ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

R Sidelinger

RESPONSIBLE MANAGER

2-6-97

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

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F PDR

A. PURPOSE - This procedure provides the steps necessary to continue plant operation while investigating an RCC/RPI malfunction.

B. ENTRY CONDITIONS/SYMPTOMS

1. SYMPTOMS - The symptoms of RCC/RPI MALFUNCTION are;

a. Annunciator C-5, PPCS ROD SEQUENCE OR ROD DEVIATION lit, or

b. Power range NIS indicate a flux tilt, or

c. Group step counters for any individual bank are not within 1 step of each other, or

d. Incore flux map indicates abnormal flux tilt, or

e. Incore thermocouples indicate abnormal power tilt, or

f. Individual rods are not within +/- 12 steps of their respective step counters as indicated on MRPI, or

g. Annunciator F-29, PPCS AXIAL OR QUADRANT POWER TILT, lit, or,

h. Annunciator C-29, MRPI SYSTEM FAILURE.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION IF AT ANY TIME DURING THIS PROCEDURE, A REACTOR TRIP OR SI OCCURS, E-0, REACTOR TRIP OR SAFETY INJECTION, SHALL BE PERFORMED.

* *

1 Place Rod Control Bank Selector Switch - TO MANUAL

* *

CAUTION
- o BANK ROD WITHDRAWAL SHOULD NOT BE PERFORMED UNTIL DIRECTED PER APPLICABLE RECOVERY PROCEDURE.
- o UNTIL THE MRPI SYSTEM IS KNOWN TO BE AT FAULT, A ROD INDICATING GREATER THAN ± 12 STEPS FROM ITS GROUP STEP COUNTER SHOULD BE CONSIDERED A MISALIGNED ROD.

* *

2 Check Dropped Rod Indication:

- o Annunciator E-28, POWER RANGE ROD DROP ROD STOP 5%/5 SECONDS - EXTINGUISHED
- o Annunciator C-14, ROD BOTTOM ROD STOP - EXTINGUISHED

IF the following conditions or indications of a dropped rod exist, THEN go to AP-RCC.3, DROPPED ROD RECOVERY.

- o Reactor Power - decreasing
- o Tavg - decreasing

IF NOT, THEN go to Step 3.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	**Check Control Rod Alignment:** a. Verify all rods in affected group - WITHIN ± 12 STEPS OF ASSOCIATED GROUP STEP COUNTER b. Go to Step 6	a. Refer to ITS Section 3.1.4 and go to Step 4.

NOTE: Step 4 is an attempt to determine whether a rod is misaligned or whether the MRPI System is malfunctioning.

4	**Check QPTR - LESS THAN 1.02**	IF QPTR greater than 1.02, THEN computer value should be verified using O-6.4 to prevent action based on failed computer inputs.

NOTE: The incore flux mapping system may aid in evaluating rod alignment depending on rod location.

5	**Evaluate Control Rod Operability:** a. Verify adequate shutdown margin (Refer to O-3.2, SHUTDOWN MARGIN FOR AN OPERATING REACTOR) b. Direct I&C to locally investigate rod failure c. Rod failure identified and corrected - MISALIGNED ROD MOVEABLE d. Restore misaligned rod (Refer to ER-RCC.2, RESTORING A MISALIGNED ROD)	a. Borate and reduce turbine load as necessary. c. Consult Reactor Engineer and ITS section 3.1.4 for operational concerns

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6 **Verify Affected Group Step Counters Operable:**

Refer to ITS section 3.1.7 for required actions.

a. Affected bank group step counter movement - CONSISTANT WITH MRPI TRANSITIONS (Evaluate affected bank using PT-1, ROD CONTROL SYSTEM)

b. Group step counters for affected bank - WITHIN 1 STEP OF EACH OTHER

NOTE: IF the MRPI CRT fails, THEN the PPCS can be used for rod position indication until the CRT is made operable. Rod position indication can be retrieved from the PPCS using the blue CBAW key.

7 **Verify All Individual Rod Position Indication Per Bank Operable:**

Refer to ITS section 3.1.7 for required action.

- o MRPI system - NO MRPI SYSTEM ALARMS
- o MRPI system - NO KNOWN PROBLEMS WITH MRPI SYSTEM THAT COULD RENDER ROD POSITION INDICATION INOPERABLE

