ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

12-14-98

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to respond to a loss of all AC power.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure may be entered directly or from:

   a. E-0, REACTOR TRIP OR SAFETY INJECTION, on the indication that neither train of AC emergency busses is energized.

2. SYMPTOMS - Which indicate a loss of all AC power are:

   a. Neither train of 480 volt AC emergency busses available.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

DUE TO POTENTIALLY EXTREME ENVIRONMENTAL CONDITIONS, CAUTION SHOULD BE USED WHEN ENTERING THE INTERMEDIATE BLDG FOR LOCAL ACTIONS.

NOTE: o Steps 1 and 2 are IMMEDIATE ACTION steps.

o CSFSTs should be monitored for information only. FR procedures should not be implemented.

o Local actions may require portable lighting and communication devices.

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1	Verify Reactor Trip: o At least one train of reactor trip breakers - OPEN o Neutron flux - DECREASING o MRPI indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	Manually trip reactor.
2	Verify MSIVs - CLOSED	Manually close MSIVs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3 Check If RCS Is Isolated:

a. PRZR PORVs - CLOSED

a. IF PRZR pressure less than 2335 psig, THEN manually close PORVs.

b. Verify RCS isolation valves closed:

1) Place letdown orifice valve switches to CLOSE

- AOV-200A
- AOV-200B
- AOV-202

2) Place letdown isolation valve switches to CLOSE

- AOV-371
- AOV-427

3) Place excess letdown isolation valve switch to CLOSE (AOV-310)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Verify Adequate TDAFW Flow:	
	a. Verify TDAFW pump - RUNNING	a. Perform the following: 1) Verify governor valve, V-3652, latched. IF governor valve tripped, THEN dispatch AO to locally reset valve. 2) Manually or locally open at least one TDAFW pump steam supply valve. • MOV-3505A • MOV-3504A
	b. Verify TDAFW pump flow - GREATER THAN 200 GPM	b. Verify proper TDAFW valve alignment: 1) TDAFW pump discharge valve (MOV-3996) open. 2) Intact S/G TDAFW pump flow control valves open. IF NOT, THEN manually align valves as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).

o AO should increase surveillance of TDAFW pump until AC power is restored.

5 Try To Restore Power to Any Train Of AC Emergency Busses:

a. Verify emergency D/G aligned for unit operation

- o Mode switch in UNIT
- o Voltage control selector in AUTO

a. Manually align switches on rear of MCB.

b. Reset and start available emergency D/Gs - ANY D/G RUNNING

b. Dispatch AO to locally start emergency D/Gs.

IF no emergency D/G available, THEN perform the following:

1) Direct AO to attempt to restore emergency D/G (Refer to ER-D/G.1, RESTORING D/G)

2) Go to Step 6.

c. Verify adequate D/G cooling

- o Bus 17 and/or Bus 18 - ENERGIZED
- o One SW Pump running for each running D/G

c. Manually energize busses and start SW Pumps as necessary.

1) IF adequate cooling can NOT be supplied to a running D/G, THEN trip affected D/G. (Refer to ER-D/G.2, Alternate Cooling for Emergency D/Gs).

d. Verify at least one train of AC emergency busses - ENERGIZED

- Bus 14 and Bus 18
- Bus 16 and Bus 17

d. Manually energize AC emergency busses.

IF at least one train of AC emergency busses can NOT be energized, THEN go to Step 6.

e. Return to procedure and step in effect

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- WHEN POWER IS RESTORED TO ANY TRAIN OF AC EMERGENCY BUSSES, RECOVERY ACTIONS SHOULD CONTINUE STARTING WITH STEP 24.
- IF AN SI SIGNAL EXISTS OR IF AN SI SIGNAL IS ACTUATED DURING THIS PROCEDURE, IT SHOULD BE RESET TO PERMIT MANUAL LOADING OF EQUIPMENT ON AN AC EMERGENCY BUS.

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6 Establish The Following Equipment Alignment:

a. Pull stop AC emergency bus loads

- RHR pumps
- CNMT RECIRC fans
- CNMT spray pumps
- SI pumps
- CCW pumps
- Charging pumps
- MDAFW pumps

b. Evaluate non-vital loads (Refer to Attachment NON-VITAL)

c. Place non-running SW pump switches to STOP, then return to AUTO

d. Place switch for MOV-313, RCP seal return isolation valve, to CLOSE

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Temporary power may be provided to Bus 16 by performing procedure ER-ELEC.4 and to Bus 13 by performing procedure ER-ELEC.5 at the Shift Supervisor's discretion.

7 Try To Restore Offsite Power:

a. Consult Power Control to determine if either normal offsite power supply - AVAILABLE

   o 12B transformer via breaker 76702

   -OR-

   o 12A transformer via breaker 75112

b. Reset SI, if necessary

c. Restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER)

a. IF normal offsite power supply NOT readily available, THEN perform the following:

   1) Restore IA system using the Diesel Air Compressor (Refer to Attachment DIESEL AIR COMPRESSOR).

   2) Evaluate Main transformer backfeed for long term concerns (Refer to ER-ELEC.3, EMERGENCY OFFSITE BACKFEED VIA MAIN & UNIT TRANSFORMER).

   3) Go to Step 8.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8 Initiate Local Actions To Isolate RCS And To Provide Cooling To Vital Areas And Equipment

a. Open all Reactor Protection and Control System rack doors in the Control Room.

b. Direct Security personnel to open the following vital area doors to increase cooling:

- Control Room Door S51
- Intermediate Bldg Door S37 (AFW pump area)
- Intermediate Bldg Door F36 (Automatic fire door, Rod Drive MG set area)
- Intermediate Bldg Door S44 (Steam Header area)

c. Dispatch AO To Locally Isolate RCP Seals and BASTs (Refer to ATTACHMENT RCS ISOLATION)

d. Dispatch AO to align backup cooling water to TDAFW Pump (Refer to ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP)

9 Isolate Makeup And Reject From Hotwell To CST By Placing Hotwell Level Controller (LC-107) In Manual AT 50%

IF valves can NOT be manually closed, THEN dispatch AO to locally isolate makeup and reject lines as necessary.

- Makeup isolation V-4058
- Reject isolation V-4055

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check S/G Status: a. MFW flow control valves - CLOSED • MFW regulating valves • MFW bypass valves b. S/G blowdown and sample valves - CLOSED	Manually close valves. IF valves can NOT be manually closed, THEN dispatch AO to locally isolate the affected flow path.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

A FAULTED OR RUPTURED S/G THAT IS ISOLATED SHOULD REMAIN ISOLATED. STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM AT LEAST ONE S/G.

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11 Check If S/G Secondary Side Is Intact:

- o Pressure in both S/Gs - STABLE OR INCREASING
- o Pressure in both S/Gs - GREATER THAN 110 PSIG

Perform the following:

a. IF any S/G pressure decreasing in an uncontrolled manner OR completely depressurized, THEN isolate faulted S/G unless needed for RCS cooldown:

1) Close faulted S/G MDAFW pump discharge valve.

- S/G A, MOV-4007
- S/G B, MOV-4008

2) Close faulted S/G TDAFW flow control valve.

- S/G A, AOV-4297
- S/G B, AOV-4298

3) Verify faulted S/G ARV controller in MANUAL with output at 0%.

- S/G A, AOV-3411
- S/G B, AOV-3410

4) Pull stop faulted S/G TDAFW pump steam supply valve.

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

IF valves can NOT be closed manually, THEN dispatch AO to locally close valves, as necessary, to isolate flow.

b. Dispatch AO to complete faulted S/G isolation (Refer to Attachment FAULTED S/G).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12 Check If S/G Tubes Are Intact:

- o Dispatch RP tech or AO to locally check steamline radiation - NORMAL

Try to identify ruptured S/G. Continue with Step 13. WHEN ruptured S/G identified, THEN perform the following:

a. Isolate ruptured S/G unless needed for RCS cooldown:

1) Close ruptured S/G MDAFW pump discharge valve.

- S/G A, MOV-4007
- S/G B, MOV-4008

2) Pull stop ruptured S/G MDAFW pump.

3) Close ruptured S/G TDAFW flow control valve.

- S/G A, AOV-4297
- S/G B, AOV-4298

4) Adjust ruptured S/G ARV controller to 1050 psig in AUTO. WHEN S/G pressure less than 1050 psig, THEN ensure ruptured S/G ARV closed.

- S/G A, AOV-3411
- S/G B, AOV-3410

5) Pull stop ruptured S/G TDAFW pump steam supply valve.

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

IF valves can NOT be closed manually, THEN dispatch AO to locally close valves, as necessary, to isolate flow.

b. Dispatch AO to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS, USING FIRE OR CITY WATER, WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

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NOTE: TDAFW pump flow control valves fail open on loss of IA.

*13 Monitor Intact S/G Levels:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. Maintain maximum AFW flow until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

b. Dispatch AO to locally control AFW flow by throttling TDAFW flow control valves, if necessary

- S/G A, AOV-4297
- S/G B, AOV-4298

b. IF valves can NOT be throttled, THEN control AFW flow by starting and stopping TDAFW pump.

c. Control AFW flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

c. IF narrow range level in any intact S/G continues to increase in an uncontrolled manner, THEN return to Step 12.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: If the loss of power is expected to continue beyond 4 hours, then degassing of main generator should commence as soon as personnel become available (Refer to Attachment GEN DEGAS).

14 Check DC Bus Loads:

a. Place control switches for MFW pump AC oil pumps to OFF (allows timer to stop DC oil pumps)

b. Stop all large non-essential DC loads

1) Evaluate DC loads (Refer to Attachment DC LOADS).

2) WHEN turbine is stopped, THEN perform the following:

a) Locally close Turbine backup seal oil reg outlet valve V-5475J.

b) Stop Turbine DC lube oil pump (within 1 hour).

c. Check DC bus voltage - GREATER THAN 105 VOLTS DC

- Bus A
- Bus B

c. IF either DC bus less than 105 volts DC, THEN refer to ER-ELEC.2, RECOVERY FROM LOSS OF A or B DC BUS.

d. Direct electricians to locally monitor DC power supply

e. Dispatch personnel with DC panel key to deenergize CNMT emergency lights (DC panel turbine building basement west, switch #2)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

WHEN POWER IS RESTORED TO ANY TRAIN OF AC EMERGENCY BUSSES, RECOVERY ACTIONS SHOULD CONTINUE STARTING WITH STEP 24.

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15	Check CST Level - GREATER THAN 5 FEET	Initiate makeup to CSTs using fire or city water as a source. (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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CAUTION

- S/G PRESSURES SHOULD BE MAINTAINED GREATER THAN 200 PSIG TO PREVENT INJECTION OF SI ACCUM NITROGEN INTO THE RCS.
- S/G NARROW RANGE LEVEL SHOULD BE MAINTAINED GREATER THAN 5% [25% ADVERSE CNMT] IN AT LEAST ONE INTACT S/G. IF LEVEL CANNOT BE MAINTAINED, S/G DEPRESSURIZATION SHOULD BE STOPPED UNTIL LEVEL IS RESTORED IN AT LEAST ONE S/G.

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NOTE:
- The S/Gs should be depressurized at maximum rate to minimize RCS inventory loss.
- PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurization of S/Gs. Depressurization should not be stopped to prevent these occurrences.
- S/G ARV nitrogen pressure should be monitored and nitrogen supply bottles changed as necessary.

16	Initiate Depressurization Of Intact S/Gs To 300 PSIG:	
	a. Check S/G narrow range levels - GREATER THAN 17% [25% adverse CNMT] IN AT LEAST ONE S/G	a. Perform the following: 1) Maintain maximum AFW flow until narrow range level greater than 17% [25% adverse CNMT] in at least one S/G. 2) Continue with Step 17. WHEN narrow range level greater than 17% [25% adverse CNMT] in at least one S/G, THEN do Steps 16b and 17.
	b. Manually dump steam from intact S/Gs at maximum rate using S/G ARVs	b. Locally dump steam from intact S/Gs at maximum rate using S/G ARV.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

*17 Monitor Reactor For Subcriticality:

a. Verify source range detector N-31 - ENERGIZED

a. Dispatch personnel with relay rack key to turn off 125 VDC power switches in REACTOR PROTECTION racks RLTR-1 and RLTR-2 to deenergize source range block relays.

b. Verify Subcriticality using the following indications:

1) Check source range, N-31

- o Indicator - ON SCALE
- o Power - STABLE OR DECREASING

2) Check intermediate range, N-35

- o Indicator - ON SCALE
- o Power - STABLE OR DECREASING

3) Check power range, N-41 and N-43

- o Indicators - LESS THAN 5%
- o Power - STABLE OR DECREASING

b. IF unable to verify subcriticality using NIS, THEN perform the following:

- o Control S/G ARVs to stop S/G depressurization and allow RCS to heat up.
- o Direct RP to sample RCS and PRZR for boron concentration.
- o Request plant staff assistance in evaluating core reactivity status

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Depressurization of S/Gs will result in a SI actuation. SI should be reset to permit manual loading of equipment on emergency busses.

18 Check SI Signal Status:

a. Any SI annunciator - LIT

a. Go to Step 22. WHEN SI actuated, THEN do Steps 18b, 19, 20 and 21.

b. Reset SI

19 Verify CI And CVI:

a. CI and CVI annunciators - LIT

- Annunciator A-26, CNMT ISOLATION
- Annunciator A-25, CONTAINMENT VENTILATION ISOLATION

a. Depress manual CI pushbutton.

b. Verify CI and CVI valve status lights - BRIGHT

b. Manually close CI and CVI valves. IF valves can NOT be verified closed by MCB indication, THEN dispatch AO to locally close valves (Refer to Attachment CI/CVI).

c. CNMT RECIRC fan coolers SW outlet valve status lights - BRIGHT

- AOV-4561
- AOV-4562

c. Dispatch AO to locally fail open valves.

d. Verify RHR Pump Suction from CNMT Sump B valves - CLOSED

- MOV-850A
- MOV-850B

d. IF sump recirculation NOT in progress, THEN manually close valves.

IF valves can NOT be verified closed by MCB indication, THEN dispatch AO to locally close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If S/G Depressurization Should Be Stopped:	
	a. Check RCS cold leg temperatures - GREATER THAN 315°F	a. Perform the following: 1) Control S/G ARVs to stop S/G depressurization. 2) Go to Step 21.
	b. Check S/G pressures - LESS THAN 300 PSIG	b. Continue with Step 21. WHEN S/G pressure decreases to less than 300 psig, THEN do Step 20c.
	c. Manually control S/G ARVs to maintain S/G pressures at 300 psig	c. Locally control S/G ARVs to maintain S/G pressures at 300 psig.
21	Check CNMT Pressure - HAS REMAINED LESS THAN 28 PSIG o Annunciator A-27, CNMT SPRAY - EXTINGUISHED o CNMT pressure indicators - LESS THAN 28 PSIG	IF CNMT pressure is less than 28 psi, THEN perform the following: a. Reset CNMT spray. b. Place CNMT spray pump discharge valve switches to CLOSE to deenergize open contactor. IF NOT, THEN continue with step 22. WHEN CNMT pressure less than 28 psig, THEN place CNMT spray pump discharge valve switches to CLOSE.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check Core Exit T/Cs - LESS THAN 1200°F	IF core exit temperatures greater than 1200°F and increasing, THEN go to SACRG-1, SEVERE ACCIDENT CONTROL ROOM GUIDELINE INITIAL RESPONSE, step 1.
23	Check If AC Emergency Power Is Restored - AT LEAST ONE TRAIN OF AC EMERGENCY BUSSES ENERGIZED • Bus 14 and Bus 18 • Bus 16 and Bus 17	Continue to control RCS conditions and monitor plant status: a. Check status of desired actions: o AC power restoration o ARV nitrogen pressure o RCP seal isolation o DC power supply b. Return to Step 11.
24	Manually Control S/G ARVs To Stabilize S/G Pressures	Locally control S/G ARVs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: SW isolation may occur when power is restored to AC emergency busses.

25 Verify SW System Operation:

a. Check normal power available to SW pumps

- o Bus 17 normal feed breaker - CLOSED

-OR-

- o Bus 18 normal feed breaker - CLOSED

a. IF both D/Gs operating, THEN ensure one SW pump running for each D/G.

IF only one D/G operating, THEN perform the following:

1) Ensure at least one SW pump running.

2) Manually perform SW isolation.

3) Go to Step 26.

b. Verify two SW pumps - RUNNING

b. IF normal power available, THEN manually start SW pumps as necessary.

IF adequate cooling can NOT be supplied to a running D/G, THEN trip affected D/G and refer to ER-D/G.2.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

THE LOADS PLACED ON THE ENERGIZED AC EMERGENCY BUS SHOULD NOT EXCEED THE CAPACITY OF THE POWER SOURCE.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Verify Following Equipment Loaded On Available AC Emergency Busses: o 480 volt MCCs - ENERGIZED • MCC C from Bus 14 • MCC D from Bus 16 o Verify instrument busses - ENERGIZED • Bus A from MCC C (A battery) • Bus B from MCC C • Bus C from MCC D (B battery) o Dispatch personnel to verify proper operation of battery chargers	Manually load equipment as power supply permits.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Select Recovery Procedure:	
	a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. Check PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	c. Check SI annunciators - EXTINGUISHED • D-19, PRESSURIZER LO PRESS 1750 PSIG • D-21, STEAM LINE LOOP A LO LO PRESS 514 PSIG • D-22, STEAM LINE LOOP B LO LO PRESS 514 PSIG • D-28, CONTAINMENT PRESSURE 4 PSIG	c. IF SI signal is present and was NOT previously reset, THEN go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	d. Go to ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 1	

-END-

ECA-0.0 APPENDIX LIST

TITLE

1) FIGURE MIN SUBCOOLING (FIG-1.0)
2) ATTACHMENT DC LOADS (ATT-8.0)
3) ATTACHMENT FAULTED S/G (ATT-10.0)
4) ATTACHMENT RUPTURED S/G (ATT-16.0)
5) ATTACHMENT CI/CVI (ATT-3.0)
6) ATTACHMENT NONVITAL (ATT-8.3)
7) ATTACHMENT GEN DEGAS (ATT-8.2)
8) ATTACHMENT RCS ISOLATION (ATT-21.0)
9) ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP (ATT-5.2)
10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

5-22-97

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to use normal operational systems to stabilize plant conditions following restoration of AC emergency power.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. ECA-0.0, LOSS OF ALL AC POWER, when AC emergency power is restored and SI is not required.

