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SUBJECT: Forwards revised EOPs including rev 6 to ECA-0.1,rev 7 to ECA-1.1,rev 8 to ECA-3.1,rev 10 to ECA-3.2,rev 4 to ES-0.2, rev 9 to ES-1.2,rev 14 to ES-1.3,rev 5 to ES-3.1,rev 6 to ES-3.2,rev 6 to ES-3.3 & rev 6 to AP-CVCS.1.

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June 5, 1992

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Mr. Allen Johnson
Project Directorate I-3
Washington, D.C. 20555

Subject: Emergency Operating Procedures
R. E. Ginna Nuclear Power Plant
Docket No. 50-244

Gentlemen:

As requested, enclosed are Ginna Station Emergency Operating Procedures.

Very truly yours,

Robert C. Mecredy

Robert C. Mecredy

Enclosures
c: Mr. Lee Bettenhausen, USNRC, Region 1
Resident Inspector, Ginna Station

Cert No P748978410

A003
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emergency.pro

ECA-0.1	Loss of All AC Power Recovery Without SI Required
ECA-1.1	Loss of Emergency Coolant Recirculation
ECA-3.1	SGTR With Loss of Reactor Coolant - Subcooled Recovery Desired
ECA-3.2	SGTR With Loss of Reactor Coolant - Saturated Recovery Desired
ECA-3.3	SGTR Without Pressurizer Pressure Control
ES-0.2	Natural Circulation Cooldown
ES-1.2	Post LOCA Cooldown and Depressurization
ES-1.3	Transfer to Cold Leg Recirculation
ES-3.1	Post-SGTR Cooldown Using Backfill
ES-3.2	Post-SGTR Cooldown Using Blowdown
ES-3.3	Post-SGTR Cooldown Using Steam Dump
AP-CVCS.1	CVCS Leak
AP-CCW.2	Loss of CCW During Power Operation

50-244 Superseded Per Rev's to EPIP's Dtd 6/5/92 #9206160376

EOP:	TITLE:	REV: 5
ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	PAGE 1 of 20

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>NOTE</u>:
- o CSFSTs should be monitored for information only. FR procedures should not be implemented prior to completion of Step 11.
- 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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. <u>IF</u> valves open or position not known, <u>THEN</u> check CCW pump status: 1) <u>IF</u> pump running, <u>THEN</u> go to Step 2. 2) <u>IF</u> pump <u>NOT</u> running, <u>THEN</u> manually close valves. <u>IF</u> valve(s) can <u>NOT</u> be closed, <u>THEN</u> place switches for RCP thermal barrier CCW outlet valves to CLOSE. • AOV-754A • AOV-754B
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). <u>IF</u> less than two SW pumps running, <u>THEN</u> 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. <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> 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. <u>WHEN</u> IA restored, <u>THEN</u> 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.

*

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) Check IA to CNMT - AVAILABLE

> 1) Go to Step 5.

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

> 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)

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

> 3) 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	Verify SI Flow Not Required:	
	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. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> 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 Check 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 50%

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	

NOTE: If any heat tracing or BAST temperatures are low, flowpaths from the BASTs should be evaluated before being used.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check BAST Temperature: o Annunciator B-31, BAST TEMP OR LO N2 PRESS - EXTINGUISHED o Annunciator K-22, HEAT TRACING SYSTEM - EXTINGUISHED	Perform the following: a. Verify SI pump suction valves from BASTs closed. • MOV-826A or MOV-826B • MOV-826C or MOV-826D b. Open at least one SI pump suction valve from RWST. o MOV-825A -OR- o MOV-825B c. Dispatch AO to locally check BAST and heat tracing temperatures.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

11 Place Following Pump Switches In AUTO:

- SI pumps
- RHR pumps
- CNMT spray pumps

NOTE: FR procedures may now be implemented as necessary.

12 Verify Adequate SW Flow To CCW Hx:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 19.
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 19. WHEN SW restored to AUX BLDG, THEN do Steps 12c through 18.
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
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 19. WHEN IA restored, THEN do Steps 13 through 18.
	b. Charging pump - ANY RUNNING	b. Continue with Step 19. WHEN any charging pump running, THEN do Steps 14 through 18.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If Seal Return Flow Should Be Established:	
	a. Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 15.
	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 if necessary	
	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 5.5 GPM	e. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm <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 15.
	f. Verify RCP #1 seal leakoff flow - GREATER THAN 0.25 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.
15	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 19. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Steps 16 through 18.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16 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 25% 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

RESPONSE NOT OBTAINED:

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
17	Check VCT Makeup System:	
	a. Verify the following: 1) Boric acid flow control valve - 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. <u>IF</u> VCT auto makeup can <u>NOT</u> be established, <u>THEN</u> 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. <u>IF NOT</u>, <u>THEN</u> 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. <u>IF</u> VCT level can <u>NOT</u> be restored, <u>THEN</u> go to Step 19.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	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 19. WHEN VCT level greater than 40%, THEN do Step 18b.
	b. Verify charging pumps aligned to VCT o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.
19	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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	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 21.
	b. Use PRZR heaters and auxiliary spray valve (AOV-296) to maintain RCS pressure	
21	Verify Natural Circulation: 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	Increase dumping steam from intact S/Gs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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: o Both intermediate range channels - LESS THAN 10^{-10} AMPS -OR- o 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 23.
	e. Transfer Rk-45 recorder to one source range and one intermediate range channel	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- o RCP THERMAL BARRIER COOLING SHOULD BE ESTABLISHED SLOWLY TO MINIMIZE POTENTIAL INTRODUCTION OF STEAM INTO THE CCW SYSTEM AND THERMAL SHOCK TO RCP.
- o RCP SEAL INJECTION SHOULD BE ESTABLISHED SLOWLY TO MINIMIZE RCP THERMAL STRESSES AND POTENTIAL SEAL FAILURES.
- o AS PART OF SUBSEQUENT RECOVERY ACTIONS, RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION UNLESS REQUIRED BY AN INADEQUATE CORE COOLING SITUATION.

* *

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

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 OF WATER

-OR-

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

RESPONSE NOT OBTAINED: Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Verify Adequate Shutdown Margin:	
	a. Direct HP to sample RCS and PRZR liquid for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
25	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 50%	d. Control S/G feed flow as necessary.
26	Verify SI Flow Not Required:	
	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. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	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.
28	Determine If Natural Circulation Cooldown Is Required:	
	a. Consult plant staff to determine if RCS cooldown is necessary	a. <u>IF</u> cooldown <u>NOT</u> required, <u>THEN</u> go to 0-3, HOT SHUTDOWN WITH XENON PRESENT.
	b. At least one RCP - OPERABLE	b. Go to ES-0.2, NATURAL CIRCULATION COOLDOWN.
	c. Go to 0-2.2, 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