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	**Establish Stable Plant Conditions:**	
	a. Tavg - TRENDING TO TREF	a. Insert control rods or, if necessary, decrease turbine load to match Tavg to Tref.
	b. PRZR pressure - TRENDING TO 2235 PSIG	b. Verify proper operation of PRZR heaters and spray or take manual control of PRZR pressure controller 431K. IF pressure can NOT be controlled, THEN refer to AP-PRZR.1, ABNORMAL PRESSURIZER PRESSURE.
	c. PRZR level - TRENDING TO PROGRAM	c. Verify proper operation of charging pump speed controllers or take manual control of speed controllers to control PRZR level.
	d. Rod insertion limit alarms - EXTINGUISHED	d. Borate as necessary and withdraw control rods to clear insertion limit alarms (refer to affected rod bank alarm response procedures if necessary).
	e. NIS PR ΔI - WITHIN ± 5% OF TARGET VALUE	e. Borate/dilute to restore ΔI to within limits.
9	**Evaluate Plant Conditions:**	
	a. Rod/MRPI malfunction - REPAIRED	a. Return to Step 4.
	b. Verify control rod operability - OPERABILITY RESTORED (Refer to PT-1, ROD CONTROL SYSTEM)	b. Refer to ITS section 3.1.4 and consult plant staff for further guidance.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Refer to O-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.

10 Notify Higher Supervision

11 Return To Procedure Or Guidance In Effect

-END-

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

2-8-2001

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

A. PURPOSE - This procedure provides guidance in the event of a loss of RHR cooling at or above normal loop levels. (i.e. RCS loop levels of 64 inches or greater)

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from;

   a. FR-C.3, RESPONSE TO SATURATED CORE COOLING, or

   b. AP-ELEC.3, LOSS OF 12A AND/OR 12B TRANSFORMER (BELOW 350° F), when RHR flow can NOT be restored, or

   c. AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN when CCW is inadequate for RHR cooling

2. SYMPTOMS - The following are symptoms of LOSS OF RHR;

   a. No RHR pumps running, or

   b. Annunciator A-20, RESIDUAL HEAT REMOVAL LOOP LO FLOW 2900 GPM (Set at 400 GPM per 0-2.2 in RHR Cooling mode), lit, or

   c. Unexpected increase in temperature while on RHR cooling, or

   d. Erratic or no flow on FI-626, RHR Loop Flow, or

   e. Annunciator J-9, SAFEGUARD BREAKER TRIP, lit.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

DO NOT START ANOTHER RHR PUMP UNTIL THE CAUSE OF THE ABNORMAL RHR INDICATIONS HAS BEEN DETERMINED. IF A RUNNING PUMP HAS TRIPPED FOR REASONS OTHER THAN LOSS OF SUCTION FLOW, THEN REDUNDANT PUMP MAY BE STARTED.

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NOTE: Conditions should be evaluated for site contingency reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).

1	Check PRZR Wide Range Level - GREATER THAN 0 INCHES	IF RCS loop level indicator in service and loop level less than 64 inches, THEN go to AP-RHR.2, LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check If RHR Pump(s) Should Be Stopped:	
	a. RHR pump - ANY RUNNING	a. Go to Step 3.
	b. Check RHR pump flow - LESS THAN 1500 GPM PER PUMP —	b. Decrease RHR flow as necessary. IF RHR flow can NOT be controlled, THEN perform the following: 1) Stop running RHR pump. 2) Dispatch an AO with a locked valve key to locally throttle RHR Hx outlet valves to approximately half open. • A RHR Hx, HCV-625 handwheel • B RHR Hx, HCV-624 handwheel 3) Start an RHR pump. 4) Direct AO to locally adjust RHR flow to less than 1500 gpm.
	c. RHR pumps cavitating: o RHR pump flow - OSCILLATING -OR- o RHR pump NPSH - APPROXIMATELY ZERO (PPCS group GD NPSH)	c. Go to Step 17.
	d. Stop RHR pumps	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

- o DO NOT INITIATE ANY ACTIONS WHICH MAY ADD POSITIVE REACTIVITY TO THE CORE.
- o NOTIFY S/G OFFICE THAT CNMT BREATHING AIR MAY BE LOST.
- o IF REFUELING IN PROGRESS, THEN STOP REFUELING OPERATIONS (NOTIFY REFUELING SRO).

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NOTE: Personnel remaining in CNMT to assist in event mitigation should consult Health Physics for changes in radiological concerns.

3 Initiate Actions To Protect Personnel In CNMT:

a. Evacuate non-essential personnel from CNMT

b. Verify all available CNMT RECIRC fan(s) - RUNNING

b. Manually start available CNMT RECIRC fans.

c. Initiate monitoring of CNMT area and process radiation monitors

c. Refer to appropriate alarm response procedures for required actions.

d. Verify CNMT penetrations with direct access to outside atmosphere - CLOSED (Refer to Attachment CNMT CLOSURE)

d. Within 4 hours, close all CNMT penetrations to outside atmosphere.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check RHR Cooling Valve Alignment - NORMAL (Refer to Attachment NORMAL RHR COOLING)	Manually or locally align valves as necessary.

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CAUTION

THE RHR HX OUTLET VALVES (HCV-624 AND HCV-625) WILL FAIL OPEN ON LOSS OF INSTRUMENT AIR PRESSURE.

