

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 8 PAGE 1 of 15
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5-19-93

Thomas A. Marlow  
PLANT SUPERINTENDENT

5-21-93  
EFFECTIVE DATE

CATEGORY 1.0

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

9306040165 930524  
PDR ADDCK 05000244  
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A. PURPOSE - This procedure provides actions to restore adequate 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 any ORANGE condition.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> 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	Check RWST Level - GREATER THAN 28%	<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 11 of ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.</li> <li>b. Go to Step 4.</li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Verify SI Pump And RHR Pump Emergency Alignment:	
a.	RHR pump discharge to Rx vessel deluge - OPEN  • MOV-852A • MOV-852B	a. Ensure at least one valve open.
b.	Verify SI pump C - RUNNING	b. Manually start pump on available bus.
c.	Verify SI pump A - RUNNING	c. Perform the following:  1) Ensure SI pumps B and C running.  2) Ensure SI pump C aligned to discharge line A:  o MOV-871B closed  o MOV-871A open  3) Go to Step 3.
d.	Verify SI pump B - RUNNING	d. Perform the following:  1) Ensure SI pumps A and C running.  2) Ensure SI pump C aligned to discharge line B:  o MOV-871B open  o MOV-871A closed  3) Go to Step 3.
e.	Verify both SI pump C discharge valves - OPEN  • MOV-871A • MOV-871B.	e. Manually open valves as necessary.





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify SI Pump Suction Alignment:	
a.	Check BAST level:	a. Perform the following:
	<ul style="list-style-type: none"> <li>o Level - GREATER THAN 10%</li> <li>o Annunciator B-23, BORIC ACID TANK LO LO LEVEL - EXTINGUISHED</li> </ul>	1) 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>
		2) Ensure at least one valve in each SI pump suction line from BAST closed. <ul style="list-style-type: none"> <li>• MOV-826A or MOV-826B</li> <li>• MOV-826C or MOV-826D</li> </ul>
		3) Go to Step 4.
b.	Verify SI pump suction valves from BAST - OPEN	b. Ensure both valves in either flow path open.
	<ul style="list-style-type: none"> <li>• MOV-826A</li> <li>• MOV-826B</li> <li>• MOV-826C</li> <li>• MOV-826D</li> </ul>	<ul style="list-style-type: none"> <li>o MOV-826A and MOV-826B</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o MOV-826C and MOV-826D</li> </ul>
c.	Verify SI pump suction from RWST - CLOSED	c. Manually align valves as necessary.
	<ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul>	



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

## 4 Verify SI Flow In Both Trains:

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

b. RCS pressure - LESS THAN  
250 psig [465 psig adverse CNMT]

c. RHR loop flow indicator - CHECK  
FOR FLOW

a. Perform the following:

1) Manually start SI pumps and  
align valves as necessary.

2) Establish maximum charging  
flow.

b. Go to Step 5.

c. Manually start RHR pumps and  
align 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 5B). *****		
5	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 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.
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

NOTE: Normal conditions for running RCPs are desired, but RCPs should not be tripped if normal conditions cannot be established or maintained.

6 Check RCP Status:

- |   |   |
|---|---|
| a. At least one RCP - RUNNING   | a. Go to Step 9.  |
| b. Support conditions for the operating RCP(s) available<br>(Refer to Attachment RCP START) | b. Try to establish support conditions for the operating RCP. |

7 Check RVLIS Fluid Fraction

- |   |  |
|---|--|
| a. Fluid fraction (any RCP on) - GREATER THAN 60% | a. <u>IF</u> increasing, <u>THEN</u> return to Step 1.<br><br><u>IF NOT</u> , then go to Step 8. |
| b. Return to procedure and step in effect.        |  |

8 Check If One RCP Should Be Stopped:

- |                        |                   |
|------------------------|-------------------|
| a. Both RCPs - RUNNING | a. Go to Step 10. |
| b. Stop one RCP        |                   |
| c. Go to Step 10       |                   |





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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9 Check Core Cooling:

- a. RVLIS level (no RCPs) - GREATER THAN 43% [46% adverse CNMT]
- b. Core exit T/Cs - LESS THAN 700°F
- c. Return to procedure and step in effect

- a. IF increasing, THEN return to Step 1. IF NOT, THEN go to Step 10.
- b. IF decreasing, THEN return to Step 1. IF NOT, THEN go to Step 10.

