

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 11 PAGE 1 of 16
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 3-24-93

Thomas A. Marlow
PLANT SUPERINTENDENT

3-26-93
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

9304080163 930330
PDR ADOCK 05000244
PDR

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EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 11 PAGE 2 of 16
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A. PURPOSE - This procedure provides actions to recover from a loss of reactor or secondary coolant.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, and FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, when a PRZR PORV is stuck open and its block valve can not be closed.
- b. E-0, REACTOR TRIP OR SAFETY INJECTION, with any of the following symptoms: high containment radiation, high containment pressure, or high containment recirculation sump level.
- c. E-0, REACTOR TRIP OR SAFETY INJECTION, ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, and FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, when RCS pressure is less than the shutoff head pressure of the RHR pumps or is decreasing.
- d. ES-1.1, SI TERMINATION, and FR-I.2, RESPONSE TO LOW PRESSURIZER LEVEL, if SI has to be reinitiated.
- e. E-2, FAULTED STEAM GENERATOR ISOLATION, after identification and isolation of a faulted S/G.
- f. ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, after normal injection mode conditions are established.
- g. ECA-1.2, LOCA OUTSIDE CONTAINMENT, when a LOCA outside containment is isolated.
- h. FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, and FR-C.2, RESPONSE TO DEGRADED CORE COOLING, after core cooling has been reestablished.
- i. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, if RCS pressure is less than all non-faulted S/G(s) pressure.
- j. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, after secondary heat sink has been reestablished and all PRZR PORVs are close.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED								
<p>***** <u>CAUTION</u> IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, STEP 1. *****</p>										
<p>*****</p> <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open AND monitored periodically. o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.) o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION). o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. 										
<p>* 1 Monitor RCP Trip Criteria: </p> <table> <tbody> <tr> <td>a. RCP status - ANY RCP RUNNING</td> <td>a. Go to Step 2.</td> </tr> <tr> <td>b. SI pumps - AT LEAST TWO RUNNING</td> <td>b. Go to Step 2.</td> </tr> <tr> <td>c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]</td> <td>c. Go to Step 2.</td> </tr> <tr> <td>d. Stop both RCPs</td> <td></td> </tr> </tbody> </table>			a. RCP status - ANY RCP RUNNING	a. Go to Step 2.	b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 2.	c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 2.	d. Stop both RCPs	
a. RCP status - ANY RCP RUNNING	a. Go to Step 2.									
b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 2.									
c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 2.									
d. Stop both RCPs										

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 100 PSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> • Steamlines • Feedlines <p><u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p> <p>***** <u>CAUTION</u> *****</p> <p>IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).</p> <p>*****</p> <p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>
* 3	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 5% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G. b. <u>IF</u> narrow range level in any S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Check Secondary Radiation Levels - NORMAL</p> <ul style="list-style-type: none"> o Steamline radiation monitor (R-31 and R-32) o Request HP sample S/Gs for activity 	<p><u>IF</u> steamline radiation monitors <u>NOT</u> available, <u>THEN</u> dispatch AO to locally check steamline radiation.</p> <p><u>IF</u> abnormal radiation levels detected in any S/G, <u>THEN</u> go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p>
<p>***** <u>CAUTION</u> IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 5B). *****</p>		
* 5	<p>Monitor PRZR PORV Status:</p> <ul style="list-style-type: none"> a. Power to PORV block valves - AVAILABLE b. PORVs - CLOSED c. Block valves - AT LEAST ONE OPEN 	<ul style="list-style-type: none"> a. Restore power to block valves unless block valve was closed to isolate an open PORV: <ul style="list-style-type: none"> • MOV-515, MCC C position 6C • MOV-516, MCC D position 6C b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs. <u>IF</u> any PORV can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. <u>IF</u> block valve can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally check breaker. <ul style="list-style-type: none"> • MOV-515, MCC C position 6C • MOV-516, MCC D position 6C c. Open one block valve unless it was closed to isolate an open PORV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>***** <u>CAUTION</u> IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. *****</p>		
6	Reset SI	
7	Reset CI:	
	a. Depress CI reset pushbutton b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.
8	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	a. Manually start SW pumps as power supply permits (258 kw each). <u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) 3) Go to Step 10.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED 	a. Perform the following: <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Verify turbine building SW isolation valves - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	b. Manually align valves.
c.	Verify at least two air compressors - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	d. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 10. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 9e and f.
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	<p>Check Normal Power Available To Charging Pumps:</p> <ul style="list-style-type: none"> Bus 14 normal feed breaker - CLOSED Bus 16 normal feed breaker - CLOSED 	<p>Verify adequate emergency D/G capacity to run charging pumps (75 kw each).</p> <p><u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to Attachment CNMT RECIRC FANS)..</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 open, demand at 0%.
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	<p>b. Manually align valves as necessary.</p> <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
c.	Start charging pumps as necessary and adjust charging flow to restore PRZR level	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If SI Should Be Terminated:	
a.	RCS pressure:	a. Do <u>NOT</u> stop SI pumps. Go to Step 14.
	o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT]	
	o Pressure - STABLE OR INCREASING	
b.	RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Do <u>NOT</u> stop SI pumps. Go to Step 14.
c.	Secondary heat sink:	c. <u>IF</u> neither condition satisfied, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to Step 14.
	o Total feed flow to intact S/Gs - GREATER THAN 200 GPM	
	-OR-	
	o Narrow range level in at least one intact S/G - GREATER THAN 5% [25% adverse CNMT]	
d.	PRZR level - GREATER THAN 5% [30% adverse CNMT]	d. Do <u>NOT</u> stop SI pumps. Perform the following:
		1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray.
		2) Go to Step 14.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Go To ES-1.1, SI TERMINATION, Step 1	
*14	Monitor If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - RUNNING	a. Go to Step 15.
	b. Check the following:	b. Continue with Step 15. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 14c through f.
	o CNMT pressure - LESS THAN 4 PSIG	
	o Sodium hydroxide tank level - LESS THAN 55%	
	c. Reset CNMT spray	
	d. Check NaOH tank outlet valves - CLOSED	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
	• AOV-836A	
	• AOV-836B	
	e. Stop CNMT spray pumps and place in AUTO	
	f. Close CNMT spray pump discharge valves	
	• MOV-860A	
	• MOV-860B	
	• MOV-860C	
	• MOV-860D	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** CAUTION *****		
	<ul style="list-style-type: none"> o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. o RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS. 	

*15	Monitor If RHR Pumps Should Be Stopped:	
	a. Check RCS pressure:	
	1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	1) Go to Step 17.
	2) RCS pressure - STABLE OR INCREASING	2) Go to Step 16.
	b. Stop RHR pumps and place in AUTO	
16	Check RCS And S/G Pressures	
	a. Check pressures in both S/Gs - STABLE OR INCREASING	a. Return to Step 1.
	b. Check pressures in both S/Gs - GREATER THAN 100 PSIG	b. Monitor RCS pressure. IF RCS pressure does NOT increase after faulted S/G dryout, THEN go to Step 17.
	c. Check RCS pressure - STABLE OR DECREASING	c. Return to Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	<p>Check If Emergency D/Gs Should Be Stopped:</p> <p>a. Verify AC emergency busses energized by offsite power:</p> <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED <p>b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers as necessary: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Ensure condenser steam dump mode control in MANUAL. 4) Restore power to MCCs: <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 5) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting breaker. 6) Refer to Attachment SI/UV for other equipment lost with loss of offsite power. 7) Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify CNMT Sump Recirculation Capability:	
a.	Check RHR system:	a. Restore power to at least one train of emergency AC busses. <u>IF</u> at least one train of cold leg recirculation capability can <u>NOT</u> be verified, <u>THEN</u> go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
	1) Power available to emergency AC busses and MCCs required for CNMT sump recirculation	
	o Bus 14 and bus 18 - ENERGIZED	
	o MCC C - ENERGIZED	
	o Bus 16 and bus 17 - ENERGIZED	
	o MCC D - ENERGIZED	
	2) RHR pumps and valves - OPERABLE	
b.	Check SW pumps - AT LEAST 2 PUMPS AVAILABLE	b. Attempt to restore at least 2 SW pumps to operable. <u>IF</u> only 1 SW pump available, <u>THEN</u> refer to Attachment MIN SW for additional guidance.
c.	Dispatch AO to check AUX BLDG sub-basement for RHR system leakage (AUX BLDG sub-basement key may be required)	c. <u>IF</u> any RHR pump seal leakage indicated, <u>THEN</u> leakage should be evaluated and isolated if necessary.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19 Evaluate Plant Status:

a. Check auxiliary building radiation - NORMAL

- Plant vent iodine (R-10B)
- Plant vent particulate (R-13)
- Plant vent gas (R-14)
- CCW liquid monitor (R-17)
- LTDN line monitor (R-9)
- CHG pump room (R-4)

b. Direct HP to obtain following samples:

- RCS boron
- RCS activity
- CNMT hydrogen
- CNMT sump boron
- BASTs boron

c. Verify adequate Rx head cooling:

- 1) Check IA to CNMT - AVAILABLE
- 2) Verify at least one control rod shroud fan - RUNNING
- 3) Verify one Rx compartment cooling fan - RUNNING

a. Notify HP and refer to appropriate AR-RMS procedure.

