EOP:	TITLE:	REV: 10
AP-RCP.1	RCP SEAL MALFUNCTION	PAGE 1 of 10

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

Terry White
RESPONSIBLE MANAGER

5-31-96
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

A. PURPOSE - This procedure provides the instructions necessary to diagnose and to respond to a reactor coolant pump seal malfunction.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-3, STEAM GENERATOR TUBE RUPTURE, or

b. ES-1.1, SI TERMINATION, or

c. ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, or

d. ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, or

e. ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, or

f. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED, or

g. ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT-SATURATED, RECOVERY DESIRED, or

h. ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, or

i. FR-I.1, RESPONSE TO HIGH PRESSURIZER LEVEL, when RCP seal malfunction is indicated.

2. SYMPTOMS - The symptoms of RCP SEAL MALFUNCTION are;

a. Annunciator B-17(18), RCP A(B) No.1 SEAL HI-LO FLOW 5.0 GPM 1.0 , lit, or

b. Annunciator B-9(10), RCP A(B) LABYR SEAL LO DIFF PRESS 15" H2O, lit, or

c. Annunciator B-3(4), RCP A(B) STAND PIPE HI LEVEL + 1 FT, lit, or

Continued on next page

2. SYMPTOMS (cont)

d. Annunciator B-11(12), RCP A(B) STAND PIPE LO LEVEL -4 FT, lit, or

e. Annunciator B-25(26), RCP A(B) No. 1 SEAL LO DIFF PRESS 220 PSID, lit, or

f. Annunciator B-1(2), RCP A(B) No. 1 SEAL OUT HI TEMP 200°F, lit, or,

g. Annunciator A-7(15), RCP A(B) CCW RETURN HIGH TEMP OR LOW FLOW, lit.

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.
- IF ANY RCP IS TRIPPED, THEN SHUTDOWN MARGIN REQUIREMENTS SHOULD BE VERIFIED (REFER TO O-3.1, BORON CONCENTRATION FOR XENON FREE ALL RODS IN MOST REACTIVE ROD STUCK OUT SHUTDOWN MARGIN).
- IF A RCP IS SECURED BECAUSE OF A SEAL MALFUNCTION, IT SHOULD NOT BE RESTARTED UNTIL THE CAUSE OF THE MALFUNCTION HAS BEEN DETERMINED AND CORRECTED.

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NOTE:
- If a Reactor trip is initiated while performing Step 1, transition to E-0 should occur while completing subsequent actions of the step.
- Total #1 Seal Flow is defined as the sum of indicated #1 Seal Leakoff Flow and RCDT leak rate (PPCS Point ID L1003, 3.2 gal/% in the normal operating range).

1	Check Total #1 Seal Leakoff Flows - LESS THAN 8.0 GPM	IF a #1 Seal Failure is verified by a decrease in Labyr Seal Diff Pressure OR increasing Seal Inlet/Outlet temps, THEN perform the following: a. IF reactor trip breakers closed, THEN trip the reactor. b. Trip the affected RCP(s). c. Allow 4 minutes for pump coast down, THEN close affected RCP(s) seal disch valve. • RCP A; AOV-270A • RCP B, AOV-270B d. IF reactor trip was NOT required, THEN go to Step 4.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check RCP Seal Return Valve Alignment:	
	a. RCP seal return isolation valve, MOV-313 - OPEN	a. Perform the following: 1) Ensure CI reset. 2) Ensure both trains of XY relays for RCP seal return isolation valve, MOV-313, reset. 3) Open RCP seal return isolation valve, MOV-313. IF MOV-313 can NOT be opened, THEN dispatch AO to AUX BLDG with RWST area key to check valve and breaker locally (breaker MCC C position 13J).
	b. Verify RCP seal disch valves - OPEN • RCP A, AOV-270A • RCP B, AOV-270B	b. Manually open valves. IF valves can NOT be opened, THEN verify IA aligned to CNMT and go to Step 3.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o If a reactor trip is initiated while performing Step 3, transition to E-0 should occur while completing subsequent actions of the step.

o The 0.8 GPM limit for #1 seal flow applies when the RCS is at normal operating pressure. Refer to Figure RCP SEAL LEAKOFF and consult plant staff for guidance if the RCS is at reduced pressure.