10 Check SI ACCUM Discharge Valves - OPEN

- MOV-841
- MOV-865

IF SI ACCUM discharge valves closed after ACCUM discharge, THEN go to Step 11. IF NOT, THEN perform the following:

- a. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves.
  - MOV-841, MCC C position 12F
  - MOV-865, MCC D position 12C
- b. Open SI ACCUM discharge valves.
  - ACCUM A, MOV-841
  - ACCUM B, MOV-865



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
<p>*****  <u>CAUTION</u>            *****</p>				
<p>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).</p> <p>o A FAULTED OR RUPTURED S/G SHOULD NOT BE USED IN SUBSEQUENT STEPS UNLESS NO INTACT S/G IS AVAILABLE.</p> <p>*****</p>				
<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>				
<p>*11 Monitor Intact S/G Levels:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p> </td> <td style="vertical-align: top;"> <p>a. Increase total feed flow to restore narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</p> </td> </tr> </table>			<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Increase total feed flow to restore narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</p>
<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Increase total feed flow to restore narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</p>			
<p>12 Verify Condenser Steam Dump In Manual:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Verify condenser available:</p> <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> <p>b. Place steam dump mode selector switch in MANUAL</p> <p>c. Place steam dump controller in MANUAL</p> </td> <td style="vertical-align: top;"> <p>a. Place intact S/G ARV controller in MANUAL and go to Step 13.</p> </td> </tr> </table>			<p>a. Verify condenser available:</p> <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> <p>b. Place steam dump mode selector switch in MANUAL</p> <p>c. Place steam dump controller in MANUAL</p>	<p>a. Place intact S/G ARV controller in MANUAL and go to Step 13.</p>
<p>a. Verify condenser available:</p> <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> <p>b. Place steam dump mode selector switch in MANUAL</p> <p>c. Place steam dump controller in MANUAL</p>	<p>a. Place intact S/G ARV controller in MANUAL and go to Step 13.</p>			



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

THE FOLLOWING STEP WILL CAUSE SI ACCUMULATOR INJECTION WHICH MAY RESULT IN A RED PATH CONDITION IN F-0.4, INTEGRITY STATUS TREE. THIS PROCEDURE SHOULD BE COMPLETED BEFORE TRANSITION TO FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK.

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13 Depressurize All Intact S/Gs  
To 200 PSIG:

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

b. Dump steam to condenser

b. Manually or locally dump steam  
from intact S/Gs:

o Use S/G ARVs.

-OR-

o Open TDAFW pump steam supply  
valve(s) for affected S/G(s):

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

-OR-

o Locally perform the following:

o Open intact S/G MSIV  
bypass valve.

o Open priming air ejector  
steam isolation valves.

- V-3580
- V-3581

c. Check S/G pressures - LESS THAN  
200 PSIG

c. Return to Step 11.

d. Stop S/G depressurization



STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> RHR PUMPS SHOULD NOT BE RUN LONGER THAN 1 HOUR WITHOUT CCW TO THE RHR HEAT EXCHANGERS. *****		
14	Check RHR Pumps - RUNNING	Manually start pumps as necessary.
15	Check If SI ACCUMs Should Be Isolated:	
	a. RCS hot leg temperatures - BOTH LESS THAN 400°F	a. Go to Step 17.
	b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves if necessary <ul style="list-style-type: none"> <li>• MOV-841, MCC C position 12F</li> <li>• MOV-865, MCC D position 12C</li> </ul>	
	c. Close SI ACCUM discharge valves <ul style="list-style-type: none"> <li>• MOV-841</li> <li>• MOV-865</li> </ul>	c. Vent any unisolated ACCUMs: <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> </ol>
	d. Locally reopen breakers for MOV-841 and MOV-865	