IF the cause is a loss of RCS inventory outside CNMT, THEN go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.

1) Go to Step 20.

2) Manually start one fan as power supply permits (45 kw)

3) Perform the following:

- o Dispatch AO to reset UV relays at MCC C and MCC D.
- o Manually start one fan as power supply permits (23 kw)

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If RCS Cooldown And Depressurization Is Required:	
	a. RCS pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	a. <u>IF</u> RHR pump flow greater than 475 gpm, <u>THEN</u> go to Step 21.
	b. Go to ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1	
21	Check If Transfer To Cold Leg Recirculation Is Required:	
	a. RWST level - LESS THAN 28%	a. Return to Step 18.
	b. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1	
-END-		

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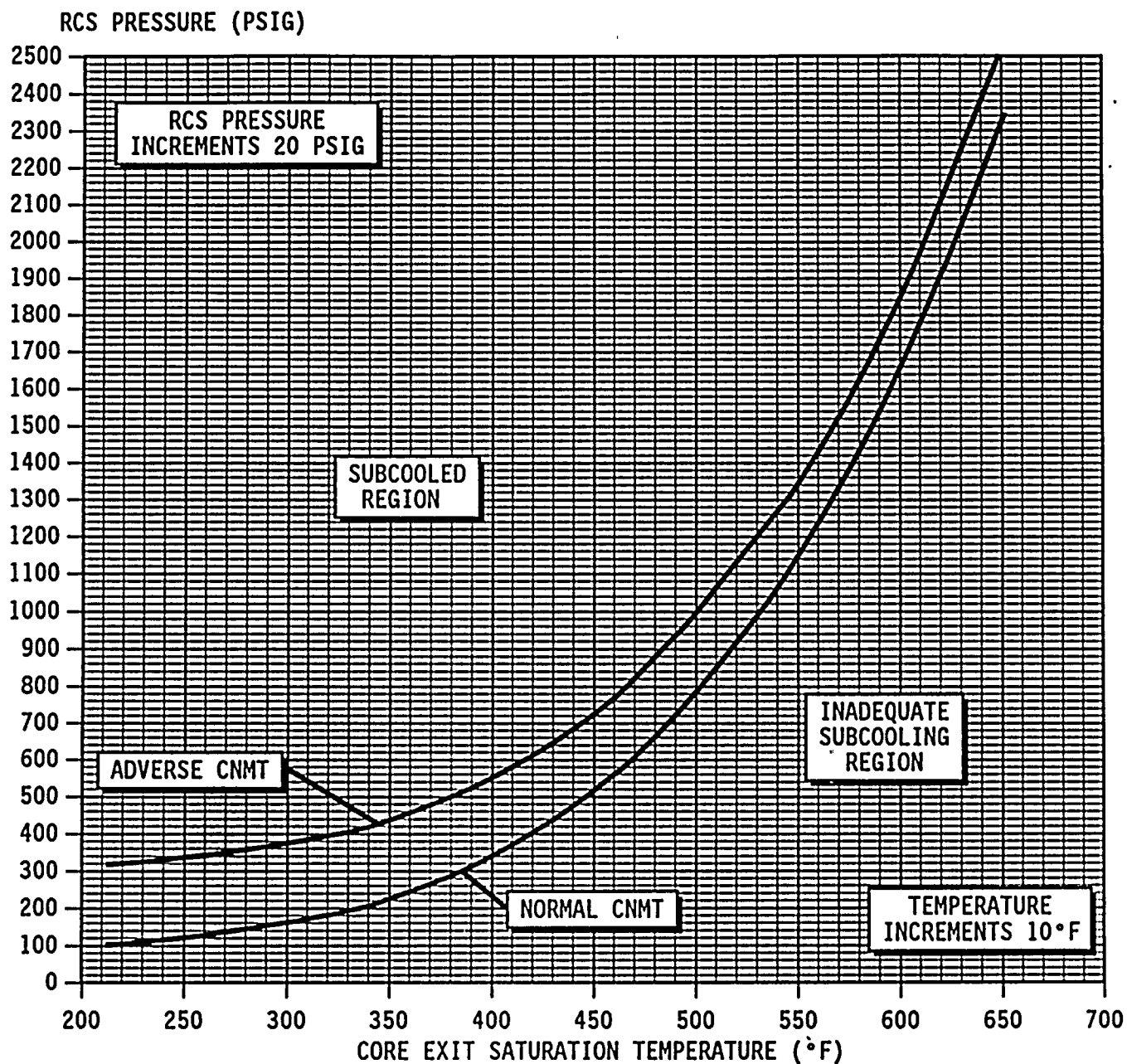
E-1 APPENDIX LIST

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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure
Below [-] Core Exit T/C Indication



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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually operate SI pumps as necessary:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING FIGURE MIN SUBCOOLING
- OR -
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SI TERMINATION CRITERIA

IF ALL conditions listed below occur, THEN go to ES-1.1, SI TERMINATION, Step 1:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- b. Total feed flow to intact S/Gs - GREATER THAN 200 GPM
- OR -
Narrow range level in at least one intact S/G - GREATER THAN 5% [25% adverse CNMT]
- c. RCS pressure:
 - o GREATER THAN 1625 PSIG [1825 psig adverse CNMT]
 - o STABLE OR INCREASING
- d. PRZR level - GREATER THAN 5% [30% adverse CNMT]

3. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

6. E-3 TRANSITION CRITERIA

IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE

6-8-94


PLANT SUPERINTENDENT

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REVIEWED BY: _____

[illegible]

123 456 789

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 2 of 38
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- A. PURPOSE - This procedure provides actions to terminate leakage of reactor coolant into the secondary system following a steam generator tube rupture (SGTR), this procedure should also be used for a SGTR in one S/G and a fault in the other S/G.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-0, REACTOR TRIP OR SAFETY INJECTION, when condenser air ejector radiation or blowdown radiation is abnormal, or
 - b. E-0, REACTOR TRIP OR SAFETY INJECTION, E-1, LOSS OF REACTOR OR SECONDARY COOLANT, E-2, FAULTED STEAM GENERATOR ISOLATION, and FR-H.3, RESPONSE TO STEAM GENERATOR HIGH LEVEL, when secondary radiation is abnormal, or
 - c. E-0, REACTOR TRIP OR SAFETY INJECTION, E-1, LOSS OF REACTOR OR SECONDARY COOLANT, ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, when an intact S/G narrow range level increases in an uncontrolled manner.
 - d. ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, when pressurizer pressure control is restored.
 - e. E-1 series FOLDOUT page whenever either S/G level increases in an uncontrolled manner or either S/G has abnormal radiation.

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 3 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED								
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open AND monitored periodically. o Critical Safety Function Status Trees should be monitored (Refer to Appendix 1 for Red Path Summary). o Personnel should be available for sampling during this procedure. o Conditions should be evaluated for Site Contingency Reporting (EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION). o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. 										
<p>* 1 Monitor RCP Trip Criteria:</p> <table border="0"> <tbody> <tr> <td>a. RCP status - ANY RCP RUNNING</td> <td>a. Go to Step 2.</td> </tr> <tr> <td>b. SI pumps - AT LEAST TWO RUNNING</td> <td>b. Go to Step 2.</td> </tr> <tr> <td>c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]</td> <td>c. Go to Step 2.</td> </tr> <tr> <td>d. Stop both RCPs</td> <td></td> </tr> </tbody> </table>			a. RCP status - ANY RCP RUNNING	a. Go to Step 2.	b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 2.	c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 2.	d. Stop both RCPs	
a. RCP status - ANY RCP RUNNING	a. Go to Step 2.									
b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 2.									
c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 2.									
d. Stop both RCPs										

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 4 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Identify Ruptured S/G(s):</p> <ul style="list-style-type: none"> o Unexpected increase in either S/G narrow range level <p>-OR-</p> <ul style="list-style-type: none"> o High radiation indication on main steamline radiation monitor <ul style="list-style-type: none"> • R-31 for S/G A • R-32 for S/G B <p>-OR-</p> <ul style="list-style-type: none"> o AO reports local indication of high steamline radiation <p>-OR-</p> <ul style="list-style-type: none"> o RP reports high radiation from S/G activity sample 	<p>Continue with Steps 6 through 11.</p> <p><u>WHEN</u> ruptured S/G(s) identified, <u>THEN</u> do Steps 3, 4 and 5.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.
- o AT LEAST ONE S/G SHALL BE MAINTAINED AVAILABLE FOR RCS COOLDOWN.