* *

5 Check IA System:

a. Verify 2 IA compressors - RUNNING

a. Manually start IA compressors as necessary (75 kw each). IF IA compressors can NOT be started manually, THEN dispatch AO to locally reset and start compressors (75 kw each).

b. Check IA supply

- Pressure - GREATER THAN 60 PSIG
- Pressure - STABLE OR INCREASING

b. IF IA pressure can NOT be restored, THEN perform the following:

1) Dispatch AO with a locked valve key to locally throttle RHR Hx outlet valves to approximately half open.

- A RHR Hx, HCV-625 handwheel
- B RHR Hx, HCV-624 handwheel

2) WHEN conditions permit, THEN refer to AP-IA.1, LOSS OF INSTRUMENT AIR, to restore IA.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* 6 Monitor RCS Temperature - GREATER THAN 200°F

Perform the following:

a. Notify Plant Staff to attempt to establish CNMT integrity AND CNMT heat removal capability.

b. Go to step 8.

* *

CAUTION

- CHANGES IN RCS PRESSURE COULD RESULT IN INACCURACIES IN RCS LOOP LEVEL INDICATION
- UNSTABLE OR FLUCTUATING LEVEL INSTRUMENTS SHOULD NOT BE RELIED ON FOR INDICATION OF RCS INVENTORY.

* *

7 Verify RCS Intact:

- PRZR level - GREATER THAN 5% AND STABLE
- RCS pressure - STABLE
- RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- RCS vent paths - CLOSED

Perform the following:

a. Verify charging line flow control valve, HCV-142, open as necessary.

b. Ensure charging line valve to loop B cold leg, AOV-294, open.

c. Start charging pumps as necessary.

d. Control charging pump speed and letdown flow as necessary to stabilize RCS conditions.

- PRZR pressure
- PRZR level
- Loop level

IF charging flow greater than 75 gpm with letdown isolated OR unable to verify RCS inventory, THEN go to AP-RCS.4, SHUTDOWN LOCA.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Establish Conditions To Start RHR Pump:	
	a. RHR pump - AVAILABLE	a. Perform the following: 1) Start trending core exit TCs. 2) IF RCS closed, THEN go to Step 10. IF RCS open to atmosphere, THEN go to Step 16.
	b. Verify CCW cooling to RHR system in service o CCW pumps - AT LEAST ONE RUNNING o CCW to RHR Hxs, MOV-738A AND MOV-738B - OPEN AS NECESSARY	b. Perform the following: 1) Ensure at least one CCW pump running. 2) Open MOV-738A and MOV-738B as necessary. IF CCW can NOT be restored, THEN continue with Step 9 while attempting to restore CCW (Refer to AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN).
	c. Close RHR pump flow control valves (controllers at 100% demand) • HCV-624 • HCV-625	
	d. Place RHR Hx bypass valve, HCV-626, to MANUAL and close valve	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

STARTING AN RHR PUMP MAY RESULT IN AN RCS LEVEL OR PRESSURE DECREASE DUE TO SHRINK OR VOID COLLAPSE.

* *

9 Restore RHR Flow:

a. Start one RHR pump - RHR PUMP RUNNING

a. Go to Step 9e.

b. Check RHR flow - LESS THAN 1500 GPM PER PUMP

b. Manually adjust RHR flow as necessary.

c. Adjust RHR Hx bypass flow control valve, HCV-626, to desired flowrate

d. Place RHR Hx bypass flow control valve, HCV-626, controller in AUTO

e. RHR flow - RESTORED

e. Perform the following:

1) Start trending core exit T/Cs.

2) IF RCS closed, THEN go to Step 10. IF RCS vented to atmosphere, THEN go to Step 16.