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****  <u>CAUTION</u>  SYMPTOMS FOR FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, SHOULD BE CLOSELY MONITORED DURING SUBSEQUENT STEPS.  *****</p>		
16	Stop All RCPs	
17	Depressurize All Intact S/Gs To Atmospheric Pressure:	
	<p>a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Dump steam to condenser</p>	<p>b. Manually or locally dump steam from intact S/Gs:</p> <ol style="list-style-type: none"> <li>1) Use S/G ARVs.</li> <li>2) Open TDAFW pump steam supply valve(s) for affected 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>3) Locally perform the following: <ul style="list-style-type: none"> <li>o Open intact S/G MSIV bypass valve.</li> <li>o Open priming air ejector steam isolation valves. <ul style="list-style-type: none"> <li>• V-3580</li> <li>• V-3581</li> </ul> </li> </ul> </li> </ol>



## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

## 18 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 maximum charging flow.
- c. Return to Step 17.

## 19 Isolate Both SI ACCUMs:

- a. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

- a. Vent any unisolated ACCUMs:

- 1) Open vent valves for unisolated SI ACCUMs.

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

- 2) Open HCV-945.

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

## 20 Stop All RCPs

## 21 Check Core Cooling:

Return to Step 17.

- o RVLIS level (no RCPs) - GREATER THAN 68% [73% adverse CNMT]
- o Both RCS hot leg temperatures - LESS THAN 320°F



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Go to Appropriate Plant Procedure	
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 17	
	-END-	



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FR-C.2 APPENDIX LIST

<u>TITLE</u>	<u>PAGES</u>
1) ATTACHMENT RCP START	1





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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 10/6/93

  
PLANT SUPERINTENDENT

10-8-93  
EFFECTIVE DATE

CATEGORY 1.0

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



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 8 PAGE 2 of 22
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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
<p><u>NOTE:</u> 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	Check RCS Pressure - GREATER THAN 250 PSIG [465 PSIG adverse CNMT]	<u>IF</u> RHR flow greater than 475 gpm, <u>THEN</u> return to procedure and step in effect.



## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

NOTE: A faulted S/G is any S/G that is depressurizing in an uncontrolled manner or is completely depressurized.

2 Check RCS Cold Leg  
Temperatures - STABLE OR  
INCREASING

Try to stop RCS cooldown:

- a. Ensure S/G ARVs closed.
- b. Close both S/G MSIVs.
- c. Ensure MFW flow control valves closed.
  - MFW regulating valves
  - MFW bypass valves
- d. Ensure MFW pumps tripped.
- e. Rotate reheater steam supply controller cam to close reheater steam supply valves.
- f. IF S/G pressure less than condensate pressure, THEN stop all condensate pumps.
- g. IF RHR system in service, THEN stop any cooldown from RHR system.
- h. 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. WHEN S/G level greater than 5% [25% adverse CNMT] in one non-faulted S/G, THEN limit feed flow to stop RCS cooldown.

This Step continued on the next page.





EOP:

FR-P.1

TITLE:

# RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION

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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):

1) Close faulted S/G(s) TDAFW pump steam supply valve(s).

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

2) IF both S/G(s) faulted, THEN control feed flow at 50 gpm to each S/G.

3) IF any S/G NOT faulted, THEN isolate all feedwater to faulted S/G unless necessary for RCS temperature control. IF a faulted S/G is necessary for RCS temperature control, THEN control feed flow at 50 gpm to that S/G.

## 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:

- MOV-515, MCC C position 6C
- MOV-516, MCC D position 6C

b. Block valves - AT LEAST ONE OPEN

b. Open one block valve unless it was closed to isolate an open PORV.

IF at least one block valve can NOT be opened, THEN dispatch AO to locally check breaker.