3 Isolate Flow From Ruptured S/G(s):

a. Adjust ruptured S/G ARV controller to 1050 psig in AUTO

b. Check ruptured S/G ARV - CLOSED

b. WHEN ruptured S/G pressure less than 1050 psig, THEN verify S/G ARV closed. IF NOT closed, THEN place controller in MANUAL and close S/G ARV.

IF S/G ARV can NOT be closed, THEN dispatch AO to locally isolate.

c. Close ruptured S/G TDAFW pump steam supply valve and place in PULL STOP

- S/G A, MOV-3505A
- S/G B, MOV-3504A

c. IF at least one MDAFW pump running, THEN dispatch AO with locked valve key to locally isolate steam from ruptured S/G to TDAFW pump.

- S/G A, V-3505
- S/G B, V-3504

d. Verify ruptured S/G blowdown valve - CLOSED

- S/G A, AOV-5738
- S/G B, AOV-5737

d. Place S/G blowdown and sample valve isolation switch to CLOSE.

IF blowdown can NOT be isolated manually, THEN dispatch AO to locally isolate blowdown.

- S/G A, V-5701
- S/G B, V-5702

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 6 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Complete Ruptured S/G Isolation:	
	a. Close ruptured S/G MSIV - RUPTURED S/G MSIV CLOSED	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close intact S/G MSIV. 2) Place intact S/G ARV controller at 1005 psig in AUTO. 3) Place condenser steam dump mode selector switch to MANUAL. 4) Adjust condenser steam dump controller to 1050 psig in AUTO. 5) Adjust reheat steam supply controller cam to close reheat steam supply valves. 6) Ensure turbine stop valves - CLOSED. 7) Dispatch A0 to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G, parts A and B). <p><u>IF</u> the ruptured S/G can <u>NOT</u> be isolated from the intact S/G, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1</p>
	b. Dispatch A0 to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G part A)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** CAUTION IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN. *****		
5	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 5% [25% adverse CNMT]	a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following: 1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT]. 2) Continue with Step 6. <u>WHEN</u> ruptured S/G level greater than 5% [25% adverse CNMT], <u>THEN</u> do Steps 5b through e.
b.	Close MDAFW pump discharge valve to ruptured S/G • S/G A, MOV-4007 • S/G B, MOV-4008	b. Dispatch AO to locally close valve.
c.	Pull stop MDAFW pump for ruptured S/G	
d.	Close TDAFW pump flow control valve to ruptured S/G • S/G A, AOV-4297 • S/G B, AOV-4298	d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G. • S/G A, V-4005 • S/G B, V-4006
e.	Verify MDAFW pump crosstie valves - CLOSED • MOV-4000A • MOV-4000B	e. Manually close valves.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 6B). *****		
* 6	Monitor PRZR PORVs And Block Valves:	
a.	Power to PORV block valves - AVAILABLE	a. Restore power to block valves unless block valve was closed to isolate an open PORV: • MOV-515, MCC C position 6C • MOV-516, MCC D position 6C
b.	PORVs - CLOSED	b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs. <u>IF</u> any PORV can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. <u>IF</u> block valve can <u>NOT</u> be closed, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
c.	Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 9 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> Pressure in both S/Gs - STABLE OR INCREASING Pressure in both S/Gs - GREATER THAN 100 PSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> Steamlines Feedlines <p><u>IF</u> faulted S/G <u>NOT</u> isolated, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
<p>***** <u>CAUTION</u> IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS). *****</p>		
<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>		
* 8	<p>Monitor Intact S/G Level:</p> <ul style="list-style-type: none"> Narrow range level - GREATER THAN 5% [25% adverse CNMT] Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN, SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</p> <p>*****</p>		
9	Reset SI	
10	Reset CI:	
	<p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED</p>	<p>b. Perform the following:</p> <p>1) Reset SI.</p> <p>2) Depress CI reset pushbutton.</p>
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
11	Check If RHR Pumps Should Be Stopped:	
	<p>a. Check RCS pressure:</p> <p>o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]</p> <p>o Pressure - STABLE OR INCREASING</p> <p>b. Stop RHR pumps and place both in AUTO</p>	<p>a. Go to Step 12.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: If ruptured S/G needed for cooldown, isolation is not necessary.

12 Verify Ruptured S/G Isolated:

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|---|--|
| <p>a. Check ruptured MSIV - CLOSED</p> | <p>a. <u>IF</u> only intact S/G MSIV can be closed, <u>THEN</u> ensure air ejector/gland steam supply and flange heating steam isolated. (Refer to ATTACHMENT RUPTURED S/G, part B).</p> <p><u>IF</u> neither S/G MSIV can be closed <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1</p> |
| <p>b. Ruptured S/G pressure - GREATER THAN 300 PSIG</p> | <p>b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> |

13 Establish Condenser Steam Dump Pressure Control:

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|---|---|
| <p>a. Verify condenser available:</p> <ul style="list-style-type: none"> o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT <p>b. Adjust condenser steam dump controller HC-484 to maintain intact S/G pressure and verify in AUTO</p> <p>c. Place steam dump mode selector switch to MANUAL</p> | <p>a. Adjust S/G ARV controllers to maintain intact S/G pressure in AUTO and go to Step 14.</p> |
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Following initiation of controlled cooldown or depressurization, RCP trip criteria is no longer applicable.

14 Initiate RCS Cooldown:

- a. Determine required core exit temperature from below table

RUPTURED SG PRESSURE	REQUIRED CORE EXIT TEMPERATURE (°F)
1100 PSIG	525 [505 adverse CNMT]
1000 PSIG	510 [490 adverse CNMT]
900 PSIG	500 [475 adverse CNMT]
800 PSIG	485 [460 adverse CNMT]
700 PSIG	465 [440 adverse CNMT]
600 PSIG	450 [420 adverse CNMT]
500 PSIG	425 [395 adverse CNMT]
400 PSIG	405 [370 adverse CNMT]
300 PSIG	375 [330 adverse CNMT]

- b. Initiate dumping steam to condenser from intact S/G at maximum rate

- b. Manually or locally initiate steam dump from intact S/G at maximum rate using S/G ARV.

IF no intact S/G available, THEN perform the following:

- o Use faulted S/G.

-OR-

- o IF both S/Gs ruptured, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1 .

- c. Core exit T/Cs - LESS THAN REQUIRED TEMPERATURE

- c. Continue with Step 15. WHEN core exit T/Cs less than required, THEN do Step 14d.

- d. Stop RCS cooldown and maintain core exit T/Cs less than required temperature



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*15	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 volt bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start CNMT RECIRC fans as necessary. 5) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Verify Adequate SW Flow:

- a. Check at least two SW pumps -
RUNNING

- a. Manually start SW pumps as power
supply permits (258 kw each).

IF less than two SW pumps
running, THEN:

- 1) Ensure SW isolation.
- 2) Dispatch AO to establish
normal shutdown alignment
(Refer to Attachment SD-1)
- 3) Go to Step 18.

- b. Dispatch AO to establish normal
shutdown alignment (Refer to
Attachment SD-1)

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 15 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED 	a. Perform the following: <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <p><u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).</p>
b.	Verify turbine building SW isolation valves - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	b. Manually align valves.
c.	Verify at least two air compressors - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	d. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 18. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 17e and f.
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Establish Charging Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to locally close seal injection needle valves to affected RCP. <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 demand at 0%.
	b. Align charging pump suction to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and establish 75 gpm total charging flow <ul style="list-style-type: none"> • Charging line flow • Seal injection 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>***** <u>CAUTION</u> RCS COOLDOWN IN STEP 14 SHOULD BE COMPLETED BEFORE CONTINUING TO STEP 19. *****</p>		
19	Check Ruptured S/G Pressure - STABLE OR INCREASING	<u>IF</u> pressure continues to decrease to less than 250 psi above the pressure of the intact S/G, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
20	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING	Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1 .