f. Open RHR Hx outlet valves as necessary to control RCS temperature

- HCV-624
- HCV-625

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Monitor RCS Temperature:	
	a. RCS temperature - STABLE OR DECREASING	a. IF RCS closed, THEN go to Step 11. IF RCS open to atmosphere, THEN go to Step 16.
	b. Go to Step 19	
11	Check Any S/G Level - GREATER THAN 17%	Verify at least 200 gpm AFW flow available. IF NOT, THEN go to Step 17.
12	Check RCS Pressure - GREATER THAN 300 PSIG	Increase RCS pressure to greater than 300 psig. IF RCS pressure can NOT be increased, THEN go to Step 17.
13	Check RCP Status - ANY RCP RUNNING	Perform the followig: a. Establish conditions for starting an RCP. o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. b. Start one RCP. IF an RCP can NOT be started, THEN verify natural circulation. (Refer to Attachment NC.) IF natural circulation NOT verified, THEN increase dumping steam.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Establish Condenser Steam Dump Manual Control:	
	a. Verify condenser available: o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT	a. Perform the following: 1) Place S/G ARV controller in MANUAL and open ARVs as necessary to stabilize RCS temperature. 2) Go to Step 15.
	b. Place condenser steam dump controller HC-484 in MANUAL	
	c. Place steam dump mode selector switch to MANUAL	
	d. Open steam dump valves as necessary to stabilize RCS temperature	
15	Monitor RCS Temperature:	
	a. RCS temperature - STABLE OR DECREASING	a. IF dumping steam does NOT provide adequate cooling, THEN perform the following: 1) Initiate S/G blowdown from both S/Gs. 2) Maintain both S/G levels stable by controlling AFW flow. 3) Go to Step 17.
	b. Go to Step 18	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check RCS Conditions:	
	a. Rx vessel head - REMOVED	a. Go to Step 17.
	b. Stop refueling operations if in progress	
	c. Verify Refueling Cavity Level - GREATER THAN 23 FEET ABOVE VESSEL FLANGE	c. Increase refueling cavity level to greater than 23 feet (Refer to O-15.3, FILLING REFUELING CANAL).
	d. Verify refueling cavity sweep fans - RUNNING	d. Locally start refueling cavity sweep fans if available.
17	Check CCW System Operation: o CCW pumps - AT LEAST ONE RUNNING o CCW to RHR Hxs, MOV-738A AND MOV-738B - OPEN AS NECESSARY o Annunciator A-21, COMP COOLING HX OUT HI TEMP - EXTINGUISHED o Annunciator A-22, CCW PUMP DISCHARGE LO PRESS - EXTINGUISHED o Annunciator A-30, CCW PUMP INLET HEADER HI TEMP - EXTINGUISHED	To restore CCW cooling to RHR Hxs, perform the following: a. Ensure the standby CCW pump is running. b. Open MOV-738A and MOV-738B as necessary. IF CCW can NOT be restored, THEN continue attempts to restore CCW (Refer to AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Consult with Plant Staff to determine alternatives for long term cooling.

18 Monitor RHR Cooling:

- o RHR cooling - RESTORED
- o RCS temperature - STABLE OR DECREASING

Perform the following:

a. Evaluate alternatives for long term cooling (Consult Plant Staff)

- Consider establishing secondary heat sink
- Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING
- Consider RCS feed and bleed

b. Continue attempts to restore RHR to operable.

c. Return to Step 3.

NOTE: Refer to O-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.

19 Notify Higher Supervision

20 Return to Procedure Or Guidance In Effect

-END-

AP-RHR.1 APPENDIX LIST

TITLE

1) FIGURE MIN SUBCOOLING (FIG-1.0)
2) ATTACHMENT NORMAL RHR COOLING (ATT-14.0)
3) ATTACHMENT RCP START (ATT-15.0)
4) ATTACHMENT NC (ATT-13.0)
5) ATTACHMENT CNMT CLOSURE (ATT-3.1)

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

10-13-2000
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

A. PURPOSE - This procedure provides guidance necessary for maintaining core cooling and protecting the reactor core in the event that RHR cooling is lost during RCS reduced inventory operation, (i.e., at indicated Loop Levels of less than 64 inches with fuel in the vessel).

B. ENTRY CONDITIONS/SYMPTOMS

1. SYMPTOMS - The following symptoms are indicative of LOSS OF RHR AT RCS REDUCED INVENTORY CONDITIONS:

   a. No RHR pumps running, or

   b. Annunciator A-20, RESIDUAL HEAT REMOVAL LOOP LO FLOW 2900 GPM (Set at 400 GPM per 0-2.2 in RHR Cooling mode) lit, or

   c. Unexpected increase in RCS temperature while on RHR cooling at low loop levels, or

   d. Erratic or no flow on FI-626

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- CHANGES IN RCS PRESSURE COULD RESULT IN INACCURACIES IN RCS LOOP LEVEL INDICATIONS.
- SHOULD CORE BOILING OCCUR, "SURGE LINE FLOODING" MAY RESULT IN RCS PRESSURIZATION AND ERRONEOUS HIGH LOOP LEVEL INDICATION.
- DO NOT START ANOTHER RHR PUMP UNTIL THE CAUSE OF THE ABNORMAL RHR INDICATIONS HAS BEEN DETERMINED AND CORRECTED. IF A RUNNING PUMP HAS TRIPPED FOR REASONS OTHER THAN LOW LOOP LEVEL OR LOSS OF SUCTION FLOW, THEN REDUNDANT PUMP MAY BE STARTED.
- IA TO CNMT MAY BE REQUIRED FOR RCS MAKEUP AND SHOULD NOT BE ISOLATED UNTIL DIRECTED BY THIS PROCEDURE.

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NOTE: Conditions should be evaluated for site contingency reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).