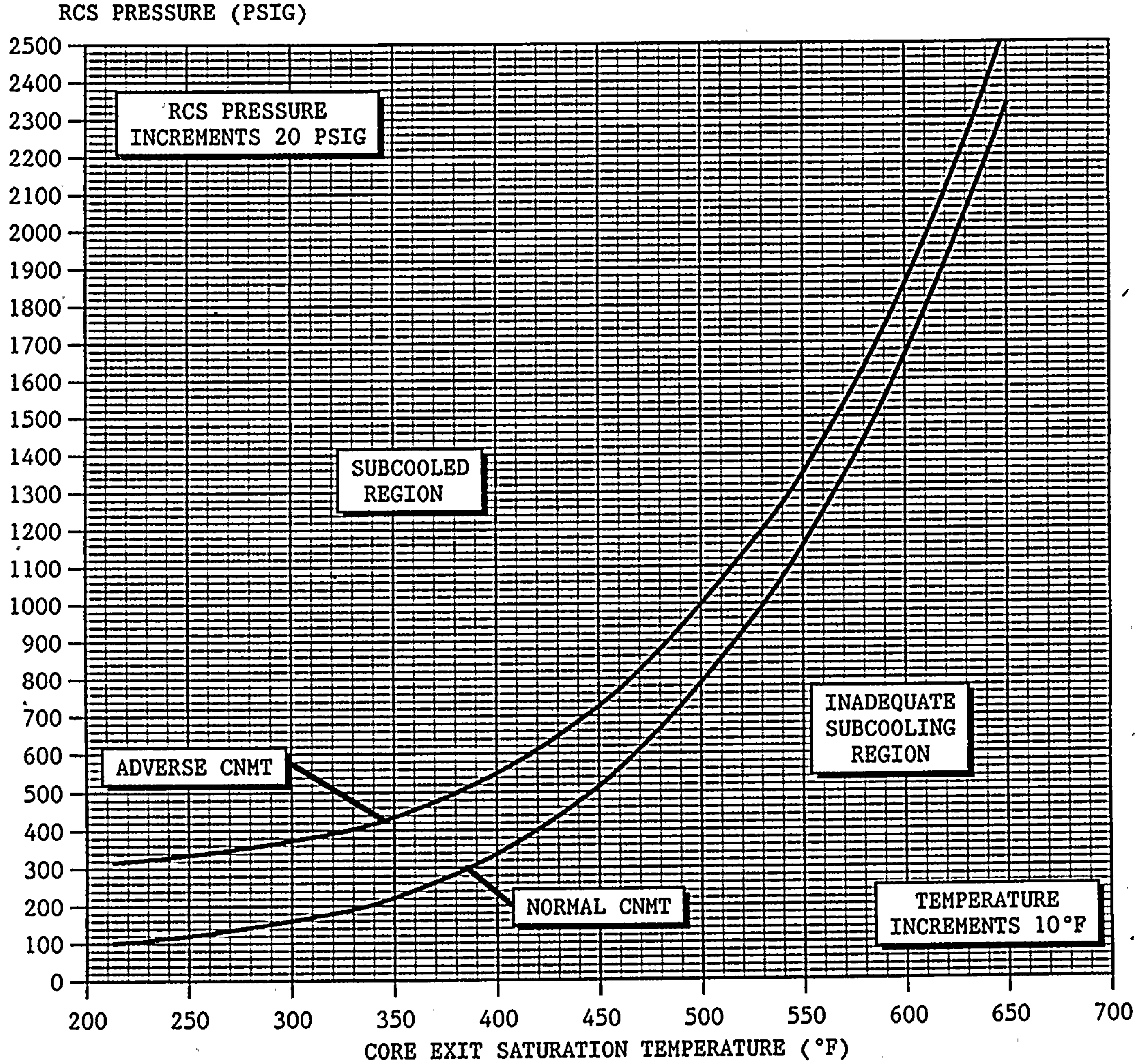
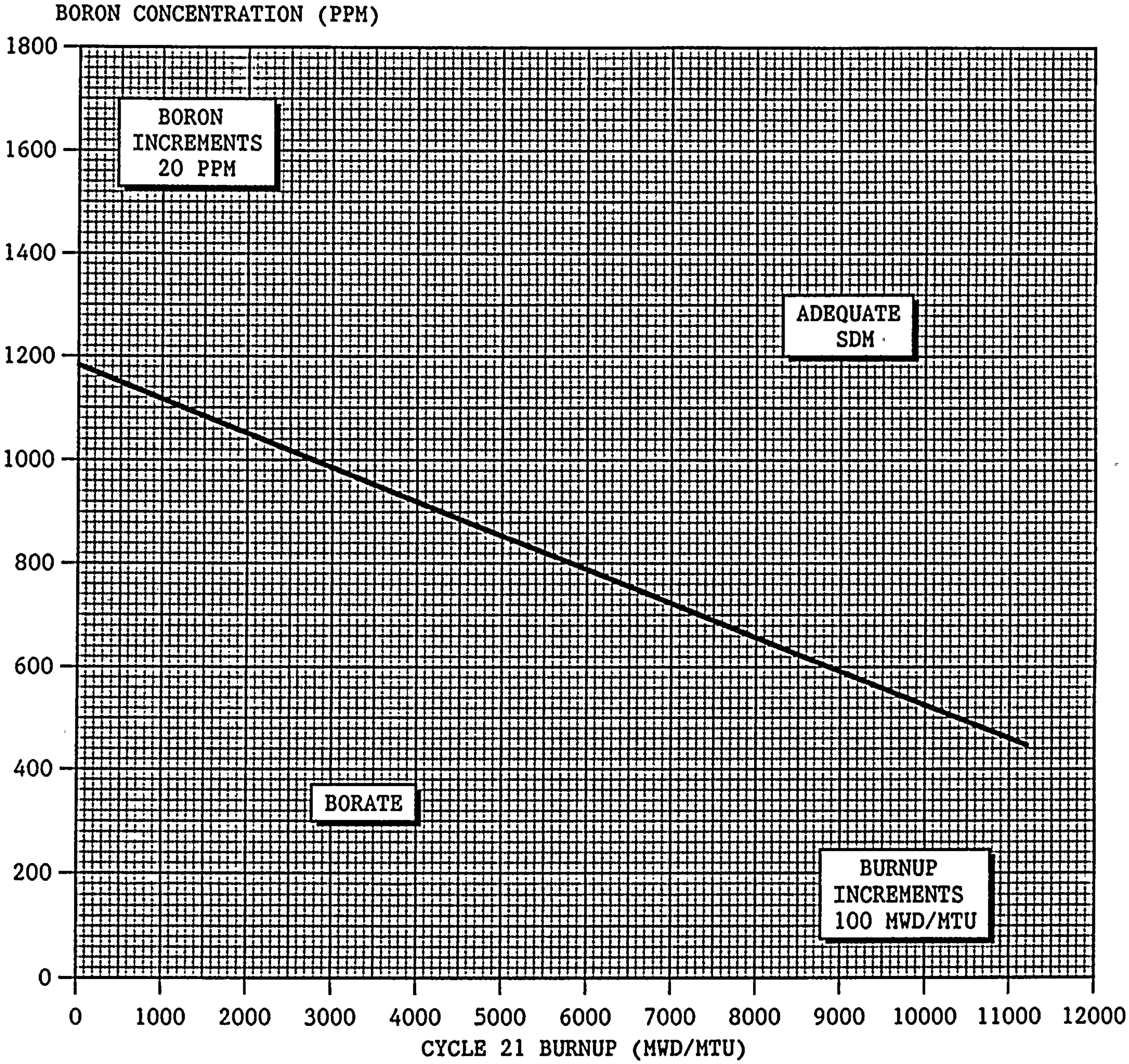


FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
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.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- o IF EMERGENCY COOLANT RECIRCULATION CAPABILITY IS RESTORED DURING THIS PROCEDURE, FURTHER RECOVERY ACTIONS SHOULD CONTINUE BY RETURNING TO PROCEDURE AND STEP IN EFFECT.

- o 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Check If Emergency Coolant Recirculation Equipment Available: o RHR pumps - OPERABLE o RHR suction valves from sump B - OPERABLE • MOV-850A • MOV-850B o RHR pump discharge to Rx vessel deluge valves - OPERABLE • MOV-852A • MOV-852B o CCW to RHR Hx - OPERABLE • MOV-738A • MOV-738B	Manually or locally try to restore at least one train (Refer to Attachment RHR SYSTEM to identify minimum components for one train).

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	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

3	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 1A and 1B priming air ejector isolation valves. • V-3580 • V-3581 <u>IF</u> no intact S/G available, <u>THEN</u> use faulted S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	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
5	Check RWST Level - GREATER THAN 15%	Go to Step 25.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6 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

b. CNMT spray pumps running - EQUAL TO MINIMUM NUMBER REQUIRED

b. Manually operate CNMT spray pumps as necessary.

<u>IF</u> CNMT spray pump(s) must be stopped, <u>THEN</u> place switch in PULL STOP.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF OFFSITE POWER IS LOST AFTER SI RESET, SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Reset SI If Necessary	
8	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 9.
	c. RHR pump - ONLY ONE RUNNING	c. <u>IF</u> two RHR pumps running, <u>THEN</u> stop one RHR pump. <u>IF</u> no RHR pumps running, <u>THEN</u> start one RHR pump.
9	Verify No Backflow From RWST To Sump:	
	a. Any RHR suction valve from sump B - OPEN • MOV-850A • MOV-850B	a. <u>IF</u> both RHR suction valves from sump B closed, <u>THEN</u> go to Step 10.
	b. RWST outlet valve to RHR pump suction (MOV-856) - CLOSED	b. Manually close valve. <u>IF</u> valve can <u>NOT</u> be closed manually, <u>THEN</u> direct AO to locally close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	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.
11	Verify Adequate SW Flow:	
	a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (258 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
12	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). <u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) <u>WHEN</u> bus 15 restored, <u>THEN</u> 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). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> 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. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12e 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
13	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 SEAL COOLING HAD PREVIOUSLY BEEN LOST, THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check RCP Status:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Stop all RCPs and go to Step 15.
	b. RCPs - AT LEAST ONE RUNNING	b. 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.
	c. Stop all but one RCP	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If SI Can Be Terminated: a. RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIGURE MIN SUBCOOLING b. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 80%	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 <u>IF</u> required injection flow is less than 100 gpm, <u>THEN</u> establish required charging flow and go to Step 16. <u>IF</u> required injection flow is greater than 100 gpm, <u>THEN</u> perform the following: a. Ensure one SI pump running b. Establish minimum charging flow for RCP seal injection. c. Consult TSC to determine if SI pump discharge valves should be locally throttled. (Locked valve key required.) d. Go to Step 18.
16	Stop SI And RHR Pumps And Place In Auto	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Verify SI Pump Suction Aligned To RWST:	
	a. SI pump suction valves from BASTs - CLOSED • MOV-826A • MOV-826B • MOV-826C • MOV-826D	a. Ensure at least one valve in each flow path closed. • MOV-826A or MOV-826B • MOV-826C or MOV-826D
	b. SI pump suction valves from RWST - OPEN • MOV-825A • MOV-825B	b. Ensure at least one valve is open.
	c. Consult TSC to determine if SI flush is required (Refer to Attachment SI FLUSH)	
18	Verify Adequate RCS Makeup Flow:	
	a. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 80%	a. Increase RCS injection flow to maintain RVLIS indication as necessary.
	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
19	Depressurize RCS To Decrease RCS Subcooling:	
	a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING	a. Go to Step 20.
	b. Use normal PRZR spray	b. 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).
	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 87% [75% adverse CNMT]	
	d. Stop RCS depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 21.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 21.
	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 21.
	f. Place RCS overpressure protection system in service (Refer to 0-7, 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
21	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 22. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 21b, 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	
22	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 23.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 23.
	c. Stop affected RCP(s)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check Core Exit T/Cs - GREATER THAN 200°F	Go to Step 38.
24	Check RWST Level - LESS THAN 15%	Return to Step 1.
25	Minimize RWST Outflow:	
	a. Any SI pump(s) - RUNNING	a. <u>IF</u> charging pump suction aligned to RWST, <u>THEN</u> 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 25e.
	b. Stop all but one SI pump	
	c. Check charging pump suction from RWST (AOV-112B) - OPEN	c. Go to Step 25e.
	d. Stop all charging pumps	
	e. Stop both CNMT spray pumps	
	f. Stop both RHR pumps	
26	Check SI pump flow - STABLE	<u>IF</u> SI flow zero or erratic, <u>THEN</u> stop running SI pump.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