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> SI ACCUMs may inject during RCS depressurization.</p>		
21	Depressurize RCS To Minimize Break Flow And Refill PRZR:	
	<p>a. Check the following:</p> <ul style="list-style-type: none"> o Ruptured S/G level - LESS THAN 90% [85% adverse CNMT] o Any RCP - RUNNING o IA to CNMT - AVAILABLE <p>b. Spray PRZR with maximum available spray until ANY of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 75% [65% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCS pressure - LESS THAN SATURATION USING FIGURE MIN SUBCOOLING <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o <u>BOTH</u> of the following: <ul style="list-style-type: none"> 1) RCS pressure - LESS THAN RUPTURED S/G PRESSURE 2) PRZR level - GREATER THAN 5% [30% adverse CNMT] 	a. Go to Step 22.
	<p>c. Close normal PRZR spray valves:</p> <ul style="list-style-type: none"> 1) Adjust normal spray valve controller to 0% DEMAND 2) Verify RCS pressure - INCREASING <p>d. Verify auxiliary spray valve (AOV-296) - CLOSED</p> <p>e. Go to Step 24</p>	<p>c. Stop RCPs.</p> <p>d. Decrease charging speed to minimum and ensure charging valve to loop B cold leg open (AOV-294).</p>

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EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 15 PAGE 19 of 38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>***** <u>CAUTION</u> *****</p> <ul style="list-style-type: none"> o THE PRT MAY RUPTURE IF A PRZR PORV IS USED TO DEPRESSURIZE THE RCS. THIS MAY RESULT IN ABNORMAL CNMT CONDITIONS. o CYCLING OF THE PRZR PORV SHOULD BE MINIMIZED. o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS MAY RESULT IN A RAPIDLY INCREASING PRZR LEVEL. <p>*****</p> <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>o When using a PRZR PORV select one with an operable block valve.</p>		
22	Depressurize RCS Using PRZR PORV To Minimize Break Flow And Refill PRZR:	
	a. Verify IA to CNMT - AVAILABLE b. PRZR PORVs - AT LEAST ONE AVAILABLE	a. Refer to Attachment N2 PORVS to operate PORVs. b. <u>IF</u> auxiliary spray available, <u>THEN</u> return to Step 21b. <u>IF</u> auxiliary spray can <u>NOT</u> be established, <u>THEN</u> go to ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, Step 1.
<p>This Step continued on the next page.</p>		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 22 continued from previous page)

c. Open one PRZR PORV until ANY of the following conditions satisfied:

- o PRZR level - GREATER THAN 75%
[65% adverse CNMT]

-OR-

- o RCS pressure - LESS THAN
SATURATION USING FIGURE MIN
SUBCOOLING

-OR-

- o BOTH of the following:

- 1) RCS pressure - LESS THAN
RUPTURED S/G PRESSURE
- 2) PRZR level - GREATER THAN
5% [30% adverse CNMT]

d. Close PRZR PORVs

d. IF either PRZR PORV can NOT be closed, THEN close associated block valve.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Check RCS Pressure -
INCREASING

Close block valve for the PRZR PORV
that was opened.

IF pressure continues to decrease,
THEN perform the following:

a. Monitor the following conditions
for indication of leakage from
PRZR PORV:

- o PORV outlet temp (TI-438) NOT
decreasing.
- o PRT pressure, level or
temperature continue to
increase.

b. Go to ECA-3.1, SGTR WITH LOSS OF
REACTOR COOLANT - SUBCOOLED
RECOVERY DESIRED, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

SI MUST BE TERMINATED WHEN TERMINATION CRITERIA ARE SATISFIED TO PREVENT OVERFILLING OF THE RUPTURED S/G.

24 Check If SI Flow Should Be Terminated:

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| <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> o Total feed flow to S/G(s) - GREATER THAN 200 GPM AVAILABLE <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Narrow range level in at least one intact S/G - GREATER THAN 5% [25% adverse CNMT] <p>c. RCS pressure - STABLE OR INCREASING</p> <p>d. PRZR level - GREATER THAN 5% [30% adverse CNMT]</p> | <p>a. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>b. <u>IF</u> neither condition satisfied, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>d. Do <u>NOT</u> stop SI pumps. Return to Step 12.</p> |
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Stop SI Pumps And Place In AUTO	
26	Establish Required Charging Line Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to locally isolate seal injection to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open. 3) Start one charging pump.
	b. Establish 20 gpm charging line flow	
*27	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually operate SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1..
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually operate SI pumps as necessary. <p><u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>

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STEP

ACTION/EXPECTED RESPONSE

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*28 Monitor If CNMT Spray Should Be Stopped:

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| <ul style="list-style-type: none"> a. CNMT spray pumps - ANY RUNNING b. Verify CNMT pressure - LESS THAN 4 PSIG c. Reset CNMT spray d. Check NaOH tank outlet valves - CLOSED <ul style="list-style-type: none"> • AOV-836A • AOV-836B e. Stop CNMT spray pumps and place in AUTO f. Close CNMT spray pump discharge valves <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D | <ul style="list-style-type: none"> a. Go to Step 29. b. Continue with Step 29. <u>WHEN</u> CNMT pressure less than 4 psig, <u>THEN</u> do Steps 28c through f. d. Place NaOH tank outlet valve controllers to MANUAL and close valves. |
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 5% [30% adverse CNMT] <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Manually operate SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Vent any unisolated ACCUMs:</p> <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least three SW pumps - RUNNING	a. Manually start pumps as power supply permits (258 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 37.
b.	Verify AUX BLDG SW isolation valves - AT LEAST ONE SET OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW).
c.	Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG 	a. Continue with Step 37. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 31 through 36.
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
d.	Charging pump - ANY RUNNING	d. Continue with Step 37. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 32 through 36.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 33.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
e.	Verify RCP #1 seal leakoff flow - LESS THAN 5.5 GPM.	e. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm, <u>THEN</u> : <ul style="list-style-type: none"> o Close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 33.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.25 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 33 | Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT] | Continue with Step 35. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 34. |
| 34 | <p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM Place the following switches to CLOSE: <ul style="list-style-type: none"> Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) Letdown isolation valve AOV-371 Loop B cold leg to REGEN Hx AOV-427 Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> TCV-130 PCV-135 Reset both trains of XY relays for AOV-371 and AOV-427 Open AOV-371 and AOV-427 Open letdown orifice valves as necessary Place TCV-130 in AUTO at 105°F Place PCV-135 in AUTO at 250 psig Adjust charging pump speed and HCV-142 as necessary | <p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> Place excess letdown divert valve, AOV-312, to NORMAL. Ensure CCW from excess letdown open, (AOV-745). Open excess letdown isolation valve AOV-310. Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35 Check VCT Makeup System:

a. Adjust boric acid flow control valve in AUTO to 9.5 gpm

b. Verify the following:

1) RMW mode selector switch in AUTO

2) RMW control armed - RED LIGHT LIT

c. Check VCT level:

o Level - GREATER THAN 20%

-OR-

o Level - STABLE OR INCREASING

b. Adjust controls as necessary.

c. Manually increase VCT makeup flow as follows:

1) Ensure BA transfer pumps and RMW pumps running. IF NOT, THEN reset MCC C and MCC D UV lockouts as necessary.

2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.

3) Increase boric acid flow as necessary.

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| EOP:

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STEAM GENERATOR TUBE RUPTURE | REV: 15

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 36 | <p>Check Charging Pump Suction Aligned To VCT:</p> <p>a. VCT level - GREATER THAN 20%</p> <p>b. Verify charging pumps aligned to VCT</p> <ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED | <p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <p>1) Ensure charging pump suction aligned to RWST</p> <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed <p>2) Continue with Step 37. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 36b.</p> <p>b. Manually align valves as necessary.</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN 1050 PSIG.

*37 Control RCS Pressure And
Makeup Flow To Minimize
RCS-To-Secondary Leakage:

- a. Perform appropriate action(s)
from table:

| PRZR
LEVEL | RUPTURED S/G NARROW RANGE LEVEL | | |
|--|---|--------------------------|--|
| | INCREASING | DECREASING | OFFSCALE HIGH |
| LESS THAN 13%
[40% ADVERSE CNMT] | <ul style="list-style-type: none"> o Increase RCS makeup flow o Depressurize RCS using Step 37b | Increase RCS makeup flow | <ul style="list-style-type: none"> o Increase RCS makeup flow o Maintain RCS and ruptured S/G pressure equal |
| BETWEEN 13%
[40% ADVERSE CNMT]
AND 50% | Depressurize RCS using Step 37b | Energize PRZR heaters | Maintain RCS and ruptured S/G pressure equal |
| BETWEEN 50% AND 75%
[65% ADVERSE CNMT] | <ul style="list-style-type: none"> o Depressurize RCS using Step 37b o Decrease RCS makeup flow | Energize PRZR heaters | Maintain RCS and ruptured S/G pressure equal |
| GREATER THAN 75%
[65% ADVERSE CNMT] | o Decrease RCS makeup flow | Energize PRZR heaters | Maintain RCS and ruptured S/G pressure equal |

- b. Control pressure using normal PRZR spray, if available, to obtain desired results for Step 37a

- b. IF letdown is in service, THEN use auxiliary spray (AOV-296).
IF NOT, THEN use one PRZR PORV.