1 Initiate CNMT Closure (Refer to O-2.3.1A, CONTAINMENT CLOSURE CAPABILITY IN TWO HOURS DURING RCS REDUCED INVENTORY OPERATION)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check If RHR Pumps Should Be Stopped:	
	a. RHR pump - ANY RUNNING	a. Go to Step 3.
	b. Check RCS level:	b. Stop RHR pumps and go to Step 3.
	o Level - GREATER THAN 6 INCHES	
	o Level - STABLE	
	c. RHR flow - LESS THAN 500 GPM	c. Reduce RHR flow as necessary.
	d. RHR pumps cavitating:	d. Go to Step 18.
	o RHR pump flow - OSCILLATING -OR- o RHR pump NPSH - APPROXIMATELY ZERO (PPCS group GD NPSH)	
	e. Stop RHR pumps	
3	Isolate Letdown And Known Drain Paths	
	a. Verify the following valves - CLOSED • RCDT pump suctions from sump B, MOV-1813A and MOV-1813B • Loop B cold leg to REGEN Hx, AOV-427 • Low pressure letdown pressure control valve, PCV-135 • RHR letdown flow control valve, HCV-133 • Excess letdown isolation valve, AOV-310	a. Manually close valves.
	b. Evaluate normal drain lineups	
	c. Evaluate maintenance activities affecting RCS or RHR system	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4 Start Available CNMT RECIRC Fans

NOTE: Personnel remaining in CNMT to assist in event mitigation should consult Radiation Protection for changes in radiological concerns.

5 Initiate Actions To Protect Personnel In CNMT:

a. Evacuate non-essential personnel from CNMT

b. Periodically monitor CNMT radiation

* *

CAUTION

- PERSONNEL WORKING IN CNMT SHOULD BE WARNED BEFORE REFILLING THE RCS TO AVOID INADVERTANT CONTAMINATION OF PERSONNEL WORKING NEAR RCS OPENINGS.
- THE S/G OFFICE SHOULD BE NOTIFIED BEFORE RAISING LOOP LEVEL.
- ONLY BORATED WATER SHOULD BE ADDED TO THE RCS TO MAINTAIN ADEQUATE SDM.

* *

* 6 Check RCS Temp — Go to Step 11.

- Core Exit TC's - LESS THAN 200°F
- No visual steam at RCS vents

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check RCS Loop Level - LESS THAN 30 INCHES	Go to Step 12.

NOTE: The next four steps are sequenced to indicate the preferred order of RCS refill methods if core boiling is not occurring.

8	Refill The RCS By Gravity Feed From The RWST	
	a. Dispatch AO to locally throttle open RHR pump suction from RWST, MOV-856	
	b. Close RHR pump discharge valve to loop B cold leg, MOV-720	
	c. Verify MOV-856 indicates midposition	c. Perform the following: 1) Open MOV-720. 2) Go to Step 9.
	d. Verify RCS loop level - INCREASING AS EXPECTED	d. Perform the following: 1) Close MOV-856. 2) Open MOV-720. 3) IF RCS loop level greater than 6 inches, THEN go to Step 9. IF NOT, THEN go to Step 11.
	e. Check RCS loop level - GREATER THAN 30 INCHES	e. Continue filling RCS. WHEN RCS loop level greater than 30 inches, THEN do Steps 8f through h.
	f. Manually close MOV-856	f. Direct AO to locally close valve.
	g. Open RHR pump discharge valve to B loop cold leg, MOV-720	g. IF MOV-720 does NOT open, THEN open core deluge valves MOV-852A and MOV-852B.
	h. Go to Step 12	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Refill The RCS By Charging To B Loop Cold Leg:	
	a. Verify IA to CNMT, AOV-5392 - OPEN	a. Manually open valve.
	b. Open and verify open charging line valve to loop B cold leg, AOV-294	b. Open alternate charging line to loop A cold leg, AOV-392B, and go to Step 9d.
	c. Verify HCV-142 demand at 0%	
	d. Start operable charging pump and increase flow to maximum	
	e. Verify charging flow - GREATER THAN ZERO	e. Perform the following: 1) Stop operating charging pump. 2) Close AOV-294. 3) Go to Step 10.
	f. Verify RCS loop level - INCREASING AS EXPECTED	f. Perform the following: 1) Open or verify open alternate charging line to loop A cold leg, AOV-392B. 2) Close AOV-294. 3) Verify loop level increasing as expected. IF NOT, THEN perform the following: a) Stop operating charging pump. b) Close AOV-392B. c) Close IA to CNMT, AOV-5392. d) Go to Step 10.
	g. Check RCS loop level - GREATER THAN 30 INCHES	g. Continue filling RCS. WHEN loop level greater than 30 inches, THEN do Steps 9h through j.
	h. Stop running charging pump	
	i. Close or verify closed charging line valve to loop B cold leg, AOV-294 and AOV-392B	
	j. Go to Step 12	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Refill RCS Using SI Pumps To Cold Legs:	
a.	Open the appropriate SI pump discharge valves to loop cold legs • A SI Pump - MOV-878B • B SI Pump - MOV-878D • C SI Pump - MOV-878B AND/OR MOV-878D	a. Ensure at least one valve open. IF valves can NOT be opened, THEN dispatch AO to check breakers. • MOV-878B, MCC D position 8C • MOV-878D, MCC D position 8F
b.	Open SI pump suction valves from RWST • MOV-825A • MOV-825B	b. Ensure at least one valve open. IF valves can NOT be opened, THEN dispatch AO to check breakers. • MOV-825A, MCC C position 9J • MOV-825B, MCC D position 9J
c.	Start operable SI pump	
d.	Verify the following: o SI flow - GREATER THAN ZERO o RCS loop level - INCREASING AS EXPECTED	d. Perform the following: 1) Stop operating SI pump. 2) Close loop cold leg inlet valves. • MOV-878B • MOV-878D 3) Go to step 11.
e.	Check RCS loop level - GREATER THAN 30 INCHES	e. Continue filling RCS. WHEN loop level greater than 30 inches, THEN do steps 10f through h.
f.	Stop running SI pump	
g.	Close SI discharge valves to loop cold legs, MOV-878B and MOV-878D	
h.	Go to Step 12	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: SI Pump makeup should not be secured when core boiling is indicated.

