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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 93

TECHNICAL REVIEW

*Terry White*  
RESPONSIBLE MANAGER

8-9-95  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

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- A. PURPOSE - This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip without a safety injection.
- B. ENTRY CONDITIONS/SYMPTOMS
  - 1. ENTRY CONDITIONS - This procedure is entered from:
    - a. E-0, REACTOR TRIP OR SAFETY INJECTION, when SI is neither actuated nor required.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF SI ACTUATION OCCURS DURING THIS PROCEDURE, THEN E-0, REACTOR TRIP OR SAFETY INJECTION, SHOULD BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u>   o FOLDOUT page should be open and monitored periodically.</p> <p>          o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.)</p>		
* 1	Monitor RCS Tav <sub>g</sub> - STABLE AT OR TRENDING TO 547°F	<p><u>IF</u> temperature less than 547°F and decreasing, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a. Stop dumping steam.</li> <li>b. Rotate reheater steam supply controller cam to close reheater steam supply valves.</li> <li>c. <u>IF</u> MDAFW pumps supplying greater than 200 gpm, <u>THEN</u> ensure TDAFW pump steam supply valves in PULL STOP.</li> <li>d. <u>IF</u> cooldown continues, <u>THEN</u> control total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G. <u>WHEN</u> S/G level greater than 5% in one S/G, <u>THEN</u> limit feed flow to that required to maintain S/G level.</li> <li>e. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.</li> </ul> <p><u>IF</u> temperature greater than 547°F and increasing, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Place condenser steam dump mode control to MANUAL</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Manually dump steam using S/G ARVs.</li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF A MFW PUMP IS LEFT RUNNING ON RECIRC FOR EXTENDED PERIODS OF TIME, OVERHEATING MAY OCCUR.</p> <p>*****</p>		
2	Check S/G Feed Flow Status:	
a.	Check RCS Tav <sub>g</sub> - LESS THAN 554°F	a. Continue with Step 3. <u>WHEN</u> temperature less than 554°F, <u>THEN</u> do Steps 2b, c, d and e.
b.	Verify MFW flow control valves - CLOSED <ul style="list-style-type: none"> <li>• MFW regulating valves</li> <li>• MFW bypass valves</li> </ul>	b. Place A and B MFW regulating valve and bypass valve controllers in MANUAL at 0% demand.
c.	Verify total AFW flow - GREATER THAN 200 GPM	c. Manually start both MDAFW pumps. <p><u>IF</u> total AFW flow greater than 200 gpm can <u>NOT</u> be established, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Manually start TDAFW pump.</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Perform the following: <ol style="list-style-type: none"> <li>1) Establish MFW on bypass valves.</li> <li>2) Go to step 3.</li> </ol> </li> </ul>
d.	Close MFW pump discharge valves <ul style="list-style-type: none"> <li>• MOV-3977, A MFW pump</li> <li>• MOV-3976, B MFW pump</li> </ul>	d. Manually stop MFW pumps.
e.	Stop MFW pumps	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify MRPI Indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	<p><u>IF</u> one or more control rods <u>NOT</u> fully inserted, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a. Place RMW mode selector switch to BORATE.</li> <li>b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate.</li> <li>c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted).</li> <li>d. Place RMW control to start and verify flow. <u>IF</u> flow can <u>NOT</u> be established, <u>THEN</u> refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> <li>o Normal feed breakers to all 480 volt busses - CLOSED</li> <li>o 480 volt bus voltage - GREATER THAN 420 VOLTS</li> <li>o Emergency D/G output breakers - OPEN</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed.</li> <li>b. Perform the following as necessary: <ul style="list-style-type: none"> <li>1) Ensure one CCW pump running.</li> <li>2) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>3) Reset Bus 13 and Bus 15 lighting breakers.</li> <li>4) Dispatch AO to locally reset and start two IA compressors.</li> <li>5) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> <li>• EH pumps</li> <li>• Turning gear oil pump</li> <li>• HP seal oil backup pump</li> </ul> </li> <li>6) Restore power to MCCs. <ul style="list-style-type: none"> <li>• A from Bus 13</li> <li>• B from Bus 15</li> <li>• E from Bus 15</li> <li>• F from Bus 15</li> </ul> </li> <li>7) Start CNMT RECIRC fans as necessary.</li> </ul> </li> <li>c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Verify At Least Two SW Pumps - RUNNING	Manually start SW pumps as necessary.
6	Verify IA Available: <ul style="list-style-type: none"> <li>o At least 2 air compressors - RUNNING</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	<p>Dispatch AO to locally reset and start air compressors as necessary.</p> <p><u>IF</u> IA pressure can <u>NOT</u> be maintained, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a. Refer to AP-IA.1, LOSS OF INSTRUMENT AIR.</li> <li>b. Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>c. Dispatch AO to locally open manual charging pump suction from RWST (V-358 in charging pump room).</li> <li>d. <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) ..</li> </ul>





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check PRZR Level Control:	
a.	Verify charging pumps - ANY RUNNING	a. Manually start charging pumps as necessary.
b.	PRZR level - GREATER THAN 13%	b. Perform the following: <ol style="list-style-type: none"> <li>1) Place loop B cold leg isolation valve to REGEN Hx (AOV-427) switch to close.</li> <li>2) Verify excess letdown isolation valve (AOV-310) closed.</li> <li>3) Ensure PRZR heaters off.</li> <li>4) Control charging to restore PRZR level greater than 13%.</li> <li>5) Continue with Step 8. <u>WHEN</u> PRZR level greater than 13%, <u>THEN</u> do Steps 7c through e.</li> </ol>
c.	Verify letdown - IN SERVICE	c. Verify excess letdown in service. <u>IF NOT</u> , <u>THEN</u> manually place letdown in service (Refer to Attachment LETDOWN).
d.	PRZR level - TRENDING TO 20%	d. Control charging and letdown to maintain PRZR level at 20%.
e.	Check PRZR heaters - ENERGIZED AS NECESSARY <ul style="list-style-type: none"> <li>o PRZR heater control group</li> <li>o PRZR heater backup group</li> </ul>	e. Reset PRZR heaters and energize as necessary to restore PRZR pressure.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check PRZR Pressure Control:	
a.	PRZR pressure - GREATER THAN 1750 PSIG	<p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify SI actuation. <u>IF NOT</u>, <u>THEN</u> manually actuate SI.</li> <li>2) Go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.</li> </ol>
b.	PRZR pressure - GREATER THAN 2210 PSIG	<p>b. <u>IF</u> pressure less than 2210 PSIG and decreasing, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure PRZR PORVs closed. <p><u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.</p> <ul style="list-style-type: none"> <li>• PCV-430, MOV-516</li> <li>• PCV-431C, MOV-515</li> </ul> </li> <li>2) Ensure normal PRZR spray valve controller, demand at 0%.</li> <li>3) <u>IF</u> PRZR pressure decreasing <u>AND</u> PRZR level increasing, <u>THEN</u> stop RCPs one at a time until PRZR pressure stabilizes.</li> <li>4) Ensure PRZR heaters energized.</li> </ol>