[illegible]

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 38 | <p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP). | <ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER). |
| 39 | <p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (LC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Check status of local actions to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G) | <ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct RP to sample hotwells for activity. |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

40 Energize PRZR Heaters As
Necessary To Saturate PRZR
Water At Ruptured S/G Pressure

41 Check RCP Cooling:

Establish normal cooling to RCPs
(Refer to Attachment SEAL COOLING).

a. Check CCW to RCPs:

- o Annunciator A-7, RCP 1A CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED
- o Annunciator A-15, RCP 1B CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED

b. Check RCP seal injection:

- o Labyrinth seal D/Ps - GREATER
THAN 15 INCHES OF WATER
- OR-
- o RCP seal injection flow to
each RCP - GREATER THAN 6 GPM

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| EOP:
E-3 | TITLE:
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|--------------------------------|---|
| <p>*****
 <u>CAUTION</u>
 IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
 *****</p> | | |
| 42 | Check RCP Status: | |
| | a. RCPs - AT LEAST ONE RUNNING | a. Perform the following:
1) Try to start one RCP:
a) Ensure conditions for starting an RCP.
o Bus 11A or 11B energized.
o Refer to Attachment RCP START.
b) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:
o Increase PRZR level to greater than 65% [80% adverse CNMT].
o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING.
c) Start one RCP.
2) <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).
<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam. |
| | b. Stop all but one RCP | |

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STEAM GENERATOR TUBE RUPTURE | REV: 15

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| <p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p> | | |
| 43 | Check If Source Range Detectors Should Be Energized: | |
| a. | Source range channels - DEENERGIZED | a. Go to Step 43e. |
| b. | Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS | b. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration. 2) Continue with Step 44. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 43c through e. |
| c. | Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p>-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip | c. Continue with Step 44. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 43d and e. |
| d. | Verify source range detectors - ENERGIZED | d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2). <p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 44.</p> |
| e. | Transfer Rk-45 recorder to one source range and one intermediate range channel | |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 44 | Establish Normal Shutdown Alignment: | |
| | <ul style="list-style-type: none"> a. Check condenser - AVAILABLE b. Perform the following: <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump c. Verify adequate Rx head cooling: <ul style="list-style-type: none"> 1) Check IA to CNMT - AVAILABLE 2) Verify at least one control rod shroud fan - RUNNING 3) Verify one Rx compartment cooling fan - RUNNING d. Verify Attachment SD-1 - COMPLETE | <ul style="list-style-type: none"> a. Dispatch AO to perform Attachment SD-2. 1) Go to Step 45. 2) Manually start one fan as power supply permits (45 kw) 3) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw) |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

45 Consult TSC To Determine
Appropriate Post-SGTR
Cooldown Procedure:

- o Go to ES-3.1, POST-SGTR COOLDOWN
USING BACKFILL, Step 1

-OR-

- o Go to ES-3.2, POST-SGTR COOLDOWN
USING BLOWDOWN, Step 1

-OR-

- o Go to ES-3.3, POST-SGTR COOLDOWN
USING STEAM DUMP, Step 1

-END-

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E-3 APPENDIX LIST

| <u>TITLE</u> | <u>PAGES</u> |
|--------------------------------|--------------|
| 1) RED PATH SUMMARY | 1 |
| 2) FIGURE MIN SUBCOOLING | 1 |
| 3) ATTACHMENT CNMT RECIRC FANS | 1 |
| 4) ATTACHMENT D/G STOP | 1 |
| 5) ATTACHMENT N2 PORVS | 1 |
| 6) ATTACHMENT NC | 1 |
| 7) ATTACHMENT SEAL COOLING | 2 |
| 8) ATTACHMENT RCP START | 1 |
| 9) ATTACHMENT RUPTURED S/G | 2 |
| 10) ATTACHMENT SD-1 | 1 |
| 11) ATTACHMENT SD-2 | 1 |
| 12) ATTACHMENT AUX BLDG SW | 1 |
| 13) FOLDOUT | 1 |

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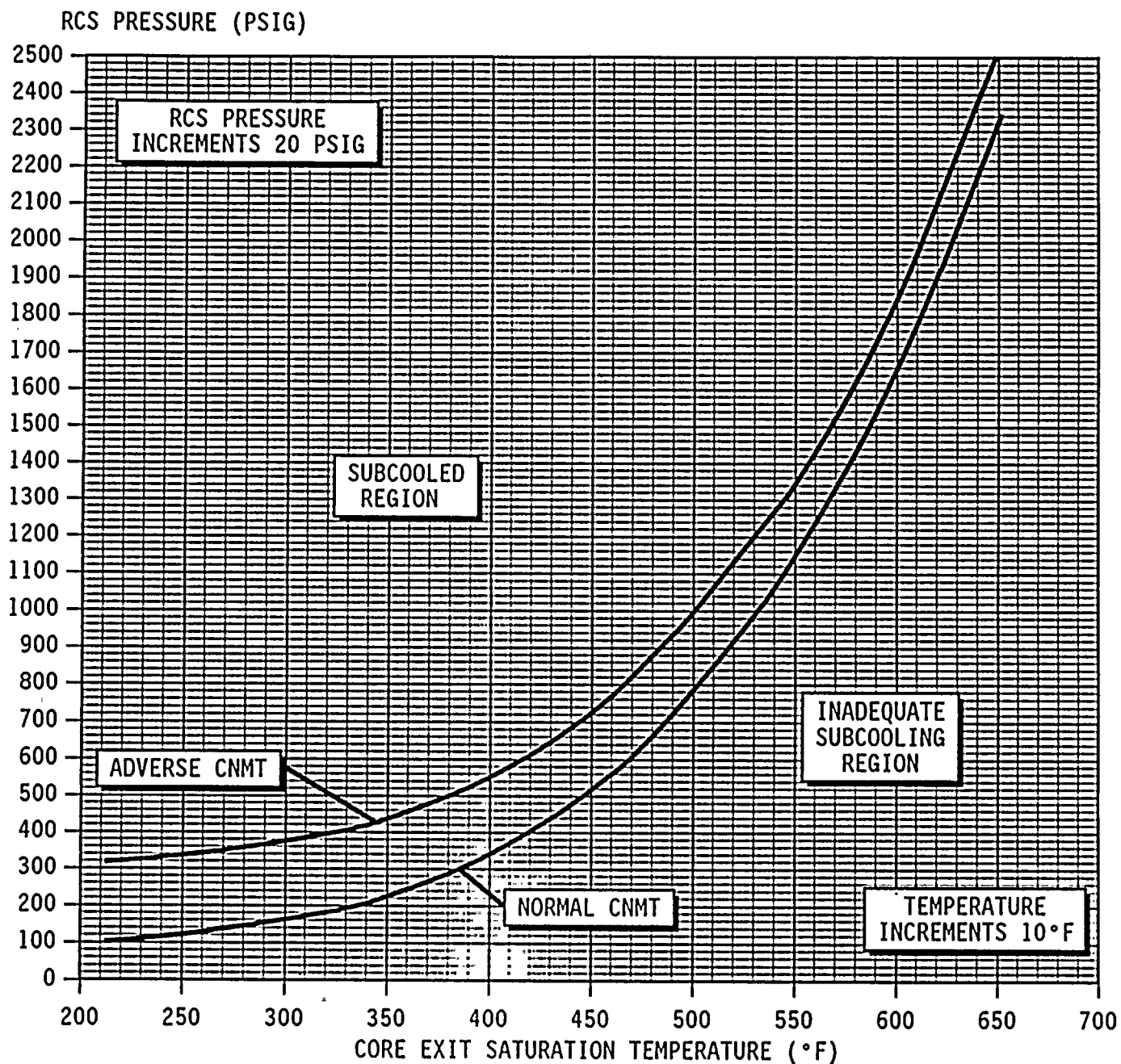
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STEAM GENERATOR TUBE RUPTURE | REV: 15
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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure Below [-] Core Exit T/C Indication



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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF either condition listed below occurs, THEN operate SI pumps manually as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT].