11 Refill RCS Using SI Pumps To Hot Legs:

a. Open the appropriate SI pump discharge valves to loop hot legs
- A SI Pump - MOV-878A
- B SI Pump - MOV-878C
- C SI Pump - MOV-878A AND/OR MOV-878C

a. Ensure at least one valve open.

IF valves can NOT be opened, THEN dispatch AO to check breakers.
- MOV-878A, MCC C position 8C
- MOV-878C, MCC C position 8F

b. Open SI pump suction valves from RWST
- MOV-825A
- MOV-825B

b. Ensure at least one valve open.

IF valves can NOT be opened, THEN dispatch AO to check breakers.
- MOV-825A, MCC C position 9J
- MOV-825B, MCC D position 9J

c. Start operable SI pump

d. Verify the following:
- o SI flow - GREATER THAN ZERO
- o RCS loop level - INCREASING AS EXPECTED

d. Perform the following:

1) Stop operating SI pump.

2) Close loop hot leg inlet valves.
- MOV-878A
- MOV-878C

3) Ensure makeup flow is initiated
- Gravity feed from RWST
- Charging pumps
- SI pumps to cold legs
- VCT overpressure
- RWST purification pump

e. Operate SI Pump as necessary to maintain the following parameters:
- o Core Exit TC's - LESS THAN 200°F
- o No visual steam at RCS vents
- o RCS loop level - GREATER THAN 30 INCHES

e. IF core exit TC's continue to increase, THEN return to Step 9 to establish additional charging or SI flow to the RCS cold legs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12 Identify And Isolate Any RCS Leakage

NOTE: If adequate time to completely vent the RHR system is not available, then air can be swept out of the RHR lines by running an RHR pump at a flowrate between 1200 gpm and 1400 gpm.

13 Vent RHR System As Necessary

a. Maintain RCS level while venting RHR system

b. Direct AO to vent RHR suction line from loop A at valve V-2764 (in CNMT by loop A)

* *

CAUTION

THE RHR PUMP FLOW CONTROL VALVES WILL FAIL OPEN ON LOSS OF INSTRUMENT AIR PRESSURE.

* *

14 Check IA system:

- o Verify adequate air compressors - RUNNING
- o Verify IA pressure - GREATER THAN 60 PSIG

Reset and start additional IA compressors as necessary (75 kw each).

IF IA pressure can NOT be restored, THEN perform the following:

a. Dispatch AO with locked valve key to locally throttle RHR Hx outlet valves to approximately half open.

- A RHR Hx, HCV-625 handwheel
- B RHR Hx, HCV-624 handwheel

b. WHEN conditions permit, THEN refer to AP-IA.1, LOSS OF INSTRUMENT AIR, to restore IA.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish Conditions To Start RHR Pump:	
	a. Check RHR cooling valve alignment - NORMAL (Refer to Attachment NORMAL RHR COOLING)	a. Manually or locally align valves as necessary.
	b. Verify CCW cooling to RHR system - IN SERVICE	b. Restore CCW cooling.
	c. Verify the following RCS conditions: o Core exit TC's - LESS THAN 200°F o No visual steam at RCS vents o RCS loop level - GREATER THAN 30 INCHES	c. Perform the following: 1) Start trending core exit TCs. 2) Return to Step 5.
	d. RHR pump - AVAILABLE	d. Perform the following: 1) Start trending core exit TCs. 2) Place RCDT pumps in service (Refer to ER-RHR.1, RCDT OPERATION FOR CORE COOLING). 3) Return to Step 5.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

STARTING AN RHR PUMP MAY RESULT IN AN RCS LEVEL DECREASE DUE TO SHRINK OR VOID COLLAPSE.