BAST DILUTION MAY HAVE OCCURRED DURING SI PUMP SUCTION SWAPOVER FROM BASTS TO RWST. IF DILUTION IS SUSPECTED, BASTS SHOULD BE SAMPLED.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	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 28. WHEN VCT level greater than 5%, THEN do Steps 27b 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
28	Establish Maximum VCT Makeup:	
	a. Check RMW control armed - RED LIGHT LIT	a. Place RMW mode switch in AUTO and place RMW control switch to START.
	b. Check VCT level - LESS THAN 20%	b. Continue with Step 29. <u>WHEN</u> VCT level less than 20%, <u>THEN</u> do Steps 28c, d and e.
	c. Check VCT makeup system - OPERATING IN AUTO	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).
	d. Increase VCT makeup flow 1) Start both RMW pumps 2) Start both boric acid pumps 3) Adjust RMW controller (HC-111) in MANUAL to 80 gpm 4) Adjust boric acid flow controller (HC-110A) in MANUAL to 9 gpm	
	e. Adjust charging pump speed to stabilize VCT level	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	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	
30	Verify SI ACCUM Isolation Valves - OPEN • MOV-841 • MOV-865	IF valves were closed to prevent SI ACCUM nitrogen injection, THEN go to Step 34. 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
31	Depressurize All Intact S/Gs To 785 PSIG:	
	a. Check S/G pressures - GREATER THAN 785 PSIG	a. Go to Step 32.
	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 31b.
	d. Stop S/G depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: The intent of Step 32 is to depressurize S/Gs more slowly, but at a rate that will maintain required RVLIS level.	
32	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 68% AND 73% [73% AND 76% adverse CNMT] -OR- o Fluid fraction (any RCP running) - BETWEEN 80% 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 32a.
	c. Stop S/G depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 34. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 33b, 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	
34	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 36.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 36.
	c. Stop affected RCP(s)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Check SI Pump Flow - STABLE	IF SI flow zero or erratic, THEN stop running SI pump.
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 35.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 35.
	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 <u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> use faulted S/G.
39	Consult TSC	

-END-

EOP:	TITLE:	REV: 6
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	PAGE 1 of 1