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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| EOP:
ECA-2.1 | TITLE:
UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS | REV: 12
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

Terry White
RESPONSIBLE MANAGER

5-31-96
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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|-----------------|---|-------------------------|
| EOP:
ECA-2.1 | TITLE:
UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS | REV: 12
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A. PURPOSE - This procedure provides actions to mitigate and minimize a loss of secondary coolant from both steam generators.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-2, FAULTED STEAM GENERATOR ISOLATION, when an uncontrolled depressurization of both steam generators occurs.

| | | |
|-----------------|---|-------------------------|
| EOP:
ECA-2.1 | TITLE:
UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS | REV: 12
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|--|
| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>*****</p> <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open AND monitored periodically. o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION). o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. | | |
| 1 | <p>Check Secondary Pressure Boundary:</p> <ul style="list-style-type: none"> o MSIVs - CLOSED o MFW flow control valves - CLOSED <ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves o MFW pump discharge valves - CLOSED o S/G blowdown and sample valves - CLOSED o TDAFW pump steam supply valves - PULL STOP o TDAFW pump flow control valves - CLOSED o S/G ARVs - CLOSED o Dispatch AO to locally isolate S/Gs (Refer to Attachment FAULTED S/G) | <p>Manually close valves one loop at a time.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths, as necessary, one loop at a time.</p> |

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|---|
| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>A MINIMUM FEED FLOW OF 50 GPM MUST BE MAINTAINED TO EACH S/G WITH A NARROW RANGE LEVEL LESS THAN 5% [25% ADVERSE CNMT].</p> <p>*****</p> | | |
| 2 | Control Feed Flow To Minimize RCS Cooldown: | |
| | a. Check cooldown rate in RCS cold legs - LESS THAN 100°F/HR | a. Decrease feed flow to 50 gpm to each S/G and go to Step 2c. |
| | b. Check narrow range level in both S/Gs - LESS THAN 50% | b. Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| | c. Check RCS hot leg temperatures - STABLE OR DECREASING | c. Control feed flow or dump steam to stabilize RCS hot leg temperatures. |
| 3 | Check If RCPs Should Be Stopped: | |
| | a. RCP status - ANY RCP RUNNING | a. Go to Step 4. |
| | b. SI pumps - AT LEAST TWO RUNNING | b. Go to Step 4. |
| | c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT] | c. Go to Step 4. |
| | d. Stop both RCPs | |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| 4 | Check CST Level - GREATER THAN 5 FEET | Switch to alternate AFW suction supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS). |
| *****
<u>CAUTION</u>
IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 5B).
***** | | |
| * 5 | Monitor PRZR PORVs And Block Valves: | |
| a. | Power to PORV block valves - AVAILABLE | a. Restore power to block valves unless block valve was closed to isolate an open PORV:

• MOV-515, MCC C position 6C
• MOV-516, MCC D position 6C |
| b. | PORVs - CLOSED | b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs.

<u>IF</u> any PORV can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. <u>IF</u> block valve can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally check breaker.

• MOV-515, MCC C position 6C
• MOV-516, MCC D position 6C |
| c. | Block valves - AT LEAST ONE OPEN | c. Open one block valve unless it was closed to isolate an open PORV. |



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|--|
| 6 | <p>Check Secondary Radiation Levels - NORMAL</p> <ul style="list-style-type: none"> o Steamline radiation monitor (R-31 and R-32) o Dispatch AO to locally check steamline radiation o Request RP sample S/Gs for activity | Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1. |
| <p>*****
 <u>CAUTION</u>
 IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.
 *****</p> | | |
| 7 | Reset SI | |

| | | |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|---|
| *****
<u>CAUTION</u>
RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES TO LESS THAN
250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY
RESTARTED TO SUPPLY WATER TO THE RCS.
***** | | |
| * 8 | Monitor If RHR Pumps Should
Be Stopped: | |
| | a. RHR pumps - ANY RUNNING | a. Go to Step 9. |
| | b. Check RCS Pressure: | |
| | 1) Pressure - GREATER THAN
250 psig [465 psig adverse
CNMT] | 1) Go to E-1, LOSS OF REACTOR OR,
SECONDARY COOLANT, Step 1. |
| | 2) Pressure - STABLE OR
INCREASING | 2) Go to Step 9. |
| | c. Stop RHR pumps and place in AUTO | |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

* 9 Monitor If CNMT Spray Should
Be Stopped:

a. CNMT spray pumps - RUNNING

a. Go to Step 10.

b. Check the following:

b. Continue with Step 10. WHEN
BOTH conditions satisfied, THEN
do Steps 9c through f.

o CNMT pressure - LESS THAN
4 PSIG

o Sodium hydroxide tank level -
LESS THAN 55%

c. Reset CNMT spray

d. Check NaOH tank outlet valves -
CLOSED

d. Place NaOH tank outlet valve
controllers to MANUAL and close
valves.

- AOV-836A

- AOV-836B

- AOV-836A

- AOV-836B

e. Stop CNMT spray pumps and place
in AUTO

f. Close CNMT spray pump discharge
valves

- MOV-860A

- MOV-860B

- MOV-860C

- MOV-860D

| | | |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 10 | Check RWST Level - GREATER THAN 28% | Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1. |
| 11 | Reset CI:

a. Depress CI reset pushbutton

b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED | b. Perform the following:

1) Reset SI.

2) Depress CI reset pushbutton. |
| 12 | Verify Adequate SW Flow:

a. Check at least two SW pumps - RUNNING | a. Manually start SW pumps as power supply permits (258 kw each).

<u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:

1) Ensure SW isolation.

2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)

3) Go to Step 14. |
| | b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) | |

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13 Establish IA to CNMT:

- a. Verify non-safeguards busses energized from offsite power
 - o Bus 13 normal feed - CLOSED
 - OR-
 - o Bus 15 normal feed - CLOSED
- b. Verify SW isolation valves to turbine building - OPEN
 - MOV-4613 and MOV-4670
 - MOV-4614 and MOV-4664
- c. Verify at least two air compressors - RUNNING
- d. Check IA supply:
 - o Pressure - GREATER THAN 60 PSIG
 - o Pressure - STABLE OR INCREASING
- e. Reset both trains of XY relays for IA to CNMT AOV-5392
- f. Verify IA to CNMT AOV-5392 - OPEN

a. Perform the following:

- 1) Close non-safeguards bus tie breakers:
 - Bus 13 to Bus 14 tie
 - Bus 15 to Bus 16 tie
- 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).

IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).

- 3) WHEN bus 15 restored, THEN reset control room lighting.

b. Manually align valves.

- c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.

d. Perform the following:

- 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).
- 2) Continue with Step 14. WHEN IA restored, THEN do Steps 13e and f.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|--|
| 14 | Check If SI ACCUMs Should Be Isolated: | |
| | <ul style="list-style-type: none"> a. Both RCS hot leg temperatures - LESS THAN 400°F b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C c. Close SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841 • MOV-865 d. Locally reopen breakers for MOV-841 and MOV-865 | <ul style="list-style-type: none"> a. Go to Step 15. c. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs, <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. |
| 15 | Check Normal Power Available To Charging Pumps: | Verify adequate emergency D/G capacity to run charging pumps (75 kw each). |
| | <ul style="list-style-type: none"> o Bus 14 normal feed breaker - CLOSED o Bus 16 normal feed breaker - CLOSED | <p><u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to Attachment CNMT RECIRC FANS).</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Check If Charging Flow Has
Been Established:

a. Charging pumps - ANY RUNNING

a. Perform the following:

- 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP:

- RCP A, V-300A
- RCP B, V-300B

- 2) Ensure HCV-142 open, demand at 0%.

b. Align charging pump suction to RWST:

b. IF LCV-112B can NOT be opened, THEN perform the following:

- o LCV-112B - OPEN
- o LCV-112C - CLOSED

- 1) Verify charging pump A NOT running and place in PULL STOP.
- 2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).
- 3) WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).

c. Start charging pumps as necessary and adjust charging flow to restore PRZR level

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

***17 Monitor SI Termination
Criteria:**

- | | |
|---|--|
| a. SI pumps - ANY RUNNING | a. Go to Step 19. |
| b. Check RCS pressure: <ul style="list-style-type: none">o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT]o Pressure - STABLE OR INCREASING | b. DO <u>NOT</u> stop SI pumps. Perform the following: <ul style="list-style-type: none">1) Energize PRZR heaters and operate PRZR spray as necessary to stabilize RCS pressure greater than 1625 psig [1825 psig adverse CNMT]2) Return to Step 2. |
| c. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING | c. DO <u>NOT</u> stop SI pumps. Return to Step 2. |
| d. PRZR level - GREATER THAN 5% [30% adverse CNMT] | d. Do <u>NOT</u> stop SI pumps. Perform the following: <ul style="list-style-type: none">1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray.2) Return to Step 17a. |

NOTE: Foldout Page E-2 transition criteria does not apply while performing steps 18 and 19.