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 8 continued from previous page)	
c.	PRZR pressure - LESS THAN 2260 PSIG	<p>c. <u>IF</u> pressure greater than 2260 psig and increasing, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify demand on PRZR pressure controller PCV-431 greater than 50%. <u>IF NOT</u>, <u>THEN</u> place controller in MANUAL and increase as necessary.</li> <li>2) Ensure PRZR heaters off.</li> <li>3) Control pressure using normal PRZR spray. <p><u>IF</u> normal PRZR spray <u>NOT</u> available and letdown is in service, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>a) Verify spray line fluid to PRZR <math>\Delta T</math> less than 320°F. <u>IF NOT</u>, <u>THEN</u> use one PORV.</li> <li>b) Use auxiliary spray.</li> </ol> <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p> </li> </ol>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><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>		
* 9	Monitor S/G Levels:	
	<p>a. Narrow range level - GREATER THAN 5%</p> <p>b. Control feed flow to maintain narrow range level between 17% and 39%.</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G.</p> <p>b. <u>IF</u> narrow range level in any S/G continues to increase, <u>THEN</u> stop feed to that S/G.</p>
10	Check If TDAFW Pump Can Be Stopped:	
	<p>a. Both MDAFW pumps - RUNNING</p> <p>b. PULL STOP TDAFW pump steam supply valves</p> <p>• MOV-3504A</p> <p>• MOV-3505A</p>	<p>a. Go to Step 11.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Establish Condenser Steam Dump Pressure Control:	
	<ul style="list-style-type: none"> <li>a. Verify condenser available: <ul style="list-style-type: none"> <li>o Any MSIV - OPEN</li> <li>o Annunciator G-15, STEAM DUMP ARMED - LIT</li> </ul> </li> <li>b. Adjust condenser steam dump controller HC-484 to 1005 psig in AUTO</li> <li>c. Place steam dump mode selector switch to MANUAL</li> <li>d. Verify RCS Tavg - STABLE AT OR TRENDING TO 547°F</li> </ul>	<ul style="list-style-type: none"> <li>a. Perform the following: <ul style="list-style-type: none"> <li>1) Place S/G ARV controller in AUTO at 1005 psig and verify proper operation. <u>IF</u> S/G ARV <u>NOT</u> controlling in AUTO, <u>THEN</u> control S/G ARV manually.</li> <li>2) Go to Step 11d.</li> </ul> </li> <li>d. Return to Step 1.</li> </ul>
12	Check RCP Status - AT LEAST ONE RUNNING	
		<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Verify bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> </li> <li>b. Start one RCP.</li> </ul> <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 <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Loss of forced air cooling may result in failure of NIS detectors.</p>		
<p>13 Check If Source Range Detectors Should Be Energized:</p>		
a.	Source range channels - DEENERGIZED	a. Go to Step 13e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN $10^{-10}$ AMPS	<p>b. Perform the following:</p> <p>1) <u>IF</u> neither intermediate range channel is decreasing <u>THEN</u> initiate boration.</p> <p>2) Continue with Step 14. <u>WHEN</u> flux is less than <math>10^{-10}</math> amps on any operable channel, <u>THEN</u> do Steps.13c, d and e.</p>
c.	Check the following: <ul style="list-style-type: none"> <li>o Both intermediate range channels - LESS THAN <math>10^{-10}</math> AMPS</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since reactor trip</li> </ul>	c. Continue with Step 14. <u>When</u> either condition met, <u>THEN</u> do Steps 13d and e.
d.	Verify source range detectors - ENERGIZED	<p>d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).</p> <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 14.</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
14	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> <p>c. Verify adequate Rx head cooling:</p> <ul style="list-style-type: none"> <li>1) Check IA to CNMT - AVAILABLE</li> <li>2) Verify at least one control rod shroud fan - RUNNING</li> <li>3) Verify one Rx compartment cooling fan - RUNNING</li> </ul> <p>d. Dispatch AO to perform Attachment SD-1</p>	<p>a. Dispatch AO to perform Attachment SD-2.</p> <p>1) Go to Step 15.</p> <p>2) Manually start one fan as power supply permits (45 kw).</p> <p>3) Manually start one fan as power supply permits (23 kw).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Maintain Stable Plant Conditions:	
	a. PRZR pressure - BETWEEN 1800 PSIG AND 2260 PSIG	a. Control PRZR heaters and spray as necessary.
	b. PRZR level - BETWEEN 20% AND 30%	b. Control charging as necessary.
	c. S/G narrow range levels - BETWEEN 17% AND 39%	c. Control S/G feed flow as necessary.
	d. RCS Tav <sub>g</sub> - GREATER THAN 540°F	d. Control dumping steam as necessary. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.
16	Check VCT Makeup System:	
	a. Verify the following:	
	1) Adjust boric acid flow control valve to 9.5 gpm	
	2) RMW mode selector switch in AUTO	
	3) RMW control armed - RED LIGHT LIT	
	b. Check VCT level	b. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20%	1) Ensure BA transfer pumps and RMW pumps running.
	-OR-	2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.
	o Level - STABLE OR INCREASING	3) Increase boric acid flow as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check Charging Pump Suction Aligned To VCT:	
a.	VCT level - GREATER THAN 20%	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> <li>o LCV-112B open</li> <li>o LCV-112C closed</li> </ul> </li> <li>2) Continue with Step 18. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 17b.</li> </ol>
b.	Verify charging pumps aligned to VCT <ul style="list-style-type: none"> <li>o LCV-112C - OPEN</li> <li>o LCV-112B - CLOSED</li> </ul>	b. Manually align valves as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify TDAFW Pump Aligned For AUTO Start:	
a.	Any MDAFW pump - AVAILABLE	a. Verify TDAFW pump operating if necessary and go to Step 20.
b.	Verify AMSAC TRIPPED status light - EXTINGUISHED	b. Reset AMSAC.
c.	Verify both S/G levels - GREATER THAN 17%	c. Continue with Step 20. <u>WHEN</u> S/G level greater than 17%, <u>THEN</u> do Steps 18d and 19.
d.	Verify the following:	
	1) TDAFW pump - OFF	1) <u>IF</u> TDAFW pump <u>NOT</u> required to maintain S/G level, <u>THEN</u> stop pump if desired.
	2) TDAFW pump steam supply valve switches in AUTO	2) Place TDAFW pump steam supply valve switches in AUTO.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	<p>Establish Normal AFW Pump Shutdown Alignment:</p> <p>a. Verify the following:</p> <ul style="list-style-type: none"> <li>o Both S/G levels - STABLE OR INCREASING</li> <li>o Total AFW flow - LESS THAN 200 GPM</li> </ul> <p>b. Close MDAFW pump discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-4007</li> <li>• MOV-4008</li> </ul> <p>c. Place AFW bypass switches to DEF</p> <p>d. Stop all but one MDAFW pump</p> <p>e. Open AFW discharge crossover valves</p> <ul style="list-style-type: none"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul> <p>f. Open AFW bypass valves as necessary to control S/G levels</p> <ul style="list-style-type: none"> <li>• AOV-4480</li> <li>• AOV-4481</li> </ul>	<p>a. Continue with Step 20. <u>WHEN</u> conditions met, <u>THEN</u> do Steps 19b through f.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Determine If Cooldown Is Required:	
	a. Consult Plant staff to determine if RCS cooldown is necessary	a. <u>IF</u> cooldown <u>NOT</u> required, <u>THEN</u> go to O-3, HOT SHUTDOWN WITH XENON PRESENT.
	b. At least one RCP - RUNNING	b. Perform the following: 1) Ensure 2 control rod shroud fans running. 2) Go to ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1.
	c. Go to O-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD SHUTDOWN	
	-END-	

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ES-0.1 APPENDIX LIST

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6)	ATTACHMENT SD-1	1
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8)	FOLDOUT	1





EOP:  
ES-0.1

TITLE:

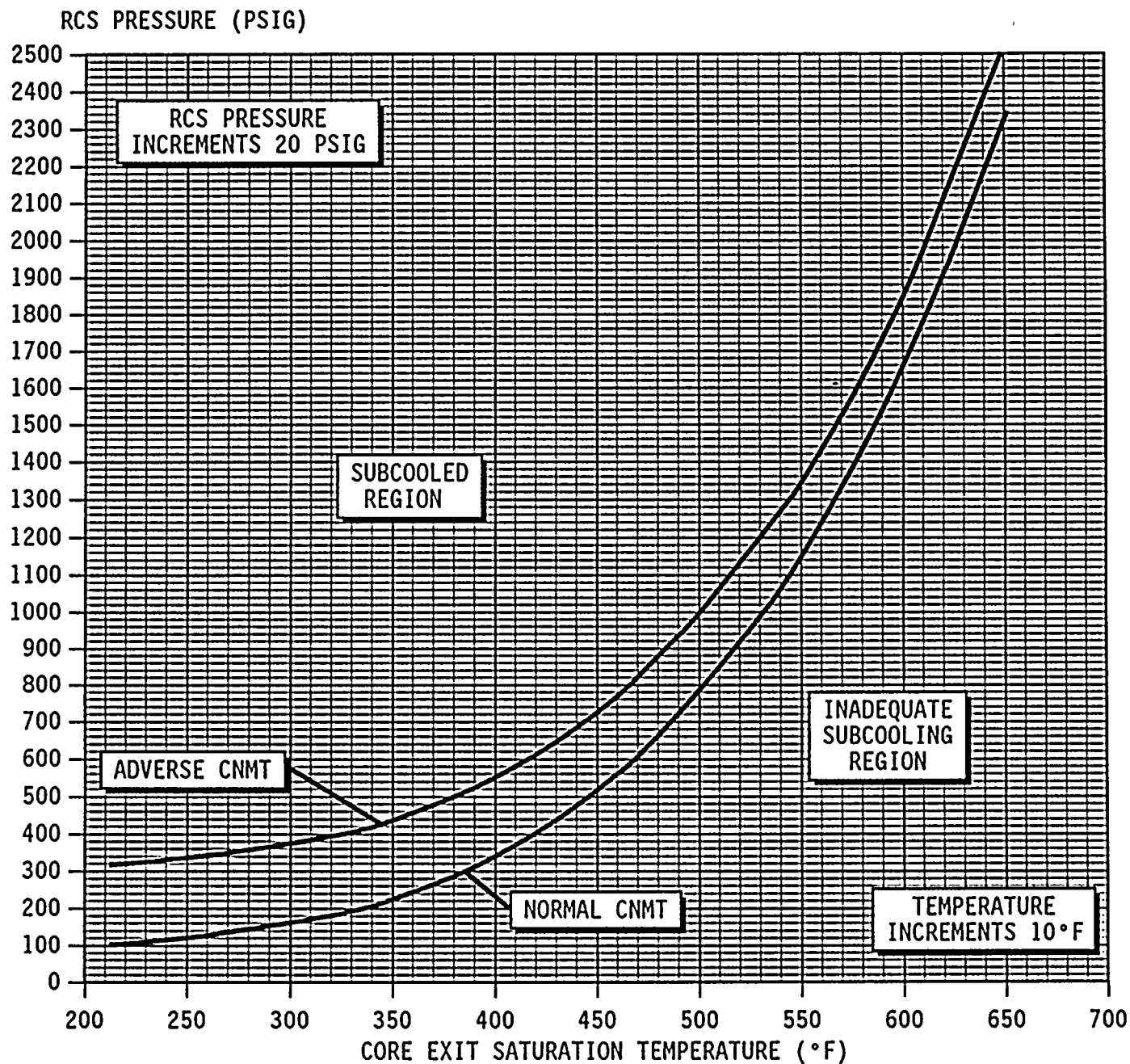
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FIGURE MIN SUBCOOLING

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



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# FOLDOUT PAGE

NOTE The Critical Safety Function Red Path Summary is available in APPENDIX 1.