A. PURPOSE - This procedure provides actions to use normal operational systems to stabilize plant conditions following restoration of AC emergency power.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. ECA-0.0, LOSS OF ALL AC POWER, when AC emergency power is restored and SI is not required.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION IF AN SI SIGNAL IS ACTUATED PRIOR TO PERFORMING STEP 10 OF THIS PROCEDURE, THEN SI SHOULD BE RESET TO PERMIT MANUAL LOADING OF EQUIPMENT ON AN AC EMERGENCY BUS.

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NOTE: o CSFSTs should be monitored for information only. FR procedures should not be implemented prior to completion of Step 10.

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Check RCP Seal Isolation Status:

a. RCP seal injection needle valves - CLOSED

- V-300A
- V-300B

a. Dispatch AO with key to RWST gate to locally close valves before starting charging pump.

b. RCP CCW return valves - CLOSED

- MOV-759A
- MOV-759B

b. IF valves open or position not known, THEN check CCW pump status:

1) IF pump running, THEN go to Step 2.

2) IF pump NOT running, THEN manually close valves.

IF valve(s) can NOT be closed, THEN place switches for RCP thermal barrier CCW outlet valves to CLOSE.

- AOV-754A
- AOV-754B

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check CI Annunciator A-26, CONTAINMENT ISOLATION - EXTINGUISHED	Perform the following: a. Depress CI reset pushbutton b. Verify annunciator A-26, CONTAINMENT ISOLATION, extinguished.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED	a. Perform the following: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie
b.	Check at least two SW pumps - RUNNING	b. Manually start SW pumps as power supply permits (258 kw each). IF less than two SW pumps running, THEN go to Step 4.
c.	Verify turbine building SW isolation valves - OPEN • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664	c. Manually align valves.
d.	Start at least two air compressors (75 kw each)	d. IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.
e.	Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	e. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 6. WHEN IA restored, THEN do Steps 3f through 5.
f.	Reset both trains of XY relays for IA to CNMT (AOV-5392) if necessary	
g.	Verify IA to CNMT AOV-5392 - OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION THE LOADS PLACED ON THE ENERGIZED AC EMERGENCY BUS SHOULD NOT EXCEED THE CAPACITY OF THE POWER SOURCE.

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4 Manually Load Following Equipment On AC Emergency Busses:

a. Start one CCW pump (124 kw)

b. Energize MCCs as power supply permits

- MCC A from Bus 13
- MCC B from Bus 15
- MCC E from Bus 15
- MCC F from Bus 15

c. Verify instrument bus D - ENERGIZED

c. Restore power to instrument bus D from MCC B or MCC A (maintenance supply).

d. WHEN bus 15 restored, THEN reset control room lighting

e. Start at least one CNMT RECIRC fan

f. Restore Rx head cooling as power supply permits:

1) Start one Rx compartment cooling fan (23 kw each)

1) Perform the following:

- o Dispatch AO to reset UV relays at MCC C and MCC D.
- o Manually start one fan as power supply permits. (23 kw)

2) Start both control rod shroud fans (45 kw each)

2) Manually start at least one fan (45 kw)

g. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) Ensure seal injection needle valves to both RCPs isolated: • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Charging pump suction aligned to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. Manually align valves as necessary. IF LCV-112B can NOT be opened, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). 3) WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps (75 kw each) as necessary and adjust charging flow to restore PRZR level	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 6	Monitor SI Initiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
7	Check PRZR Level - GREATER THAN 13% [40% FOR ADVERSE CONTAINMENT]	Control charging flow as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION
- 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 IF S/G NR LEVEL DECREASES TO LESS THAN 5% [25% ADVERSE CNMT] AND FEED FLOW IS LESS THAN 200 GPM, THEN THE MDAFW PUMPS SHOULD BE MANUALLY LOADED ON AC EMERGENCY BUS TO SUPPLY WATER TO THE S/G(S).

* *

NOTE:
- o If MDAFW pump operation is not required, pump switches should be maintained in PULL-STOP to prevent automatic start.
- o TDAFW pump flow control valves fail open on loss of IA.

* 8 Monitor Intact S/G Levels:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

IF feed flow less than 200 gpm, THEN perform the following:

1) Verify MDAFW pump discharge valves open.
   - MOV-4007
   - MOV-4008

2) Manually start MDAFW pumps as necessary (228 KW each).

b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 52%

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9 Establish S/G Pressure Control:

a. Adjust S/G ARV controllers to maintain existing S/G pressure

b. Verify S/G ARV controllers in AUTO

c. Dispatch AO to perform Attachment SD-2

* *

CAUTION IF AN SI SIGNAL IS ACTUATED AFTER THE SI PUMP SWITCHES ARE PLACED IN AUTO, THEN ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, SHOULD BE PERFORMED.

* *

NOTE: Safeguards pump switches should be placed in AUTO only if associated bus is energized.

10 Place Following Pump Switches In AUTO:

- SI pumps
- RHR pumps
- CNMT spray pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: FR procedures may now be implemented as necessary.

11	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (258 kw each). IF less than two SW pumps can be operated, THEN go to Step 17.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW). Continue with Step 17. WHEN SW restored to AUX BLDG, THEN do Steps 11c through 16.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.
12	Check If Normal CVCS Operation Can Be Established	
	a. Verify IA restored: o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG	a. Continue with Step 17. WHEN IA restored, THEN do Steps 12 through 16.
	b. Charging pump - ANY RUNNING	b. Continue with Step 17. WHEN any charging pump running, THEN do Steps 13 through 16.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 17. WHEN PRZR level increases to greater than 13% [40% adverse CNMT], THEN do Steps 14 through 16.
14	Establish Normal Letdown: a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx c. Place letdown controllers in MANUAL at 40% open • TCV-130 • PCV-135 d. Reset both trains of XY relays for AOV-371 and AOV-427 if necessary 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	Consult TSC to determine if excess letdown should be placed in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check VCT Makeup System:	
	a. Verify the following: 1) Boric acid and RMW flow control valves - SET FOR REQUIRED CSD CONCENTRATION (Refer to Figure SDM) 2) At least one BA and RMW pump in AUTO 3) RMW mode selector switch in AUTO 4) RMW control armed - RED LIGHT LIT	a. IF VCT auto makeup can NOT be established, THEN manually control VCT level (Refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION).
	b. Check VCT level o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	b. Manually increase VCT makeup flow as follows: 1) Ensure BA transfer pumps and RMW pumps running. IF NOT, THEN dispatch AO to 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. IF VCT level can NOT be restored, THEN go to Step 17.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	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 17. WHEN VCT level greater than 40%, THEN do Step 16b.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.
17	Control PRZR Level:	
	a. Check letdown - IN SERVICE	a. Stop and start charging pumps as necessary to control PRZR level.
	b. Maintain PRZR level between 13% [40% adverse CNMT] and 50%	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

o When using a PRZR PORV select one with an operable block valve.

18 Establish PRZR Pressure Control:

a. Check letdown - IN SERVICE

a. Perform the following:

1) Use PRZR heaters and one PRZR PORV to maintain RCS pressure.

IF IA NOT available, THEN Refer to Attachment N2 PORVS to operate PORV.

2) Go to Step 19.

b. Use PRZR heaters and auxiliary spray valve (AOV-296) to maintain RCS pressure

19 Verify Natural Circulation:

Increase dumping steam from intact S/Gs.

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

o S/G pressures - STABLE OR DECREASING

o RCS hot leg temperatures - STABLE OR DECREASING

o Core exit T/Cs - STABLE OR DECREASING

o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR S/G PRESSURE

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

20 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 20e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing THEN initiate boration.

2) Continue with Step 21. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 20c through e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with Step 21. WHEN either condition met, THEN do Steps 20d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 21.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Verify Adequate Shutdown Margin:	
	a. Direct RP to sample RCS and PRZR liquid for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
22	Maintain Stable Plant Conditions	
	a. RCS pressure - STABLE	a. Control PRZR heaters and auxiliary spray if available.
	b. RCS temperature - STABLE	b. Control dumping steam as necessary.
	c. PRZR level - BETWEEN 13% [40% adverse CNMT] and 50%	c. Control charging as necessary.
	d. Intact S/G level - BETWEEN 17% [25% adverse CNMT] and 52%	d. Control S/G feed flow as necessary.
*23	Monitor SI Initiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Try To Restore Offsite Power To All AC Busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER)	Maintain plant condition stable using AC emergency power.
25	Determine If Natural Circulation Cooldown Is Required:	
	a. Consult plant staff to determine if RCS cooldown is necessary	a. IF cooldown NOT required, THEN go to O-3, HOT SHUTDOWN WITH XENON PRESENT.
	b. At least one RCP - OPERABLE	b. Go to ES-0.2, NATURAL CIRCULATION COOLDOWN.
	c. Go to O-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD SHUTDOWN	

-END-

ECA-0.1 APPENDIX LIST

FIGURE MIN SUBCOOLING

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

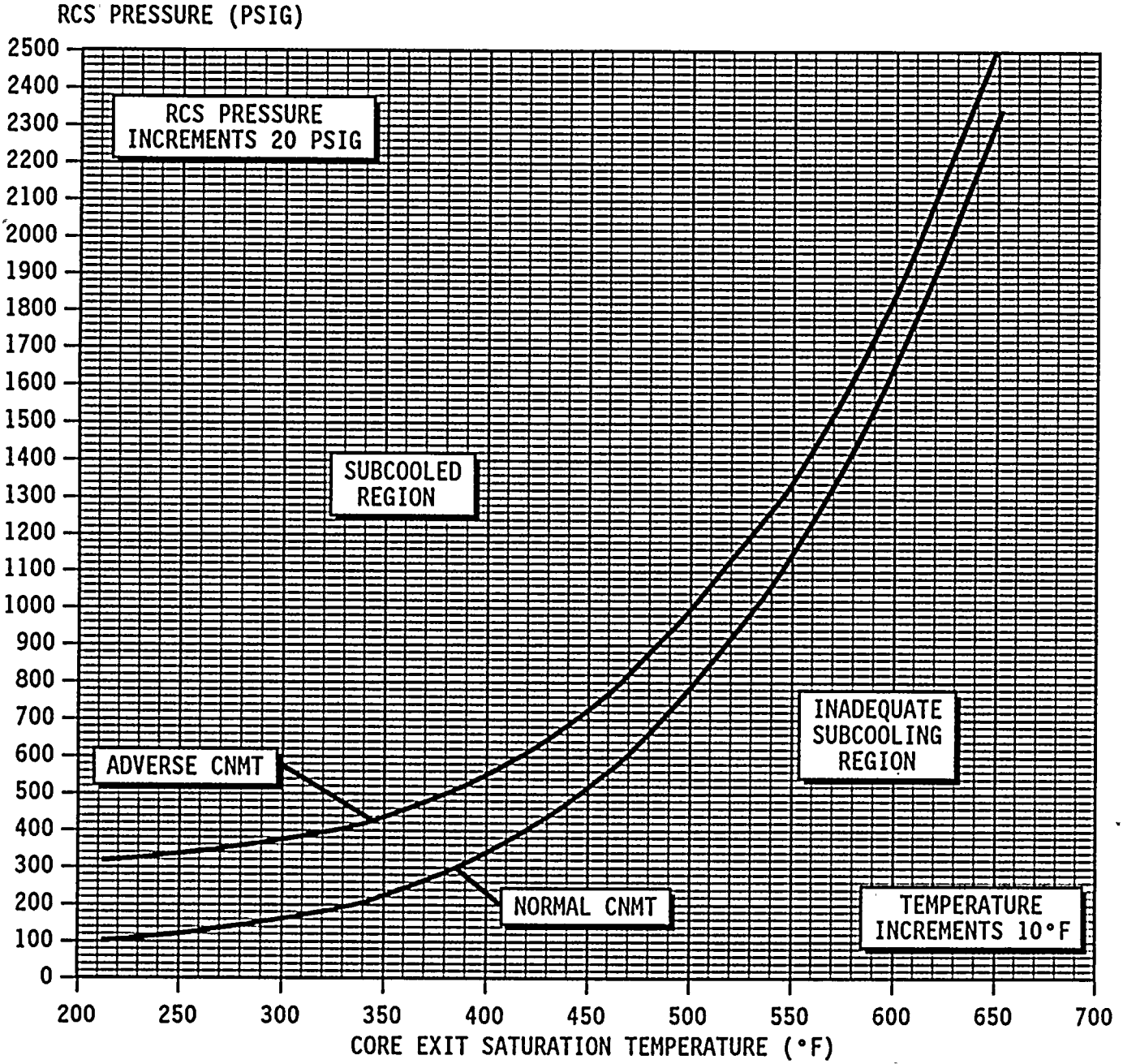
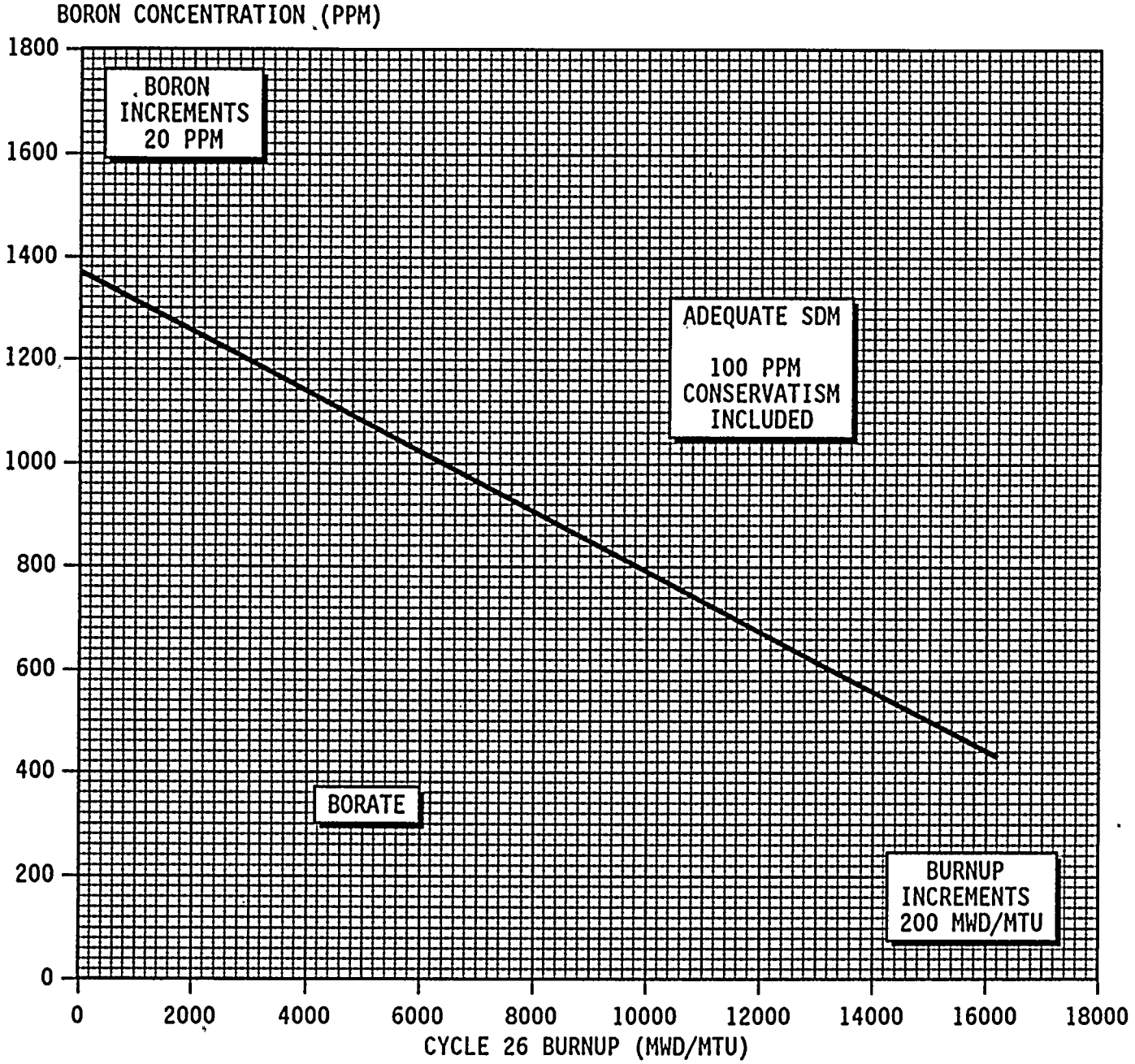


FIGURE SDM

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



ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

1-14-99

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to restore emergency coolant recirculation capability, to delay depletion of the RWST by adding makeup and reducing outflow, and to depressurize the RCS to minimize break flow.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when cold leg recirculation capability cannot be verified.

b. ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, when recirculation cannot be established or maintained OR when RWST level is < 15% and recirculation has not been established.

c. ECA-1.2, LOCA OUTSIDE CONTAINMENT, when a LOCA outside containment cannot be isolated.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF EMERGENCY COOLANT RECIRCULATION IS ESTABLISHED DURING THIS PROCEDURE, FURTHER RECOVERY ACTIONS SHOULD CONTINUE BY RETURNING TO ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.
- IF SUCTION SOURCE IS LOST TO ANY SI OR CNMT SPRAY PUMP, THE PUMP SHOULD BE STOPPED.

* *

NOTE: Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Verify CNMT Sump Recirculation Capability:

a. Check RHR system:

- RHR pumps - OPERABLE
- RHR suction valves from sump B - OPERABLE
  - MOV-850A
  - MOV-850B
- RHR pump discharge to Rx vessel deluge valves - OPERABLE
  - MOV-852A
  - MOV-852B
- CCW pumps - OPERABLE
- CCW to RHR Hx - OPERABLE
  - MOV-738A
  - MOV-738B

a. Perform the following:

1) Manually or locally try to restore at least one train (Refer to Attachment RHR SYSTEM to identify minimum components for one train).

2) Continue with step 2. WHEN at least one train is restored, THEN do steps 1b, c and d.

b. Check at least two SW pumps - RUNNING

b. Manually start SW pumps as power supply permits (243 kw each).

c. Check RWST level - GREATER THAN 28%

c. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 2 AND continue with step 2 of this procedure until such time as Emergency Coolant Recirculation is established.

d. Return to procedure and step in effect.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2 Add Makeup To RWST As Necessary

- o Refer to S-9J, BLENDING TO RWST

  -OR-

- o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST OR SFP

  -OR-

- o Refer to Attachment SFP-RWST

* *

CAUTION

IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

* *

NOTE: TDAFW pump flow control valves fail open on loss of IA.