ECA-1.1 APPENDIX LIST

EOP:	TITLE:	
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 6 PAGE 1 of 1

FIGURE MIN SUBCOOLING

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

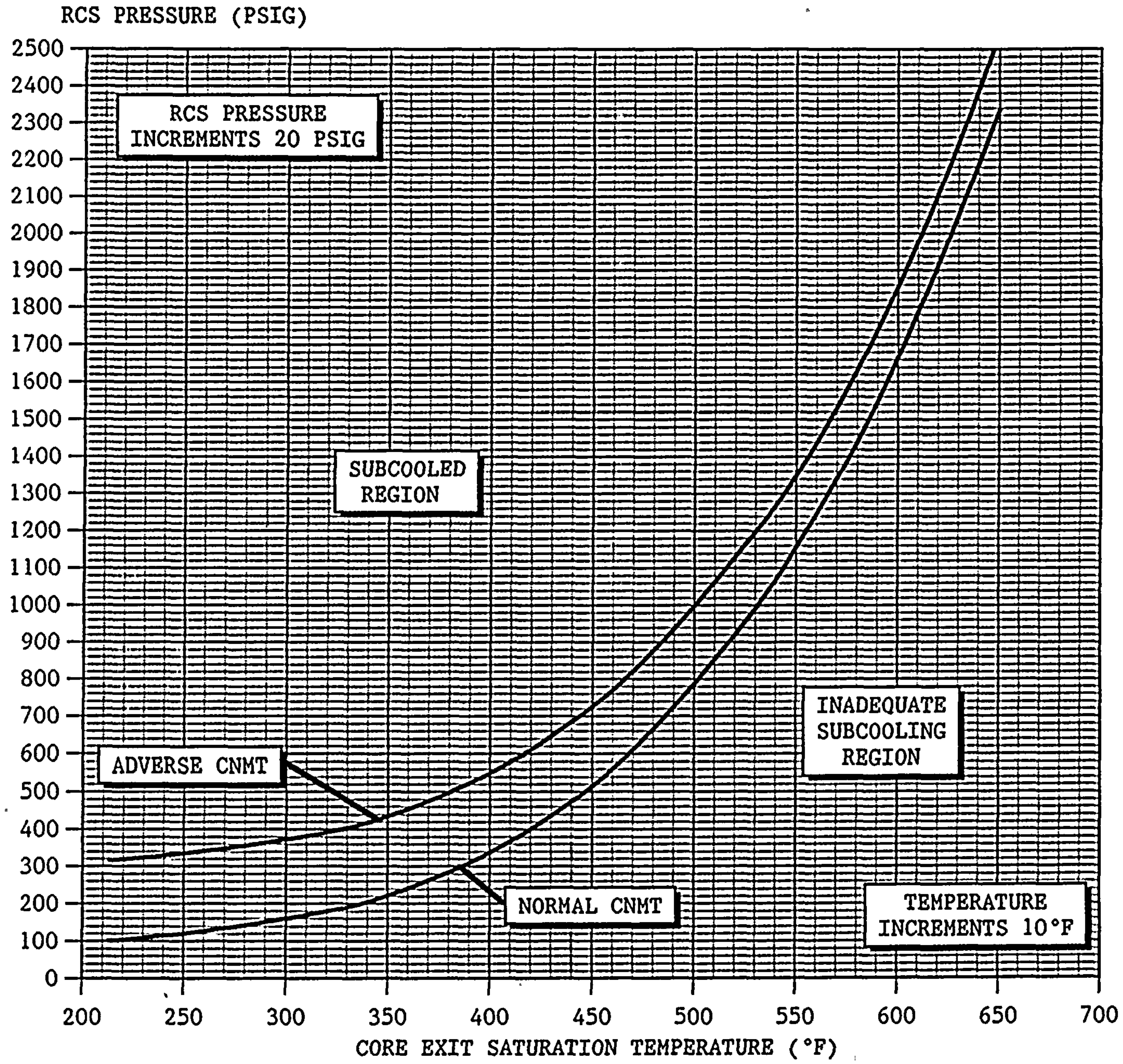
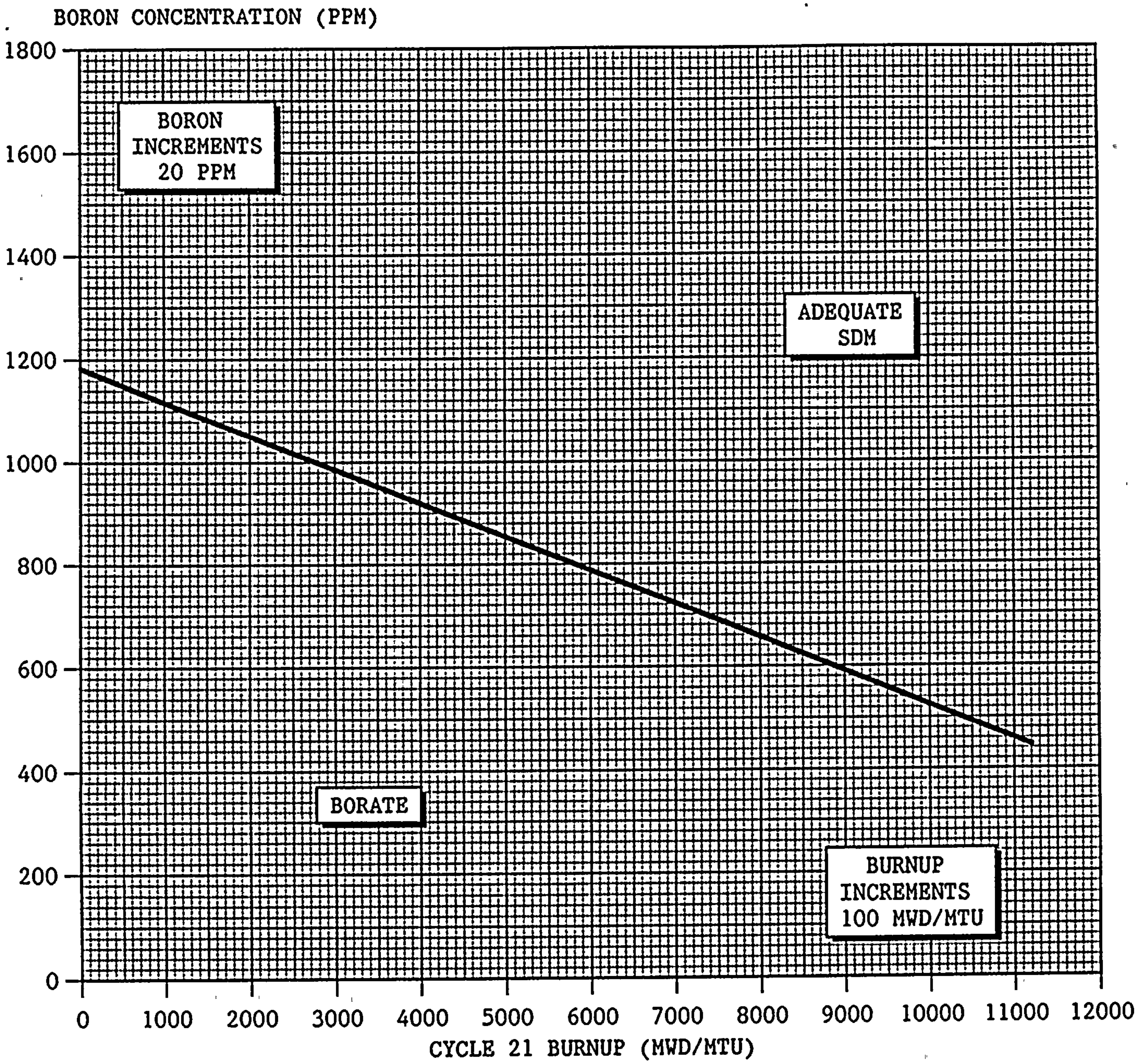
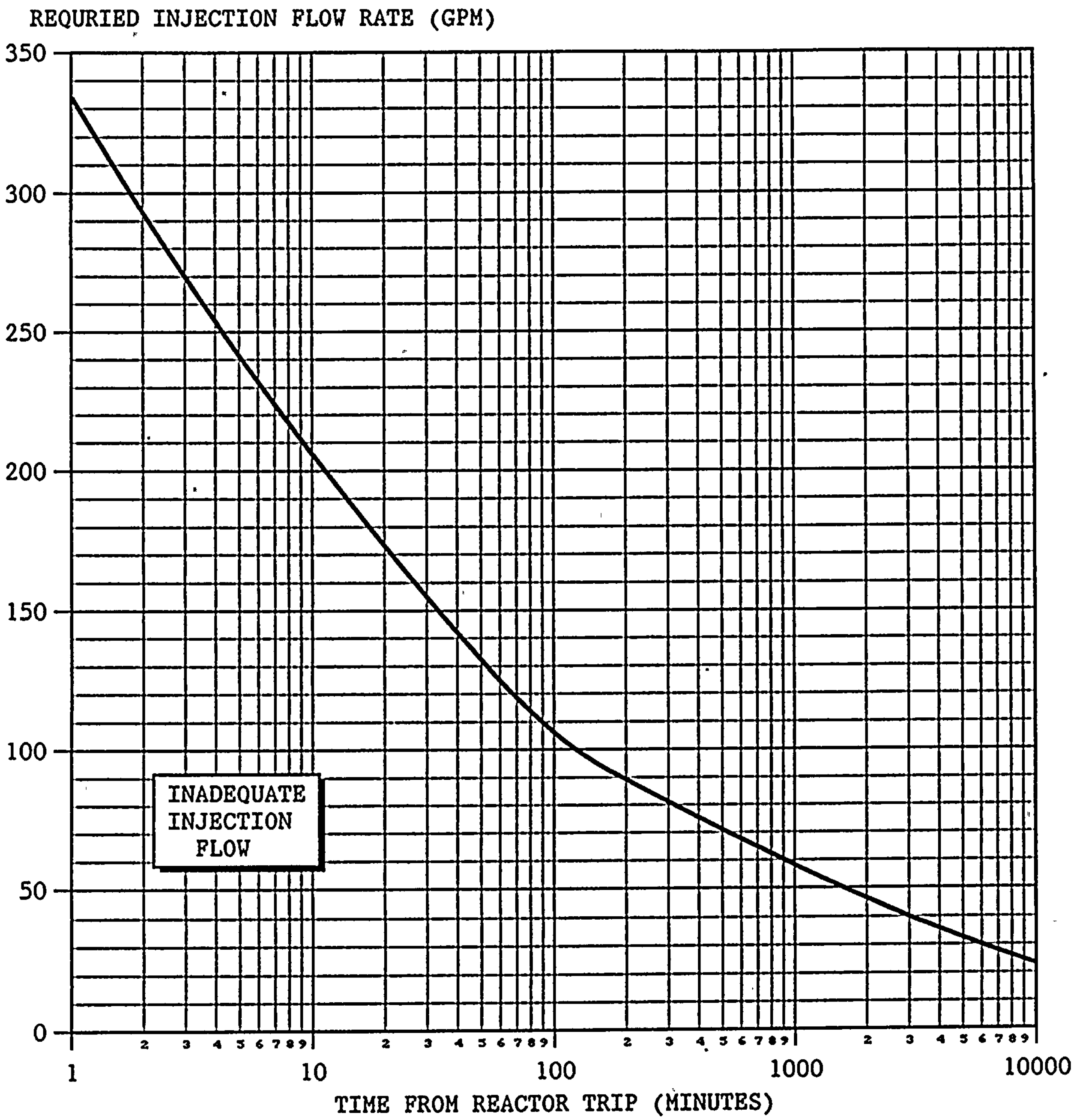


FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

FIGURE MIN RCS INJECTION



ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
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, 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.

[illegible]

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

o 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.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 (258 kw each). <u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following: 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1). 3) Go to Step 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). <u>IF NOT</u>, <u>THEN</u> 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 at least two air compressors - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
	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. <u>WHEN</u> IA restored, <u>THEN</u> 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	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) WHEN bus 15 restored, THEN reset control room lighting. 5) 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	Check If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - ANY RUNNING	a. Go to Step 7.
	b. Verify CNMT pressure - LESS THAN 4 PSIG	b. Continue with Step 7. <u>WHEN</u> 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

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check If RHR Pumps Should Be Stopped:	
	a. Check RCS pressure: o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] o Pressure - STABLE OR INCREASING	a. Go to Step 8.
	b. Stop RHR pumps and place in AUTO	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	**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 HP and refer to appropriate AR-RMS procedure.
	b. Direct HP to obtain following samples: • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron • BASTs boron	
	c. Verify adequate Rx head cooling:	
	1) Check IA to CNMT - AVAILABLE	1) Go to Step 9.
	2) Verify at least one control rod shroud fan - RUNNING	2) Manually start one fan as power supply permits (45 kw).
	3) Verify one Rx compartment cooling fan - RUNNING	3) 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
9	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 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 as necessary and establish 75 gpm total charging flow • Charging line flow • Seal injection	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	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 100 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.

* *

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check 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
	<u>NOTE</u>: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).	
12	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. <u>IF</u> no intact S/G available, <u>THEN</u> perform the following: o Use faulted S/G. -OR- o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.
13	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	Go to Step 26.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If Subcooled Recovery Is Appropriate:	
	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% [85% 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.
15	Check Safeguards Pump Status	Go to Step 22.
	o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	
16	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 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Depressurize RCS To Refill PRZR:	
	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 18. 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.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check RCP Status:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 19.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Go to Step 26.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Return to Step 17.
	d. 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
19	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 20.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 325°F [270°F adverse CNMT], <u>OR</u> <u>IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 26. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 325°F [270°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 19c. <u>IF</u> no RHR pump can be operated in injection mode, <u>THEN</u> go to Step 26.
	c. Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 17.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

a. Two SI pumps - RUNNING

a. Go to Step 21.

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 325°F [270°F adverse CNMT], OR IF RHR normal cooling in service, THEN go to Step 26.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 20d. IF no RHR pump can be operated in injection mode, THEN go to Step 26.

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

d. Do NOT stop SI pump. Return to Step 17.

e. Stop one SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21 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 26. IF NOT, THEN go to Step 22.

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 325°F [270°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 26.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 21d. IF no RHR pump can be operated in injection mode, THEN go to Step 26.