3 Check Total #1 Seal Flow - BETWEEN 0.8 GPM AND 6.0 GPM	IF #1 Seal Inlet and Outlet temperatures are increasing, THEN perform the following: a. IF reactor trip breakers closed, THEN trip the reactor. b. Trip the affected RCP(s). c. Allow 4 minutes for pump coast down, THEN close affected RCP(s) seal disch valve. • RCP A, AOV-270A • RCP B, AOV-270B IF #1 Seal Inlet and Outlet temperatures are stable, THEN perform the following while continuing with this procedure. o IF total #1 Seal Flow greater than 6.0 gpm, THEN maintain seal injection flow rate of 9.0 GPM or greater to the affected RCP. o IF total #1 Seal flow exceeds 8.0 GPM OR Seal Inlet/Outlet temperatures begin to increase, THEN return to Step 1. o Prepare for orderly pump shutdown by placing the plant in Hot Shutdown using O-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN. o Secure the affected RCP with 8 hours.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check RCP Cooling: o Annunciator A-7, RCP A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	Perform the following: a. Verify RCP CCW supply and return valves open. • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B b. Ensure open CCW outlet valves from RCP thermal barriers. • RCP A, AOV-754A • RCP B, AOV-754B
5	Check RCP #2 Seal Indications: o Annunciator B-3, RCP A STANDPIPE HI LEVEL +1 FT - EXTINGUISHED o Annunciator B-4, RCP B STANDPIPE HI LEVEL +1 FT - EXTINGUISHED	IF affected RCP #1 seal leakoff flow decreasing, THEN failure of #2 seal may be indicated. Continue plant operation while closely monitoring RCP seal indications.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

REDUCING CHARGING FLOW WILL RESULT IN INCREASING REGEN HX OUTLET TEMPERATURE.

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6	Check RCP Labyrinth Seal D/Ps - GREATER THAN 15 INCHES OF WATER	Perform the following: a. Ensure open CCW outlet valves from RCP thermal barriers. • RCP A, AOV-754A • RCP B, AOV-754B b. Verify seal injection flow greater than 5 GPM for affected RCP. c. Adjust HCV-142 as necessary. d. Dispatch AO to check seal injection filter D/P. e. Check CCW surge tank level stable. IF level increasing, THEN go to AP-CCW.1, LEAKAGE INTO THE COMPONENT COOLING LOOP.
7	Check RCP #3 Seal Indications: o Annunciator B-11, RCP A STAND PIPE LO LEVEL -4FT - EXTINGUISHED o Annunciator B-12, RCP B STAND PIPE LO LEVEL -4FT - EXTINGUISHED	Check CNMT radiation monitors normal. • R-11 • R-12 IF RCP standpipe level low and CNMT radiation increasing, THEN # 3 seal leakage increase is probable. Continue plant operation while closely monitoring RCP seal indications.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: In the absence of other seal failure indications, an elevated #1 seal outlet temperature may indicate pump bearing damage.

* 8 Monitor Plant Conditions:

a. RCP #1 seal flow

- o Total #1 seal leakoff flow - LESS THAN 6.0 GPM
- o Total #1 seal flow - GREATER THAN 0.8 GPM

a. IF affected RCP running, THEN return to Step 1. IF NOT, THEN perform the following:

1) Monitor affected RCP (Refer to Attachment RCP DIAGNOSTICS).

2) Consult Plant Staff to determine if cooldown required.

b. RCP #1 Seal Flow - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF

b. Perform the following:

- o Ensure seal injection flow exceeds #1 seal leakoff flow.
- o Refer to S-2.1, Reactor Coolant Pump Operation.
- o Consult plant staff for further instructions.

c. RCP #1 seal outlet temperatures - LESS THAN 215° AND STABLE

c. IF pump bearing damage is suspected, THEN notify plant staff and expedite shutdown of the affected RCP. IF NOT, THEN return to Step 1.

d. RCS leakage - NORMAL (Refer to leakage surveillance sheet)

d. Perform the following:

1) Calculate RCS leakrate.