## 1. SI ACTUATION CRITERIA

IF ANY condition listed below occurs, THEN actuate SI and go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

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

- OR -

- o PRZR level - LESS THAN 5% [30% adverse CNMT]  
AND RCS subcooling based on core exit T/Cs - LESS THAN 20°F USING FIGURE MIN SUBCOOLING

- OR -

- o Any automatic SI setpoint is reached

## 2. 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).

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GINNA STATION

CONTROLLED COPY NUMBER 23

*R. Sidelinger*  
RESPONSIBLE MANAGER

1-23-97  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 13 PAGE 2 of 16
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A. PURPOSE - This procedure provides actions to restore core cooling.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. F-0.2, CORE COOLING Critical Safety Function Status Tree, on a RED condition.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p>		
1	<p><b>Check RWST Level - GREATER THAN 28%</b></p>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. Ensure SI system aligned for cold leg recirculation using Steps 1 through 12 of ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.</li> <li>b. <u>WHEN</u> the SI system is aligned for sump recirculation, <u>THEN</u> go to Step 4.</li> </ul>
2	<p><b>Verify SI Pump Suction Aligned to RWST:</b></p> <ul style="list-style-type: none"> <li>a. Verify SI pump suction valves from RWST - OPEN <ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. Ensure at least one SI pump suction valve from RWST open. <ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul> </li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><u>CAUTION</u> RHR PUMPS SHOULD NOT BE RUN LONGER THAN 1 HOUR WITHOUT CCW TO THE RHR HEAT EXCHANGERS.</p> <p>*****</p>		
3	Verify SI Pump And RHR Pump Emergency Alignment:	
	<p>a. RHR pump discharge to Rx vessel, deluge - OPEN</p> <ul style="list-style-type: none"> <li>• MOV-852A</li> <li>• MOV-852B</li> </ul> <p>b. Verify both RHR pumps - RUNNING</p> <p>c. Verify SI pump C - RUNNING</p> <p>d. Verify SI pump A - RUNNING</p> <p>e. Verify SI pump B - RUNNING</p> <p>f. Verify both SI pump C discharge valves - OPEN</p> <ul style="list-style-type: none"> <li>• MOV-871A</li> <li>• MOV-871B</li> </ul>	<p>a. Ensure at least one valve open.</p> <p>b. Manually start pumps</p> <p>c. Manually start pump on available bus.</p> <p>d. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure SI pumps B and C running.</li> <li>2) Ensure SI pump C aligned to discharge line A: <ul style="list-style-type: none"> <li>o MOV-871B closed</li> <li>o MOV-871A open</li> </ul> </li> <li>3) Go to Step 4.</li> </ol> <p>e. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure SI pumps A and C running.</li> <li>2) Ensure SI pump C aligned to discharge line B: <ul style="list-style-type: none"> <li>o MOV-871B open</li> <li>o MOV-871A closed</li> </ul> </li> <li>3) Go to Step 4.</li> </ol> <p>f. Manually open valves as necessary.</p>





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FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	PAGE 5 of 16

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<b>Verify SI Flow In Both Trains:</b> <ul style="list-style-type: none"> <li>SI line loop A and B flow indicators - CHECK FOR FLOW</li> <li>RHR loop flow indicator - CHECK FOR FLOW</li> </ul>	Perform the following: <ul style="list-style-type: none"> <li>Manually start pumps and align valves as necessary.</li> <li>Establish maximum charging flow.</li> </ul>
5	<b>Check RCP Support Conditions:</b> <ul style="list-style-type: none"> <li>Verify Bus 11A or 11B - ENERGIZED</li> <li>Check other RCP support conditions (Refer to Attachment RCP START)</li> </ul>	Continue attempts to establish RCP support conditions.
6	<b>Check SI ACCUM Discharge Valves - OPEN</b> <ul style="list-style-type: none"> <li>MOV-841</li> <li>MOV-865</li> </ul>	IF SI ACCUM discharge valves closed after ACCUM discharge, <u>THEN</u> go to Step 7. <u>IF NOT</u> , <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves.               <ul style="list-style-type: none"> <li>MOV-841, MCC C position 12F</li> <li>MOV-865; MCC D position 12C</li> </ul> </li> <li>Open SI ACCUM discharge valves.               <ul style="list-style-type: none"> <li>ACCUM A, MOV-841</li> <li>ACCUM B, MOV-865</li> </ul> </li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check Core Exit T/Cs - LESS THAN 1200°F	Go to Step 10.
8	Check RVLIS Indication:	
	a. RCPs - BOTH SECURED	a. Return to procedure and step in effect
	b. RVLIS level - GREATER THAN 43% [46% adverse CNMT]	b. <u>IF</u> RVLIS increasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 9.
	c. Return to procedure and step in effect	
9	Check Core Exit T/Cs:	
	a. Temperature - LESS THAN 700°F	a. <u>IF</u> decreasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 10.
	b. Return to procedure and step in effect	
*****		
<b>CAUTION</b> 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.		
*****		
10	Reset SI	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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**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.

**NOTE:** This procedure should be continued while obtaining CNMT hydrogen sample in Step 12.

**12 Check CNMT Hydrogen  
Concentration:**

a. Direct RP to start CNMT hydrogen  
monitors as necessary

b. Hydrogen concentration - LESS  
THAN 0.5%

b. Consult TSC to determine if  
hydrogen recombiners should be  
placed in service.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*****		
	<p><u>CAUTION</u></p> <ul style="list-style-type: none"> <li>o 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).</li> <li>o A FAULTED OR RUPTURED S/G SHOULD NOT BE USED IN SUBSEQUENT STEPS UNLESS NO INTACT S/G IS AVAILABLE.</li> </ul>	
*****		
	<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>	
	<p><b>*13. Monitor Intact S/G Levels:</b></p>	
	<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p>	<p>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.</p> <p><u>IF</u> total feed flow greater than 200 gpm can <u>NOT</u> be established, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Continue attempts to establish a heat sink in at least one S/G (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).</li> <li>2) Go to Step 23.</li> </ol>
	<p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*****		
<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 14B).</p>		
*****		
14	Check RCS Vent Paths:	
a.	Power to PRZR PORV block valves - AVAILABLE	a. Restore power to block valves unless block valve was closed to isolate an open PORV:  • MOV-515, MCC D position 6C • MOV-516, MCC C 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.
c.	Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.
d.	Rx vessel head vent valves - CLOSED  • SOV-590 • SOV-591 • SOV-592 • SOV-593	d. Manually close valves.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	<p><b>Establish Condenser Steam Dump Pressure Control:</b></p> <ul style="list-style-type: none"> <li>a. Verify condenser available: <ul style="list-style-type: none"> <li>o Intact S/G MSIV - OPEN</li> <li>o Annunciator G-15, STEAM DUMP ARMED - LIT</li> </ul> </li> <li>b. Place steam dump mode selector switch in MANUAL</li> <li>c. Place steam dump controller in MANUAL</li> </ul>	<ul style="list-style-type: none"> <li>a. Place intact S/G ARV controller in MAANUAL and go to Step 16.</li> </ul>
<p><u>NOTE:</u> Partial uncovering of S/G tubes is acceptable in the following steps.</p>		
16	<p><b>Depressurize All Intact S/Gs To 200 PSIG:</b></p> <ul style="list-style-type: none"> <li>a. Dump steam to condenser at maximum rate</li> <li>b. Check S/G pressure - LESS THAN 200 PSIG</li> <li>c. Check RCS hot leg temperatures - BOTH LESS THAN 400°F</li> <li>d. Stop S/G depressurization</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually or locally dump steam at maximum rate using S/G ARVs.</li> <li>b. <u>IF</u> S/G pressure decreasing, <u>THEN</u> return to Step 13.  <u>IF NOT</u>, <u>THEN</u> go to Step 23.</li> <li>c. <u>IF</u> RCS hot leg temperatures decreasing, <u>THEN</u> return to Step 13.  <u>IF NOT</u>, <u>THEN</u> go to Step 23.</li> </ul>



EOP:

FR-C.1

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RESPONSE TO INADEQUATE CORE COOLING

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**17 Check If SI ACCUMs Should Be Isolated:**

a. RCS hot leg temperatures - BOTH  
LESS THAN 400°F

b. Verify SI reset

c. Close SI ACCUM discharge valves

- ACCUM A, MOV-841
- ACCUM B, MOV-865

d. Locally reopen breakers for  
MOV-841 and MOV-865

a. Go to Step 23.

b. Manually reset SI.

c. Vent any unisolated ACCUMs:

1) Open vent valves for  
unisolated SI ACCUMs.