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

d. Do NOT stop SI pump. Return to Step 17.

e. Stop running SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Start Charging Pumps As Necessary And Control Charging Flow To Maintain PRZR Level	

* *

CAUTION

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check RCP Status:	
	a. RCPs - AT LEAST ONE RUNNING	a. Perform the following: 1) Establish conditions for starting an RCP: o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. 2) 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	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.	
25	Verify Adequate Shutdown Margin	
	a. Direct HP 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	Verify SI Flow Not Required:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually operate SI pumps as necessary and go to Step 27.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually operate SI pumps as necessary and return to Step 17.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	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. <u>IF</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> go to Step 27c. <u>IF NOT</u>, <u>THEN</u> go to Step 28.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Return to Step 17.
	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
28	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)	
29	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. <u>IF</u> hotwell level increasing, <u>THEN</u> direct HP 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
30	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 per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 31.
	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).
	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.
31	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
32	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 33.
	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 5.5 GPM	f. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm <u>THEN</u>: o Close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 33.
	g. Verify RCP #1 seal leakoff flow - GREATER THAN 0.25 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.	
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: o Both intermediate range channels - LESS THAN 10^{-10} AMPS -OR- o 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	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 NEEDED FOR RCS COOLDOWN.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Check Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow. <u>IF</u> either of the following conditions occurs, <u>THEN</u> 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.
36	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 37.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 37.
	c. Stop affected RCP(s)	

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 39.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 39.
	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 39.
	f. Place RCS overpressure protection system in service (Refer to 0-7, 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	
39	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 11.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	

-END-

ECA-3.1 APPENDIX LIST

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 43% [46% 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

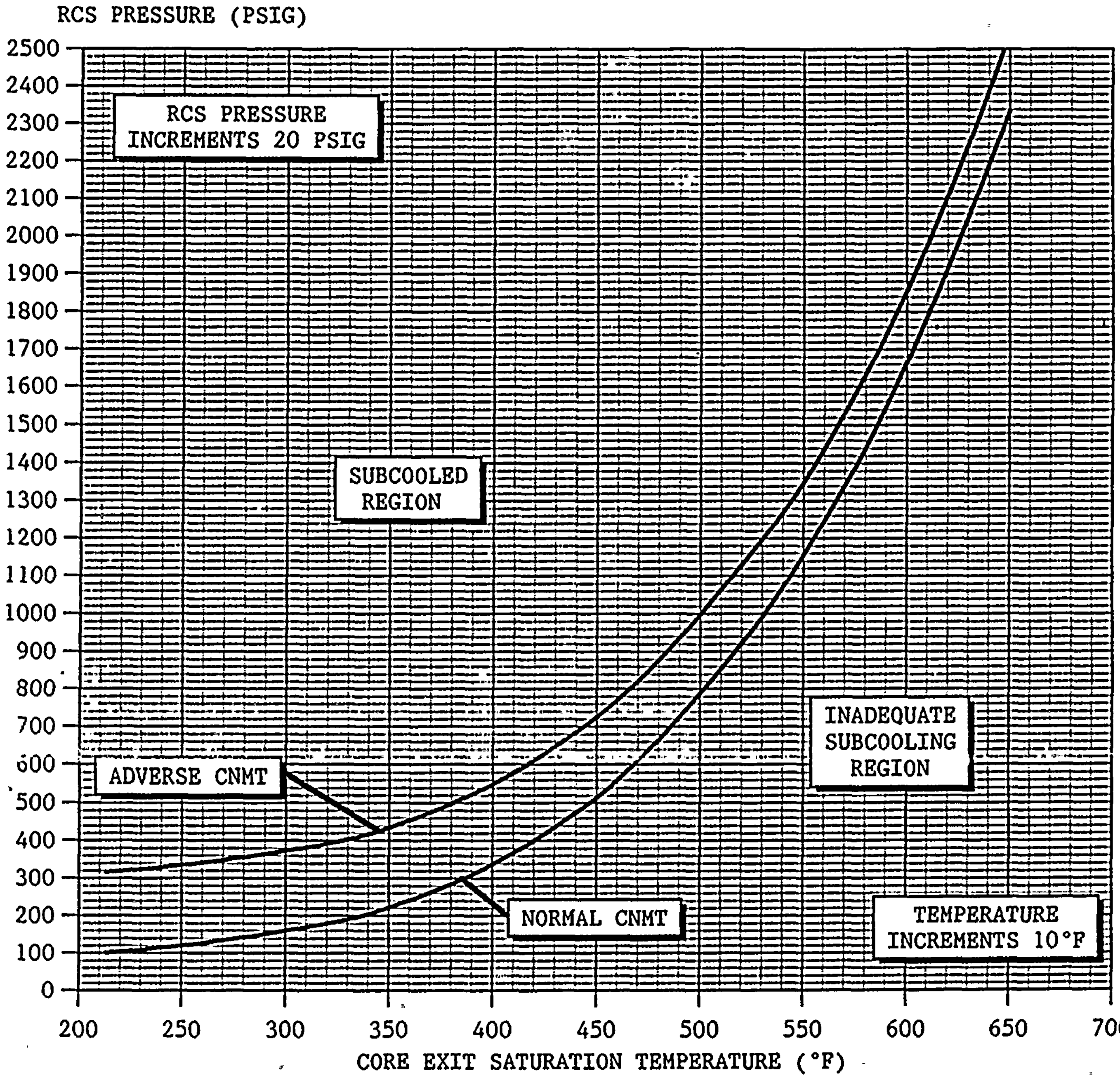
d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 7 PAGE 1 of 1

FIGURE MIN SUBCOOLING

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



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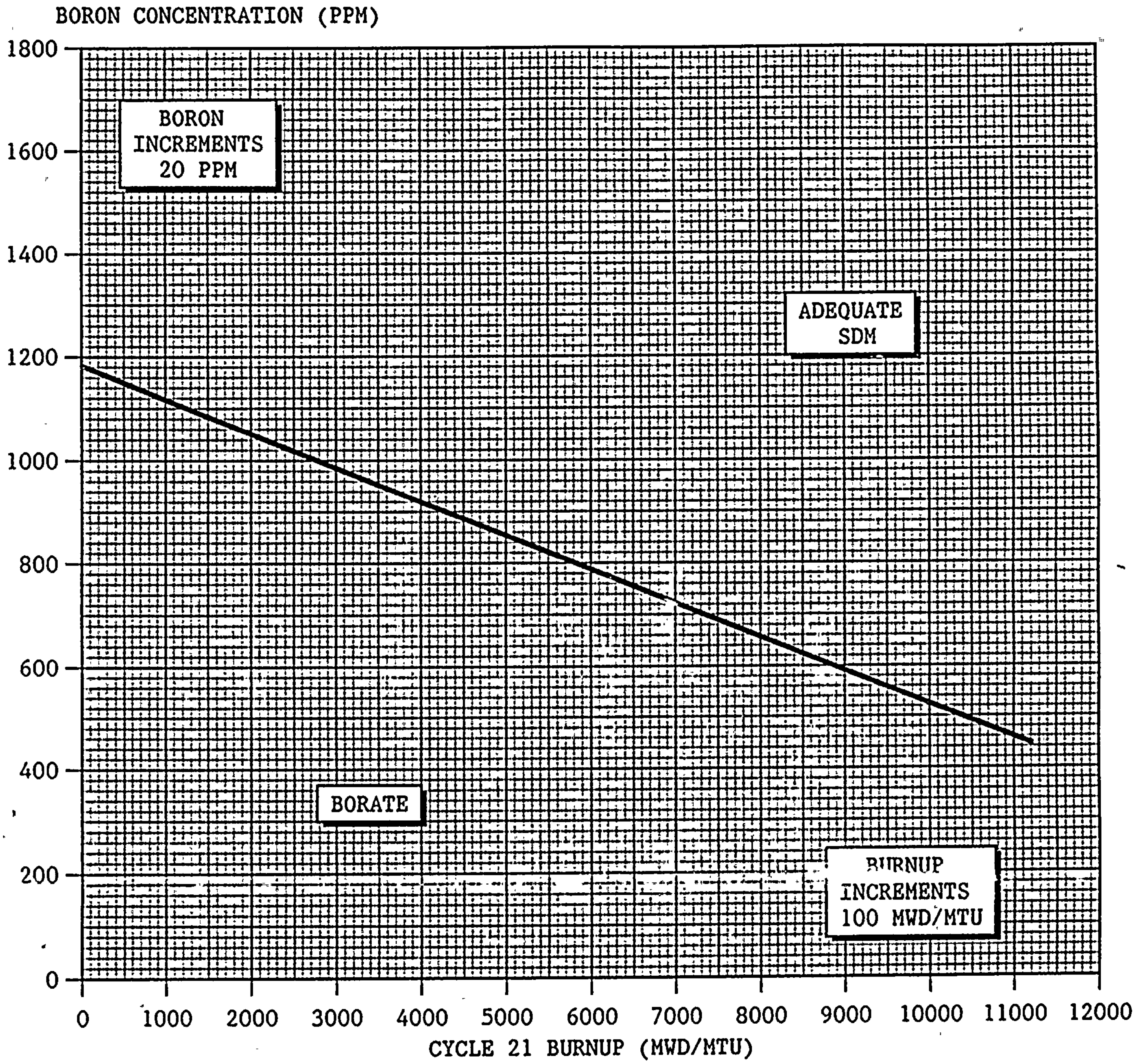
EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 7 PAGE 1 of 1

FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

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

   o 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% [85% 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

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
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:
- o 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.
- 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 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 TO SFP

  -OR-

- o Refer to Attachment SFP-RWST

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	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 3.
	b. Stop RHR pumps and place in AUTO	
3	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 100 PSIG	<u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown: • Steamlines • Feedlines <u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

*

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.