2) Refer to ITS section 3.4.13.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

9 Notify Higher Supervision

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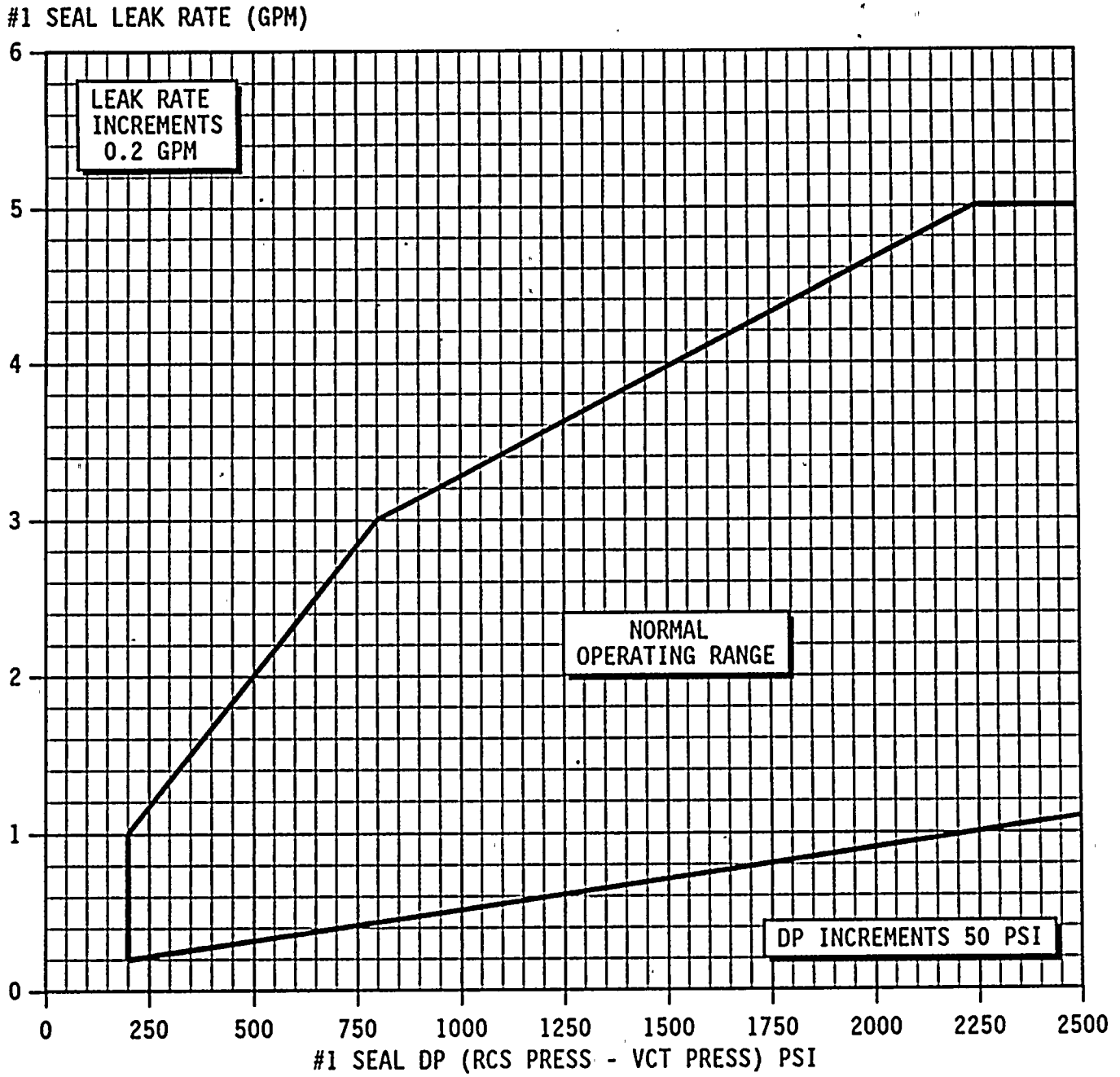
AP-RCP.1 APPENDIX LIST