- MOV-515, MCC C position 6C
- MOV-516, MCC D position 6C



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<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>		
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: <ul 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> </ul>
	c. Go to Step 4e	
	d. PRZR pressure - LESS THAN 2335 PSIG	d. Perform the following: <ul 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> </ul>
	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.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check SI Pumps - ANY RUNNING	Go to Step 14.
6	<p>Check If SI Can Be Terminated:</p> <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> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 80%</li> </ul>	<p>Do <u>NOT</u> stop SI pumps. Perform the following:</p> <p>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:</p> <p>1) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized</li> <li>o Refer to Attachment RCP START</li> </ul> <p>2) <u>IF</u> conditions established, <u>THEN</u> start one RCP.</p> <p>b. Go to Step 27.</p>
<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>		
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).
		<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 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)	





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Establish IA to CNMT:	
	<p>a. Verify non-safeguards busses energized from offsite power</p> <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> <p>b. Verify SW isolation valves to turbine building - OPEN</p> <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul> <p>c. Verify at least two air compressors - RUNNING</p> <p>d. Check IA supply:</p> <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul> <p>e. Reset both trains of XY relays for IA to CNMT AOV-5392</p> <p>f. Verify IA to CNMT AOV-5392 - OPEN</p>	<p>a. Perform the following:</p> <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, 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> <p>b. Manually align valves.</p> <p>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.</p> <p>d. Perform the following:</p> <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>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>ALIGNING SI PUMP SUCTION TO RWST BEFORE ISOLATING BAST MAY RESULT IN BACKFLOW FROM RWST TO BASTS.</p> <p>*****</p>		
12	Verify SI Pump Suction Aligned To RWST:	
	<p>a. SI pump suction valves from BASTs - CLOSED</p> <ul style="list-style-type: none"> <li>• MOV-826A</li> <li>• MOV-826B</li> <li>• MOV-826C</li> <li>• MOV-826D</li> </ul>	<p>a. Ensure at least one valve in each flow path closed.</p> <ul style="list-style-type: none"> <li>• MOV-826A or MOV-826B</li> <li>• MOV-826C or MOV-826D</li> </ul>
	<p>b. SI pump suction valves from RWST - OPEN</p> <ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul>	<p>b. Ensure at least one valve is open.</p>
	<p>c. Consult TSC to determine if SI flush is required (Refer to Attachment SI FLUSH)</p>	



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	<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 and adjust charging flow to restore PRZR level</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>

11



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 8 PAGE 12 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*14	<p>Monitor SI Reinitiation Criteria:</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> <p>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:</p> <ol 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> </ol> <p>b. Go to Step 27.</p>
15	<p>Check RCS Hot Leg Temperatures - STABLE</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>





## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

## 16 Check If SI ACCUMs Should Be Isolated:

## a. Check the following:

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

- o RVLIS indication:

- o Level - GREATER THAN 68% [73% adverse CNMT]

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 80%

## b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves

- MOV-841, MCC C position 12F
- MOV-865, MCC D position 12C

## c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

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

## a. Return to Step 14.

## 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.

3) Continue with Step 17. Do NOT decrease RCS pressure to less than unisolated ACCUM pressure.



STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE RCS SHOULD NOT BE DEPRESSURIZED TO LESS THAN SI ACCUM PRESSURE UNTIL SI ACCUMS ISOLATED.</p> <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>		
17	Depressurize RCS To Decrease RCS Subcooling:	
	<p>a. Depressurize using normal PRZR spray if available</p> <p>b. Depressurize RCS until either of the following conditions satisfied:</p> <p>o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING</p> <p style="text-align: center;">-OR-</p> <p>o PRZR level - GREATER THAN 87% [75% adverse CNMT]</p> <p>c. Stop RCS depressurization</p>	<p>a. <u>IF</u> normal spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 19.
	b. Check the following:	b. Go to Step 19.
	o RCP #1 seal D/P - LESS THAN 220 PSID	
	-OR-	
	o RCP #1 seal leakoff - LESS THAN 0.25 GPM	
	c. Stop affected RCP(s)	
*****		
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.		
*****		
19	Check PRZR Level - GREATER THAN 13% [40% adverse CNMT]	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 26.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	a. Continue with Step 24. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 20 through 23:
b.	CCW pumps - ANY RUNNING	b. Perform the following: <ol style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ol>
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: <ol style="list-style-type: none"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ol>
d.	Charging pump - ANY RUNNING	d. Continue with Step 25. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 21 through 25.