4 Check Intact S/G Level:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: Shutdown margin should be monitored during RCS cooldown. Refer to Figure SDM.	
5	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.
6	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	Go to Step 18.
7	Check Safeguards Pump Status o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	Go to Step 14.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Place PRZR Heater Switches In The Following Positions: o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF	

* *

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	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 10. 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.

*

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If An RCP Should Be Started:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 11.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Go to Step 18.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Return to Step 9.
	d. 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
11	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 12.
	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 325°F [270°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 18. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 11c. IF no RHR pump can be operated in injection mode, THEN go to Step 18.
	c. Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 9.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If One Of Two SI Pumps Should Be Stopped:	
	a. Two SI pumps - RUNNING	a. Go to Step 13.
	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 325°F [270°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 18. IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°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 operated in injection mode, THEN go to Step 18.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do NOT stop SI pump. Return to Step 9.
	d. Stop one SI pump	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13 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 18. IF NOT, THEN go to Step 14.

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 325°F [270°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 18.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°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 operated in injection mode, THEN go to Step 18.

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

d. Do NOT stop SI pump. Return to Step 9.

e. Stop running SI pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Control Charging Flow To Maintain RCS Inventory: o RVLIS level (no RCPs) - BETWEEN 68% AND 73% [73% AND 76% adverse CNMT] -OR- o RVLIS fluid fraction (any RCP running) - BETWEEN 80% AND 90%	Start charging pumps as necessary and adjust charging flow to maintain RCS inventory.

* *

<u>CAUTION</u>

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check RCP Status:	
	a. RCPs - AT LEAST ONE RUNNING	a. Perform the following: 1) Establish conditions for starting an RCP: o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. 2) Start one RCP. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC). <u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.
	b. Stop all but one RCP	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

o IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG.

* *

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	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: o PRZR level - GREATER THAN 75% [65% adverse CNMT] -OR- o RCS pressure - AT SATURATION FROM STEP 16a	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Verify Adequate Shutdown Margin	
	a. Direct HP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
18	Verify SI Flow Not Required:	
	a. Core exit T/Cs - DECREASING	a. Increase dumping steam. IF core exit T/Cs do NOT decrease, THEN manually operate SI pumps as necessary.
	b. Check RVLIS indication: o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] -OR- o Fluid Fraction (any RCP running) - GREATER THAN 80%	b. Manually operate SI pumps as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	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 19c. IF NOT, THEN go to Step 20.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Return to Step 9.
	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
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	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)	
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	a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct HP 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
22	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 per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 23.
	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).
	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.
23	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
24	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 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 5.5 GPM	f. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm <u>THEN</u>: o Close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP <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 0.25 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 26.
	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) Check IA to CNMT - AVAILABLE	1) Go to Step 27.
	2) Verify at least one control rod shroud fan - RUNNING	2) Manually start one fan as power supply permits (45 kw)
	3) Verify one Rx compartment cooling fan - RUNNING	3) 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.

*

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Check Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% 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.
28	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 29.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 29.
	c. Stop affected RCP(s)	
29	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 31.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 31.
	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 31.
	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	
31	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 4.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	

-END-

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 9 PAGE 1 of 1

ECA-3.2 APPENDIX LIST

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 43% [46% 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

FIGURE MIN SUBCOOLING

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

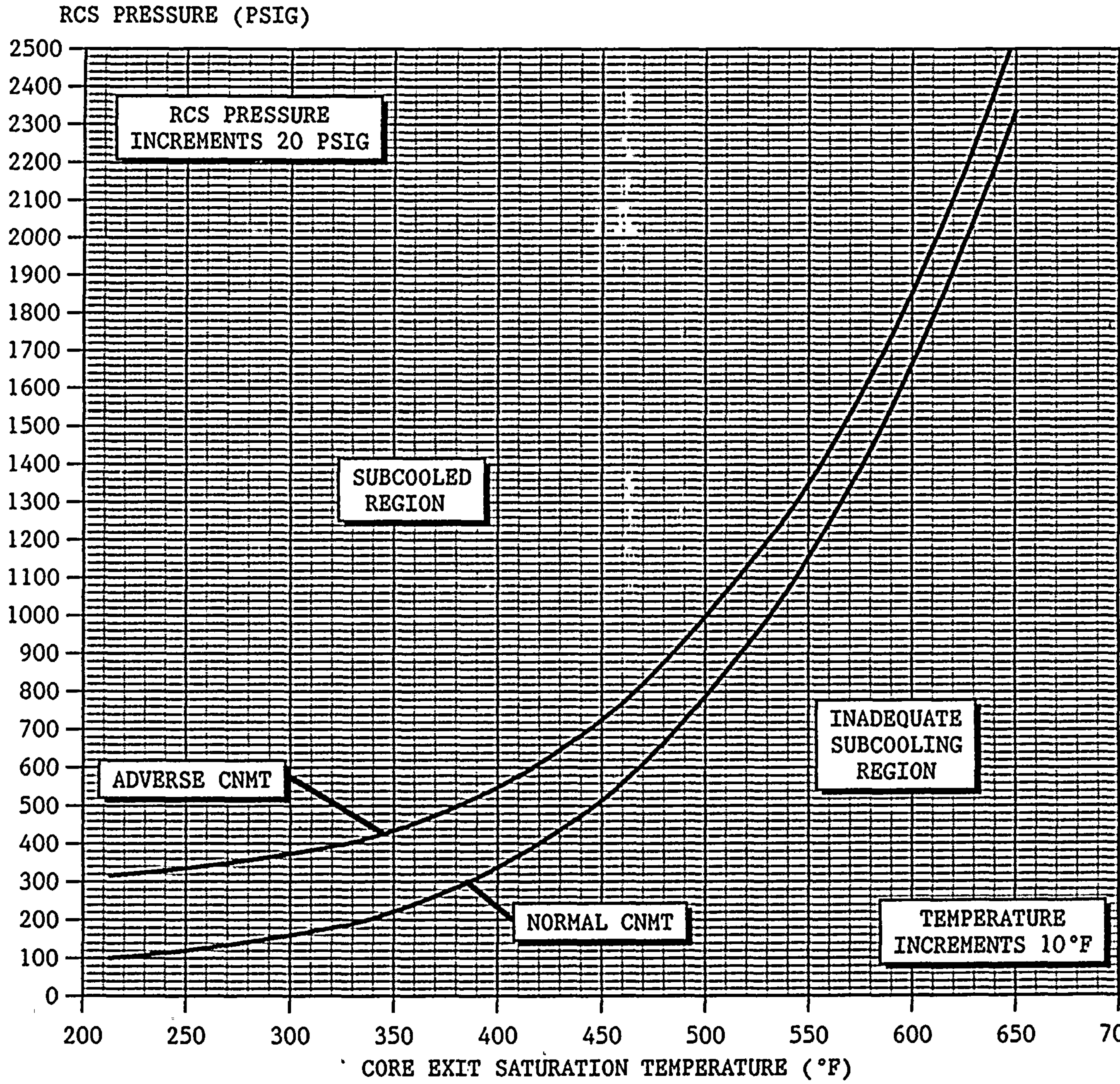
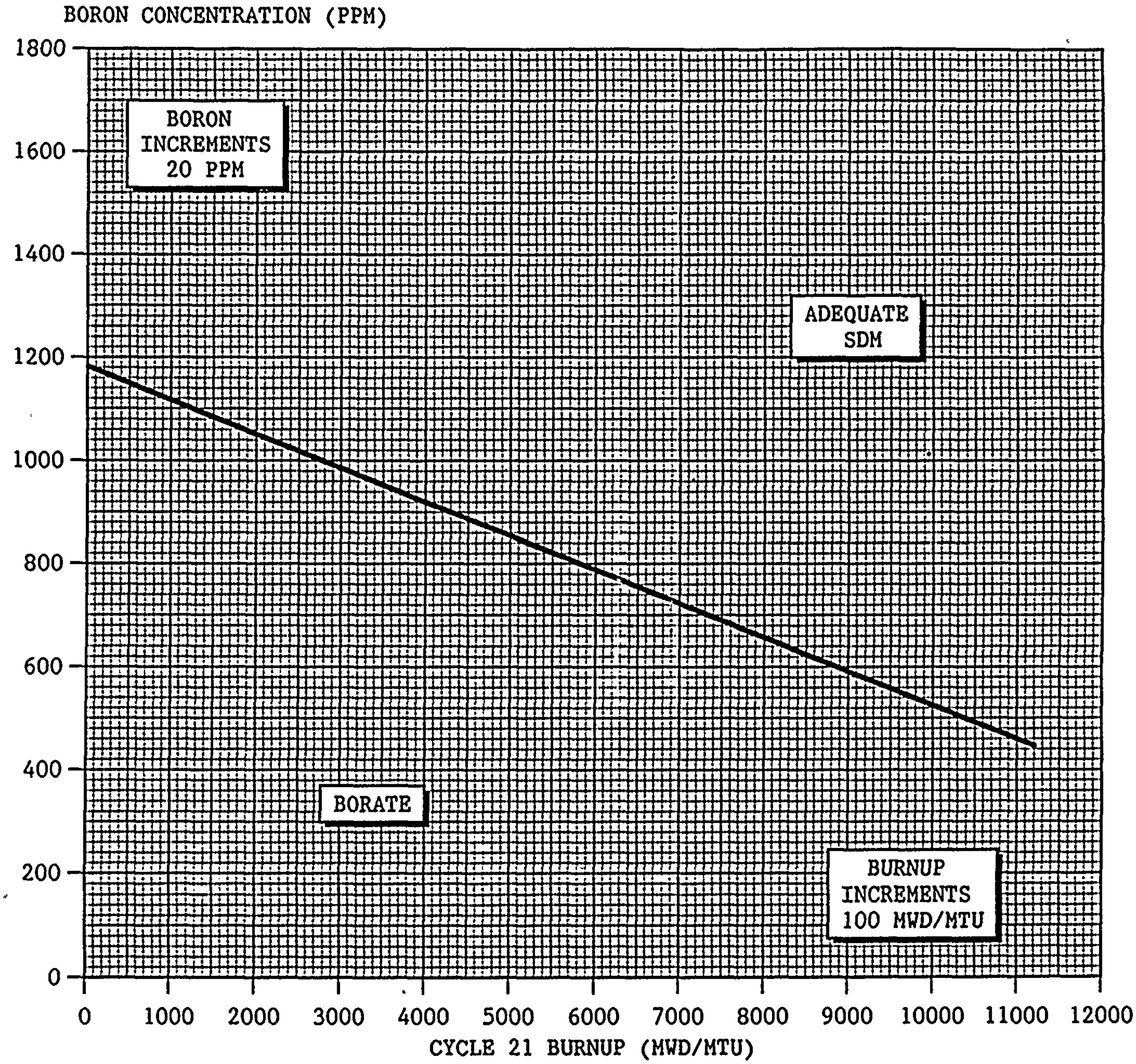