- ACCUM A, AOV-834A
- ACCUM B, AOV-834B

2) Open HCV-945.

**18 Stop Both RCPs****19 Dump Steam to Condenser At Maximum Rate To Depressurize All Intact S/Gs To Atmospheric Pressure**

Manually or locally dump steam at maximum rate using S/G ARVs.

**20 Verify SI Flow:**

- o SI line loop A and B flow indicators - CHECK FOR FLOW

-OR-

- o RHR loop flow indicator - CHECK FOR FLOW

Perform the following:

a. Continue efforts to establish SI flow.

b. Try to establish charging flow.

c. IF core exit T/Cs less than 1200°F, THEN return to Step 19.

IF NOT, THEN go to Step 23.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<b>21 Check Core Cooling:</b>		
a. Core exit T/Cs - LESS THAN 1200°F		a. Go to Step 23.
b. RCS hot leg temperatures - BOTH LESS THAN 320°F		b. Return to Step 19.
c. RVLIS level (no RCPs) - GREATER THAN 68% [73% adverse CNMT]		c. Return to Step 19.
<b>22 Go to Appropriate Plant Procedure</b>		
a. Check RWST level - GREATER THAN 28%		a. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
b. Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 18		



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**NOTE:** Normal conditions are desired but not required for starting the RCPs.

**23 Check If RCPs Should Be Started:**

- a. Core Exit T/Cs - GREATER THAN 1200°F
- b. Check if an idle RCS cooling loop is available
  - o Narrow range S/G level - GREATER THAN 5% [25% adverse CNMT]
  - o RCP in associated loop - AVAILABLE AND NOT OPERATING

a. Go to Step 24.

b. Perform the following:

- 1) Open all PRZR PORVs and block valves

IF any block valve can NOT be opened, THEN ensure power supplied to block valve.

IF IA NOT available, THEN refer to Attachment N2 PORVS.

- 2) IF core exit T/Cs remain greater than 1200°F, THEN open Rx vessel head vent valves.

- SOV-590
- SOV-591
- SOV-592
- SOV-593

- 3) Go to Step 24.

c. Start RCP in one idle RCS cooling loop

d. Return to Step 23a

EOP:  FR-C.1	TITLE:  RESPONSE TO INADEQUATE CORE COOLING	REV: 13  PAGE 14 of 16
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	<p><b>Try To Locally Depressurize All Intact S/Gs To Atmospheric Pressure:</b></p> <ul style="list-style-type: none"> <li>o Use intact S/G(s) ARVs</li> <li>-OR-</li> <li>o Open TDAFW pump steam supply valve from intact S/G(s) <ul style="list-style-type: none"> <li>• S/G A, MOV-3505A</li> <li>• S/G B, MOV-3504A</li> </ul> </li> <li>-OR-</li> <li>o Perform the following: <ul style="list-style-type: none"> <li>a. Open intact S/G MSIV bypass valves</li> <li>b. Open both priming air ejector steam inlet valves <ul style="list-style-type: none"> <li>• V-3580</li> <li>• V-3581</li> </ul> </li> </ul> </li> </ul>	Use faulted or ruptured S/G.
25	<p><b>Check If SI ACCUMs Should Be Isolated:</b></p> <ul style="list-style-type: none"> <li>a. RHR loop flow indicator - AT LEAST INTERMITTENT FLOW</li> <li>b. Close SI ACCUM discharge valves <ul style="list-style-type: none"> <li>• ACCUM A, MOV-841</li> <li>• ACCUM B, MOV-865</li> </ul> </li> <li>c. Locally reopen breakers for MOV-841 and MOV-865</li> </ul>	<ul style="list-style-type: none"> <li>a. Return to Step 23.</li> <li>b. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> <li>1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> <li>• ACCUM A, AOV-834A</li> <li>• ACCUM B, AOV-834B</li> </ul> </li> <li>2) Open HCV-945.</li> </ul> </li> </ul>



EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 13 PAGE 15 of 16
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	<p><b>Check If RCPs Should Be Stopped:</b></p> <ul style="list-style-type: none"> <li>a. Both RCS hot leg temperatures - LESS THAN 320°F</li> <li>b. Stop all RCPs</li> </ul>	<ul style="list-style-type: none"> <li>a. Go to Step 27.</li> </ul>
27	<p><b>Verify SI Flow:</b></p> <ul style="list-style-type: none"> <li>o SI line loop A and B flow indicators - CHECK FOR FLOW</li> <li>-OR-</li> <li>o RHR loop flow indicator - CHECK FOR FLOW</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. Continue efforts to establish SI flow.</li> <li>b. Try to establish charging flow.</li> <li>c. Return to Step 23.</li> </ul>
28	<p><b>Check Core Cooling:</b></p> <ul style="list-style-type: none"> <li>a. RCPs - BOTH SECURED</li> <li>b. RCS hot leg temperatures - LESS THAN 320°F</li> <li>c. RVLIS level - GREATER THAN 68% [73% adverse CNMT]</li> </ul>	<ul style="list-style-type: none"> <li>a. Return to Step 23.</li> <li>b. Return to Step 23.</li> <li>c. Return to Step 23.</li> </ul>





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Go to Appropriate Plant Procedure	
a.	IF PRZR PORVs and head vents were opened in Step 23, <u>THEN</u> consult TSC to evaluate long term status <u>AND</u> continue with transitions.	
b.	Check RWST level - GREATER THAN 28%	b. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
c.	Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 18.	
	-END-	

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FR-C.1 APPENDIX LIST

	<u>TITLE</u>	<u>PAGES</u>
1)	ATTACHMENT RCP START	2
2)	ATTACHMENT N2 PORVS	1

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 1 of 21
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 213

R. Sidelman  
RESPONSIBLE MANAGER

4-24-97  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 2 of 21
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- A. PURPOSE - This procedure provides actions to avoid, or limit, thermal shock or pressurized thermal shock to the reactor pressure vessel, or overpressure conditions at low temperature.
- B. ENTRY CONDITIONS/SYMPTOMS
  - 1. ENTRY CONDITIONS - This procedure is entered from:
    - a. F-0.4, INTEGRITY Critical Safety Function Status Tree, on either a RED or ORANGE condition.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*****		
	<div><div>CAUTION</div><div>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 THE AFW PUMPS).</div></div>	
*****		
	<div><div>NOTE:</div><div>Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10<sup>+05</sup> R/hr.</div></div>	
1	Check RCS Pressure - GREATER THAN 250 PSIG [465 PSIG adverse CNMT]	<div><div>IF</div><div>RHR flow greater than 475 gpm,</div><div>THEN return to procedure and step in effect.</div></div>

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 4 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><u>CAUTION</u> 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> A faulted S/G is any S/G that is depressurizing in an uncontrolled manner or is completely depressurized.</p>		
2	Check RCS Cold Leg Temperatures - STABLE OR INCREASING	<p>Try to stop RCS cooldown:</p> <ol style="list-style-type: none"> <li>Ensure S/G ARVs closed.</li> <li>Close both S/G MSIVs.</li> <li>Ensure MFW flow control valves closed. <ul style="list-style-type: none"> <li>MFW regulating valves</li> <li>MFW bypass valves</li> </ul> </li> <li>Ensure MFW pumps tripped.</li> <li>Rotate reheater steam supply controller cam to close reheater steam supply valves.</li> <li><u>IF</u> S/G pressure less than condensate pressure, <u>THEN</u> stop all condensate pumps.</li> <li><u>IF</u> RHR system in service, <u>THEN</u> stop any cooldown from RHR system.</li> <li>Control total feed flow to non-faulted S/G(s) greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one non-faulted S/G. <u>WHEN</u> S/G level greater than 5% [25% adverse CNMT] in one non-faulted S/G, <u>THEN</u> limit feed flow to stop RCS cooldown.</li> </ol>
This Step continued on the next page.		