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>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>		
21	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 25% 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	



## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

## 22 Check VCT Makeup System:

a. BAST levels - ANY GREATER THAN 5%

b. Check Annunciator B-23, BORIC  
ACID TANK LO LO LEVEL -  
EXTINGUISHEDc. Adjust boric acid flow control  
valve in AUTO to 4.5 gpm

d. Verify the following:

- 1) RMW mode selector switch in  
AUTO
- 2) RMW control armed - RED LIGHT  
LIT

e. Check VCT level:

- o Level - GREATER THAN 20%
- OR-
- o Level - STABLE OR INCREASING

a. Go to Step 23.

b. Perform the following:

- 1) Adjust boric acid flow  
control valve to required  
flow from table.

BAST LEVEL	BORIC ACID FLOW (GPM)
<10%	4.5
10-15%	6.7
15-20%	8.9
>20%	10.0

- 2) Go to Step 22d.

d. Adjust controls as necessary.

e. 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.



## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

23 Check Charging Pump Suction  
Aligned To VCT:

a. VCT level - GREATER THAN 20%

a. IF VCT level can NOT be  
maintained greater than 5%, THEN  
perform the following:1) Ensure charging pump suction  
aligned to RWST

o LCV-112B open

o LCV-112C closed

2) Continue with Step 24. WHEN  
VCT level greater than 40%,  
THEN do Step 23b.b. Verify charging pumps aligned to  
VCTb. Manually align valves as  
necessary.

o LCV-112C - OPEN

o LCV-112B - CLOSED

24 Check PRZR Level - LESS THAN  
87% [75% adverse CNMT]Control charging and letdown as  
necessary to reduce PRZR level to  
less than 87% [75% adverse CNMT].  
If necessary establish excess  
letdown.IF no letdown available AND CCW to  
RCPs established, THEN cycle  
charging pumps as necessary to  
control PRZR level.



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: For optimum long term pressure control, saturated conditions should be restored in the PRZR.

25 Verify PRZR Liquid Temperature (TI-424) - AT SATURATION FOR DESIRED PRESSURE

IF PRZR liquid temperature low, THEN energize PRZR heaters as necessary to establish desired temperature.

26 Check RCS Subcooling Based On Core Exit T/Cs - BETWEEN 0°F AND 10°F USING FIGURE MIN SUBCOOLING

IF RCS pressure less than 160 psig [200 psig adverse CNMT], THEN go to Step 27. IF NOT, THEN depressurize using normal spray.

IF normal spray NOT available and letdown is in service, THEN use auxiliary spray for any further depressurization. Return to Step 17b.

IF auxiliary spray NOT available, THEN return to Step 17a.

27 Check Cool Down Rate In RCS Cold Legs - GREATER THAN 100°F IN ANY 60 MINUTES PERIOD

Return to procedure and step in effect.

28 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





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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	<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>	
30	<p>Verify SI Flow Not Required:</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> <li>-OR-</li> <li>o Fluid fraction (any RCP running) - GREATER THAN 80%</li> </ul> </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> <p>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> </p> <p>b. <u>IF</u> conditions established, <u>THEN</u> start one RCP.</p>