**18 Stop SI and RHR Pumps And
Place In Auto**

| | | |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| *19 | Monitor SI Reinitiation Criteria: | |
| | a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING | a. Manually operate SI pumps as necessary and return to Step 2. |
| | b. PRZR level - GREATER THAN 5% [30% adverse CNMT] | b. Control charging flow to maintain PRZR level.

IF PRZR level can NOT be maintained, THEN manually operate SI pumps as necessary and return to Step 2. |
| 20 | Check RCS Hot Leg Temperatures - STABLE OR DECREASING | Control feed flow or dump steam to stabilize RCS hot leg temperatures. |
| 21 | Check Narrow Range Level In Both S/Gs - LESS THAN 50% | Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| 22 | Verify Adequate SW Flow To CCW Hx: | |
| | a. Verify at least two SW pumps - RUNNING | a. Manually start pumps as power supply permits (258 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 28. |
| | b. Verify AUX BLDG SW isolation valves - OPEN

• MOV-4615 and MOV-4734
• MOV-4616 and MOV-4735 | b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW). |
| | c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED | c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow. |



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Check If Normal CVCS
Operation Can Be Established

a. Verify IA restored:

- o IA to CNMT (AOV-5392) - OPEN
- o IA pressure - GREATER THAN 60 PSIG

b. Verify instrument bus D -
ENERGIZED

c. CCW pumps - ANY RUNNING

d. Charging pump - ANY RUNNING

a. Continue with Step 28. WHEN IA restored, THEN do Steps 23 through 27.

b. Energize MCC B. IF MCC B NOT available, THEN perform the following:

- 1) Verify MCC A energized.
- 2) Place instrument bus D on maintenance supply.

c. Perform the following:

- 1) IF any RCP #1 seal outlet temperature offscale high, THEN isolate CCW to thermal barrier of affected RCP(s).

- RCP A, MOV-749A and MOV-759A
- RCP B, MOV-749B and MOV-759B

- 2) Manually start one CCW pump.

d. Continue with Step 28. WHEN any charging pump running, THEN do Steps 24 through 27.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|--------------------------|---|
| 24 Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT] | | Continue with Step 26. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 25. |
| 25 Establish Normal Letdown: <ul style="list-style-type: none"> a. Verify charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx c. Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> • TCV-130 • PCV-135 d. Reset both trains of XY relays for AOV-371 and AOV-427 e. Open AOV-371 and AOV-427 f. Open letdown orifice valves as necessary g. Place TCV-130 in AUTO at 105°F h. Place PCV-135 in AUTO at 250 psig i. Adjust charging pump speed and HCV-142 as necessary | | <p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

26 Check VCT Makeup System:

- | | |
|--|---|
| <ul style="list-style-type: none">a. Adjust boric acid flow control valve in AUTO to 9.5 gpmb. Adjust RMW flow control valve in AUTO to 40 gpmc. Verify the following:<ul style="list-style-type: none">1) RMW mode selector switch in AUTO2) RMW control armed - RED LIGHT LITd. Check VCT level:<ul style="list-style-type: none">o Level - GREATER THAN 20%<li style="text-align: center;">-OR-o Level - STABLE OR INCREASING | <ul style="list-style-type: none">c. Adjust controls as necessary.d. Manually increase VCT makeup flow as follows:<ul style="list-style-type: none">1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u>, <u>THEN</u> reset MCC C and MCC D UV lockouts as necessary.2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.3) Increase boric acid flow as necessary. |
|--|---|

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| 27 Check Charging Pump Suction
Aligned To VCT: | | |
| a. VCT level - GREATER THAN 20% | | a. <u>IF</u> VCT level can <u>NOT</u> be
maintained greater than 5%, <u>THEN</u>
perform the following:

1) Ensure charging pump suction
aligned to RWST

o LCV-112B open

o LCV-112C closed

2) Continue with Step 28. <u>WHEN</u>
VCT level greater than 40%,
<u>THEN</u> do Step 27b. |
| b. Verify charging pumps aligned to
VCT: | o LCV-112C - OPEN

o LCV-112B - CLOSED | b. Manually align valves as
necessary. |

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STEP

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RESPONSE NOT OBTAINED

28 Check RCP Cooling:

Establish normal cooling to RCPs
(Refer to Attachment SEAL COOLING).

a. Check CCW to RCPs:

- o Annunciator A-7, RCP 1A CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED
- o Annunciator A-15, RCP 1B CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED

b. Check RCP seal injection:

- o Labyrinth seal D/Ps - GREATER
THAN 15 INCHES OF WATER

-OR-

- o RCP seal injection flow to
each RCP - GREATER THAN 6 GPM

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|--|
| 29 | Check If Seal Return Flow Should Be Established: | |
| | a. Verify RCP #1 seal outlet temperature - LESS THAN 235°F | a. Go to Step 30. |
| | b. Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B | b. Manually open valves as necessary. |
| | c. Reset both trains of XY relays for RCP seal return isolation valve MOV-313 | |
| | d. Open RCP seal return isolation valve MOV-313 | d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313. |
| | e. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM | e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 30.</p> |
| | f. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM | f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| | <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves. o When using PRZR PORV, select one with an operable block valve. | |
| 30 | Energize Heaters And Operate Normal Spray As Necessary To Maintain RCS Pressure Stable | <p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p> <p><u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> |



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 31 | <p>Verify All AC Busses -
ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480
volt busses - CLOSED o 480 bus voltage - GREATER THAN
420 VOLTS o Emergency D/G output breakers -
OPEN | <p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal
feed breaker open, <u>THEN</u> ensure
associated D/G breaker closed. b. Perform the following, as
necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie
breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in
PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) <u>WHEN</u> bus 15 restored, <u>THEN</u>
reset control room lighting. 5) Refer to Attachment SI/UV for
other equipment lost with
loss of offsite power. c. Try to restore offsite power to
all AC busses (Refer to
ER-ELEC.1, RESTORATION OF
OFFSITE POWER). |

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|-----------------|---|--------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|--|
| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p> | | |
| 32 | Check RCP Status - AT LEAST ONE RUNNING | <p>Try to start one RCP:</p> <ul style="list-style-type: none"> a. Establish conditions for starting an RCP. <ul style="list-style-type: none"> o Bus 11A or 11B energized o Refer to Attachment RCP START. b. Start one RCP. <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase feed flow or dumping steam.</p> |

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

33 Check If Source Range
Detectors Should Be Energized:

a. Source range channels -
DEENERGIZED

b. Check intermediate range flux -
EITHER CHANNEL LESS THAN
10⁻¹⁰ AMPS

c. Check the following:

- o Both intermediate range
channels - LESS THAN
10⁻¹⁰ AMPS

-OR-

- o Greater than 20 minutes since
reactor trip

d. Verify source range detectors -
ENERGIZED

e. Transfer Rk-45 recorder to one
source range and one
intermediate range channel.

a. Go to Step 33e.

b. Perform the following:

- 1) IF neither intermediate range
channel is decreasing THEN
initiate boration.
- 2) Continue with Step 34. WHEN
flux is LESS THAN 10⁻¹⁰ amps
on any operable channel, THEN
do Steps 33c, d and e.

c. Continue with step 34. WHEN
either condition met, THEN do
Steps 33d and e.

d. Manually energize source range
detectors by depressing P-6
permissive defeat pushbuttons (2
of 2).