* 3 Monitor Intact S/G Levels:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.
b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	b. IF narrow range level in any S/G continues to increase, THEN stop feed flow to that S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

4 Initiate RCS Cooldown To Cold Shutdown:

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

b. Dump steam to condenser from intact S/G(s)

b. Manually or locally dump steam from intact S/G(s):

- o Use S/G ARVs

-OR-

- o Open TDAFW pump steam supply valves.

-OR-

- o Dispatch AO to perform the following:

  1) Open S/G MSIV bypass valves.

  2) Open priming air ejector steam supply root valve, V-3578.

  3) Open 1A and 1B priming air ejector isolation valves.

     - V-3580
     - V-3581

IF no intact S/G available, THEN use faulted S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Verify CNMT RECIRC Fans Running:	
	a. All fans - RUNNING	a. Manually start fans.
	b. Charcoal filter dampers green status lights - EXTINGUISHED	b. Dispatch personnel with relay rack key to locally open dampers using trip relay pushbuttons in relay room racks. • AUX RELAY RACK RA-2 for fan A • AUX RELAY RACK RA-3 for fan C
* 6	Monitor RWST Level - GREATER THAN 15%	Go to Step 26.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7 Determine CNMT Spray Requirements:

a. Determine number of CNMT spray pumps required from table:

RWST LEVEL	CNMT PRESSURE	CNMT RECIRC FANS RUNNING	CNMT SPRAY PUMPS REQUIRED
GREATER THAN 28%	GREATER THAN 60 PSIG	-	2
	BETWEEN 28 PSIG AND 60 PSIG	0 OR 1	2
		2 OR 3	1
		ALL	0
	LESS THAN 28 PSIG	-	0
BETWEEN 15% AND 28%	GREATER THAN 60 PSIG	-	2
	BETWEEN 28 PSIG AND 60 PSIG	0, 1, 2, OR 3	1
		ALL	0
	LESS THAN 28 PSIG	-	0
LESS THAN 15%	-	-	0

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 7 continued from previous page)	
	b. CNMT spray pumps running - EQUAL TO MINIMUM NUMBER REQUIRED	b. Manually operate CNMT spray pumps as necessary. IF CNMT spray pump(s) must be stopped, THEN perform the following: 1) Reset CNMT spray. 2) Place CNMT spray pump in PULL STOP. 3) IF CNMT pressure less than 28 psig, THEN close discharge valves for idle CNMT spray pump(s). o Pump A • MOV-860A • MOV-860B o Pump B • MOV-860C • MOV-860D
8	Check ECCS Pump Status: o SI Pumps - ANY RUNNING -OR- o RHR Pumps - ANY RUNNING IN INJECTION MODE	Go to step 19.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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.

* *

9 Reset SI If Necessary

10 Establish One Train Of SI Flow

a. SI pumps - LESS THAN THREE RUNNING

a. Stop one SI pump.

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

b. Stop RHR pumps and go to Step 11.

c. RHR pump - ONLY ONE RUNNING

c. IF two RHR pumps running, THEN stop one RHR pump.

IF no RHR pumps running, THEN start one RHR pump.

11 Verify No Backflow From RWST To Sump:

a. Any RHR suction valve from sump B - OPEN

- MOV-850A
- MOV-850B

a. IF both RHR suction valves from sump B closed, THEN go to Step 12.

b. RWST outlet valve to RHR pump suction (MOV-856) - CLOSED

b. Perform the following:

1) Place MOV-856 key switch to ON

2) Manually close valve

IF valve can NOT be closed manually, THEN direct AO to locally close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	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.
13	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (243 kw each). IF less than two SW pumps running, THEN perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) 3) Go to Step 16.
	b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Establish IA to CNMT:	
	a. Verify non-safeguards busses energized from offsite power o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED	a. Perform the following: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) WHEN bus 15 restored, THEN reset control room lighting.
	b. Verify SW isolation valves to turbine building - OPEN • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664	b. Manually align valves.
	c. Verify at least two air compressors - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.
	d. Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	d. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 15. WHEN IA restored, THEN do Steps 14e and f.
	e. Reset both trains of XY relays for IA to CNMT AOV-5392	
	f. Verify IA to CNMT AOV-5392 - OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish Required Charging Line Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with RWST area key to locally close seal injection needle valves to affected RCP: • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 demand at 0%. 3) Start one charging pump.
	b. Establish 20 gpm total charging flow	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

16 Check If An RCP Should Be Started:

a. All RCPs - STOPPED

a. Stop all but one RCP and go to step 17.

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

b. Go to Step 17.

c. Try to start an RCP:

1) Establish conditions for starting an RCP

- o Bus 11A or 11B energized
- o Refer to Attachment RCP START

2) Start one RCP.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*17	Monitor SI Termination Criteria:	
	a. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84%	a. Go to step 19.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIGURE MIN SUBCOOLING	b. Limit RCS injection flow to that required to remove decay heat: o Determine required injection flow using Figure MIN RCS INJECTION o Stop SI pumps as necessary to establish and maintain minimum required SI flow. o IF required injection flow is less than 100 gpm, THEN establish required charging flow and go to Step 18. IF required injection flow is greater than 100 gpm, THEN perform the following: 1) Ensure one SI pump running 2) Establish minimum charging flow for RCP seal injection. 3) Consult TSC to determine if SI pump discharge valves should be locally throttled. (Locked valve key required.) 4) Go to Step 19.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Stop SI And RHR Pumps And Place In Auto	
19	Verify Adequate RCS Makeup Flow:	
	a. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84%	a. Increase RCS injection flow as necessary to maintain RVLIS indication stable.
	b. Core exit T/Cs - STABLE OR DECREASING	b. Increase RCS injection flow to maintain core exit T/Cs stable or decreasing.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE: If normal RCP support conditions can NOT be satisfied, then any running RCP(s) should be stopped.

20 Depressurize RCS To Decrease RCS Subcooling:

a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 10°F USING FIGURE MIN SUBCOOLING

a. Go to Step 21.

b. Normal PRZR spray -AVAILABLE

b. Use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

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

c. Depressurize RCS until either of the following conditions satisfied:

- o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING

-OR-

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

d. WHEN either condition met, THEN stop RCS depressurization

e. Check RCS subcooling - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

e. Increase RCS makeup flow as necessary to restore subcooling.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 22.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 22.
	c. Place letdown pressure controller (PCV-135) in MANUAL CLOSED	
	d. Check following valves - OPEN • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)	d. Perform the following: 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371. 3) Place AOV-427 switch to OPEN. 4) Open one letdown orifice valve.
	e. Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 22.
	f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	g. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 23. WHEN both RCS hot leg temperatures less than 400°F, THEN do Steps 22b, c and d.
	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	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.
	d. Locally reopen breakers for MOV-841 and MOV-865	
*23	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 24.
	b. Check the following: o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	b. Stop affected RCP(s).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check Core Exit T/Cs - GREATER THAN 200°F	Go to Step 38.
25	Check RWST Level - LESS THAN 15%	Return to Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Minimize RWST Outflow:	
	a. Any SI pump(s) - RUNNING	a. IF charging pump suction aligned to RWST, THEN perform the following: 1) Verify SI pump suction aligned to RWST, MOV-825A or MOV-825B open. 2) Start one SI pump and verify flow. 3) Stop running charging pumps. 4) Go to Step 26e.
	b. Stop all but one SI pump	
	c. Check charging pump suction from RWST (AOV-112B) - OPEN	c. Go to Step 26e.
	d. Stop all charging pumps	
	e. Stop both RHR pumps	
	f. Pull Stop both CNMT spray pumps	
	g. Check CNMT pressure - LESS THAN 28 PSIG	g. Go to Step 27.
	h. Reset CNMT spray	
	i. Close discharge valves for idle CNMT spray pump o Pump A • MOV-860A • MOV-860B o Pump B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*27	Check SI pump flow - STABLE	IF SI flow zero or erratic, THEN stop running SI pump.
28	Try To Add Makeup To RCS From VCT:	
	a. Check VCT level - GREATER THAN 5%	a. Stop charging pumps taking suction from VCT and continue with Step 29. WHEN VCT level greater than 5%, THEN do Steps 28b and c.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.
	c. Start charging pumps as necessary to establish two pumps running	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

29 Establish Maximum VCT Makeup:

a. Check RMW control armed - RED LIGHT LIT

b. Check VCT level - LESS THAN 20%

c. Check VCT makeup system - OPERATING IN AUTO

d. Increase VCT makeup flow

1) Start both RMW pumps

2) Start both boric acid pumps

3) Adjust RMW controller (HC-111) to maximum flow from table

BAST CONC (PPM)	MAX RMW FLOW (GPM)
8750 (5%)	40
10500 (6%)	50
12250 (7%)	60
14000 (8%)	70
15750 (9%)	80
17500 (10%)	90

4) Adjust boric acid flow controller (HC-110A) in MANUAL to 9.5 gpm

e. Adjust charging pump speed to stabilize VCT level

a. Place RMW mode switch in AUTO and place RMW control switch to START.

b. Continue with Step 30. WHEN VCT level less than 20%, THEN do Steps 29c, d and e.

c. Perform the following:

1) Open makeup system valves.

- AOV-110B
- AOV-110C
- AOV-111

2) Start BA transfer pumps and RMW pumps.

3) Open boric acid flow control valve (AOV-110A).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Try To Add Makeup To RCS From Alternate Source: a. Evaluate Use Of RCDT Pumps (Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING) b. Consult TSC to determine other means of makeup	
31	Verify SI ACCUM Isolation Valves - OPEN • MOV-841 • MOV-865	IF valves were closed to prevent SI ACCUM nitrogen injection, THEN go to Step 35. IF NOT, THEN perform the following: a. Dispatch AO 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Depressurize All Intact S/Gs To 785 PSIG:	
	a. Check S/G pressures - GREATER THAN 785 PSIG	a. Go to Step 33.
	b. Dump steam to condenser at maximum rate	b. Manually or locally dump steam at maximum rate from intact S/G(s): o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves • V-3580 • V-3581
	c. Check S/G pressures - LESS THAN 785 PSIG	c. Return to Step 32b.
	d. Stop S/G depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: The intent of Step 33 is to depressurize S/Gs more slowly, but at a rate that will maintain required RVLIS level.

33 Depressurize Intact S/Gs To 200 PSIG Slowly To Inject SI ACCUMs:

a. Dump steam to condenser as necessary to maintain appropriate RVLIS indication:

- o Level (no RCPs) - BETWEEN 77% AND 82% [82% AND 85% adverse CNMT]

-OR-

- o Fluid fraction (any RCP running) - BETWEEN 84% AND 90%

a. Manually or locally dump steam from intact S/G(s) to maintain appropriate RVLIS indication:

- o Use S/G ARVs

-OR-

- o Open steam supply valves to TDAFW pump

-OR-

- o Dispatch AO to perform the following:

  1) Open affected S/G MSIV bypass valve.

  2) Open priming air ejector steam isolation valves

     - V-3580
     - V-3581

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

b. Return to Step 33a.

c. Stop S/G depressurization

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 35. WHEN both RCS hot leg temperatures less than 400°F, THEN do Steps 34b, c and d.
	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	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.
	d. Locally reopen breakers for MOV-841 and MOV-865	
*35	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 36.
	b. Check the following: o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	b. Stop affected RCP(s).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	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/G(s): o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves • V-3580 • V-3581

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 36.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 36.
	c. Place letdown pressure controller in MANUAL CLOSED	
	d. Check following valves - OPEN • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)	d. Perform the following: 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
	e. Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Return to Step 36.
	f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	g. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	Maintain RCS Heat Removal:	
	a. Use RHR system if in service	
	b. Dump steam to condenser from intact S/Gs	b. Manually or locally dump steam from intact S/G(s): o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves • V-3580 • V-3581 IF no intact S/G available and RHR system NOT in service, THEN use faulted S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 39.

39 Check CNMT Hydrogen Concentration:

a. Direct RP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

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

40 Consult TSC

-END-

ECA-1.1 APPENDIX LIST

TITLE

1) FIGURE MIN SUBCOOLING (FIG-1.0)
2) FIGURE SDM (FIG-2.0)
3) FIGURE MIN RCS INJECTION (FIG-6.0)
4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
5) ATTACHMENT RHR COOL (ATT-14.1)
6) ATTACHMENT SFP-RWST (ATT-18.0)
7) ATTACHMENT RCP START (ATT-15.0)
8) ATTACHMENT SD-1 (ATT-17.0)
9) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
10) ATTACHMENT RHR SYSTEM (ATT-14.5)
11) ATTACHMENT N2 PORVS (ATT-12.0)