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 2 continued from previous page)	
		i. Minimize cooldown from faulted S/G(s): <ol style="list-style-type: none"> <li>Close faulted S/G(s) TDAFW pump steam supply valve(s).               <ul style="list-style-type: none"> <li>S/G A, MOV-3505A</li> <li>S/G B, MOV-3504A</li> </ul> </li> <li><u>IF</u> both S/G(s) faulted, <u>THEN</u> control feed flow at 50 gpm to each S/G.</li> <li><u>IF</u> any S/G <u>NOT</u> faulted, <u>THEN</u> isolate all feedwater to faulted S/G unless necessary for RCS temperature control. <u>IF</u> a faulted S/G is necessary for RCS temperature control, <u>THEN</u> control feed flow at 50 gpm to that S/G.</li> </ol>
	3 Check PRZR PORV 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: <ul style="list-style-type: none"> <li>MOV-515, MCC D position 6C</li> <li>MOV-516, MCC C position 6C</li> </ul>
	b. Block valves - AT LEAST ONE OPEN	b. Open one block valve unless it was closed to isolate an open PORV.  <u>IF</u> at least one block valve can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally check breaker. <ul style="list-style-type: none"> <li>MOV-515, MCC D position 6C</li> <li>MOV-516, MCC C position 6C</li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><u>CAUTION</u> IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, THEN STEP 4 SHOULD BE PERFORMED AFTER PRESSURE DECREASES TO LESS THAN THE APPLICABLE PORV SETPOINT.</p> <p>*****</p>		
4	Check PRZR PORV Status:	
	a. Check Reactor Vessel Overpressure Protection System - IN SERVICE	a. Go to Step 4d.
	b. Check RCS pressure - LESS THAN 410 PSIG	b. Perform the following: <ol style="list-style-type: none"> <li>1) Ensure at least one PRZR PORV open.</li> <li>2) Continue with Step 5. <u>WHEN</u> pressure less than setpoint, <u>THEN</u> do Step 4e.</li> </ol>
	c. Go to Step 4e	
	d. PRZR pressure - LESS THAN 2335 PSIG	d. Perform the following: <ol style="list-style-type: none"> <li>1) Ensure at least one PRZR PORV open.</li> <li>2) Continue with Step 5. <u>WHEN</u> pressure less than setpoint, <u>THEN</u> do Step 4e.</li> </ol>
	e. Verify PRZR PORVs - CLOSED	e. Manually close valve.  <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check SI Pumps - ANY RUNNING	Go to Step 13.
6	Check If SI Can Be Terminated:	Perform the following:
	<ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIGURE MIN SUBCOOLING</li> <li>o. Check RVLIS indication: <ul style="list-style-type: none"> <li>o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT]</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. <u>IF</u> RCS subcooling based on core exit T/Cs greater than 0°F using Figure MIN SUBCOOLING and no RCP running, <u>THEN</u> attempt to start an RCP: <ul style="list-style-type: none"> <li>1) Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized</li> <li>o Refer to Attachment RCP START</li> </ul> </li> <li>2) <u>IF</u> conditions established, <u>THEN</u> start one RCP.</li> </ul> </li> <li>b. Go to Step 26.</li> </ul>
*****		
<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
8	Stop SI And RHR Pumps And Place In AUTO	
9	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.
10	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, <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 12. <u>WHEN</u> adequate SW available, <u>THEN</u> do Step 11.
	b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 9 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ol style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>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).</li> <li>3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ol>
b.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	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"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 12. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 11e and f.</li> </ol>
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
12	<p>Check If Charging Flow Has Been Established:</p> <p>a. Charging pumps - ANY RUNNING</p> <p>b. Align charging pump suction to RWST:</p> <ul style="list-style-type: none"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul> <p>c. Start charging pumps as necessary to establish charging line flow to REGEN HX - GREATER THAN 20 GPM</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>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 valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol> <p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).</li> <li>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).</li> </ol>

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 11 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*13	<p><b>Monitor SI Reinitiation Criteria:</b></p> <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN FIGURE MIN SUBCOOLING</li> <li>o RVLIS indication: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 68% [73% adverse CNMT]</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 80%</li> </ul>	<p>Manually operate SI pumps as necessary and perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> RCS subcooling based on core exit T/Cs greater than Figure MIN SUBCOOLING and no RCP running, <u>THEN</u> attempt to start a RCP: <ul style="list-style-type: none"> <li>1) Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized</li> <li>o Refer to Attachment RCP START</li> </ul> </li> <li>2) <u>IF</u> conditions established, <u>THEN</u> start one RCP.</li> </ul> </li> <li>b. Go to Step 26.</li> </ul>
14	<p><b>Check RCS Hot Leg Temperatures - STABLE</b></p>	<p><u>IF</u> increasing, <u>THEN</u> control feed flow and dump steam to stabilize RCS hot leg temperatures.</p> <p><u>IF</u> decreasing, <u>THEN</u> verify that actions of Step 2 have been performed before continuing with procedure.</p>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	<p><b>Check If SI ACCUMs Should Be Isolated:</b></p> <p>a. Check the following:</p> <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</li> <li>o RVLIS indication: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 68% [73% adverse CNMT]</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 80%</li> </ul> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-841, MCC C position 12F</li> <li>• MOV-865, MCC D position 12C</li> </ul> <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-841</li> <li>• MOV-865</li> </ul> <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Return to Step 13.</p> <p>c. Vent any unisolated ACCUMs:</p> <ol style="list-style-type: none"> <li>1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> <li>• ACCUM A, AOV-834A</li> <li>• ACCUM B, AOV-834B</li> </ul> </li> <li>2) Open HCV-945.</li> <li>3) Continue with Step 16. Do <u>NOT</u> decrease RCS pressure to less than unisolated ACCUM pressure.</li> </ol>

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION THE RCS SHOULD NOT BE DEPRESSURIZED TO LESS THAN SI ACCUM PRESSURE  
UNTIL SI ACCUMS ISOLATED.

\*\*\*\*\*

NOTE: 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 a PRZR PORV select one with an operable block valve.

**16 Depressurize RCS To Decrease  
RCS Subcooling:**

- |   |   |
|---|---|
| a. Depressurize using normal PRZR<br>spray if available | a. <u>IF</u> normal spray <u>NOT</u> available,<br><u>THEN</u> use one PRZR PORV. <u>IF</u> <u>IA</u><br><u>NOT</u> available, <u>THEN</u> refer to<br>Attachment N2 PORVS. |
|---|---|

IF no PRZR PORV available, THEN  
use auxiliary spray valve  
(AOV-296).

- b. Depressurize RCS until one of  
the following conditions  
satisfied:
- o RCS subcooling based on core  
exit T/Cs - LESS THAN 10°F  
USING FIGURE MIN SUBCOOLING

-OR-

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

-OR-

- o RCS pressure - LESS THAN 160  
psig [200 psig adverse CNMT]

- c. Stop RCS depressurization

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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**\*17 Monitor RCP Operation:**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. RCPs - ANY RUNNING</li> <li>b. Check the following: <ul style="list-style-type: none"> <li>o RCP #1 seal D/P - GREATER THAN 220 PSID</li> <li>o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>a. Go to Step 18.</li> <li>b. Stop affected RCP(s).</li> </ul> |
|---|---|

\*\*\*\*\*

**CAUTION** AN INCREASE IN RCS PRESSURE MAY RESULT IN EXCESSIVE REACTOR VESSEL STRESS. RCS PRESSURE AND TEMPERATURE SHOULD BE MAINTAINED STABLE WHILE PERFORMING SUBSEQUENT STEPS IN THIS PROCEDURE.

\*\*\*\*\*

- |   |   |
|---|---|
| <p><b>18 Check PRZR Level - GREATER THAN 13% [40% adverse CNMT]</b></p> | <p>Try to restore level with charging while maintaining stable RCS pressure. <u>IF</u> level can <u>NOT</u> be restored, <u>THEN</u> go to Step 25.</p> |
|---|---|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored:	a. Continue with Step 23. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 19 through 22.
	o IA to CNMT (AOV-5392) - OPEN	
	o IA pressure - GREATER THAN 60 PSIG	
b.	CCW pumps - ANY RUNNING	b. Perform the following:
		1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> 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.
c.	Verify instrument bus D - ENERGIZED	c. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following:
		1) Verify MCC A energized.
		2) Place instrument bus D on maintenance supply.
d.	Charging pump - ANY RUNNING	d. Continue with Step 24. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 20 through 24.