16 Restore RHR Flow:

a. Close RHR pump flow control valves

- HCV-624
- HCV-625

a. IF IA NOT available, THEN ensure AO has locally throttled RHR Hx outlet valves and go to step 16c.

b. Place RHR Hx bypass valve, HCV-626, to MANUAL and close valve

c. Start one RHR pump

d. Ensure RHR flow - LESS THAN 1500 GPM

d. IF IA NOT available, THEN dispatch AO with locked valve key to locally adjust flow using RHR Hx outlet valves.

- A RHR Hx, HCV-625 handwheel
- B RHR Hx, HCV-624 handwheel

e. Check RCS loop level - GREATER THAN 30 INCHES

e. Establish adequate makeup flow to stabilize RCS loop level at greater than 30 inches.

f. Gradually increase RHR bypass flow to desired flowrate

g. RHR flow - RESTORED

g. Perform the following:

1) Start trending core exit T/Cs.

2) Place RCDT pumps in service (Refer to ER-RHR.1, RCDT OPERATION FOR CORE COOLING).

3) Return to Step 5.

h. Establish desired RCS cooldown rate

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Consult with Plant Staff to determine alternatives for long term cooling.

17 Establish Stable Plant Conditions:

a. Verify Core Exit TC's - LESS THAN 200°F

a. Continue cooling with RHR. Return to Step 16d.

b. Check RCS loop level:

- Level - GREATER THAN 30 INCHES
- Level - STABLE

b. IF RCS loop level increasing, THEN reduce makeup rate to stabilize level. IF RCS loop level decreasing, THEN return to Step 8.

c. Stop any running SI pump

d. Stop any running charging pump

e. Maintain RCS level stable using RWST gravity feed as necessary

e. Initiate makeup to the RCS using either of the following:

- One charging pump at maximum flow

-OR-

- One SI pump

18 Check CCW System Operation:

- CCW pumps - AT LEAST ONE RUNNING
- CCW to RHR Hxs, MOV-738A AND MOV-738B - OPEN AS NECESSARY
- Annunciator A-21, COMP COOLING HX OUT HI TEMP - EXTINGUISHED
- Annunciator A-22, CCW PUMP DISCHARGE LO PRESS - EXTINGUISHED
- Annunciator A-30, CCW PUMP INLET HEADER HI TEMP - EXTINGUISHED

To restore CCW cooling to RHR Hxs, perform the following:

a. Ensure the standby CCW pump is running.

b. Open MOV-738A and MOV-738B as necessary.

IF CCW can NOT be restored, THEN continue attempts to restore CCW (Refer to AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check Core Exit TC's: o Temperature - LESS THAN 140°F o Temperature - STABLE OR DECREASING	Continue cooling with RHR. Return to Step 16d.
20	Initiate Monitoring of RCS Temperature	
	NOTE: Refer to O-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.	
21	Notify Higher Supervision	
22	Return To Procedure Or Guidance In Effect	

-END-

AP-RHR.2 APPENDIX LIST

TITLE

1) ATTACHMENT NORMAL RHR COOLING (ATT-14.0)

EOP:	TITLE:	REV: 6
ATT-15.0	ATTACHMENT RCP START	PAGE 1 of 3

Responsible Manager R. Sidelinger Date 10-13-2000

CAUTION: IF seal outlet temperature is greater than 235°F, THEN CCW thermal barrier cooling and seal injection should NOT be established to the affected RCP(s). Both of these methods of seal cooling could have unintended consequences that result in additional pump damage or failure of the CCW system. Seal cooling should instead be restored by cooling the RCS, which will reduce the temperature of the water flowing through the pump seals.

A) The following are prerequisites for starting an RCP:
- o RCP oil lift pump running (~2 minutes) (MCC E)
- o RCP oil lift pressure white light - LIT

B) In addition, the following conditions should be met prior to starting an RCP:

- o Both PRZR spray valves closed - DEMAND AT 0%
- o CCW in service to selected RCP(s) with flow and temperature alarms (A-7, A-15) extinguished.
- o Selected RCP(s) seal inlet temperature - LESS THAN 135°F
- o Selected RCP(s) motor bearing temperatures - LESS THAN 200°F (PPCS address is GD RCPS or use recorder, if selected)
- o Selected RCP(s) seal injection in service
  - o Seal injection flow - GREATER THAN 6 GPM
  - o Labyrinth seal D/P - GREATER THAN 15 INCHES OF WATER
- o Selected RCP(s) #1 seal D/P - GREATER THAN 220 PSID
- o Selected RCP(s) oil levels:
  - o Level alarms (A-24, A-32) - EXTINGUISHED
  - o Level indicators - ON SCALE
- o Selected RCP(s) seal return alignment:

  a) RCP #1 seal outlet valve(s) open:
  - o AOV-270A for RCP A
  - o AOV-270B for RCP B

  b) IF MOV-313, seal return isolation, open, THEN verify the following:
  - o VCT pressure - GREATER THAN 15 PSIG
  - o Selected RCP(s) #1 seal leakoff flow - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF
  - o Selected RCP(s) standpipe low level alarm (B-11, B-12) - EXTINGUISHED

c) IF MOV-313 closed, THEN verify other RCP #1 seal parameters normal for selected RCP(s):
   - o RCP #1 seal inlet temperature - LESS THAN 135°F
   - o RCP #1 seal D/P - GREATER THAN 220 PSID

NOTE: RCP oil lift pump should be stopped after RCP is running.
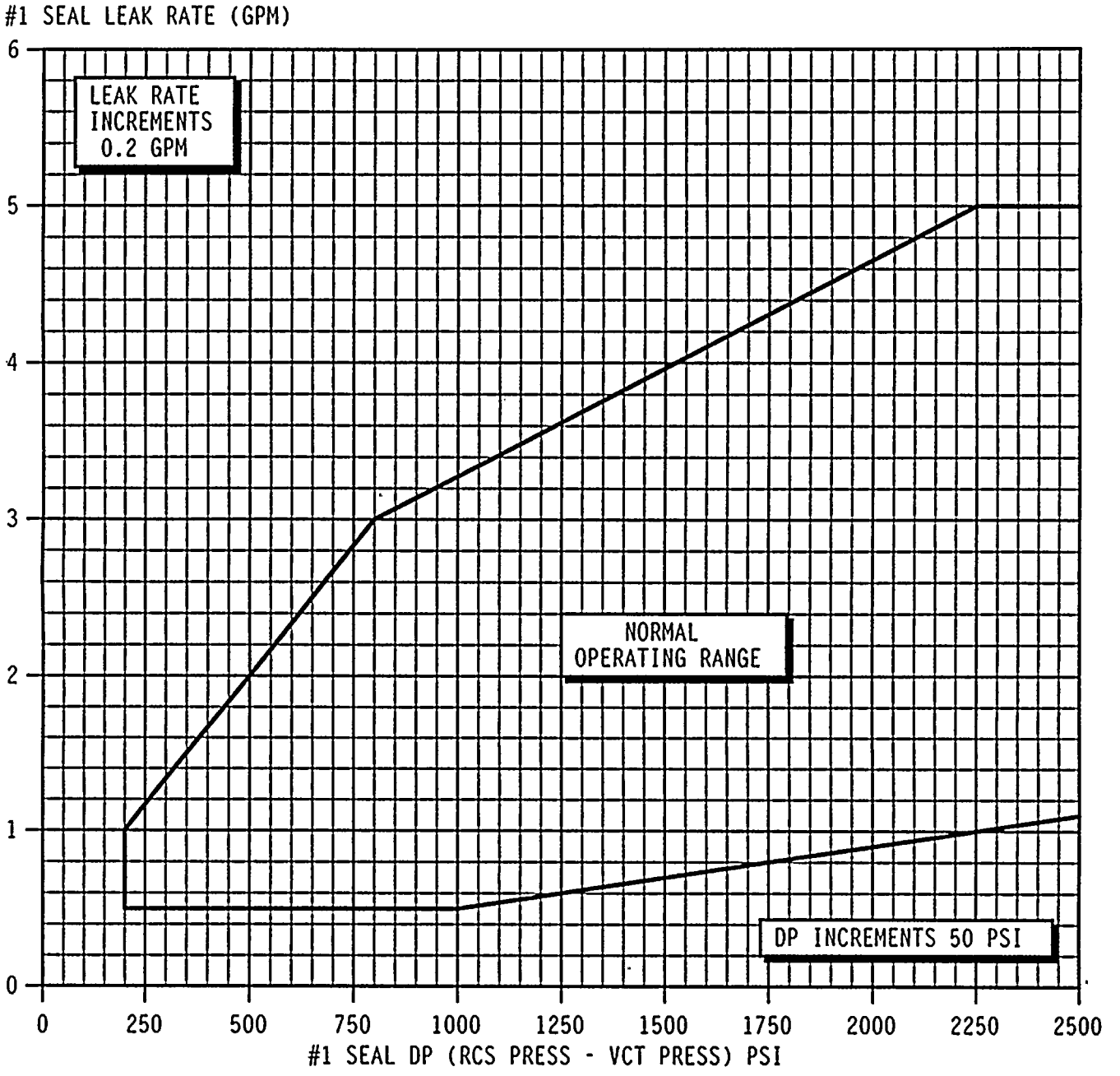
FIGURE RCP SEAL LEAKOFF