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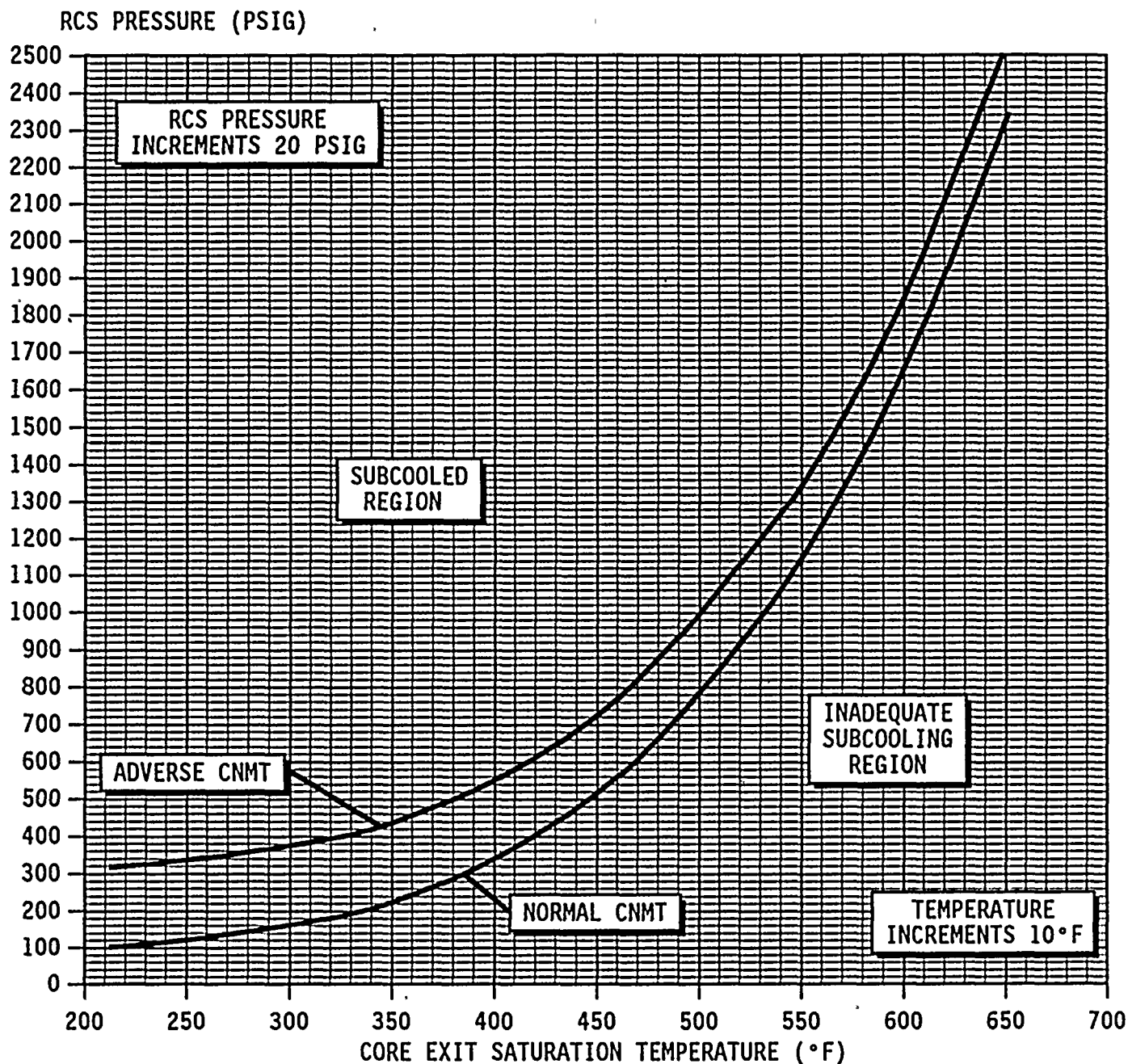
FR-P.1 APPENDIX LIST

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2) FIGURE SOAK LIMITS	1
3) ATTACHMENT RCP START	1
4) ATTACHMENT SD-1	1
5) ATTACHMENT CNMT RECIRC FANS	1
6) ATTACHMENT N2 PORVS	1
7) ATTACHMENT SI FLUSH	1



FIGURE MIN SUBCOOLING

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







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FIGURE SOAK LIMITS