FIGURE MIN SUBCOOLING

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

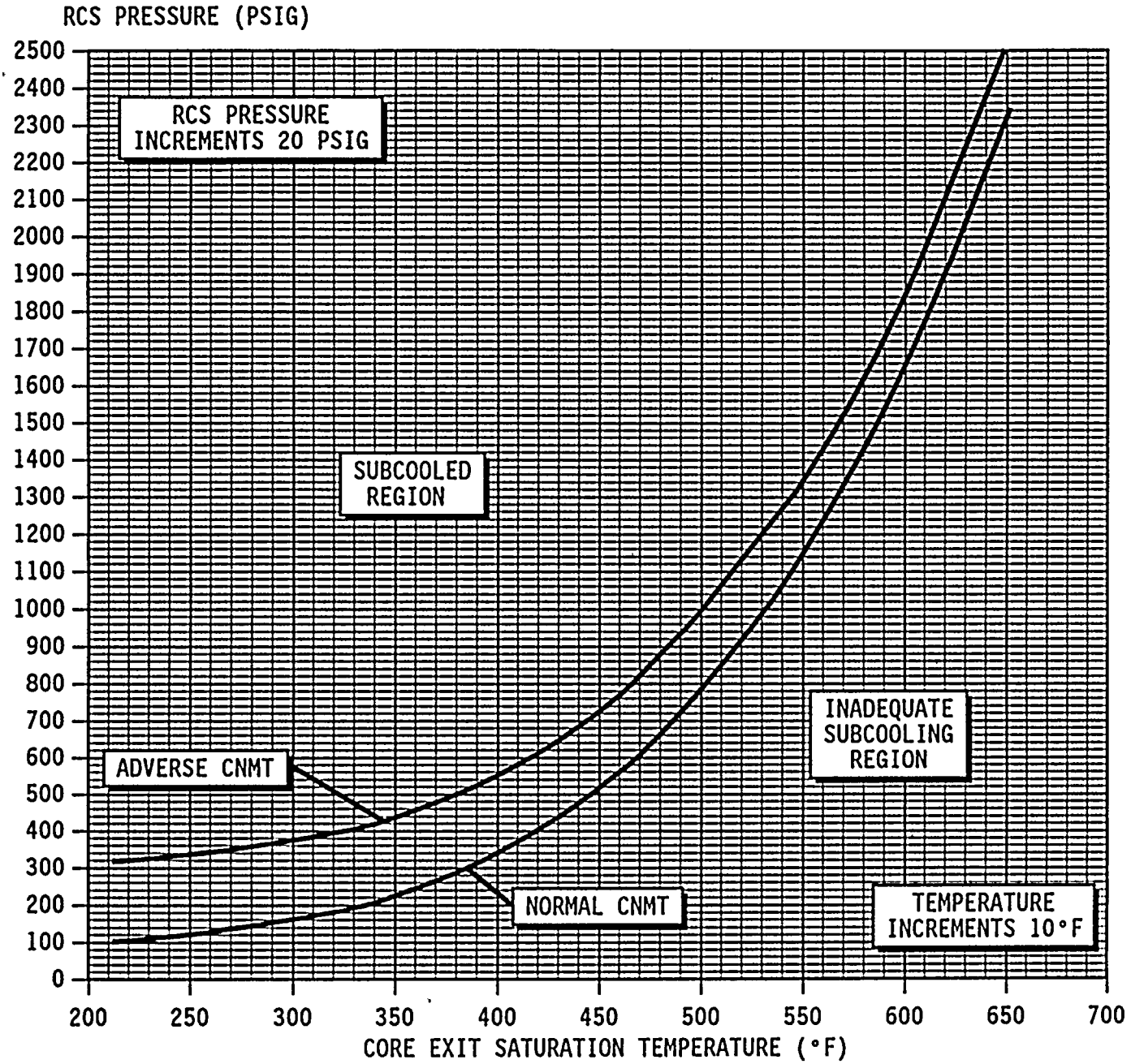


FIGURE SDM

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

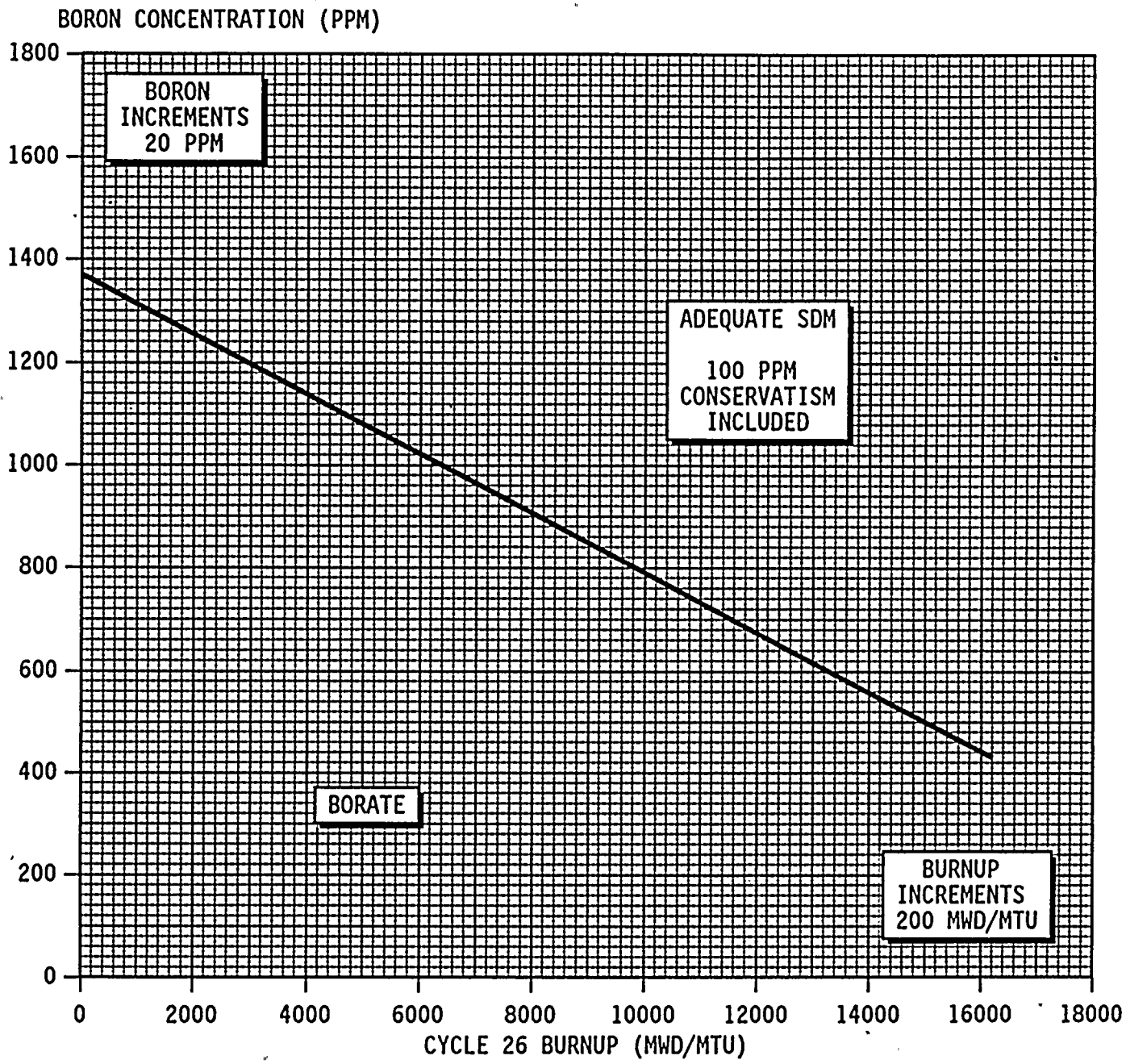


FIGURE MIN RCS INJECTION

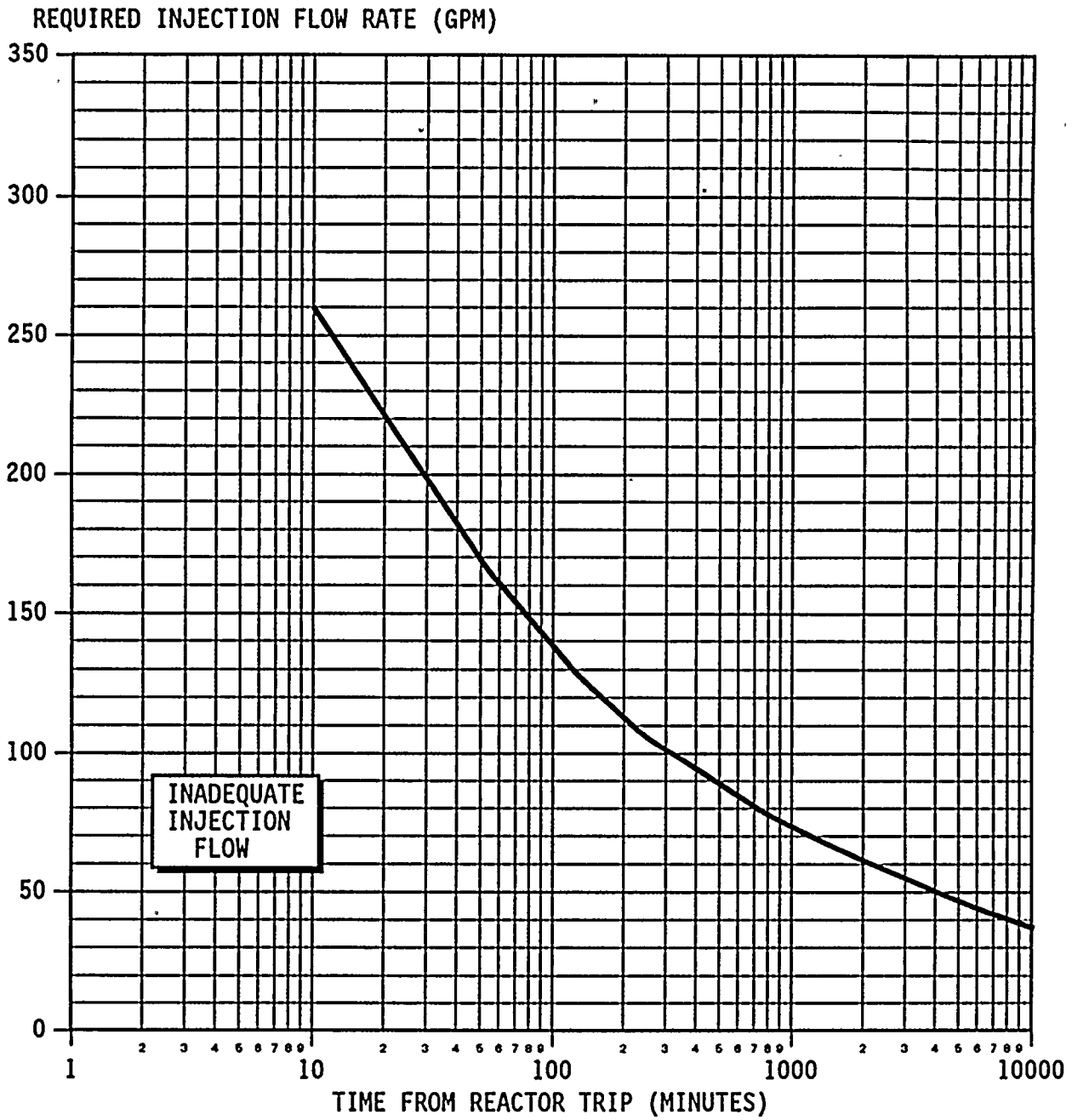


FIGURE RCP SEAL LEAKOFF

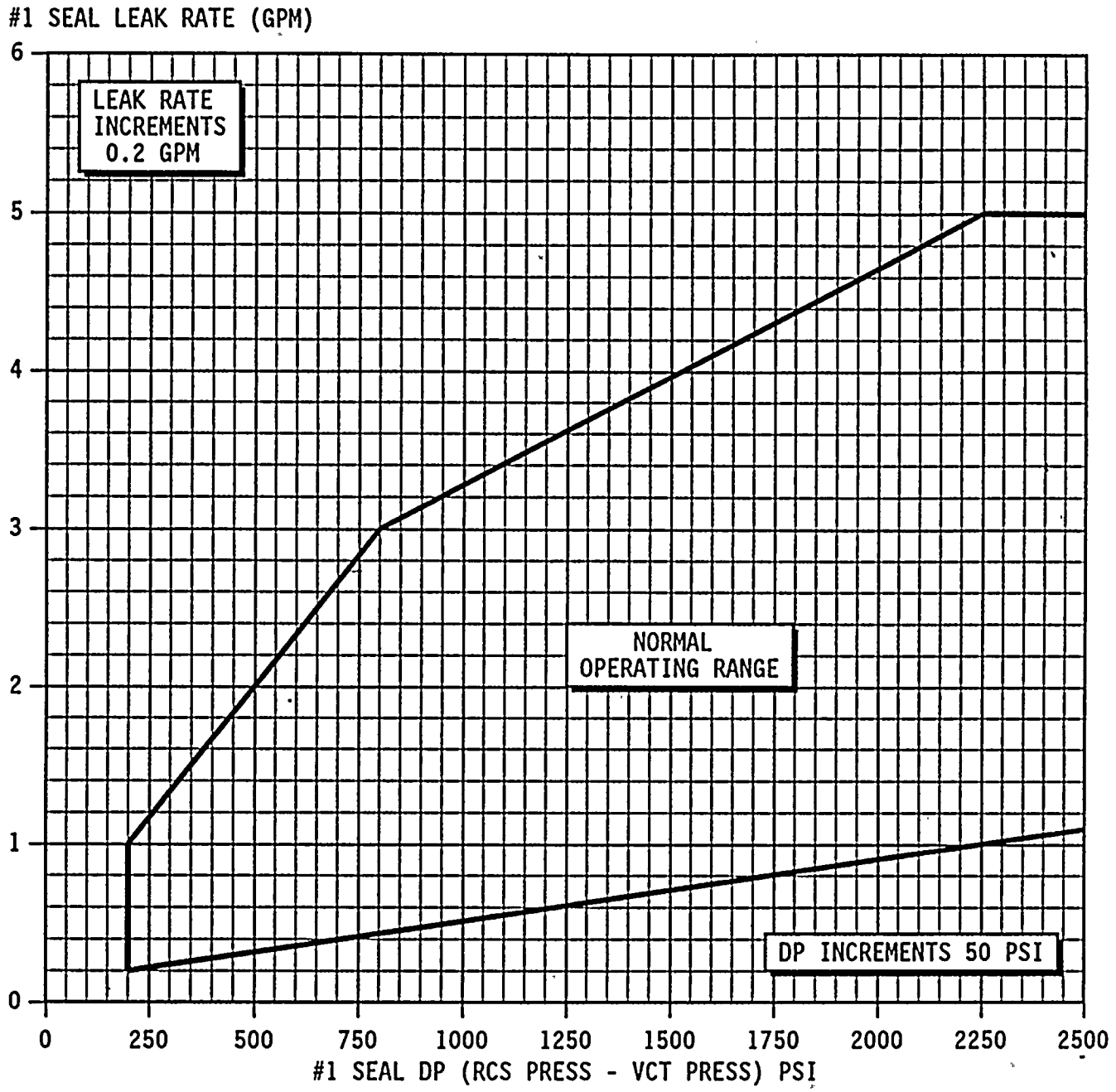


FIGURE MIN RCS INJECTION

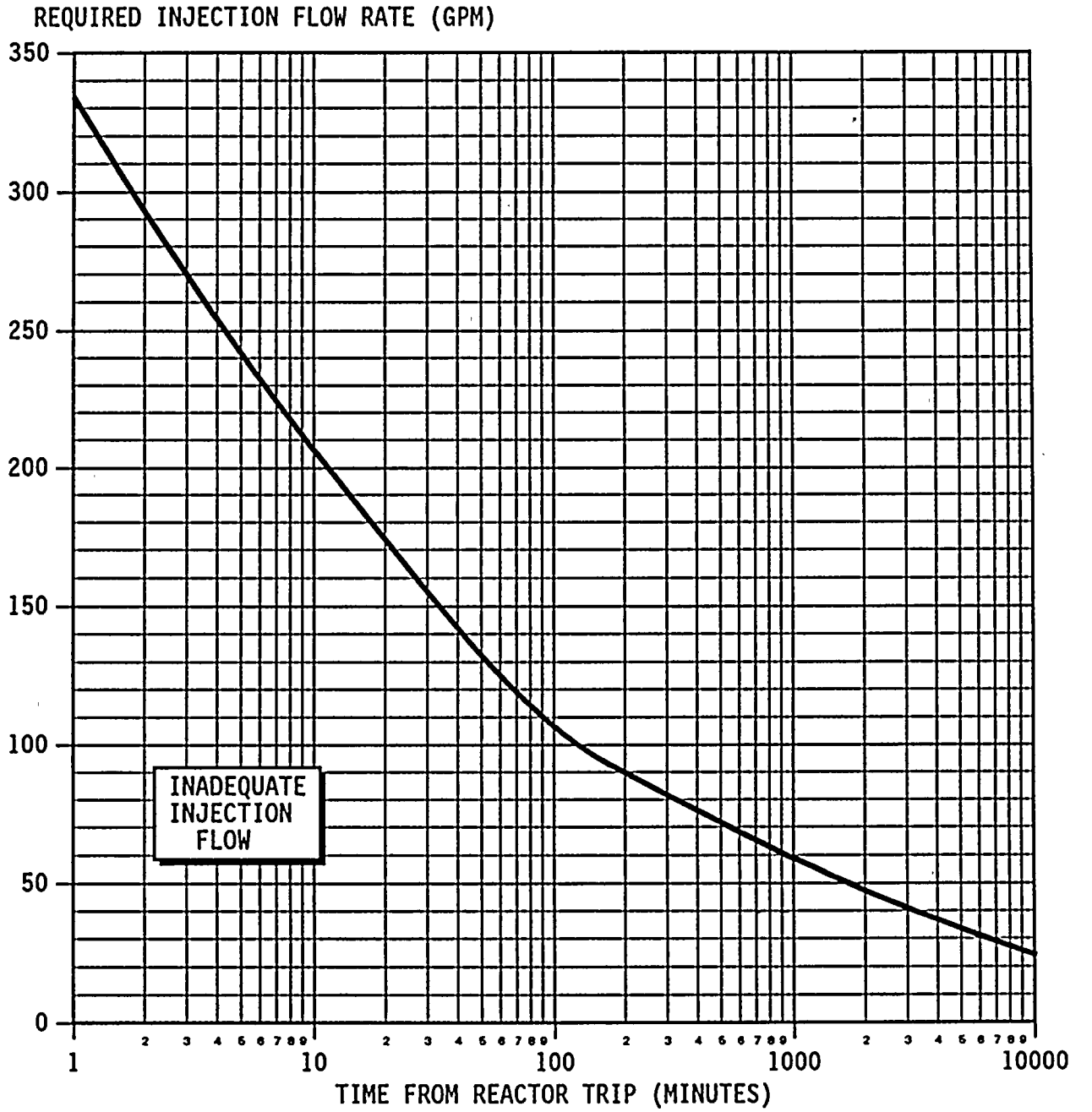
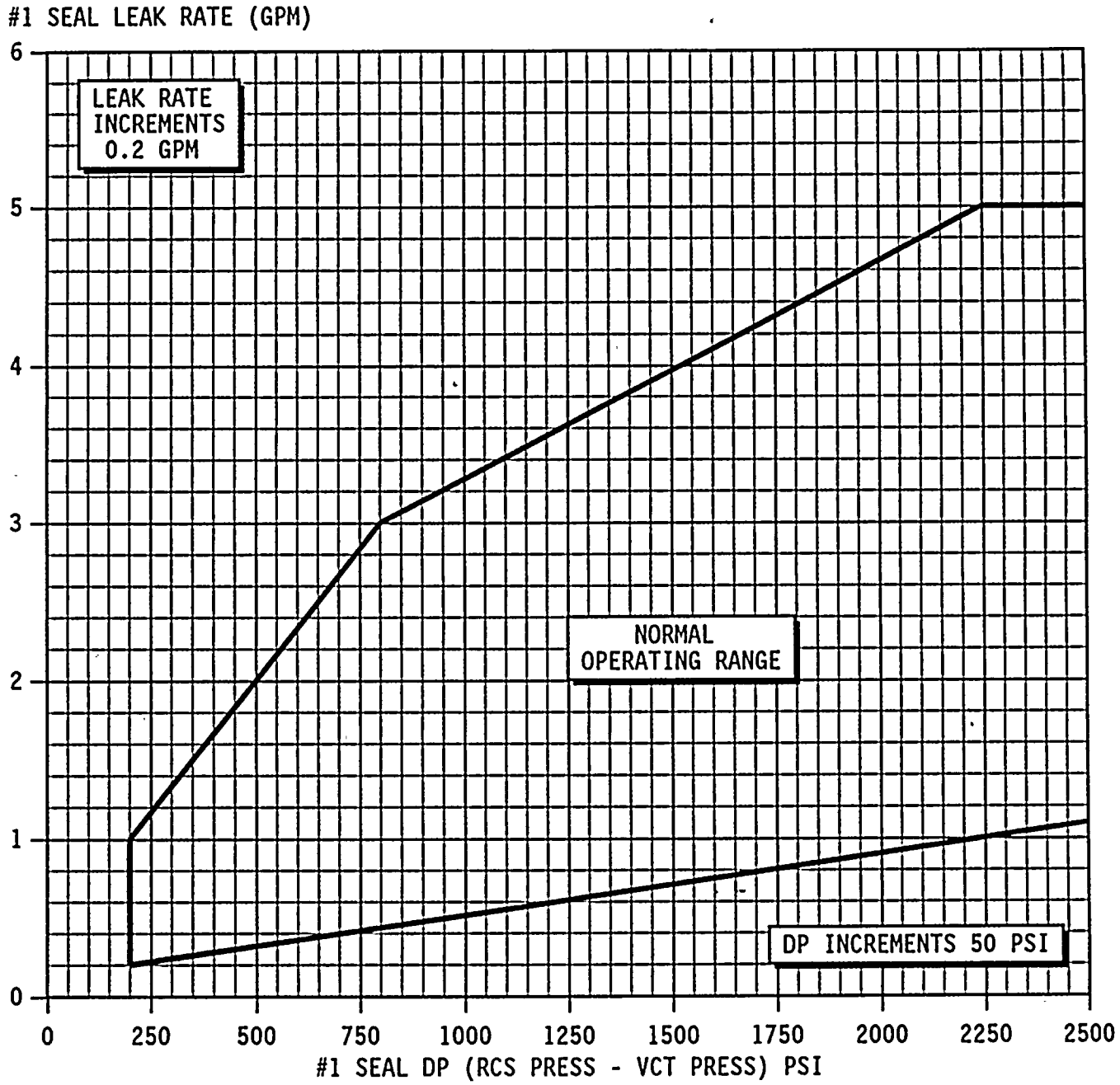


FIGURE RCP SEAL LEAKOFF



ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

3-31-2000

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to mitigate and minimize a loss of secondary coolant from both steam generators.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-2, FAULTED STEAM GENERATOR ISOLATION, when an uncontrolled depressurization of both steam generators occurs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.

* *

NOTE:
- o FOLDOUT page should be open AND monitored periodically.
- o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).
- o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Check Secondary Pressure Boundary:

- o MSIVs - CLOSED
- o MFW flow control valves - CLOSED
  - MFW regulating valves
  - MFW bypass valves
- o MFW pump discharge valves - CLOSED
- o S/G blowdown and sample valves - CLOSED
- o TDAFW pump steam supply valves - PULL STOP
- o TDAFW pump flow control valves - CLOSED
- o S/G ARVs - CLOSED
- o Dispatch AO to locally isolate S/Gs (Refer to Attachment FAULTED S/G)

Manually close valves one loop at a time.

IF valves can NOT be closed, THEN dispatch AO to locally isolate flowpaths, as necessary, one loop at a time.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

A MINIMUM FEED FLOW OF 50 GPM MUST BE MAINTAINED TO EACH S/G WITH A NARROW RANGE LEVEL LESS THAN 5% [25% ADVERSE CNMT].

