

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 7 PAGE 1 of 15
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

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Thomas A. Marlowe
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CATEGORY 1.0

REVIEWED BY: _____

9305140049 930505
PDR ADDCK 05000244
F PDR

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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 10^{+05} R/hr.</p>	
1	Check RWST Level - GREATER THAN 28%	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Ensure SI system aligned for cold leg recirculation using Steps 1 through 11 of ES-1.3, TRANSFER TO COLD LEG RECIRCULATION. b. Go to Step 4.

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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 <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> 1) Ensure SI pumps B and C running. 2) Ensure SI pump C aligned to discharge line A: <ul style="list-style-type: none"> o MOV-871B closed o MOV-871A open 3) Go to Step 3.
d.	Verify SI pump B - RUNNING	d. Perform the following: <ol style="list-style-type: none"> 1) Ensure SI pumps A and C running. 2) Ensure SI pump C aligned to discharge line B: <ul style="list-style-type: none"> o MOV-871B open o MOV-871A closed 3) Go to Step 3.
e.	Verify both SI pump C discharge valves - OPEN <ul style="list-style-type: none"> • 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"> o Level - GREATER THAN 10% o Annunciator B-23, BORIC ACID TANK LO LO LEVEL - EXTINGUISHED 	<ul style="list-style-type: none"> 1) Ensure at least one SI pump suction valve from RWST open. <ul style="list-style-type: none"> • MOV-825A • MOV-825B 2) Ensure at least one valve in each SI pump suction line from BAST closed. <ul style="list-style-type: none"> • MOV-826A or MOV-826B • MOV-826C or MOV-826D 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"> • MOV-826A • MOV-826B • MOV-826C • MOV-826D 	<ul style="list-style-type: none"> o MOV-826A and MOV-826B -OR- o MOV-826C and MOV-826D
c.	Verify SI pump suction from RWST - CLOSED	c. Manually align valves as necessary.
	<ul style="list-style-type: none"> • MOV-825A • MOV-825B 	

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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	a. Perform the following: 1) Manually start SI pumps and align valves as necessary. 2) Establish maximum charging flow.
b.	RCS pressure - LESS THAN 250 psig [465 psig adverse CNMT]	b. Go to Step 5.
c.	RHR loop flow indicator - CHECK FOR FLOW	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
(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. |
| | <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]	a. <u>IF</u> increasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 10.
	b. Core exit T/Cs - LESS THAN 700°F	b. <u>IF</u> decreasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 10.
	c. Return to procedure and step in effect	
10	Check SI ACCUM Discharge Valves - OPEN	<u>IF</u> SI ACCUM discharge valves closed after ACCUM discharge, <u>THEN</u> go to Step 11. <u>IF NOT</u> , <u>THEN</u> perform the following:
	• MOV-841	a. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves.
	• MOV-865	• 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> 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). o A FAULTED OR RUPTURED S/G SHOULD NOT BE USED IN SUBSEQUENT STEPS UNLESS NO INTACT S/G IS AVAILABLE. *****</p> <p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>		
*11	Monitor Intact S/G Levels:	
	a. Narrow range level - GREATER THAN 5% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	a. Increase total feed flow to restore narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.
12	Verify Condenser Steam Dump In Manual:	
	a. Verify condenser available: <ul style="list-style-type: none"> o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT b. Place steam dump mode selector switch in MANUAL c. Place steam dump controller in MANUAL	a. Place intact S/G ARV controller in MANUAL and go to Step 13.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>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.</p> <p>*****</p>		
13	Depressurize All Intact S/Gs To 200 PSIG:	
	<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> <ul style="list-style-type: none"> o Use S/G ARVs. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Open TDAFW pump steam supply valve(s) for affected S/G(s): • S/G A, MOV-3505A • S/G B, MOV-3504A <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> 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
	<p>c. Check S/G pressures - LESS THAN 200 PSIG</p> <p>d. Stop S/G depressurization</p>	<p>c. Return to Step 11.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RHR PUMPS SHOULD NOT BE RUN LONGER THAN 1 HOUR WITHOUT CCW TO THE RHR HEAT EXCHANGERS.</p> <p>*****</p>		
14	Check RHR Pumps - RUNNING	Manually start pumps as necessary.
15	Check If SI ACCUMs Should Be Isolated:	
	<p>a. RCS hot leg temperatures - BOTH LESS THAN 400°F</p> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves if necessary</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Go to Step ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p>

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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:	
	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: 1) Use S/G ARVs. 2) Open TDAFW pump steam supply valve(s) for affected S/G(s): • S/G A, MOV-3505A • S/G B, MOV-3504A 3) Locally perform the following: o Open intact S/G MSIV bypass valve. o Open priming air ejector steam isolation valves. • V-3580 • V-3581

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	<p>Verify SI Flow:</p> <ul style="list-style-type: none"> o SI line loop A and B flow indicators - CHECK FOR FLOW <li style="text-align: center;">-OR- o RHR loop flow indicator - CHECK FOR FLOW 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Continue efforts to establish SI flow. b. Try to establish maximum charging flow. c. Return to Step 17.
19	<p>Isolate Both SI ACCUMs:</p> <ul style="list-style-type: none"> a. Close SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841 • MOV-865 b. Locally reopen breakers for MOV-841 and MOV-865 	<ul style="list-style-type: none"> a. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.
20	<p>Stop All RCPs</p>	
21	<p>Check Core Cooling:</p> <ul style="list-style-type: none"> o RVLIS level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] o Both RCS hot leg temperatures - LESS THAN 320°F 	<p>Return to Step 17.</p>

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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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AP-CCW.1	LEAKAGE INTO THE COMPONENT COOLING LOOP	PAGE 2 of 11

A. PURPOSE - This procedure provides the actions required to identify and isolate leakage into the CCW system and to control the plant during the course of the event.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from;

a. AP-CVCS.1, CVCS LEAK, when conditions indicate LEAKAGE INTO THE COMPONENT COOLING LOOP.

