	Y:Operator SignatureInitials	Date	Time
	Operator Signature Initials	Date	Time
Deficiencies a	nd action taken:		
REVIEWED BY:		_	
	SKU Uperations Supervisor Date		
APPROVED BY	: Shift Superintendent	-	
	Date Date		

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OPERATING INSTRUCTION SO1-9-4 ELECTRICAL REVISION 2 PAGE 18 OF 19 ATTACHMENT 3 TCN 2-2

MAIN AND AUXILIARY TRANSFORMER OPERATIONS

C AUXILIARY TRANSFORMER RELAY PROTECTION

1.0 PREREQUISITES

 Obtain the SRO Operations Supervisor approval to perform this Checklist.

APPROVED BY Initials:

SRO Ops. Supv. Date Time

2.0 INSTRUCTIONS

2.1 Deviations from indicated positions are allowed by approval of the SRO Operations Supervisor. Deviated positions shall be approved by circling the indicated position, writing the deviated position above, and initialing each deviated position by the SRO Operations Supervisor.

NOTE: This alignment may be performed in any order.

	DESCRIPTION	DC CUTOUT SWITCH POSITION	ALIGN INITIAL	1700
2.2	Aux Transformer C Sudden Pressure Relay	CLOSED		
2.3	Aux Transformer C Overcurrent Relay	CLOSED		
2.4	Aux Transformer C Differential Relay	CLOSED		
2.5	Aux Transformer C Feeder Differential Relay (located at the Relay House)	CLOSED		
2.6	Aux. Transformer 4KV Loss of Voltage Relay	CLOSED	_	TON
COMMENTS:				

ATTACHMENT 3 PAGE 1 OF 2