* *

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

2 Control Feed Flow To Minimize RCS Cooldown:

a. Check cooldown rate in RCS cold legs - LESS THAN 100°F/HR	a. Decrease feed flow to 50 gpm to each S/G and go to Step 2c.
b. Check narrow range level in both S/Gs - LESS THAN 50%	b. Control feed flow to maintain narrow range level less than 50% in both S/Gs.
c. Check RCS hot leg temperatures - STABLE OR DECREASING	c. Control feed flow or dump steam to stabilize RCS hot leg temperatures.

* 3 Monitor RCP Trip Criteria:

a. RCP status - ANY RCP RUNNING	a. Go to Step 4.
b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 4.
c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 4.
d. Stop both RCPs	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check CST Level - GREATER THAN 5 FEET	Switch to alternate AFW suction supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

* *

CAUTION

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	Monitor PRZR PORVs And 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 D position 6C • MOV-516, MCC C position 6C
	b. PORVs - CLOSED	b. IF PRZR pressure less than 2335 psig, THEN manually close PORVs. IF any PORV can NOT be closed, THEN manually close its block valve. IF block valve can NOT be closed, THEN dispatch AO to locally check breaker. • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
	c. Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check Secondary Radiation Levels - NORMAL o Steamline radiation monitor (R-31 and R-32) o Dispatch AO to locally check steamline radiation o Request RP sample S/Gs for activity	Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

* *

CAUTION

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.

* *

7 Reset SI

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.

* *

* 8	Monitor If RHR Pumps Should Be Stopped:	
	a. RHR pumps - ANY RUNNING	a. Go to Step 9.
	b. Check RCS Pressure:	
	1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	1) Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	2) Pressure - STABLE OR INCREASING	2) Go to Step 9.
	c. Stop RHR pumps and place in AUTO	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 9	Monitor If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - RUNNING	a. Go to Step 10.
	b. Check the following: o CNMT pressure - LESS THAN 4 PSIG o Sodium hydroxide tank level - LESS THAN 55%	b. Continue with Step 10. WHEN BOTH conditions satisfied, THEN do Steps 9c through f.
	c. Reset CNMT spray	
	d. Check NaOH tank outlet valves - CLOSED • AOV-836A • AOV-836B	d. Place NaOH tank outlet valve controllers to MANUAL and close valves. • AOV-836A • AOV-836B
	e. Stop CNMT spray pumps and place in AUTO	
	f. Close CNMT spray pump discharge valves • MOV-860A • MOV-860B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check RWST Level - GREATER THAN 28%	Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
11	Reset CI:	
	a. Depress CI reset pushbutton	
	b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.
12	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (257 kw each). IF less than two SW pumps running, THEN perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) 3) Go to Step 14.
	b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Establish IA to CNMT:	
	a. Verify non-safeguards busses energized from offsite power o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED	a. Perform the following: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) WHEN bus 15 restored, THEN reset control room lighting.
	b. Verify SW isolation valves to turbine building - OPEN • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664	b. Manually align valves.
	c. Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.
	d. Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	d. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 14. WHEN IA restored, THEN do Steps 13e and f.
	e. Reset both trains of XY relays for IA to CNMT AOV-5392	
	f. Verify IA to CNMT AOV-5392 - OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Go to Step 15.
	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	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.
	d. Locally reopen breakers for MOV-841 and MOV-865	
15	Check Normal Power Available To Charging Pumps: o Bus 14 normal feed breaker - CLOSED o Bus 16 normal feed breaker - CLOSED	Verify adequate emergency D/G capacity to run charging pumps (75 kw each). IF NOT, THEN evaluate if CNMT RECIRC fans can be stopped (Refer to Attachment CNMT RECIRC FANS).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY-RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Align charging pump suction to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). IF LCV-112C can NOT be closed, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and adjust charging flow to restore PRZR level	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*17	Monitor SI Termination Criteria:	
	a. SI pumps - ANY RUNNING	a. Go to Step 19.
	b. Check RCS pressure: o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT] o Pressure - STABLE OR INCREASING	b. DO NOT stop SI pumps. Perform the following: 1) Energize PRZR heaters and operate PRZR spray as necessary to stabilize RCS pressure greater than 1625 psig [1825 psig adverse CNMT] 2) Return to Step 2.
	c. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	c. DO NOT stop SI pumps. Return to Step 2.
	d. PRZR level - GREATER THAN 5% [30% adverse CNMT].	d. Do NOT stop SI pumps. Perform the following: 1) IF normal PRZR spray available, THEN try to stabilize RCS pressure with PRZR spray. 2) Return to Step 17a.
	NOTE: o Following SI termination, RCP trip criteria is no longer applicable. o Foldout Page E-2 transition criteria does not apply while performing steps 18 and 19.	
18	Stop SI and RHR Pumps And Place In Auto	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*19	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and return to Step 2.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN manually start SI pumps as necessary and return to Step 2.
20	Check RCS Hot Leg Temperatures - STABLE OR DECREASING	Control feed flow or dump steam to stabilize RCS hot leg temperatures.
21	Check Narrow Range Level In Both S/Gs - LESS THAN 50%	Control feed flow to maintain narrow range level less than 50% in both S/Gs.
22	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 28.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check If Normal CVCS Operation Can Be Established	
	a. Verify IA restored: o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG	a. Continue with Step 28. WHEN IA restored, THEN do Steps 23 through 27.
	b. Verify instrument bus D - ENERGIZED	b. Energize MCC B. IF MCC B NOT available, THEN perform the following: 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
	c. CCW pumps - ANY RUNNING	c. Perform the following: 1) IF any RCP #1 seal outlet temperature offscale high, THEN isolate CCW to thermal barrier of affected RCP(s). • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
	d. Charging pump - ANY RUNNING	d. Continue with Step 28. WHEN any charging pump running, THEN do Steps 24 through 27.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 26. WHEN PRZR level increases to greater than 13% [40% adverse CNMT], THEN do Step 25.
25	Establish Normal Letdown: a. Verify charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx c. Place letdown controllers in MANUAL at 40% open • 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	IF RCP seal return has been established, THEN establish excess letdown as follows: o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. IF RCP seal return NOT established, THEN consult TSC to determine if excess letdown should be placed in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Adjust RMW flow control valve in AUTO to 40 gpm	
	c. Verify the following: 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT	c. Adjust controls as necessary.
	d. Check VCT level: o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	d. 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
27	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 28. WHEN VCT level greater than 40%, THEN do Step 27b.
	b. Verify charging pumps aligned to VCT: o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	Check RCP Cooling: a. Check CCW to RCPs: o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED b. Check RCP seal injection: o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check If Seal Return Flow Should Be Established:	
	a. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 30.
	b. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	b. Manually open valves as necessary.
	c. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	d. Open RCP seal return isolation valve MOV-313	d. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	e. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, THEN close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B IF both RCP seal discharge valves are shut, THEN go to Step 30.
	f. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

o When using PRZR PORV, select one with an operable block valve.

30	Energize Heaters And Operate Normal Spray As Necessary To Maintain RCS Pressure Stable	IF normal spray NOT available and letdown is in service, THEN use auxiliary spray valve (AOV-296). IF PRZR spray NOT available, THEN use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	Verify All AC Busses - ENERGIZED BY OFFSITE POWER o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN	Perform the following: a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed. b. Perform the following, as necessary: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump 5) Ensure D/G load within limits. 6) WHEN bus 15 restored, THEN reset control room lighting. 7) Refer to Attachment SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

* *

32 Check RCP Status - AT LEAST ONE RUNNING

Try to start one RCP

a. IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

   - o Increase PRZR level to greater than 65% [82% adverse CNMT]
   - o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING
   - o Energize PRZR heaters as necessary to saturate PRZR water

b. Establish conditions for starting an RCP:

   - o Verify bus 11A or 11B energized.
   - o Refer to Attachment RCP START.

c. Start one RCP.

   IF an RCP can NOT be started, THEN verify natural circulation (Refer to Attachment NC).

   IF natural circulation can NOT be verified, THEN increase feed flow or dumping steam.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

33 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 33e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing THEN initiate boration.

2) Continue with Step 34. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 33c, d and e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with step 34. WHEN either condition met, THEN do Steps 33d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 34.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Check If Emergency D/Gs Should Be Stopped:	
	a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
	b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling: 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING	1) Manually start one fan as power supply permits (45 kw) 2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)
	d. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	Maintain Plant Conditions - STABLE o RCS pressure o PRZR level o RCS temperatures	Control plant systems as necessary to maintain conditions stable.
*37	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary. Return to Step 2.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN manually start SI pumps as necessary. Return to Step 2.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	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 PRZR level - GREATER THAN 5% [30% adverse CNMT]	a. Go to Step 39.
	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	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.
	d. Locally reopen breakers for MOV-841 and MOV-865	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
40	Check RCS Hot Leg Temperatures - LESS THAN 350°F	Control feed flow and dump steam to establish RCS cooldown rate less than 100°F/hr in RCS cold legs.
*41	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 42.
	b. Check the following:	b. Stop affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

o When using PRZR PORV, select one with operable block valve.

*42 Check RCS Pressure - LESS THAN 400 PSIG [300 PSIG adverse CNMT]

Perform the following:

a. Depressurize RCS using normal PRZR spray.
IF normal spray NOT available and letdown is in service, THEN use auxiliary spray.
IF NOT, THEN use one PRZR PORV.
IF IA NOT available, THEN refer to Attachment N2 PORVS.

b. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F using Figure MIN SUBCOOLING.

c. Return to Step 37.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 37.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 41.
	c. Place letdown pressure controller (PCV-135) in MANUAL CLOSED	
	d. Check following valves - OPEN • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)	d. Perform the following: 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
	e. Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Return to Step 41.
	f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	f. IF RCS overpressure protection system can NOT be placed in service, THEN notify TSC of potential Tech Spec violation if RHR system is placed in service.
	g. Establish RHR normal cooling (Refer to Attachment RHR COOL)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
44	Continue RCS Cooldown To Cold Shutdown: a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Check narrow range level in both S/Gs - LESS THAN 50%	b. Control feed flow to maintain narrow range level less than 50% in both S/Gs.
45	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 44.
46	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	

-END-

ECA-2.1 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) FIGURE SDM (FIG-2.0)
4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
5) ATTACHMENT FAULTED S/G (ATT-10.0)
6) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
7) ATTACHMENT NC (ATT-13.0)
8) ATTACHMENT RCP START (ATT-15.0)
9) ATTACHMENT N2 PORVS (ATT-12.0)
10) ATTACHMENT SEAL COOLING (ATT-15.2)
11) ATTACHMENT SI/UV (ATT-8.4)
12) ATTACHMENT D/G STOP (ATT-8.1)
13) ATTACHMENT SD-1 (ATT-17.0)
14) ATTACHMENT SD-2 (ATT-17.1)
15) ATTACHMENT RHR COOL (ATT-14.1)
16) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

   Manually start SI pumps as necessary if EITHER condition listed below occurs:

   - RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
   - PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% ADVERSE CNMT]

2. E-2 TRANSITION CRITERIA

   IF any S/G pressure increases at any time (except while performing SI termination in Steps 18 and 19), THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

   IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

   IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

5. E-3 TRANSITION CRITERIA

   IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

3-31-2000

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS for an SGTR concurrent with a LOCA (i.e. Ruptured-Faulted S/G).

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G can not be isolated from any intact S/G.

b. E-3, STEAM GENERATOR TUBE RUPTURE, if PRZR PORV can not be isolated by closing its block valve.

c. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G is faulted.

d. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if no intact S/G is available for RCS cooldown.

e. E-3, STEAM GENERATOR TUBE RUPTURE, if minimum D/P between ruptured and intact S/G cannot be maintained.

f. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS subcooling is less than required.

g. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS pressure does not increase after closing PRZR PORV and block valve.

h. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI can not be terminated.

i. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI is reinitiated after termination.

j. E-3, STEAM GENERATOR TUBE RUPTURE, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if SI accumulators should not be isolated.

k. ES-3.1, POST-SGTR COOLDOWN USING BACKFILL,
ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and
ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if a non-ruptured S/G is not available for RCS cooldown.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.
- IF PRZR LEVEL IS LESS THAN 50% OR IF ADVERSE CNMT CONDITIONS EXIST, THEN PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL IS EVALUATED BY THE TSC.
- 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.

* *

NOTE:
- Foldout page should be open AND monitored periodically.
- Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Reset SI

2 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (257 kw each). IF less than two SW pumps running, THEN perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1). 3) Go to Step 5.
	b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED	a. Perform the following: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).
b.	Verify SW isolation valves to turbine building - OPEN • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664	b. Manually align valves.
c.	Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	d. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 5. WHEN IA restored, THEN do Steps 4e and f.
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 5	Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN	Perform the following: a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed. b. Perform the following, as necessary: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) WHEN bus 15 restored, THEN reset control room lighting. 7) Refer to Attachment SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 6	Monitor If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - ANY RUNNING	a. Go to Step 7.
	b. Check the following: o CNMT pressure - LESS THAN 4 PSIG o Sodium hydroxide tank level - LESS THAN 55%	b. Continue with Step 7. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 6c through f.
	c. Reset CNMT spray	
	d. Check NaOH tank outlet valves - CLOSED • AOV-836A • AOV-836B	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
	e. Stop CNMT spray pumps and place in AUTO	
	f. Close CNMT spray pump discharge valves • MOV-860A • MOV-860B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.

7 Check Ruptured S/G Level:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. IF ruptured S/G NOT faulted, THEN perform the following:

1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].

2) Continue with Step 8. WHEN ruptured S/G level greater than 5% [25% adverse CNMT], THEN do Steps 7b through e.

b. Close MDAFW pump discharge valve to ruptured S/G

- S/G A, MOV-4007
- S/G B, MOV-4008

b. Dispatch AO to locally close valve.

c. Pull stop MDAFW pump for ruptured S/G

d. Close TDAFW pump flow control valve to ruptured S/G

- S/G A, AOV-4297
- S/G B, AOV-4298

d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.

- S/G A, V-4005
- S/G B, V-4006

e. Verify MDAFW pump crosstie valves - CLOSED

- MOV-4000A
- MOV-4000B

e. Manually close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS-THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.

* *

8 Check If RHR Pumps Should Be Stopped:

a. Check RCS pressure:

- Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]
- Pressure - STABLE OR INCREASING

a. Go to Step 9.

b. Stop RHR pumps and place in AUTO

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Evaluate Plant Status:	
	a. Check auxiliary building radiation - NORMAL • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • Letdown line monitor (R-9) • CHG pump room (R-4)	a. Notify RP and refer to appropriate AR-RMS procedure.
	b. Direct RP to obtain following samples: • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron	
	c. Verify adequate Rx head cooling: 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING	1) Manually start one fan as power supply permits (45 kw). 2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Establish 75 GPM Charging Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with RWST area key to locally isolate seal injection to affected RCP. • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open.
	b. Align charging pump suction to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). IF LCV-112C can NOT be closed, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and establish 75 gpm total charging flow • Charging line flow • Seal injection	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check If S/G Secondary Side Is Intact: o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 110 PSIG	IF any S/G pressure decreasing in an uncontrolled manner OR completely depressurized, THEN verify faulted S/G isolated unless needed for RCS cooldown: • Steamlines • Feedlines IF NOT, THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

NOTE: TDAFW pump flow control valves fail open on loss of IA.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*12	Monitor Intact S/G Levels:	
	a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in intact S/G.
	b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	b. IF narrow range level in the intact S/G continues to increase in an uncontrolled manner, THEN consider isolating unnecessary release paths: • TDAFW pump steam supply valves • S/G blowdown valves • Refer to Attachment RUPTURED S/G

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

13 Initiate RCS Cooldown To Cold Shutdown:

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

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G

c. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available, THEN perform the following:

- Use faulted S/G.

-OR-

- IF RHR system NOT in service, THEN use ruptured S/G.

*14 Monitor Conditions For Subcooled Recovery:

a. Check RWST level - GREATER THAN 50%

a. IF CNMT sump B level is less than 113 inches, THEN go to ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 1.

b. Check ruptured S/G narrow level - LESS THAN 90% [80% adverse CNMT]

b. Consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0° USING FIGURE MIN SUBCOOLING	Go to Step 28.
16	Check Safeguards Pump Status o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	Go to Step 24.
17	Place PRZR Heater Switches In The Following Positions: o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF	
18	Check PRZR level - LESS THAN 13% [40% adverse CNMT]	Go to Step 20.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE:
- o When using PRZR PORV, select one with an operable block valve.
- o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

19 Depressurize RCS To Refill PRZR:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. Use normal PRZR spray valve associated with running RCP • RCP A, PCV-431A • RCP B, PCV-431B	a. Use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS. IF no PORV available, THEN use auxiliary spray valve.
b. PRZR level - GREATER THAN 13% [40% adverse CNMT]	b. Continue with Step 20. WHEN level greater than 13% [40% adverse CNMT], THEN stop RCS depressurization.
c. Stop RCS depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
- INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.

* *

20 Check If An RCP Should Be Started:

a. Both RCPs - STOPPED

a. Stop all but one RCP and go to Step 21.

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

b. Go to Step 28.

c. PRZR level - GREATER THAN 13% [40% adverse CNMT]

c. Return to Step 18.

d. Try to start an RCP

1) Establish conditions for starting an RCP

- Bus 11A or 11B energized
- Refer to Attachment RCP START

2) Start one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 22.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT], OR IF RHR normal cooling in service, THEN go to Step 28. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 21c. IF no RHR pump can be started in injection mode, THEN go to Step 28.
	c. Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 18.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

22 Check If One Of Two SI Pumps Should Be Stopped:

a. Two SI pumps - RUNNING

a. Go to Step 23.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT], OR IF RHR normal cooling in service, THEN go to Step 28.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 22d. IF no RHR pump can be started in injection mode, THEN go to Step 28.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 18.

e. Stop one SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

23 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 28. IF NOT, THEN go to Step 24.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	255°F [295°F adverse CNMT]
TWO	235°F [285°F adverse CNMT]
THREE	210°F [270°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 28.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 23d. IF no RHR pump can be started in injection mode, THEN go to Step 28.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 18.

e. Stop running SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check If Charging Flow Should Be Controlled To Maintain PRZR Level:	
	a. Check RHR pumps - RUNNING IN INJECTION MODE	a. Start charging pumps and control charging flow to maintain PRZR level and go to Step 25.
	b. Go to Step 28	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
- INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.