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 16 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION</b> IF RCS PRESSURE LESS THAN 250 PSIG, THEN PCV-135 SHOULD BE ADJUSTED TO ESTABLISH DESIRED LETDOWN FLOW, NOT TO INCREASE PRESSURE.</p> <p>*****</p>		
20	Establish Normal Letdown:	IF RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:
a.	Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM	o Place excess letdown divert valve, AOV-312, to NORMAL.
b.	Place the following switches to CLOSE:	o Ensure CCW from excess letdown open, (AOV-745).
	• Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)	o Open excess letdown isolation valve AOV-310.
	• AOV-371, letdown isolation valve	o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.
	• AOV-427, loop B cold leg to REGEN Hx	o Adjust charging pump speed as necessary.
c.	Place letdown controllers in MANUAL at 40% open	IF RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.
	• 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	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<p><b>Check VCT Makeup System:</b></p> <ul style="list-style-type: none"> <li>a. Adjust boric acid flow control valve in AUTO to 9.5 gpm</li> <li>b. Adjust RMW flow control valve in AUTO to 40 gpm</li> <li>c. Verify the following: <ul style="list-style-type: none"> <li>1) RMW mode selector switch in AUTO</li> <li>2) RMW control armed - RED LIGHT LIT</li> </ul> </li> <li>d. Check VCT level: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 20% -OR-</li> <li>o Level - STABLE OR INCREASING</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>c. Adjust controls as necessary.</li> <li>d. Manually increase VCT makeup flow as follows: <ul style="list-style-type: none"> <li>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.</li> <li>2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.</li> <li>3) Increase boric acid flow as necessary.</li> </ul> </li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22 Check Charging Pump Suction Aligned To VCT:		
a. VCT level - GREATER THAN 20%		<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> <li>o LCV-112B open</li> <li>o LCV-112C closed</li> </ul> </li> <li>2) Continue with Step 23. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 22b.</li> </ol>
b. Verify charging pumps aligned to VCT	<ul style="list-style-type: none"> <li>o LCV-112C - OPEN</li> <li>o LCV-112B - CLOSED</li> </ul>	b. Manually align valves as necessary.
23 Check PRZR Level - LESS THAN 75% [65% adverse CNMT]		<p>Control charging and letdown as necessary to reduce PRZR level to less than 75% [65% adverse CNMT]. If necessary establish excess letdown.</p> <p><u>IF</u> no letdown available <u>AND</u> CCW to RCPs established, <u>THEN</u> cycle charging pumps as necessary to control PRZR level.</p>



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 19 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> For optimum long term pressure control, saturated conditions should be restored in the PRZR.</p>		
24	Verify PRZR Liquid Temperature (TI-424) - AT SATURATION FOR DESIRED PRESSURE	IF PRZR liquid temperature low, <u>THEN</u> energize PRZR heaters as necessary to establish desired temperature.
25	Check RCS Subcooling Based On Core Exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING	<p>IF RCS pressure less than 160 psig [200 psig adverse CNMT], <u>THEN</u> go to Step 26. IF NOT, <u>THEN</u> depressurize using normal spray. Return to step 16b.</p> <p>IF normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray for any further depressurization. Return to Step 16b.</p> <p>IF auxiliary spray <u>NOT</u> available, <u>THEN</u> return to Step 16a.</p>
26	Check Cool Down Rate In RCS Cold Legs - GREATER THAN 100°F IN ANY 60 MINUTES PERIOD	Return to procedure and step in effect.
27	Maintain RCS Pressure And Temperature Stable For At Least 1 Hour	
	a. Control steam dump and feed flow as necessary	
	b. Perform actions of other procedures in effect which do not cool down the RCS or increase RCS pressure until the RCS temperature soak has been completed	

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 16 PAGE 20 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b> The following pressure, temperature and cooldown rate limits remain applicable in subsequent procedures.</p>	
28	<p><u>WHEN</u> 1 HOUR Soak Is Complete, <u>THEN</u> Continue RCS Cooldown And Depressurization As Necessary</p> <p>a. Maintain RCS pressure and cold leg temperature within the limits of Figure SOAK LIMITS</p> <p>b. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 50°F IN ANY 60 MINUTES PERIOD</p>	
29	<p><b>Verify SI Flow Not Required:</b></p> <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN FIGURE MIN SUBCOOLING</li> <li>o RVLIS indication: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 68% [73% adverse CNMT]</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 80%</li> </ul>	<p>Manually operate SI pumps as necessary.</p> <p><u>IF</u> RCS subcooling based on core exit T/Cs greater than Figure MIN SUBCOOLING and no RCP running, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a. Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized</li> <li>o Refer to Attachment RCP START</li> </ul> </li> <li>b. <u>IF</u> conditions established, <u>THEN</u> start one RCP.</li> </ul>



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FR-P.1 APPENDIX LIST

<u>TITLE</u>	<u>PAGES</u>
1) FIGURE MIN SUBCOOLING	1
2) FIGURE SOAK LIMITS	1
3) FIGURE RCP SEAL LEAKOFF	1
4) ATTACHMENT RCP START	2
5) ATTACHMENT SD-1	1
6) ATTACHMENT CNMT RECIRC FANS	1
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FIGURE MIN SUBCOOLING