IF source ranges can NOT be
restored, THEN refer to
ER-NIS.1, SR MALFUNCTION and go
to Step 34.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

34 Check If Emergency D/Gs
Should Be Stopped:

a. Verify AC emergency busses
energized by offsite power:

- o Emergency D/G output breakers
- OPEN
- o AC emergency bus voltage -
GREATER THAN 420 VOLTS
- o AC emergency bus normal feed
breakers - CLOSED

b. Stop any unloaded emergency D/G
and place in standby (Refer to
Attachment D/G STOP)

a. Try to restore offsite power
(Refer to ER-ELEC.1, RESTORATION
OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35 Establish Normal Shutdown
Alignment:

a. Check condenser - AVAILABLE

a. Dispatch AO to perform
Attachment SD-2.

b. Perform the following:

- o Open generator disconnects
 - 1G13A71
 - 9X13A73
- o Place voltage regulator to OFF
- o Open turbine drain valves
- o Rotate reheater steam supply
controller cam to close valves
- o Place reheater dump valve
switches to HAND
- o Stop all but one condensate
pump

c. Verify adequate Rx head cooling:

- 1) Verify at least one control
rod shroud fan - RUNNING
- 2) Verify one Rx compartment
cooling fan - RUNNING

1) Manually start one fan as
power supply permits (45 kw)

2) Perform the following:

- o Dispatch AO to reset UV
relays at MCC C and MCC D.
- o Manually start one fan as
power supply permits
(23 kw)

d. Verify Attachment SD-1 - COMPLETE

| | | |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 36 | Maintain Plant Conditions -
STABLE

o RCS pressure

o PRZR level

o RCS temperatures | Control plant systems as necessary
to maintain conditions stable. |
| *37 | Monitor SI Reinitiation
Criteria:

a. RCS subcooling based on core
exit T/Cs - GREATER THAN 0°F
USING FIGURE MIN SUBCOOLING

b. PRZR level - GREATER THAN 5%
[30% adverse CNMT] | a. Manually operate SI pumps as
necessary. Return to Step 2.

b. Control charging flow to
maintain PRZR level.

<u>IF</u> PRZR level can <u>NOT</u> be
maintained, <u>THEN</u> manually
operate SI pumps as necessary.
Return to Step 2. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 38 | <p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 5% [30% adverse CNMT] <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p> | <p>a. Go to Step 39.</p> <p>c. Vent any unisolated ACCUMs:</p> <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A; AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|---|
| 39 | Check RCS Hot Leg
Temperatures - LESS THAN 350°F | Control feed flow and dump steam to
establish RCS cooldown rate less
than 100°F/hr in RCS cold legs. |
| <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by
closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p> o When using PRZR PORV, select one with operable block valve.</p> | | |
| 40 | Check RCS Pressure - LESS
THAN 400 PSIG [300 PSIG
adverse CNMT] | <p>Use normal PRZR spray.</p> <p><u>IF</u> normal spray <u>NOT</u> available and
letdown is in service, <u>THEN</u> use
auxiliary spray.</p> <p><u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.</p> <p><u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to
Attachment N2 PORVS.</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

41 Check If RHR Normal Cooling
Can Be Established:

- | | |
|--|--|
| a. RCS cold leg temperature - LESS THAN 350°F | a. Return to Step 37. |
| b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT] | b. Return to Step 40. |
| c. Place letdown pressure controller (PCV-135) in MANUAL CLOSED | |
| d. Check following valves - OPEN <ul style="list-style-type: none">• AOV-371, letdown isolation valve• AOV-427, loop B cold leg to REGEN Hx• At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) | d. Perform the following: <ul style="list-style-type: none">1) Reset both trains of XY relays for AOV-371 and AOV-427.2) Open AOV-371 and AOV-427.3) Open one letdown orifice valve. |
| e. Verify pressure on PI-135 - LESS THAN 400 PSIG | e. Return to Step 40. |
| f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM) | f. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service. |
| g. Establish RHR normal cooling (Refer to Attachment RHR COOL) | |

| | | |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 42 | Continue RCS Cooldown To Cold Shutdown:

a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR

b. Check narrow range level in both S/Gs - LESS THAN 50% | b. Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| 43 | Check Core Exit T/Cs - LESS THAN 200°F | Return to Step 42. |
| 44 | Evaluate Long Term Plant Status:

a. Maintain cold shutdown conditions

b. Consult TSC | |

-END-

| | | |
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ECA-2.1 APPENDIX LIST

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| 3) ATTACHMENT FAULTED S/G | 1 |
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| 5) ATTACHMENT NC | 1 |
| 6) ATTACHMENT RCP START | 2 |
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| 10) ATTACHMENT D/G STOP | 1 |
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RED PATH SUMMARY

- a. SUBCRITICALITY - Nuclear power greater than 5%
- b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND
RVLIS level (no RCPs) less than 43% [46%
adverse CNMT]
- c. HEAT SINK - Narrow range level in all S/Gs less than 5%
[25% adverse CNMT] AND total feedwater flow
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than
100°F in last 60 minutes AND RCS cold leg
temperature less than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

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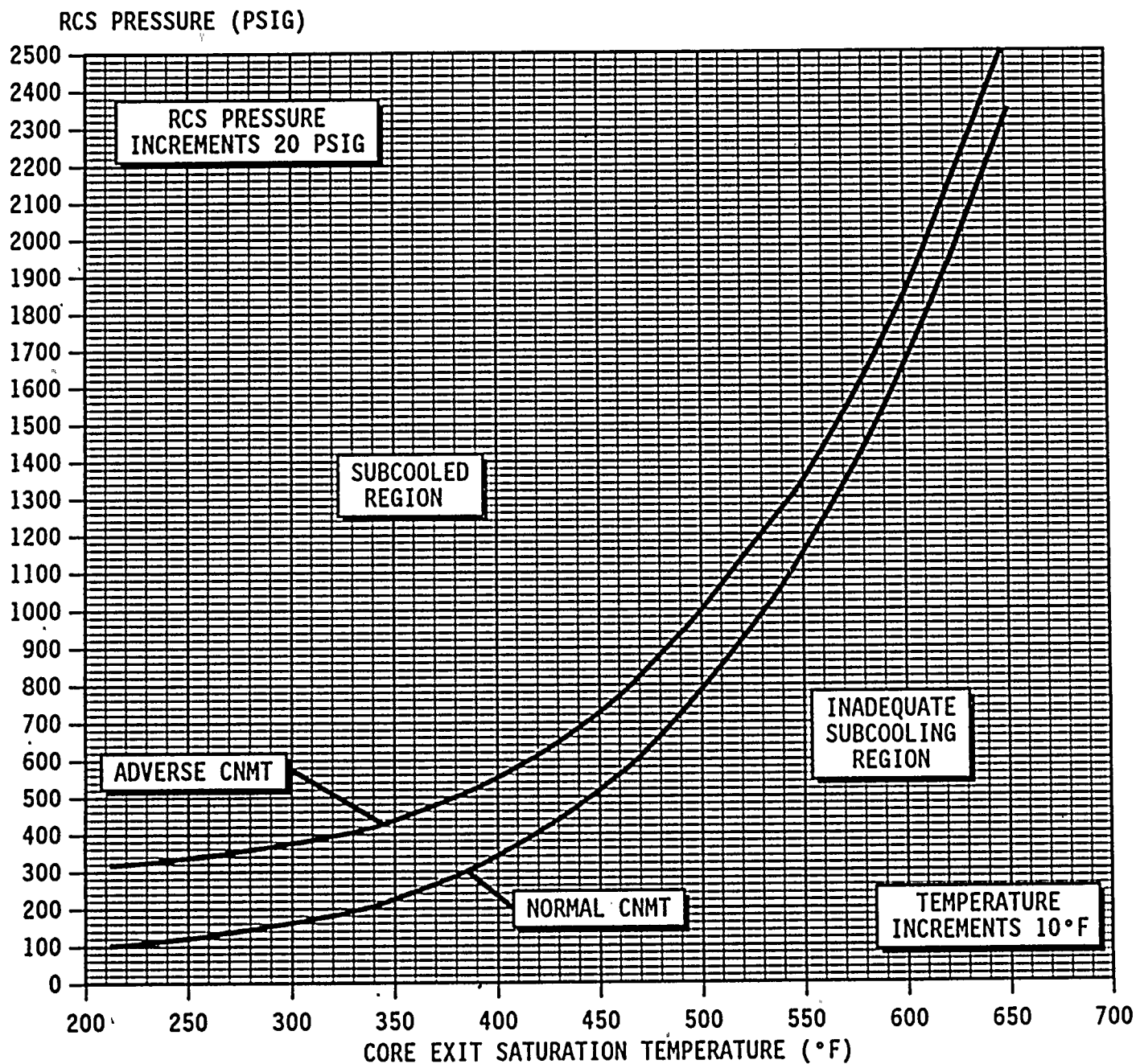
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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure
Below [-] Core Exit T/C Indication



| | | |
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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

Manually operate SI pumps as necessary if EITHER condition listed below occurs:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% ADVERSE CNMT]

2. E-2 TRANSITION CRITERIA

IF any S/G pressure increases at any time (except while performing SI termination in Steps 18 and 19), THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. LOSS OF EMERGENCY COOLANT RECIRCULATION CRITERION

IF emergency coolant recirculation is established and subsequently lost, THEN go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