* *

25 Check RCP Status:

a. RCPs - AT LEAST ONE RUNNING

a. Try to start one RCP

1) IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

   - o Increase PRZR level to greater than 65% [82% adverse CNMT]
   - o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING
   - o Energize PRZR heaters as necessary to saturate PRZR water

2) Establish conditions for starting an RCP:

   - o Verify bus 11A or 11B energized.
   - o Refer to Attachment RCP START.

3) 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.

b. Stop all but one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

26 Depressurize RCS To Minimize RCS Subcooling:

a. Depressurize using normal PRZR spray if available

a. Depressurize using one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

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

b. Energize PRZR heaters as necessary

c. Depressurize RCS until EITHER of the following conditions satisfied:

o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING

-OR-

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.

27 Verify Adequate Shutdown Margin

a. Direct RP to sample RCS and ruptured S/G for boron concentration

b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM

b. Borate as necessary.

*28 Monitor SI Reinitiation Criteria:

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

a. Manually start SI pumps as necessary and go to Step 29.

b. PRZR level - GREATER THAN 5% [30% adverse CNMT]

b. Manually start SI pumps as necessary and return to Step 18.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check If SI ACCUMs Should Be Isolated:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. IF both RCS hot leg temperatures less than 400°F, THEN go to Step 29c. IF NOT, THEN go to Step 30.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Return to Step 18.
	c. 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	
	d. Close SI ACCUM discharge valves • MOV-841 • MOV-865	d. Vent any unisolated ACCUMs: 1) Open vent valves for unisolated SI ACCUMs. • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.
	e. Locally reopen breakers for MOV-841 and MOV-865	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check If Emergency D/Gs Should Be Stopped:	
	a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
	b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	
31	Minimize Secondary System Contamination:	
	a. Isolate reject from hotwell to CST: o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE	a. IF hotwell level increasing, THEN direct RP to sample hotwells for activity.
	b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 33.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.
33	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
	a. Check CCW to RCPs o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	b. Check RCP seal injection o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Check If Seal Return Flow Should Be Established:	
	a. Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
	b. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 35.
	c. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
	d. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	e. Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	f. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, THEN close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B IF both RCP seal discharge valves are shut, THEN go to Step 35.
	g. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

35 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 35e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 36. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 35c, d and e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with Step 36. WHEN either condition met, THEN do Steps 35d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 36.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*37	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow. IF either of the following conditions occurs, THEN stop feed flow to ruptured S/G unless needed for RCS cooldown: o Ruptured S/G pressure decreases in an uncontrolled manner. -OR- o Ruptured S/G pressure increases to 1020 psig.
*38	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 39.
	b: Check the following: o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	b. Stop affected RCP(s).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Manually or locally dump steam using intact S/G ARV. IF no intact S/G available, THEN: o Use faulted S/G. -OR- o IF RHR system NOT in service, THEN use ruptured S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 41.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 41.
	c. Place letdown pressure controller in MANUAL CLOSED	
	d. Check following valves - OPEN • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)	d. Perform the following: 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
	e. Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 41.
	f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	g. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 41.

41 Check CNMT Hydrogen Concentration:

a. Direct RP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

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

42 Check Core Exit T/Cs - LESS THAN 200° F

Return to Step 8.

43 Evaluate Long Term Plant Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

ECA-3.1 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) FIGURE SDM (FIG-2.0)
4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
5) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
6) ATTACHMENT SI/UV (ATT-8.4)
7) ATTACHMENT RUPTURED S/G (ATT-16.0)
8) ATTACHMENT N2 PORVS (ATT-12.0)
9) ATTACHMENT RCP START (ATT-15.0)
10) ATTACHMENT D/G STOP (ATT-8.1)
11) ATTACHMENT SEAL COOLING (ATT-15.2)
12) ATTACHMENT SD-1 (ATT-17.0)
13) ATTACHMENT SD-2 (ATT-17.1)
14) ATTACHMENT RHR COOL (ATT-14.1)
15) ATTACHMENT NC (ATT-13.0)
16) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52%. [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary:

- RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
- PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SATURATED RECOVERY CRITERIA

IF ruptured S/G narrow range level increases to greater than 90% [80% adverse CNMT], THEN consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

3. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS)

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

3-31-2000

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, when RWST level is low without a corresponding increase in containment sump level.

b. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, when the ruptured S/G level is high and plant staff selects saturated recovery method.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.

* *

NOTE:
- Steps 1 through 14 of ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, should be performed before continuing with this procedure.
- FOLDOUT page should be open and monitored periodically.
- Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Add Makeup To RWST As Necessary:

- Refer to S-9J, BLENDING TO RWST

-OR-

- Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST TO SFP

-OR-

- Refer to Attachment SFP-RWST

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.

* *

2 Check Ruptured S/G Level:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. IF ruptured S/G NOT faulted, THEN perform the following:

1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].

2) Continue with Step 3. WHEN ruptured S/G level greater than 5% [25% adverse CNMT], THEN do Steps 2b through e.

b. Close MDAFW pump discharge valve to ruptured S/G

- S/G A, MOV-4007
- S/G B, MOV-4008

b. Dispatch AO to locally close valve.

c. Pull stop MDAFW pump for ruptured S/G

d. Close TDAFW pump flow control valve to ruptured S/G

- S/G A, AOV-4297
- S/G B, AOV-4298

d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.

- S/G A, V-4005
- S/G B, V-4006

e. Verify MDAFW pump crosstie valves - CLOSED

- MOV-4000A
- MOV-4000B

e. Manually close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- 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.
- RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.

* *

3 Check If RHR Pumps Should Be Stopped:

a. Check RCS pressure:

1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]

2) RCS pressure - STABLE OR INCREASING

a. Go to Step 4.

b. Stop RHR pumps and place in AUTO

4 Check If S/G Secondary Side Is Intact:

- Pressure in both S/Gs - STABLE OR INCREASING
- Pressure in both S/Gs - GREATER THAN 110 PSIG

IF any S/G pressure decreasing in an uncontrolled manner OR completely depressurized, THEN verify faulted S/G isolated unless needed for RCS cooldown:

- Steamlines
- Feedlines

IF NOT, THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: TDAFW pump flow control valves fail open on loss of IA.

* 5 Monitor Intact S/G Level:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

b. IF narrow range level in the intact S/G continues to increase in an uncontrolled manner, THEN consider isolating unnecessary release paths:

- TDAFW pump steam supply valves
- S/G blowdown valves
- Refer to Attachment RUPTURED S/G

NOTE: Shutdown margin should be monitored during RCS cooldown. Refer to Figure SDM.

6 Initiate RCS Cooldown To Cold Shutdown:

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

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G

c. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available, THEN perform the following:

o Use faulted S/G.

-OR-

o IF RHR system NOT in service, THEN use ruptured S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	Go to Step 19.
8	Check Safeguards Pump Status o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	Go to Step 15.
9	Place PRZR Heater Switches In The Following Positions: o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE: o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

o When using PRZR PORV, select one with an operable block valve.

10 Depressurize RCS To Refill PRZR:

a. Use normal PRZR spray valve associated with running RCP

- PCV-431A for A RCP
- PCV-431B for B RCP

a. Use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

IF no PORV available, THEN use auxiliary spray valve.

b. PRZR level - GREATER THAN 13% [40% adverse CNMT]

b. Continue with Step 11. WHEN level greater than 13% [40% adverse CNMT], THEN stop RCS depressurization.

c. Stop RCS depressurization

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
- INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.

* *

11 Check If An RCP Should Be Started:

a. Both RCPs - STOPPED

a. Stop all but one RCP and go to Step 12.

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

b. Go to Step 19.

c. PRZR level - GREATER THAN 13% [40% adverse CNMT]

c. Return to Step 10.

d. Try to start an RCP

1) Establish conditions for starting an RCP

- Bus 11A or 11B energized
- Refer to Attachment RCP START

2) Start one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 13.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 10°F [10°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 12c. IF no RHR pump can be started in injection mode, THEN go to Step 19.
	c. Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 10.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If One Of Two SI Pumps Should Be Stopped:	
	a. Two SI pumps - RUNNING	a. Go to Step 14.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [35°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 13c. IF no RHR pump can be started in injection mode, THEN go to Step 19.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 10.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 19. IF NOT, THEN go to Step 15.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	215°F [215°F adverse CNMT]
TWO	150°F [150°F adverse CNMT]
THREE	80°F [80°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 14d. IF no RHR pump can be started in injection mode, THEN go to Step 19.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 10.

e. Stop running SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If Charging Flow Should Be Controlled To Maintain RCS Inventory:	
	a. Check RHR pumps - RUNNING IN INJECTION MODE	a. Perform the following: 1) Control charging flow to maintain RCS inventory: o RVLIS level (no RCPs) - BETWEEN 77% AND 82% [82% AND 85% adverse CNMT] -OR- o RVLIS fluid fraction (any RCP running) - BETWEEN 84% AND 90% 2) Go to Step 16.
	b. Go to Step 19	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

- IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
- INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.

16 Check RCP Status:

a. RCPs - AT LEAST ONE RUNNING

a. Try to start one RCP

1) IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

- o Increase PRZR level to greater than 65% [82% adverse CNMT]
- o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING
- o Energize PRZR heaters as necessary to saturate PRZR water

2) Establish conditions for starting an RCP:

- o Verify bus 11A or 11B energized.
- o Refer to Attachment RCP START.

3) 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.

b. Stop all but one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

- VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.
- IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG.

NOTE:
- If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.
- When using PRZR PORV, select one with an operable block valve.

17 Depressurize RCS To Saturation At Core Exit:

a. Determine saturation pressure for core exit T/Cs using Figure TSAT

b. Use normal PRZR spray valves associated with running RCP
   - PCV-431A for A RCP
   - PCV-431B for B RCP

b. Use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

   IF PORV NOT available, THEN use auxiliary spray valve (AOV-296).

c. Energize PRZR heaters as necessary

d. Depressurize RCS until EITHER of the following conditions satisfied:
   - PRZR level - GREATER THAN 75% [65% adverse CNMT]

   -OR-

   - RCS pressure - AT SATURATION FROM STEP 17a

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
*19	Monitor SI Reinitiation Criteria:	
	a. Core exit T/Cs - DECREASING	a. Manually start SI pumps as necessary.
	b. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid Fraction (any RCP running) - GREATER THAN 84%	b. Manually start SI pumps as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If SI ACCUMs Should Be Isolated:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. IF both RCS hot leg temperatures less than 400°F, THEN go to Step 20c. IF NOT, THEN go to Step 21.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Return to Step 10.
	c. 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	
	d. Close SI ACCUM discharge valves • MOV-841 • MOV-865	d. Vent any unisolated ACCUMs: 1) Open vent valves for unisolated SI ACCUMs. • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.
	e. Locally reopen breakers for MOV-841 and MOV-865	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If Emergency D/Gs Should Be Stopped:	
	a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
	b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	
22	Minimize Secondary System Contamination:	
	a. Isolate reject from hotwell to CST: o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE	a. IF hotwell level increasing, THEN direct RP to sample hotwells for activity.
	b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 24.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.
24	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
	a. Check CCW to RCPs o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	b. Check RCP seal injection o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Check If Seal Return Flow Should Be Established:	
	a. Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
	b. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 26.
	c. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
	d. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	e. Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	f. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, THEN close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B IF both RCP seal discharge valves are shut, THEN go to Step 26.
	g. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

26 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 26e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 27. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 26c, d and e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with Step 27. WHEN either condition met, THEN do Steps 26d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 27.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling: 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING	1) Manually start one fan as power supply permits (45 kw) 2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).
	d. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.

* *

*28 Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]

Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.

IF either of the following conditions occurs, THEN stop feed flow to ruptured S/G unless needed for RCS cooldown:

- o Ruptured S/G pressure decreases in an uncontrolled manner.

-OR-

- o Ruptured S/G pressure increases to 1020 psig.

*29 Monitor RCP Operation:

a. RCPs - ANY RUNNING

a. Go to Step 30.

b. Check the following:

- o RCP #1 seal D/P - GREATER THAN 220 PSID
- o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF

b. Stop the affected RCP(s).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.
31	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 32.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 32.
	c. Place letdown pressure controller in MANUAL CLOSED	
	d. Check following valves - OPEN • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)	d. Perform the following: 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
	e. Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 32.
	f. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	g. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 32.

32	Check CNMT Hydrogen Concentration:	
	a. Direct RP to start CNMT hydrogen monitors as necessary	
	b. Hydrogen concentration - LESS THAN 0.5%	b. Consult TSC to determine if hydrogen recombiners should be placed in service.
33	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 3.
34	Evaluate Long Term Plant Status:	
	a. Maintain cold shutdown conditions	
	b. Consult TSC	

-END-

ECA-3.2 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) FIGURE SDM (FIG-2.0)
4) FIGURE TSAT (FIG-8.0)
5) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
6) ATTACHMENT SFP-RWST (ATT-18.0)
7) ATTACHMENT N2 PORVS (ATT-12.0)
8) ATTACHMENT NC (ATT-13.0)
9) ATTACHMENT SEAL COOLING (ATT-15.2)
10) ATTACHMENT RCP START (ATT-15.0)
11) ATTACHMENT D/G STOP (ATT-8.1)
12) ATTACHMENT RUPTURED S/G (ATT-16.0)
13) ATTACHMENT SD-1 (ATT-17.0)
14) ATTACHMENT SD-2 (ATT-17.1)
15) ATTACHMENT RHR COOL (ATT-14.1)
16) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary:

- Core exit T/Cs - INCREASING

-OR-

- Check RVLIS indication:

  Level (no RCPs) - LESS THAN 77% [82% adverse CNMT]

  Fluid fraction (any RCP running) - LESS THAN 84%

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized, and has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

2-28-2001

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions for a SGTR with coincident loss of normal and auxiliary PRZR sprays and PORVs.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-3, STEAM GENERATOR TUBE RUPTURE, when PRZR pressure control is not available.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o Foldout page should be open AND monitored periodically.

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1	Check Ruptured S/G Narrow Range Level - LESS THAN 80% [60% adverse CNMT]	Go to Step 8.
2	Check RCP Status - AT LEAST ONE RUNNING	Try to start one RCP: a. Establish conditions for starting RCP. o Bus 11A and Bus 11B energized o Refer to Attachment RCP START b. Start one RCP. IF no RCP can be started, THEN go to Step 4.
3	Check IF Normal PRZR Spray Available:	
	a. Verify the following: 1) Verify IA to CNMT - AVAILABLE 2) Verify spray valve associated with running RCP - OPERABLE	a. Perform the following: 1) Place PRZR heater control group to PULL STOP. 2) Place PRZR heater backup group to OFF. 3) Place normal spray valve controllers to MANUAL at 0%. 4) Go to Step 4.
	b. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Try To Restore PRZR PORV:	
	a. Block valves - AT LEAST ONE OPEN • MOV-516 for PCV-430 • MOV-515 for PCV-431C	a. Open one block valve unless it was closed to isolate an open PORV. If block valves can NOT be opened, THEN dispatch AO to locally ensure breakers to block valves closed. • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
	b. Check IA to CNMT - AVAILABLE	b. Refer to Attachment N2 PORVS to operate PORVs.
	c. Verify at least one PRZR PORV flow path - AVAILABLE	c. Go to Step 5.
	d. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 22	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: If auxiliary spray is the only means of RCS pressure control, THEN the 320°F ΔT limit between the spray line and PRZR does not apply.

5 Try To Establish Auxiliary Spray:

a. Charging pumps - AT LEAST ONE RUNNING

a. Perform the following:

1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN locally isolate seal injection to affected RCP.

- RCP A, V-300A
- RCP B, V-300B

2) Ensure HCV-142 demand at 0%.

3) Start charging pumps as necessary.

IF charging not available, THEN go to Step 6.

b. Establish auxiliary spray flow:

1) Open auxiliary spray valve (AOV-296)

2) Close charging valve to loop B cold leg (AOV-294)

b. IF auxiliary spray can NOT be established, THEN go to Step 6.

c. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21b

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: TDAFW pump flow control valves fail open on loss of IA.

* 6 Monitor Intact S/G Level:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

b. IF narrow range level in intact S/G continues to increase in an uncontrolled manner, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

7 Check PRZR Level - GREATER THAN 5% [30% adverse CNMT]

Return to Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check If SI Can Be Terminated:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	b. Secondary heat sink: o Total feed flow to intact S/Gs - GREATER THAN 200 GPM AVAILABLE -OR- o Narrow range level in intact S/G - GREATER THAN 5% [25% adverse CNMT]	b. IF neither condition satisfied, THEN do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	c. RVLIS indication o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84%	c. Do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	d. Any ruptured S/G narrow range level - INCREASING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH	d. Do NOT stop SI pumps. Return to Step 2.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Stop SI Pumps and Place In AUTO	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Charging pump suction aligned to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. Manually align valves as necessary. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). IF LCV-112C can NOT be closed, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and adjust charging flow to perform the following: o Restore PRZR level o Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*11	Monitor RCS Inventory: o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING o RVLIS indication o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84%	Perform the following: a. Manually start SI pumps as necessary. b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
12	Verify Adequate SW Flow To CCW Hx: a. Verify at least two SW pumps - RUNNING b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	a. Manually start pumps as power supply permits (257 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 20. b. Manually align valves. c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If Normal CVCS Operation Can Be Established	
	a. Verify IA restored: o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG	a. Continue with Step 17. WHEN IA restored, THEN do Steps 13 through 16.
	b. Verify instrument bus D - ENERGIZED	b. Energize MCC B. IF MCC B NOT available, THEN perform the following: 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
	c. CCW pumps - ANY RUNNING	c. Perform the following: 1) IF any RCP #1 seal outlet temperature offscale high, THEN isolate CCW to thermal barrier of affected RCP(s). • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
	d. Charging pump - ANY RUNNING	d. Continue with Step 20. WHEN any charging pump running, THEN do Steps 14 through 17.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: If PRZR level is less than 13%, letdown may be established by placing AOV-427 to OPEN.

14 Establish Normal Letdown:

a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM

b. Place the following switches to CLOSE:

- Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)
- AOV-371, letdown isolation valve
- AOV-427, loop B cold leg to REGEN Hx

c. Place letdown controllers in MANUAL at 40% open

- 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

IF RCP seal return has been established, THEN establish excess letdown as follows:

- o Place excess letdown divert valve, AOV-312, to NORMAL.
- o Ensure CCW from excess letdown open, (AOV-745).
- o Open excess letdown isolation valve AOV-310.
- o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.
- o Adjust charging pump speed as necessary.