FIGURE RCP SEAL LEAKOFF



ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 10/30/91

Thomas A. Marlow
PLANT SUPERINTENDENT

11/1/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

A. PURPOSE - This procedure provides the instructions necessary to mitigate the consequences of a reactor coolant leak.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. S-12.2, OPERATOR ACTION IN THE EVENT OF INDICATION OF SIGNIFICANT INCREASE IN LEAKAGE, when a significant increase in RCS leakage is indicated.

b. AP-CVCS.1, CVCS LEAK, when leak cannot be isolated.

2. SYMPTOMS - The symptoms of REACTOR COOLANT LEAK are;

a. Annunciator F-14, CHARGING PUMP SPEED, lit, or

b. Annunciator A-2, VCT LEVEL 14% 86, lit, or

c. Annunciator E-16, RMS PROCESS MONITOR HIGH ACTIVITY, lit, or

d. Annunciator E-24, RMS AREA MONITOR HIGH ACTIVITY, lit, or

e. Annunciator F-4, PRESSURIZER LEVEL DEVIATION -5 NORMAL +5, lit, or

f. Annunciator F-10, PRESSURIZER LO PRESS 2185 PSI, lit, or

g. Annunciator F-11, PRESSURIZER LO LEVEL 13%, lit.

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.

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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 Level - STABLE AT PROGRAM LEVEL	IF PRZR level decreasing, THEN start additional charging pumps and increase speed as necessary to stabilize PRZR level. IF PRZR level continues to decrease, THEN close loop B cold leg to REGEN Hx isolation valve, AOV-427. IF available charging pumps are running at maximum speed with letdown isolated, AND PRZR level is decreasing, THEN trip the reactor and go to E-0, REACTOR TRIP or SAFETY INJECTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: IF VCT level decreases to 5%, charging pump suction will swap to the RWST. This may require a load reduction.

2	Check VCT Makeup System:	
	a. Verify VCT level - GREATER THAN 5%	a. Ensure charging pump suction aligned to RWST. • LCV-112B - OPEN • LCV-112C - CLOSED
	b. Verify the following: 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT	b. Adjust controls as necessary.
	c. Check VCT level: o Level GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	c. Check letdown divert valve, LCV-112A, closed. IF VCT makeup flow NOT adequate, THEN perform the following: 1) Ensure BA transfer pumps and RMW pumps running. 2) Place RMW flow control valve, HCV-111, in MANUAL and increase RMW flow. 3) Increase boric acid flow as necessary. IF VCT level can NOT be maintained, THEN refer to ER-CVCS.2, REACTOR MAKEUP CONTROL MALFUNCTION, if necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Check If RCS Leakage In CNMT: o Check CNMT radiation monitors - NORMAL • R-2 • R-7 • R-10A • R-11 • R-12 o CNMT sump A pump run frequency - NORMAL (Refer to leakage surveillance sheet)	IF leakage is indicated in CNMT, THEN perform the following: a. Direct HP to sample CNMT for entry. b. Continue with Step 4. WHEN CNMT cleared for entry, THEN dispatch personnel to investigate CNMT for RCS leakage.

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CAUTION

HEALTH PHYSICS TECHNICIAN SHOULD BE CONSULTED PRIOR TO ENTERING A HIGH AIRBORNE AREA.