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

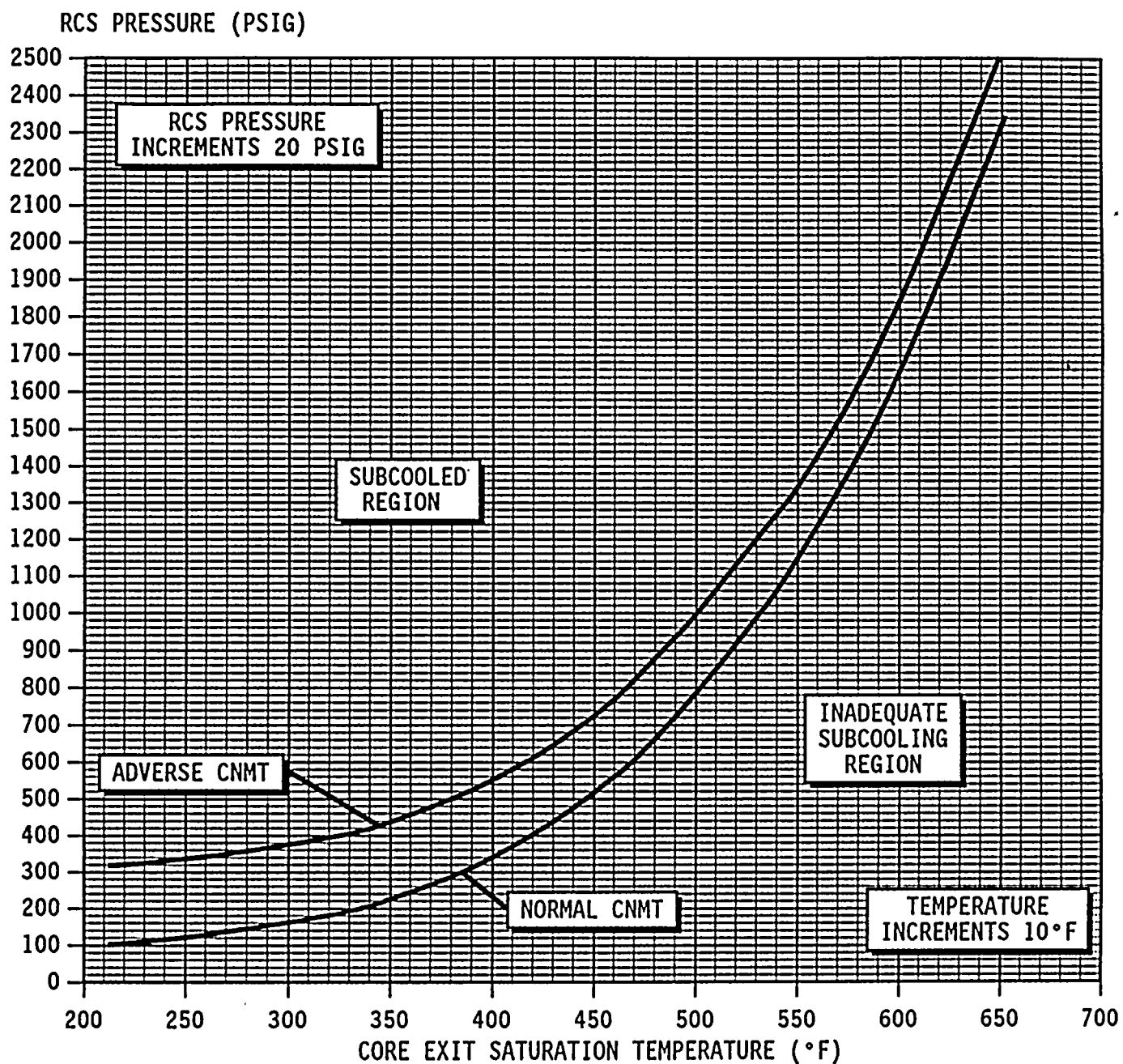




FIGURE SOAK LIMITS

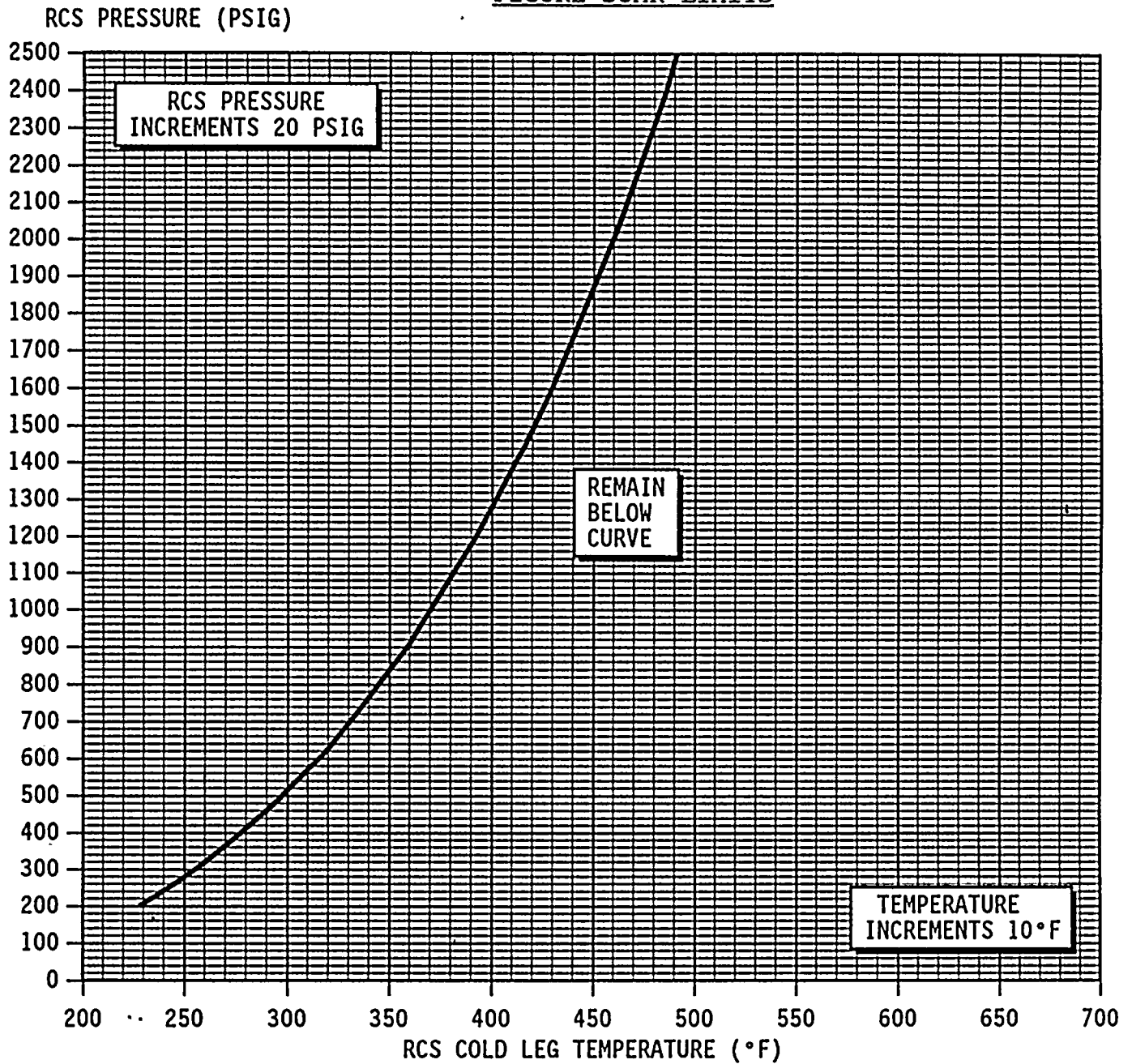
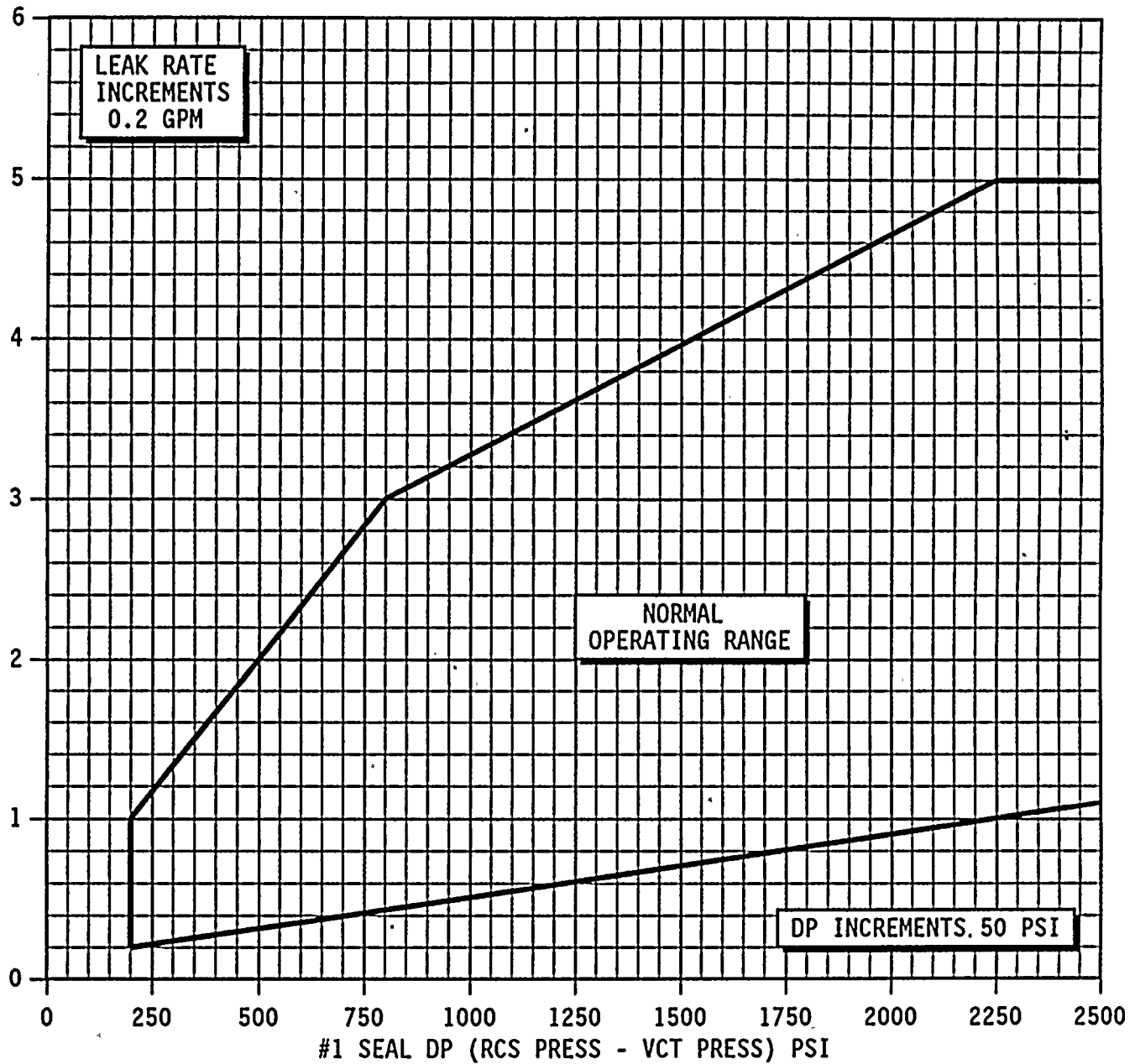


FIGURE RCP SEAL LEAKOFF

#1 SEAL LEAK RATE (GPM)





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ROCHESTER GAS AND ELECTRIC CORPORATION

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CONTROLLED COPY NUMBER 23

Terry White  
RESPONSIBLE MANAGER

5-31-96  
EFFECTIVE DATE

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EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 10 PAGE 2 of 11
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A. PURPOSE - This procedure provides actions to add negative reactivity to a core which is observed to be critical when expected to be shut down.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, when reactor trip is not verified and manual trip is not effective.
- b. F-0.1, SUBCRITICALITY Critical Safety Function Status Tree on either a RED or ORANGE condition.