2. SYMPTOMS - The symptoms of LEAKAGE INTO THE COMPONENT COOLING LOOP are;

a. Annunciator A-5, COMP COOLING SURGE TANK HI LEVEL 58.8%, or

b. CCW radiation monitor (R-17) alarm, or

c. Annunciator A-7 (15), RCP 1A (1B) CCW RETURN HI TEMP OR LO FLOW 165 GPM 125°F, or

d. Erratic RCP labyrinth seal D/P.

EOP: AP-CCW.1	TITLE: LEAKAGE INTO THE COMPONENT COOLING LOOP	REV: 7 PAGE 3 of 11
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF, AT ANY TIME DURING THIS PROCEDURE, A REACTOR TRIP OR SI OCCURS, E-0, REACTOR TRIP OR SAFETY INJECTION, SHALL BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u> Letdown diversion to CVCS HUT may cause R-17 increase or alarm.</p>		
1	Check CCW Radiation Monitor (R-17) - INCREASING	Go to Step 11.
2	Check CCW Radiation Monitor (R-17) - IN ALARM	Go to Step 4.
3	Verify CCW Surge Tk Vent RCV-017 - CLOSED	Close CCW surge tk vent RCV-017.
4	Check RCS Leakage - GREATER THAN NORMAL (Leakage found on latest RCS Leakage Surveillance Sheet)	Go to Step 11.



EOP:

AP-CCW.1

TITLE:

LEAKAGE INTO THE COMPONENT COOLING LOOP

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: RCPs may be safely operated without CCW to the thermal barrier if seal injection flow is maintained.

5 Check RCP Thermal Barrier Indications:

- o Labyrinth seal D/Ps - NORMAL
(Both D/Ps reading approximately the same value)
- o RCP #1 seal leak off flows -
NORMAL (Check #1 seal leak-off charts for normal indication)
- o Annunciator A-7 (15) RCP 1A (1B)
CCW RETURN HI TEMP OR LO FLOW
165 GPM 125°F ALARM -
EXTINGUISHED

IF either pump has indication of a thermal barrier leak, THEN:

- a. Verify seal injection flow
- b. Close CCW from 1A (1B) thermal barrier MOV-754A (754B).
- c. IF CCW surge tank level stable, THEN go to Step 19.
- d. IF CCW surge tank level continues to increase, THEN go to Step 6.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>CLOSELY MONITOR PRZR LEVEL WHILE LETDOWN IS ISOLATED.</p> <p>*****</p>		
6	Check NRHX For Leakage:	
	<ul style="list-style-type: none"> a. Normal letdown - INSERVICE b. Letdown indications <ul style="list-style-type: none"> o Letdown line flow - NORMAL (approximately 40 GPM) o Low press LTDN pressure - NORMAL (approximately 250 psig) o NRHX CCW outlet (local TI-600) - LESS THAN 190°F 	<ul style="list-style-type: none"> a. <u>IF</u> excess letdown inservice, <u>THEN</u> go to Step 10. b. Isolate letdown as follows: <ul style="list-style-type: none"> 1) Close letdown loop B cold leg to RHx AOV-427. 2) Close LTDN orifices AOVs 200A, 200B, and 202. 3) Place low press LTDN press PI-135 PCV-135 in manual <u>AND</u> close (at 100% DEMAND signal). 4) Close HCV-142 and reduce charging as necessary. 5) Go to Step 7.
	c. Go to Step 11	



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>Check If CCW Inleakage Has Stopped:</p> <ul style="list-style-type: none"> o CCW surge tank level - STABLE 	<p>Restore normal letdown:</p> <ul style="list-style-type: none"> a. Establish charging line flow to REGEN Hx greater than 20 GPM. b. Place letdown controllers TCV-130 and PCV-135 in manual at 25% open. c. Open AOV-427. d. Open letdown orifice valves as necessary. e. Place TCV-130 in auto at 105°F. f. Place PCV-135 in auto at 250 psig. g. Adjust charging speed and HCV-142 as necessary. h. Go to Step 11.

EOP:

AP-CCW.1

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8 Establish Excess Letdown:

- a. Place excess letdown divert valve, AOV-312, to NORMAL
- b. Verify RCP seal return isolation valve, MOV-313, OPEN
- c. Ensure CCW from excess letdown open, (AOV-745)
- d. Open excess letdown isolation valve, AOV-310
- e. Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig
- f. Adjust charging pump speed as necessary

9 Check PRZR Level:

- a. PRZR level - TRENDING TO REFERENCE LEVEL
- b. Go to Step 18

- a. Reduce charging as necessary to control PRZR level.