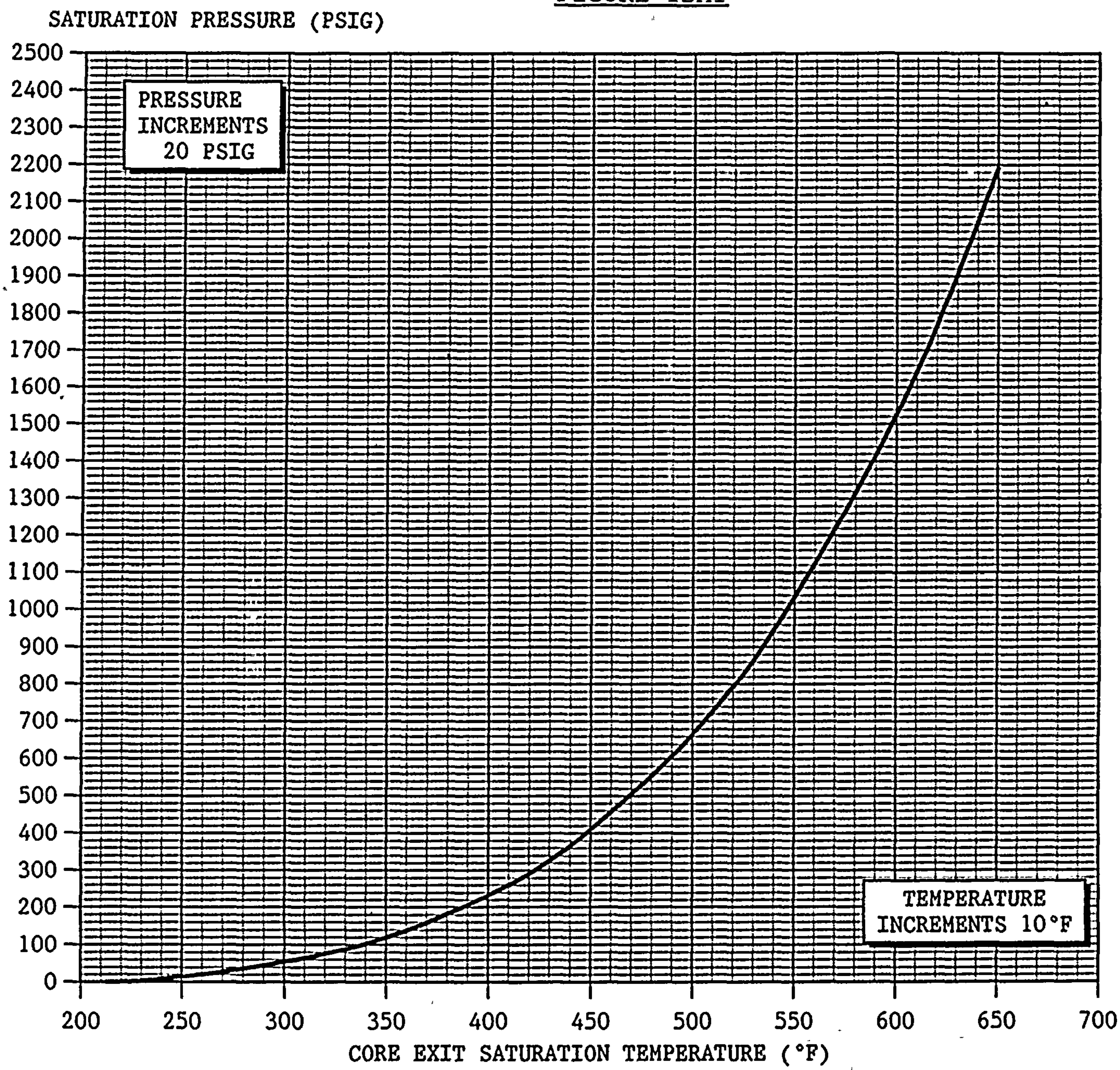
FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

EOP:	TITLE:	REV: 9
ECA-3.2	SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	PAGE 1 of 1

FIGURE TSAT



FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

- o Core exit T/Cs - INCREASING

-OR-

- o Check RVLIS indication:

Level (no RCPs) - LESS THAN 68% [73% adverse CNMT]

Fluid fraction (any RCP running) - LESS THAN 80%

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

TECHNICAL REVIEW

PORC REVIEW DATE 4/1/92

Thomas A. Marlow
PLANT SUPERINTENDENT

4/4/92
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: ______________________

A. PURPOSE - This procedure provides actions to perform a natural circulation RCS cooldown and depressurization to cold shutdown, with no accident in progress, under requirements that will preclude any upper head void formation.

B. SYMPTOMS AND OR ENTRY CONDITIONS

This procedure is entered from:

1) ES-0.1, REACTOR TRIP RESPONSE, when it has been determined that a natural circulation cooldown is required.

2) ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, when it has been determined that a natural circulation cooldown is required.

3) Other normal operating procedures when a natural circulation cooldown is required.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

****

CAUTION

- o IF SI ACTUATION OCCURS DURING THIS PROCEDURE, E-0, REACTOR TRIP OR SAFETY INJECTION, SHOULD BE PERFORMED.
- o VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

****

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

o If conditions can be established for starting an RCP during this procedure, Step 1 should be repeated.