EOP:	TITLE:	REV: 10
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u>   o Steps 1 through 3 are IMMEDIATE ACTION steps.</p> <p>          o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p>		
1	<p>Verify Reactor Trip:</p> <ul style="list-style-type: none"> <li>o At least one train of reactor trip breakers - OPEN</li> <li>o Neutron flux - DECREASING</li> <li>o MRPI indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM</li> </ul>	<p>Manually trip reactor.</p> <p><u>IF</u> reactor trip breakers <u>NOT</u> open, <u>THEN</u> manually insert control rods.</p>
2	<p>Verify Turbine Stop Valves - CLOSED</p>	<p>Manually trip turbine.</p> <p><u>IF</u> turbine trip can <u>NOT</u> be verified, <u>THEN</u> close both MSIVs.</p>
3	<p>Check AFW Pumps Running:</p> <ul style="list-style-type: none"> <li>a. MDAFW pumps - RUNNING</li> <li>b. TDAFW pump - RUNNING IF NECESSARY</li> </ul>	<p>a. Manually start MDAFW pumps.</p> <p>b. Manually open steam supply valves.</p> <ul style="list-style-type: none"> <li>• MOV-3505A</li> <li>• MOV-3504A</li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>ACTIONS TAKEN TO INITIATE RCS BORATION SHALL NOT BE REVERSED WHEN PERFORMING STEPS 1 THROUGH 12 OF E-0, REACTOR TRIP OR SAFETY INJECTION.</p> <p>*****</p> <p><u>NOTE:</u> If offsite power is lost coincident with SI, then MCC C and MCC D lockout relays must be reset to restore BA and RMW pumps.</p>		
4	Initiate Emergency Boration Of RCS:	
a.	Check SI status:	a. Perform the following:
	<ul style="list-style-type: none"> <li>o All SI annunciators - EXTINGUISHED</li> <li>o All SI pumps - OFF IN AUTO</li> </ul>	<ul style="list-style-type: none"> <li>1) Complete steps 1 through 12 of E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this procedure</li> <li>2) <u>IF</u> SI flow indicated, <u>THEN</u> go to Step 5. <u>IF NOT</u>, <u>THEN</u> go to Step 4b.</li> </ul>
b.	Verify at least one charging pump - RUNNING	b. Perform the following:
		<ul style="list-style-type: none"> <li>1) Reset SI if necessary.</li> <li>2) Start one charging pump.</li> </ul>
c.	Align boration path:	c. Initiate normal boration at maximum rate using the boric acid flow control valve, FCV-110A. <u>IF</u> flow can <u>NOT</u> be established, <u>THEN</u> refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.
	<ul style="list-style-type: none"> <li>1) Start two BA transfer pumps</li> <li>2) Open MOV-350</li> <li>3) Verify BA flow</li> </ul>	
d.	Verify charging flow path:	d. Manually align valves and verify flow.
	<ul style="list-style-type: none"> <li>o Charging valve to loop B cold leg (AOV-294) - OPEN</li> <li>o Charging flow control valve (HCV-142) - DEMAND AT 0%</li> </ul>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check If The Following Trips Have Occurred:	
	a. Reactor trip	a. Dispatch AO to locally trip reactor: <ul style="list-style-type: none"> <li>o Trip MG set breakers at bus 13 and bus 15.</li> <li>o Open reactor trip breakers locally.</li> </ul>
	b. Turbine trip	b. Dispatch operator to locally trip turbine using manual trip lever on west end of HP turbine.
6	Check PRZR PORV Status:	Verify CNMT ventilation isolation. <u>IF</u> dampers <u>NOT</u> closed, <u>THEN</u> momentarily deenergize CNMT particulate monitor, R-11, to actuate CVI.
	<ul style="list-style-type: none"> <li>o RCS pressure - LESS THAN 2335 PSIG</li> <li>o PORVs - CLOSED</li> <li>o Annunciator F-19, PRZR PORV OUTLET HI TEMP - EXTINGUISHED</li> </ul>	



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** CAUTION *****		
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).		
*****		
7	Check S/G Level:	
	a. Narrow range level in at least one S/G - GREATER THAN 5% [25% adverse CNMT]	a. Perform the following:  1) Verify total feed flow greater than 400 gpm.  IF NOT, THEN manually start pumps and align valves as necessary.  2) Maintain total feed flow greater than 400 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.
	b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	
8	Verify Dilution Paths - ISOLATED	Manually isolate dilution paths.
	o Place RMW mode switch to BORATE	
	o Verify RMW to blender (HCV-111) - CLOSED	
	o Verify RMW pumps - OFF	



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	<p>Stabilize RCS Temperature:</p> <ul style="list-style-type: none"> <li>a. Control steam dump as necessary</li> <li>b. Verify the following: <ul style="list-style-type: none"> <li>o Core exit T/Cs - STABLE OR INCREASING</li> <li>o Pressure in both S/Gs - STABLE OR INCREASING</li> <li>o Pressure in both S/Gs - GREATER THAN 100 PSIG</li> </ul> </li> <li>c. Go to Step 14</li> </ul>	<ul style="list-style-type: none"> <li>b. <u>IF</u> RCS cooldown can <u>NOT</u> be controlled, <u>THEN</u> close both MSIVs and go to Step 10.</li> </ul>
10	<p>Verify MFW Isolation:</p> <ul style="list-style-type: none"> <li>a. MFW pumps - TRIPPED</li> <li>b. MFW flow control valves - CLOSED <ul style="list-style-type: none"> <li>• MFW regulating valves</li> <li>• MFW bypass valves</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. Manually close MFW pump discharge valves and trip MFW pumps.</li> <li>b. Place A and B S/G MFW regulating valve and bypass valve controllers to MANUAL at 0% demand.</li> </ul>
11	<p>Identify Faulted S/G:</p> <ul style="list-style-type: none"> <li>o Any S/G Pressure - DECREASING IN AN UNCONTROLLED MANNER</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Any S/G - COMPLETELY DEPRESSURIZED</li> </ul>	<p>Go to Step 14.</p>



STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> *****		
	<ul style="list-style-type: none"> <li>o AT LEAST ONE S/G SHALL BE MAINTAINED AVAILABLE FOR RCS COOLDOWN.</li> <li>o IF BOTH S/GS ARE FAULTED, AT LEAST 50 GPM FEED FLOW SHOULD BE MAINTAINED TO EACH S/G.</li> </ul>	
*****		
12	Isolate Feed Flow To Faulted S/G:	Manually close valves.
	<ul style="list-style-type: none"> <li>o Close faulted S/G MDAFW pump discharge valve <ul style="list-style-type: none"> <li>• S/G A, MOV-4007</li> <li>• S/G B, MOV-4008</li> </ul> </li> <li>o Pull stop faulted S/G MDAFW pump</li> <li>o Close faulted S/G TDAFW flow control valve <ul style="list-style-type: none"> <li>• S/G A, AOV-4297</li> <li>• S/G B, AOV-4298</li> </ul> </li> <li>o Verify faulted S/G MFW regulating valve and bypass valve - CLOSED <ul style="list-style-type: none"> <li>• S/G A, HCV-466 and HCV-480</li> <li>• S/G B, HCV-476 and HCV-481</li> </ul> </li> <li>o Verify MDAFW pump crosstie valves - BOTH CLOSED <ul style="list-style-type: none"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul> </li> <li>o Close faulted S/G SAFW pump discharge valve <ul style="list-style-type: none"> <li>• S/G A, MOV-9701A</li> <li>• S/G B, MOV-9701B</li> </ul> </li> </ul>	<p>IF valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths as necessary.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Isolate Steam Flow From Faulted S/G:	Manually close valves.
	<ul style="list-style-type: none"> <li>o Verify faulted S/G ARV - CLOSED <ul style="list-style-type: none"> <li>• S/G A, AOV-3411</li> <li>• S/G B, AOV-3410</li> </ul> </li> <li>o Close faulted S/G TDAFW pump steam supply valve and place in PULL STOP <ul style="list-style-type: none"> <li>• S/G A, MOV-3505A</li> <li>• S/G B, MOV-3504A</li> </ul> </li> <li>o Verify faulted S/G blowdown and sample valves - CLOSED <ul style="list-style-type: none"> <li>• S/G A, AOV-5738 and AOV-5735</li> <li>• S/G B, AOV-5737 and AOV-5736</li> </ul> </li> <li>o Dispatch AO to complete faulted S/G isolation (Refer to Attachment FAULTED S/G).</li> </ul>	<p>IF valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths as necessary.</p>



STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>BORATION SHOULD CONTINUE TO OBTAIN ADEQUATE SHUTDOWN MARGIN DURING SUBSEQUENT ACTIONS.</p> <p>*****</p> <p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>		
14	Verify Reactor Subcritical:	Perform the following:
	<ul style="list-style-type: none"> <li>o Power range channels - LESS THAN 5%</li> <li>o Intermediate range channels - STABLE OR DECREASING</li> <li>o Intermediate range channels startup rate - NEGATIVE</li> <li>o Core exit T/Cs - STABLE</li> </ul>	<ul style="list-style-type: none"> <li>a. Stabilize RCS temperature.</li> <li>b. Continue to inject boric acid.</li> <li>c. Direct RP to sample RCS and PRZR for boron concentration.</li> <li>d. Verify boron concentration greater than Figure SDM.</li> </ul> <p><u>IF</u> adequate shutdown margin verified, <u>THEN</u> return to procedure and step in effect.</p> <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>a. Allow RCS to heat up.</li> <li>b. Perform actions of other FR procedures in effect which do <u>NOT</u> cooldown or otherwise add positive reactivity to the core.</li> <li>c. Return to Step 5.</li> </ul>







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FR-S.1 APPENDIX LIST

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1) FIGURE SDM	1
2) ATTACHMENT FAULTED S/G	1



FIGURE SDM

- NOTE:**
- o Curve includes allowance for one stuck rod. Add 100 ppm for each additional stuck rod.
  - o To obtain core burnup, use PPCS point ID BURNUP.