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4	Dispatch AO To AUX BLDG To Investigate For CVCS Leak (locked area keys required)	
5	Check For Leak To CCW System: o CCW surge tank level - APPROXIMATELY 50% AND STABLE o CCW radiation monitor, R-17 - NORMAL	Go to AP-CCW.1, LEAKAGE INTO THE COMPONENT COOLING LOOP.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check CVCS Conditions:	
	a. Letdown indication: o Letdown flow - APPROXIMATELY 40 GPM o Low pressure LTDN pressure - APPROXIMATELY 250 PSIG o Letdown pressure control valve, PCV-135, demand - APPROXIMATELY 35% OPEN	a. IF letdown isolated, THEN continue with Step 6b. IF NOT isolated, THEN go to AP-CVCS.1, CVCS LEAK, Step 5.
	b. Charging indication: o Seal injection flows - GREATER THAN 6 GPM AND STABLE o RCP Labyrinth seal D/Ps - GREATER THAN 15 INCHES AND APPROXIMATELY EQUAL o Charging pump discharge pressure - GREATER THAN RCS PRESSURE	b. Go to AP-CVCS.1, CVCS LEAK, Step 5.
	c. AUX BLDG radiation levels - NORMAL • R-4 • R-9 • R-10B • R-13 • R-14	c. Go to AP-CVCS.1, CVCS LEAK, Step 5 and refer to CVCS piping diagrams for further guidance.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check PRT Indications: a. Level - BETWEEN 61% AND 84% b. Pressure - APPROXIMATELY 1.5 PSIG AND STABLE c. Temperature - AT CNMT AMBIENT TEMPERATURE AND STABLE	Check tailpipe and valve leakoff temperatures for the PRZR safety valves and PORVs for indication of leakage. IF no PORV or safety valve leakage is indicated, THEN check other leak paths from the RCS to the PRT. • Letdown relief valve, RV-203 • Seal return relief valve, RV-314

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CAUTION

STEAM GENERATOR TUBE LEAKAGE IN ONE S/G SHALL NOT EXCEED 0.1 GPM WHEN AVERAGED OVER 24 HOURS.

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8	Check S/Gs For Leakage: o Air ejector radiation monitors - NORMAL • R-15 • R-15A o S/G blowdown radiation monitor (R-19) - NORMAL o Steamline radiation monitors - NORMAL • R-31 • R-32 o S/G sample activity - NORMAL (Check with HP Department for normal)	IF S/G tube leak indicated, THEN refer to 0-6.10, PLANT OPERATION WITH A S/G TUBE LEAK INDICATION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Check SI Accumulator Levels - STABLE	Calculate in leakage to SI accumulators (Refer to S-16.11, MONITORING INLEAKAGE TO SI ACCUMULATORS).
10	Check RCP Seal Leakoff Flows: o Leakoff flows - BETWEEN 0.25 GPM AND 5.5 GPM o Leakoff flows - STABLE	Go to AP-RCP.1, RCP SEAL MALFUNCTION.
11	Check RCDT Leak Rate - NORMAL (Refer to RCS Daily Leakage Log and PPCS point ID L1003)	Check other sources of in leakage to RCDT: a. IF Rx vessel flange leakoff temperature has increased, THEN close Rx VESS FLANGE SEAL LEAKOFF VLV, AOV-521. b. Verify excess letdown isolated. IF NOT, THEN ensure RCDT divert valve, AOV-312, in the VCT position. c. IF source of leakage NOT determined, THEN suspect loop drains.
12	Check Valve Leakoff Temperatures - NORMAL (Refer to Pressurizer Valve Leak-Off Temperature Record Log)	IF any valve leakoff temperature is abnormally high, THEN initiate investigation of that leakage path.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Establish Stable Plant Conditions:	
	a. PRZR level - TRENDING TO PROGRAM	a. Control charging and letdown flows to restore PRZR level to program.
	b. Check PRZR pressure control: o Pressure - TRENDING TO 2235 PSIG o PRZR backup heaters - OFF	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.
14	Evaluate RCS Leakage:	
	a. Leakage within limits (Refer to leakage surveillance sheet and Tech Spec section 3.1.5)	a. IF leak NOT isolable, but PRZR level and seal injection can be maintained, THEN shut the plant down as quickly as possible (Refer to 0-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN).
	b. Leak location identified	b. Return to Step 1.
	NOTE: Refer to 0-9.3, NRC STATE AND COUNTIES IMMEDIATE NOTIFICATION, for reporting requirements.	
15	Notify Higher Supervision	

-END-