IF RCP seal return NOT established, THEN consult TSC to determine if excess letdown should be placed in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Adjust RMW flow control valve in AUTO to 40 gpm	
	c. Verify the following: 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT	c. Adjust controls as necessary.
	d. Check VCT level: o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	d. 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. 3) Increase RMW flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	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 17. WHEN VCT level greater than 40%, THEN do Step 16b.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check RCP Cooling: a. Check CCW to RCPs: o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED b. Check RCP seal injection: o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If Seal Return Flow Should Be Established:	
	a. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 19.
	b. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	b. Manually open valves as necessary.
	c. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	d. Open RCP seal return isolation valve MOV-313	d. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	e. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 19.
	f. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Equalize Charging And Letdown Flows: a. Verify charging pump controllers in manual b. Control charging and seal injection flows to equal letdown and seal leakoff flows	
20	Check If Emergency D/Gs Should Be Stopped: a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
21	Minimize Secondary System Contamination: a. Isolate reject from hotwell to CST: o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)	a. IF hotwell level increasing, THEN direct RP to sample hotwells for activity.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

22 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 22e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 23. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 22c through e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with Step 23. WHEN either condition met, THEN do Steps 22d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 22.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling: 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING	1) Manually start one fan as power supply permits (45 kw) 2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)
	d. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Plant staff should decide whether to repair PRZR pressure control systems or continue with this procedure. If PRZR pressure control is established, PRZR level should be restored to greater than 5% [30% adverse CNMT] and then further recovery should continue with E-3, STEAM GENERATOR TUBE RUPTURE, Step 32.

24 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 (no RCPs - GREATER THAN 77% [82% adverse CNMT]

    -OR-

  - o Fluid fraction (any RCP running) - GREATER THAN 84%

a. Return to Step 11.

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

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.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.

25 Verify Adequate Shutdown Margin

a. Direct RP to sample RCS and ruptured S/G for boron concentration

b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM

b. Borate as necessary.

26 Maintain Required RCP Seal Injection Flow And Labyrinth Seal D/P:

- Labyrinth seal D/P to each RCP - GREATER THAN 15 INCHES OF WATER
- RCP seal injection flow - GREATER THAN 6 GPM

Perform the following:

- Adjust charging flow to REGEN Hx, HCV-142 as necessary.

-OR-

- Dispatch AO to adjust seal injection needle valves V-300A and V-300B if necessary.

27 Initiate RCS Cooldown to 350°F In RCS Cold Legs:

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

b. Dump steam to condenser from intact S/G

b. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available, THEN use faulted S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN THE RUPTURED S/G ARV SETPOINT.

* *

28 Control Charging Flow To Maintain RCS Subcooling:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING

a. Increase charging flow to maintain subcooling greater than 20°F using Figure MIN SUBCOOLING and go to Step 29.

b. Ruptured S/G narrow range level - LESS THAN 90% [80% adverse CNMT]

b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 29.

c. Ruptured S/G narrow range level - STABLE OR DECREASING

c. IF ruptured S/G level increasing, THEN decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using Figure MIN SUBCOOLING.

29 Check If RCS Cooldown Should Be Stopped:

a. RCS cold leg temperatures - LESS THAN 350°F

a. Return to Step 25.

b. Stop RCS cooldown

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check RCS Pressure - GREATER THAN 400 PSIG [300 PSIG adverse CNMT]	Go to Step 33.
*31	Monitor Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow. IF any of the following conditions occurs, THEN stop feed flow to ruptured S/G: o Ruptured S/G pressure decreases in an uncontrolled manner. -OR- o Ruptured S/G pressure increases to 1020 psig. -OR- o Ruptured S/G pressure decreases to 350 psig psig AND ruptured S/G level greater than 5% [25% adverse CNMT]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- STEAM SHOULD NOT BE RELEASED FROM A RUPTURED S/G IF WATER MAY EXIST IN ITS STEAMLINE.
- RUPTURED S/G PRESSURE MAY DECREASE RAPIDLY WHEN STEAM IS RELEASED.

* *

32 Depressurize RCS And Ruptured S/G To 400 PSIG [300 PSIG adverse CNMT]

a. Perform the following:

- Decrease charging and increase letdown to initiate backfill

-OR-

- Initiate blowdown from ruptured S/G

-OR-

- Dump steam from ruptured S/G

b. Check RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]

b. Return to Step 31.

c. Stop RCS depressurization

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 27.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 31.
	c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. IF RCS overpressure protection system can NOT be placed in service, THEN notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
	NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.	
34	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Initiate RCS Cooldown To Cold Shutdown:	
	a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Use RHR system if in service	
	c. Dump steam to condenser from intact S/G	c. Manually or locally dump steam from intact S/G using ARVs. IF no intact S/G available and RHR system NOT in service, THEN use faulted S/G.
36	Control Charging Flow To Maintain RCS Subcooling:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING	a. Increase charging flow to maintain subcooling greater than 20°F using Figure MIN SUBCOOLING and go to Step 37.
	b. Ruptured S/G narrow range level - LESS THAN 90% [80% adverse CNMT]	b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 37.
	c. Ruptured S/G narrow range level - STABLE OR DECREASING	c. IF ruptured S/G level increasing, THEN decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using Figure MIN SUBCOOLING.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*37	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 39.
	b. Check the following:	b. Stop the affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	
38	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 34.
39	Evaluate Long Term Plant Status:	
	a. Maintain cold shutdown conditions	
	b. Consult TSC	

-END-

ECA-3.3 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) FIGURE SDM (FIG-2.0)
4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
5) ATTACHMENT RCP START (ATT-15.0)
6) ATTACHMENT N2 PORVS (ATT-12.0)
7) ATTACHMENT RUPTURED S/G (ATT-16.0)
8) ATTACHMENT D/G STOP (ATT-8.1)
9) ATTACHMENT SD-1 (ATT-17.0)
10) ATTACHMENT SEAL COOLING (ATT-15.2)
11) ATTACHMENT SD-2 (ATT-17.1)
12) ATTACHMENT RHR COOL (ATT-14.1)
13) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING

- OR -

- o Check RVLIS indication:

  Level (no RCPs) - LESS THAN 77% [82% adverse CNMT]
  Fluid Fraction (any RCP running) - LESS THAN 84%

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

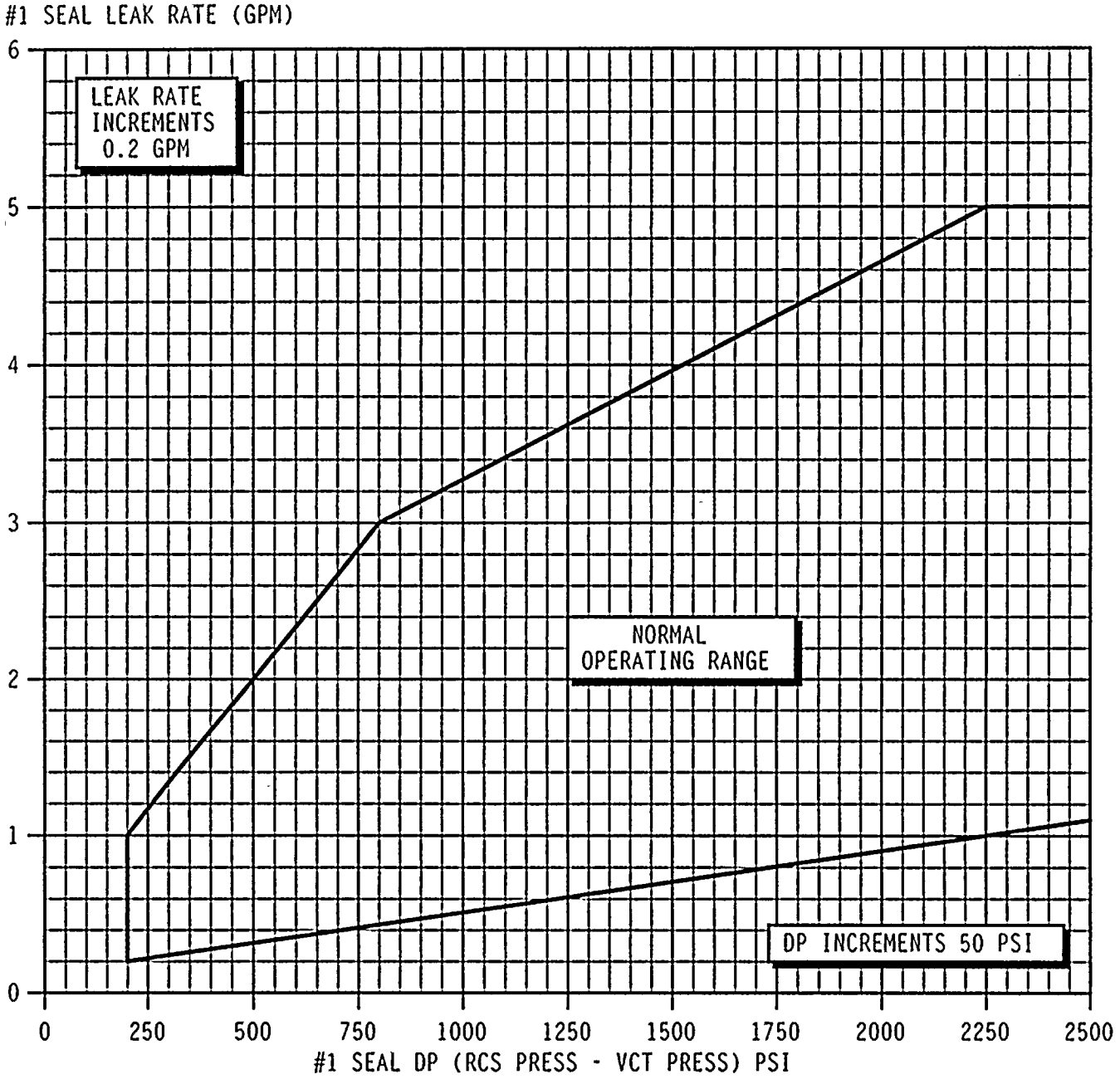
4. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

EOP:	TITLE:	REV: 2
FIG-4.0	FIGURE RCP SEAL LEAKOFF	PAGE 1 of 1

Responsible Manager _____ Date 2-28-2001

FIGURE RCP SEAL LEAKOFF



ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

3-31-2000

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip without a safety injection.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-0, REACTOR TRIP OR SAFETY INJECTION, when SI is neither actuated nor required.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF SI ACTUATION OCCURS DURING THIS PROCEDURE, THEN E-0, REACTOR TRIP OR SAFETY INJECTION, SHOULD BE PERFORMED.

* *

NOTE: o FOLDOUT page should be open and monitored periodically.

o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.)

* 1 Monitor RCS Tavg - STABLE AT OR TRENDING TO 547°F

IF temperature less than 547°F and decreasing, THEN perform the following:

a. Stop dumping steam.

b. Ensure S/G blowdown and sample valves closed.

c. Ensure reheater steam supply valves are closed.

d. IF MDAFW pumps supplying greater than 200 gpm, THEN ensure TDAFW pump steam supply valves in PULL STOP.

e. IF cooldown continues, THEN control total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G. WHEN S/G level greater than 5% in one S/G, THEN limit feed flow to that required to maintain S/G level.

f. IF cooldown continues, THEN close both MSIVs.

IF temperature greater than 547°F and increasing, THEN dump steam to stabilize and slowly decrease temperature to 547°F.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF A MFW PUMP IS LEFT RUNNING ON RECIRC FOR EXTENDED PERIODS OF TIME, OVERHEATING MAY OCCUR.

2 Check S/G Feed Flow Status:

a. Check RCS Tavg - LESS THAN 554°F

a. Continue with Step 3. WHEN temperature less than 554°F, THEN do Steps 2b, c, d and e.

b. Verify MFW flow control valves - CLOSED

- MFW regulating valves
- MFW bypass valves

b. Place A and B MFW regulating valve and bypass valve controllers in MANUAL at 0% demand.

c. Verify total AFW flow - GREATER THAN 200 GPM

c. Manually start both MDAFW pumps.

IF total AFW flow greater than 200 gpm can NOT be established, THEN perform the following:

o Manually start TDAFW pump.

-OR-

o Perform the following:

1) Establish MFW on bypass valves.

2) Go to step 3.

d. Close MFW pump discharge valves

- MOV-3977, A MFW pump
- MOV-3976, B MFW pump

d. Manually stop MFW pumps.

e. Stop MFW pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify MRPI Indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	IF one or more control rods NOT fully inserted, THEN perform the following: a. Place RMW mode selector switch to BORATE. b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate. c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted). d. Place RMW control to start and verify flow. IF flow can NOT be established, THEN refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Verify All AC Busses - ENERGIZED BY OFFSITE POWER o Normal feed breakers to all 480 volt busses - CLOSED o 480 volt bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN	Perform the following: a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed. b. Perform the following as necessary: 1) Ensure one CCW pump running. 2) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 3) Reset Bus 13 and Bus 15 lighting breakers. 4) Dispatch AO to locally reset and start two IA compressors. 5) Place the following pumps in PULL STOP: • EH pumps • Turning gear oil pump • HP seal oil backup pump 6) Restore power to MCCs. • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 7) Start HP seal oil backup pump 8) Start CNMT RECIRC fans as necessary. 9) Ensure D/G load within limits. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Verify At Least Two SW Pumps - RUNNING	Manually start SW pumps as necessary.
6	Verify IA Available: o Adequate air compressor(s) - RUNNING o IA pressure - GREATER THAN 60 PSIG	Dispatch AO to locally reset and start air compressors as necessary. IF IA pressure can NOT be maintained, THEN perform the following: a. Refer to AP-IA.1, LOSS OF INSTRUMENT AIR. b. Verify charging pump A NOT running and place in PULL STOP. c. Dispatch AO to locally open manual charging pump suction from RWST (V-358 in charging pump room). d. WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check PRZR Level Control:	
	a. Verify charging pumps - ANY RUNNING	a. Manually start charging pumps as necessary.
	b. PRZR level - GREATER THAN 13%	b. Perform the following: 1) Place loop B cold leg isolation valve to REGEN Hx (AOV-427) switch to close. 2) Verify excess letdown isolation valve (AOV-310) closed. 3) Ensure PRZR heaters off. 4) Control charging to restore PRZR level greater than 13%. 5) Continue with Step 8. <u>WHEN</u> PRZR level greater than 13%, <u>THEN</u> do Steps 7c through e.
	c. Verify letdown - IN SERVICE	c. Verify excess letdown in service. <u>IF NOT</u>, <u>THEN</u> manually place letdown in service (Refer to Attachment LETDOWN).
	d. PRZR level - TRENDING TO 35%	d. Control charging and letdown to maintain PRZR level at 35%.
	e. Check PRZR heaters - ENERGIZED AS NECESSARY o PRZR heater control group o PRZR heater backup group	e. Reset PRZR heaters and energize as necessary to restore PRZR pressure.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check PRZR Pressure Control:	
	a. PRZR pressure - GREATER THAN 1750 PSIG	a. Perform the following: 1) Verify SI actuation. IF NOT, THEN manually actuate SI. 2) Go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.
	b. PRZR pressure - GREATER THAN 2210 PSIG	b. IF pressure less than 2210 PSIG and decreasing, THEN perform the following: 1) Ensure PRZR PORVs closed. IF any valve can NOT be closed, THEN manually close its block valve. • PCV-430, MOV-516 • PCV-431C, MOV-515 2) Ensure normal PRZR spray valves closed. • PCV-431A • PCV-431B IF valves can NOT be closed, THEN stop associated RCP(s). 3) Ensure PRZR heaters energized.

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 8 continued from previous page)	
	c. PRZR pressure - LESS THAN 2260 PSIG	c. IF pressure greater than 2260 psig and increasing, THEN perform the following: 1) Verify demand on PRZR pressure controller PCV-431 greater than 50%. IF NOT, THEN place controller in MANUAL and increase as necessary. 2) Ensure PRZR heaters off. 3) Control pressure using normal PRZR spray. IF normal PRZR spray NOT available and letdown is in service, THEN perform the following: a) Verify spray line fluid to PRZR ΔT less than 320°F. IF NOT, THEN use one PORV. b) Use auxiliary spray. IF PRZR spray NOT available, THEN use one PRZR PORV.
* 9	Monitor S/G Levels:	
	a. Narrow range level - GREATER THAN 5%	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G.
	b. Control feed flow to maintain narrow range level between 17% and 52%.	b. IF narrow range level in any S/G continues to increase, THEN stop feed to that S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If TDAFW Pump Can Be Stopped:	
	a. Both MDAFW pumps - RUNNING	a. Go to Step 11.
	b. PULL STOP TDAFW pump steam supply valves • MOV-3504A • MOV-3505A	
11	Establish Condenser Steam Dump Pressure 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 AUTO at 1005 psig and verify proper operation. IF S/G ARV NOT controlling in AUTO, THEN control S/G ARV manually. 2) Go to Step 11d.
	b. Adjust condenser steam dump controller HC-484 to 1005 psig in AUTO	
	c. Place steam dump mode selector switch to MANUAL	
	d. Verify RCS Tavg - STABLE AT OR TRENDING TO 547°F	d. Return to Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check RCP Status - AT LEAST ONE RUNNING	Perform the following: 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

NOTE: Loss of forced air cooling may result in failure of NIS detectors.

13 Check If Source Range Detectors Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 13e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing THEN initiate boration.

2) Continue with Step 14. WHEN flux is less than 10^{-10} amps on any operable channel, THEN do Steps 13c, d and e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with Step 14. When either condition met, THEN do Steps 13d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION, and go to Step 14.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump (Refer to T-5F, STARTING OR STOPPING THE CONDENSATE PUMPS)	
	c. Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw).
	2) Verify one Rx compartment cooling fan - RUNNING	2) Manually start one fan as power supply permits (23 kw).
	d. Dispatch AO to perform Attachment SD-1	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Maintain Stable Plant Conditions:	
	a. PRZR pressure - BETWEEN 1800 PSIG AND 2260 PSIG	a. Control PRZR heaters and spray as necessary.
	b. PRZR level - BETWEEN 35% AND 40%	b. Control charging as necessary.
	c. S/G narrow range levels - BETWEEN 17% AND 52%	c. Control S/G feed flow as necessary.
	d. RCS Tavg - GREATER THAN 540°F	d. Control dumping steam as necessary. IF cooldown continues, THEN close both MSIVs.
16	Check VCT Makeup System:	
	a. Verify the following: 1) Adjust boric acid flow control valve to 9.5 gpm 2) Adjust RMW flow control valve to 40 gpm 3) RMW mode selector switch in AUTO 4) RMW control armed - RED LIGHT LIT	
	b. Check VCT level o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	b. Manually increase VCT makeup flow as follows: 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	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 18. WHEN VCT level greater than 40%, THEN do Step 17b.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Establish Normal AFW Pump Shutdown Alignment:	
	a. Verify the following: o Both S/G levels - GREATER THAN 17% AND STABLE OR INCREASING o Total AFW flow - LESS THAN 200 GPM	a. Continue with Step 20. WHEN conditions met, THEN do Steps 19b through f.
	b. Close MDAFW pump discharge valves • MOV-4007 • MOV-4008	
	c. Place AFW bypass switches to DEF	
	d. Stop all but one MDAFW pump	
	e. Open AFW discharge crossover valves • MOV-4000A • MOV-4000B	
	f. Open AFW bypass valves as necessary to control S/G levels • AOV-4480 • AOV-4481	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Determine If Cooldown Is Required:	
	a. Consult Plant Staff - COOLDOWN REQUIRED	a. Go to O-3, HOT SHUTDOWN WITH XENON PRESENT.
	b. At least one RCP - RUNNING	b. Perform the following: 1) Ensure 2 control rod shroud fans running. 2) Go to ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1.
	c. Go to O-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN	

-END-

ES-0.1 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) ATTACHMENT LETDOWN (ATT-9.0)
4) ATTACHMENT RCP START (ATT-15.0)
5) ATTACHMENT NC (ATT-13.0)
6) ATTACHMENT SD-1 (ATT-17.0)
7) ATTACHMENT SD-2 (ATT-17.1)
8) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI ACTUATION CRITERIA

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

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

- OR -

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

- OR -

- o Any automatic SI setpoint is reached

2. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

9-8-2000
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides the necessary instructions to terminate safety injection and stabilize plant conditions.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-0, REACTOR TRIP OR SAFETY INJECTION, and E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when specified termination criteria are satisfied.

b. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, after secondary heat sink has been reestablished and SI has been terminated.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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.

* *

NOTE: o FOLDOUT page should be open AND monitored periodically.

o Critical Safety Function Status Trees should be monitored (Refer to Appendix I for Red Path Summary).

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Reset SI

2 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.

3 Maintain PRZR Pressure Between 1800 PSIG And 2235 PSIG

o Reset PRZR heaters

o Use normal PRZR spray

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (257 kw each). IF less than two SW pumps running, THEN perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1). 3) Go to Step 7.
	b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Establish IA to CNMT:	
	a. Verify non-safeguards busses energized from offsite power o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED	a. Perform the following: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) WHEN bus 15 restored, THEN reset control room lighting.
	b. Verify SW isolation valves to turbine building - OPEN • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664	b. Manually align valves.
	c. Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.
	d. Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	d. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 6. WHEN IA restored, THEN do Steps 5e and f.
	e. Reset both trains of XY relays for IA to CNMT AOV-5392	
	f. Verify IA to CNMT AOV-5392 - OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Charging pump suction aligned to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. Manually align valves as necessary. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). IF LCV-112C can NOT be closed, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and adjust charging flow to restore PRZR level	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Stop SI And RHR Pumps And Place In AUTO	
* 8	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 9	Monitor If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - RUNNING	a. Go to Step 10.
	b. Check CNMT pressure - LESS THAN 4 PSIG	b. Continue with Step 10. <u>WHEN</u> CNMT pressure less than 4 psig, <u>THEN</u> do Steps 9c through f.
	c. Reset CNMT spray	
	d. Check NaOH tank outlet valves - CLOSED • AOV-836A • AOV-836B	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
	e. Stop CNMT spray pumps and place in AUTO	
	f. Close CNMT spray pump discharge valves • MOV-860A • MOV-860B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Verify MRPI Indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	IF one or more control rods NOT fully inserted, THEN perform the following: a. Place RMW mode selector switch to BORATE. b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate. c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted). d. Place RMW control to start and verify flow. IF flow can NOT be established, THEN refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.
11	Establish Condenser Steam Dump Pressure Control: a. Verify condenser available: o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO. c. Place steam dump mode selector switch to MANUAL.	a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 12.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw each). IF less than two SW pumps can be operated, THEN go to Step 18.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Manually start an additional SW pump as power supply permits (257 kw each).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If Normal CVCS Operation Can Be Established	
	a. Verify IA restored: o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG	a. Continue with Step 18. WHEN IA can be restored, THEN do Steps 13 through 17.
	b. Verify instrument bus D - ENERGIZED	b. Energize MCC B. IF MCC B NOT available, THEN perform the following: 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
	c. CCW pumps - ANY RUNNING	c. Perform the following: 1) IF any RCP #1 seal outlet temperature offscale high, THEN isolate CCW to thermal barrier of affected RCP(s). • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
	d. Charging pump - ANY RUNNING	d. Continue with Step 18. WHEN any charging pump running, THEN do Steps 14 through 17.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 16. WHEN PRZR level increases to greater than 13% [40% adverse CNMT], THEN do Step 15.
15	Establish Normal Letdown: a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx c. Place letdown controllers in MANUAL at 40% open • 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 to control PRZR level	IF RCP seal return has been established, THEN establish excess letdown as follows: o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. IF RCP seal return NOT established, THEN consult Plant Staff to determine if excess letdown should be placed in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Adjust RMW flow control valve in AUTO to 40 gpm	
	c. Verify the following: 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT	c. Adjust controls as necessary.
	d. Check VCT level: o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING	d. Manually increase VCT makeup flow as follows: 1) Ensure BA transfer pumps and RMW pumps running. IF NOT, THEN dispatch AO to locally 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
17	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 18. WHEN VCT level greater than 40%, THEN do Step 17b.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.
18	Check RCS Hot Leg Temperatures - STABLE	Control steam dump and total feed flow as necessary to stabilize RCS temperature.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

19 Control PRZR Heaters And Operate Normal Spray To Stabilize RCS Pressure

IF normal spray NOT available and letdown is in service, THEN perform the following:

a. Verify Regen Hx Chg outlet temp to PRZR Vapor temp ΔT less than 320°F. IF NOT, THEN control pressure using one PRZR PORV and go to Step 20.

b. Control pressure using auxiliary spray.

IF auxiliary spray NOT available, THEN use one PRZR PORV.

NOTE: TDAFW pump flow control valves fail open on loss of IA.

*20 Monitor Intact S/G Levels:

a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

b. IF narrow range level in any S/G continues to increase, THEN stop feed flow to that S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: SW should be aligned to CCW Hxs before restoring RCP seal cooling.

21 Check RCP Cooling:

Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).

a. Check CCW to RCPs:

- o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED
- o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED

b. Check RCP seal injection:

- o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER

-OR-

- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If Seal Return Flow Should Be Established:	
	a. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 23.
	b. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	b. Manually open valves as necessary.
	c. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	d. Open RCP seal return isolation valve MOV-313	d. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	e. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve. • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 23.
	f. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

23 Verify All AC Busses - ENERGIZED BY OFFSITE POWER

- o Normal feed breakers to all 480 volt busses - CLOSED
- o 480 volt bus voltage - GREATER THAN 420 VOLTS
- o Emergency D/G output breakers - OPEN

Perform the following:

a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed.

b. Perform the following as necessary:

1) Close non-safeguards bus tie breakers:

- Bus 13 to Bus 14 tie
- Bus 15 to Bus 16 tie

2) Reset Bus 13 and Bus 15 lighting breakers.

3) Dispatch AO to locally reset and start two IA compressors.

4) Place the following pumps in PULL STOP:

- EH pumps
- Turning gear oil pump
- HP seal oil backup pump

5) Restore power to MCCs.

- A from Bus 13
- B from Bus 15
- E from Bus 15
- F from Bus 15

6) Start HP seal oil backup pump.

7) Start CNMT RECIRC fans as necessary.

8) Ensure D/G load within limits.

9) Refer to Attachment SI/UV for other equipment lost with loss of offsite power.

c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

24 Check If Source Range Channels Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 24e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 25. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 24c, d and e.

c. Check the following:

- Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

- Greater than 20 minutes since reactor trip

c. Continue with step 25. WHEN either condition met, THEN do Steps 24d and e.

d. Verify source range detectors - ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION, and go to Step 25.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Check If Emergency D/Gs Should Be Stopped:	
	a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
	b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

* *

26 Check RCP Status - AT LEAST ONE RUNNING

Perform the following:

a. IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

- o Increase PRZR level to greater than 65% (82% adverse CNMT).
- o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING.
- o Energize PRZR heaters as necessary to saturate PRZR water.

b. Establish conditions for starting an RCP:

- o Verify bus 11A or 11B energized.
- o Refer to Attachment RCP START.

c. 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 from intact S/Gs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)
	d. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	Maintain Plant Conditions Stable:	
	a. RCS pressure - BETWEEN 1800 PSIG AND 2235 PSIG	a. Control PRZR heaters and spray as necessary.
	b. PRZR level - BETWEEN 35% AND 40%	b. Control charging as necessary.
	c. Intact S/G narrow range levels - BETWEEN 17% AND 52%	c. Control S/G feed flow as necessary.
	d. RCS cold leg temperature - STABLE	d. Control dumping steam as necessary. IF cooldown continues, THEN close both MSIVs.
*29	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

30 Go To Procedure O-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN

-END-

ES-1.1 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
4) ATTACHMENT D/G STOP (ATT-8.1)
5) ATTACHMENT NC (ATT-13.0)
6) ATTACHMENT SEAL COOLING (ATT-15.2)
7) ATTACHMENT RCP START (ATT-15.0)
8) ATTACHMENT SD-1 (ATT-17.0)
9) ATTACHMENT SD-2 (ATT-17.1)
10) ATTACHMENT SI/UV (ATT-8.4)
11) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

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

- OR -

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

RESPONSIBLE MANAGER

3-31-2000

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions following a loss of reactor coolant inventory.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when RCS pressure is greater than the shutoff head pressure of the RHR pumps.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, STEP 1.
- IF PRZR LEVEL IS LESS THAN 50% OR IF ADVERSE CNMT CONDITIONS EXIST, THEN PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL IS EVALUATED BY THE TSC.
- RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.

* *

NOTE: o Foldout page should be open and monitored periodically.

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Monitor If RHR Pumps Should Be Stopped:		
a. Check RCS pressure:		a. Go to Step 2.
1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]		
2) Pressure - STABLE OR INCREASING		
b. Stop RHR pumps and place AUTO		

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2	Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN	Perform the following: a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed. b. Perform the following, as necessary: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) WHEN bus 15 restored, THEN reset control room lighting. 7) Refer to Attachment SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Establish 75 GPM Charging Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with RWST area key to locally isolate seal injection to affected RCP: • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 open, demand at 0%.
	b. Align charging pump suction to RWST: o LCV-112B - OPEN o LCV-112C - CLOSED	b. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room). IF LCV-112C can NOT be closed, THEN perform the following: 1) Verify charging pump A NOT running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary (75 kw each) and establish 75 gpm total charging flow • Charging line flow • Seal injection flow	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Establish Condenser Steam Dump Pressure Control:	
	a. Verify condenser available: o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT	a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 5.
	b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO	
	c. Place steam dump mode selector switch to MANUAL	
	NOTE: TDAFW pump flow control valves fail open on loss of IA.	
* 5	Monitor Intact S/G Levels:	
	a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.
	b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	b. IF narrow range level in any S/G continues to increase in an uncontrolled manner, THEN go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

6 Initiate RCS Cooldown To Cold Shutdown:

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

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G(s)

c. Manually or locally dump steam using intact S/Gs ARV.

7 Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

Manually start SI pumps as necessary and go to Step 19.

8 Check SI and RHR Pump Status:

Go to Step 15.

- SI pumps - ANY RUNNING

-OR-

- RHR pumps - ANY RUNNING IN INJECTION MODE

9 Place PRZR Heater Switches In The Following Positions:

- PRZR heater control group - PULL STOP
- PRZR heater backup group - OFF

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

10	Depressurize RCS To Refill PRZR:	
	a. Depressurize using normal PRZR spray if available	a. Depressurize using one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS. IF no PORV available, THEN use auxiliary spray valve (AOV-296).
	b. PRZR level - GREATER THAN 13% [40% adverse CNMT]	b. Continue with Step 11. WHEN level greater than 13% [40% adverse CNMT], THEN stop RCS depressurization.
	c. Stop RCS depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

* *

11 Check If An RCP Should Be Started:

a. Both RCPs - STOPPED

a. Stop all but one RCP and go to Step 12.

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

b. Go to Step 19.

c. PRZR level - GREATER THAN 13% [40% adverse CNMT]

c. Return to Step 10.

d. Try to start an RCP

d. Ensure at least one control rod shroud fan running (45 kw each).

1) Establish conditions for starting an RCP

- o Bus 11A or 11B energized
- o Refer to Attachment RCP START

2) Start one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 13.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 12c. IF no RHR pump can be started in injection mode, THEN go to Step 19.
	c. Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 10.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13 Check If One Of Two SI Pumps Should Be Stopped:

a. Two SI pumps - RUNNING

a. Go to Step 14.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 13d. IF no RHR pump can be started in injection mode, THEN go to Step 19.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 10.

e. Stop one SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 19. IF NOT, THEN go to Step 15.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	255°F [295°F adverse CNMT]
TWO	235°F [285°F adverse CNMT]
THREE	210°F [270°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 14d. IF no RHR pump can be started in injection mode, THEN go to Step 19.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 10.

e. Stop running SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If Charging Flow Should Be Controlled To Maintain PRZR Level:	
	a. Check RHR pumps - RUNNING IN INJECTION MODE	a. Start charging pump and control charging flow to maintain PRZR level and go to Step 16.
	b. Go to Step 19	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

* *

16 Check RCP Status:

a. RCPs - AT LEAST ONE RUNNING

a. Perform the following:

1) Try to start one RCP:

a) IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

- Increase PRZR level to greater than 65% [82% adverse CNMT].
- Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING.
- Energize PRZR heaters as necessary to saturate PRZR water.

b) Establish conditions for starting an RCP:

- Verify Bus 11A ro 11B energized.
- Refer to Attachment RCP START.

c) Start one RCP.

2) IF an RCP can NOT be started, THEN verify natural circulation (Refer to Attachment NC).

IF natural circulation can NOT be verified, THEN increase dumping steam.

b. Stop all but one RCP

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

* *

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

17 Depressurize RCS To Minimize RCS Subcooling:

a. Depressurize using normal PRZR spray if available

a. IF normal spray NOT available, THEN use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

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

b. Energize PRZR heaters as necessary

c. Depressurize RCS until EITHER of the following conditions satisfied:

o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING

-OR-

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
*19	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to Step 20.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually start SI pumps as necessary and return to Step 10.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If SI ACCUMs Should Be Isolated:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. IF both RCS hot leg temperatures less than 400°F, THEN go to Step 20c. IF NOT, THEN go to Step 21.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Return to Step 10.
	c. 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	
	d. Close SI ACCUM discharge valves • ACCUM A, MOV-841 • ACCUM B, MOV-865	d. Vent any unisolated ACCUMs: 1) Open vent valves for unisolated SI ACCUMs. • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.
	e. Locally reopen breakers for MOV-841 and MOV-865	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If Emergency D/Gs Should Be Stopped:	
	a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
	b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	
22	Verify Adequate SW Flow To CCW Hx:	
	a. Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw per pump). IF less than two SW pumps can be operated, THEN go to Step 23.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
	c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check RCP Cooling a. Check CCW to RCPs o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED b. Check RCP seal injection o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check If Seal Return Flow Should Be Established:	
	a. Verify instrument bus D - ENERGIZED	a. Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
	b. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 25.
	c. Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
	d. Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
	e. Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
	f. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 25.
	g. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.	
25	Check If Source Range Detectors Should Be Energized:	
	a. Source range channels - DEENERGIZED	a. Go to Step 25e.
	b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS	b. Perform the following: 1) IF neither intermediate range channel is decreasing, THEN initiate boration. 2) Continue with Step 26. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 25c, d and e.
	c. Check the following: o Both intermediate range channels - LESS THAN 10^{-10} AMPS -OR- o Greater than 20 minutes since reactor trip	c. Continue with Step 26. WHEN either condition met, THEN do Steps 25d and e.
	d. Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2). IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 25.
	e. Transfer Rk-45 recorder to one source range and one intermediate range channel	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform Attachment SD-2.
	b. Perform the following: o Open generator disconnects • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling: 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING	1) Manually start one fan as power supply permits (45 kw) 2) Perform the following: o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)
	d. Verify Attachment SD-1 - COMPLETE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*27	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 28.
	b. Check the following:	b. Stop affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF	
28	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.
29	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 30.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 30.
	c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	d. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 30.

30 Check CNMT Hydrogen Concentration:

a. Direct RP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

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

31 Check Core Exit T/Cs - LESS THAN 200° F

Return to Step 1.

32 Evaluate Long Term Plant Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

ES-1.2 APPENDIX LIST

TITLE

1) RED PATH SUMMARY
2) FIGURE MIN SUBCOOLING (FIG-1.0)
3) FIGURE SDM (FIG-2.0)
4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
5) ATTACHMENT SEAL COOLING (ATT-15.2)
6) ATTACHMENT RCP START (ATT-15.0)
7) ATTACHMENT NC (ATT-13.0)
8) ATTACHMENT D/G STOP (ATT-8.1)
9) ATTACHMENT SD-1 (ATT-17.0)
10) ATTACHMENT SD-2 (ATT-17.1)
11) ATTACHMENT SI/UV (ATT-8.4)
12) ATTACHMENT N2 PORVS (ATT-12.0)
13) ATTACHMENT RHR COOL (ATT-14.1)
14) FOLDOUT

RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND RVLIS level (no RCPs) less than 52% [55% adverse CNMT]

c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary:
- o RCS subcooling based on core exit T/Cs - LESS THAN 0° F USING FIGURE MIN SUBCOOLING

- OR -

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SI TERMINATION CRITERIA

IF ALL conditions listed below occur, THEN go to ES-1.1, SI TERMINATION, Step 1:

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

b. Total feed flow to intact S/Gs - GREATER THAN 200 GPM

- OR -

Narrow range level in at least one intact S/G - GREATER THAN 5% [25% adverse CNMT]

c. RCS pressure:
   - o GREATER THAN 1625 PSIG [1825 psig adverse CNMT]
   - o STABLE OR INCREASING

d. PRZR level - GREATER THAN 5% [30% adverse CNMT]

3. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

6. E-3 TRANSITION CRITERIA

IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI Pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.