1 Try To Restart An RCP:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. Establish conditions for starting an RCP:	a. Go to Step 2.
o Bus 11A or 11B energized	
o Refer to Attachment RCP START	
b. Start one RCP	
c. Any RCP - RUNNING	c. Go to Step 2.
d. Go to O-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITION	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check VCT Makeup System:	
	a. Verify the following: 1) Boric acid flow control valve - SET FOR REQUIRED CSD CONCENTRATION 2) RMW mode selector switch in AUTO 3) 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
3	Check Charging Pump Suction Aligned To VCT:	
	a. Check VCT level: o Level - GREATER THAN 20% o VCT makeup system - AVAILABLE	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 4. WHEN VCT level greater than 40%, THEN do Step 3b.
	b. Verify the following: o LCV-112C - OPEN o LCV-112B - CLOSED	b. Manually align valves as necessary.
4	Borate RCS To Cold Shutdown Boron Concentration (Refer to Figure SDM)	
5	Establish Maximum Rx Vessel Head Cooling: o Check control rod shroud fans (45 kw) - BOTH RUNNING o Check one Rx compartment cooling fan (23 kw)- RUNNING	Start fans as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Verify Adequate Shutdown Margin	
	a. Direct HP to sample the RCS for boron concentration • RCS loop A • RCS loop B • PRZR	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Perform the following: 1) Maintain RCS average temperature greater than 500°F until adequate SDM established. 2) Continue to borate 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 WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

o SI MUST BE BLOCKED BEFORE S/G PRESSURE DECREASES TO 514 PSIG.

o THE ΔT BETWEEN PRZR LIQUID AND THE HOT LEG TEMPERATURE SHOULD NOT BE PERMITTED TO EXCEED 200°F. IF THIS LIMIT IS EXCEEDED, THEN NOTIFY TECHNICAL ENGINEERING OF THE MAXIMUM ΔT OBSERVED.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Initiate RCS Cooldown To Cold Shutdown:	
	a. Dump steam to condenser	a. Manually or locally dump steam using S/G ARVs.
	b. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR	
	c. Maintain S/G narrow range level - BETWEEN 17% AND 39%	c. Control feed flow as necessary.
	d. Plot RCS cold leg temperatures and PRZR temperature twice per hour (Refer to 0-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD SHUTDOWN, for plot paper)	
8	Check RCS Hot Leg Temperatures - LESS THAN 550°F	Return to Step 7.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- o If charging line to PRZR vapor ΔT exceeds 320°F, then plant staff should be consulted before using auxiliary spray.
- 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Depressurize RCS To 1950 PSIG:	
	a. Check letdown - IN SERVICE	a. Try to establish letdown (Refer to Attachment LETDOWN). IF letdown can NOT be established, THEN depressurize RCS using one PRZR PORV and go to Step 10.
	b. Depressurize RCS using auxiliary spray valve (AOV-296)	b. IF auxiliary spray valve NOT available, THEN use one PRZR PORV.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

SI ACTUATION CIRCUITS WILL AUTOMATICALLY UNBLOCK IF PRZR PRESSURE INCREASES TO GREATER THAN 1992 PSIG.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If SI Should Be Blocked:	
	a. Check the following: o PRZR pressure - LESS THAN 1950 PSIG -OR- o LOW PRZR PRESS BLOCK SAF INJEC status light - LIT	a. Return to Step 9.
	b. Place SI block switches to BLOCK • Train A • Train B	
	c. Verify SAFETY INJECTION BLOCKED status light - LIT	c. Maintain PRZR pressure greater than 1750 psig and S/G pressure greater than 514 psig until SI blocked.
11	Determine RCS Pressure And Temperature Limits:	
	a. Check control rod shroud fans - BOTH RUNNING	a. Perform the following: 1) Maintain RCS pressure within limits of Figure NAT CIRC C/D WITHOUT SHROUD FANS. 2) Go to Step 12.
	b. Maintain RCS pressure - WITHIN LIMITS OF FIGURE NAT CIRC C/D WITH SHROUD FANS	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Maintain PRZR Level Between 20% And 30%	
13	Monitor RCS Cooldown: o Core exit T/Cs - DECREASING o RCS hot leg temperatures - DECREASING o RCS subcooling based on core exit T/Cs - INCREASING o Cooldown rate in RCS cold legs - LESS THAN 25°F/HR	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- o If at any time it is determined that a natural circulation cooldown and depressurization must be performed at a rate that may form a steam void in the vessel, then procedure ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL, should be used.
- o If charging line to PRZR vapor ΔT exceeds 320°F, then plant staff should be consulted before using auxiliary spray.
- 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Initiate RCS Depressurization:	
	a. Check letdown - IN SERVICE	a. Try to establish letdown (Refer to Attachment LETDOWN). <u>IF</u> letdown can <u>NOT</u> be established, <u>THEN</u> depressurize RCS using one PRZR PORV and go to Step 15.
	b. Depressurize RCS using auxiliary spray valve (AOV-296)	b. <u>IF</u> auxiliary spray valve <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.
	c. Plot RCS temperature and pressure on curve selected in Step 11 hourly	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Continue Cooldown And Depressurization:	
	a. Check RCS cold leg temperature - GREATER THAN 335°F	a. Stabilize RCS temperature and go to Step 15c.
	b. Maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR	
	c. Maintain RCS temperature and pressure within limits of Figure determined previously	c. Control RCS pressure as necessary to restore pressure/ temperature relationship to within limits of approprite Figure.
16	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 OR O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
17	Check For Steam Void In Reactor Vessel:	Repressurize RCS within allowable limits and continue cooldown.
	o PRZR level - NO UNEXPECTED LARGE VARIATIONS	<u>IF</u> RCS depressurization must continue, <u>THEN</u> go to ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL.
	o RVLIS level (no RCPs) - GREATER THAN 95%	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If SI ACCUMs Should Be Isolated:	
	a. RCS pressure - LESS THAN 1500 PSIG	a. Continue with Step 19. WHEN RCS pressure is less than 1500 psig, THEN do Steps 18b through 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 • ACCUM A, MOV-841 • ACCUM B, MOV-865	c. IF any valve can NOT be closed, THEN perform the following: 1) Dispatch personnel to locally close valves, as necessary. 2) Maintain RCS pressure greater than 1000 psig until both SI ACCUMs isolated. IF any SI ACCUM can NOT be isolated AND RCS depressurization to less than 1000 psig is required, THEN: 1) Open vent valves for unisolated SI ACCUMs. • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. 3) Maintain RCS pressure greater than SI ACCUM pressure.
	d. Locally open breakers for MOV-841 and MOV-865	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Maintain Letdown Flow: a. Open letdown orifice valves as necessary b. Adjust low pressure letdown control valve setpoint as necessary	
20	Maintain Required RCP Seal Injection Flow And Labyrinth Seal D/P: o Labyrinth seal D/P to each RCP - GREATER THAN 15 INCHES OF WATER o Seal injection flow to each RCP - GREATER THAN 6 GPM	Perform the following: o Adjust charging flow to REGEN Hx (HCV-142) as necessary. -OR- o Dispatch AO to adjust seal injection needle valves if necessary. • RCP A, V-300A • RCP B, V-300B

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If SI System Normal Shutdown Alignment Should Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 15.
	b. RCS pressure - LESS THAN 1500 PSIG	b. Stabilize RCS temperature and return to Step 14.
	c. Lock out SI system as follows:	
	1) Place all SI pump switches in PULL STOP	
	2) Locally close breakers for SI pump discharge valves to cold legs	
	• MOV-878B, MCC D position 8C • MOV-878D, MCC D position 8F	
	3) Close SI pump discharge to cold legs	
	• MOV-878B • MOV-878D	
	4) Locally open breakers for MOV-878B and MOV-878D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If RHR Normal Cooling Can Be Established:	
	a. RCS pressure - LESS THAN 400 PSIG	a. Stabilize RCS temperature and return to Step 14.
	b. Verify all SI pump switches in PULL STOP	b. Return to Step 21.
	c. Sample the RHR system to ensure adequate boron concentration (Refer to Attachment RHR SAMPLE)	
	d. Place RCS overpressure protection system in service (Refer to 0-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	d. IF RCS overpressure protection system can NOT be placed in service, THEN consult Plant staff to determine if RHR normal cooling should be established and go to Step 23.
	e. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
23	Continue RCS Cooldown To Cold Shutdown	

* *

CAUTION

DEPRESSURIZING THE RCS BEFORE THE ENTIRE RCS IS LESS THAN 200°F MAY RESULT IN ADDITIONAL VOID FORMATION IN THE RCS.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Continue Cooldown Of Inactive Portion Of RCS:	
	a. Cool upper head region using control rod shroud fans	
	b. Cool S/G U-tubes by dumping steam from all S/Gs	

STEP — ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

* *

CAUTION

IF LESS THAN TWO CONTROL ROD SHROUD FANS ARE RUNNING, THE UPPER HEAD REGION MAY REMAIN ABOVE 200°F FOR UP TO 29 HOURS AFTER REACHING CSD.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Determine If RCS Depressurization Is Permitted:	
	a. Entire RCS - LESS THAN 200°F • Core exit T/Cs • Upper head T/Cs • RCS hot leg temperature • RCS cold leg temperature	a. Do <u>NOT</u> depressurize RCS. Return to Step 23.
	b. Check control rod shroud fan status - BOTH RUNNING DURING COOLDOWN	b. Consult Plant staff to determine wait period for upper head cooling.
	c. Maintain cold shutdown conditions (Refer to 0-2.3, PLANT AT COLD SHUTDOWN)	

-END-

ES-0.2 APPENDIX LIST

	TITLE	PAGES
1)	RED PATH SUMMARY	1
2)	FIGURE MIN SUBCOOLING	1
3)	FIGURE SDM	1
4)	FIGURE NAT CIRC C/D WITHOUT SHROUD FANS	1
5)	FIGURE NAT CIRC C/D WITH SHROUD FANS	1
6)	ATTACHMENT RCP START	1
7)	ATTACHMENT LETDOWN	1
8)	ATTACHMENT RHR COOL	2
9)	ATTACHMENT RHR SAMPLE	1
10)	FOLDOUT	1

EOP:	TITLE:	
ES-0.2	NATURAL CIRCULATION COOLDOWN	REV: 3 PAGE 1 of 1

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 43% [46% 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

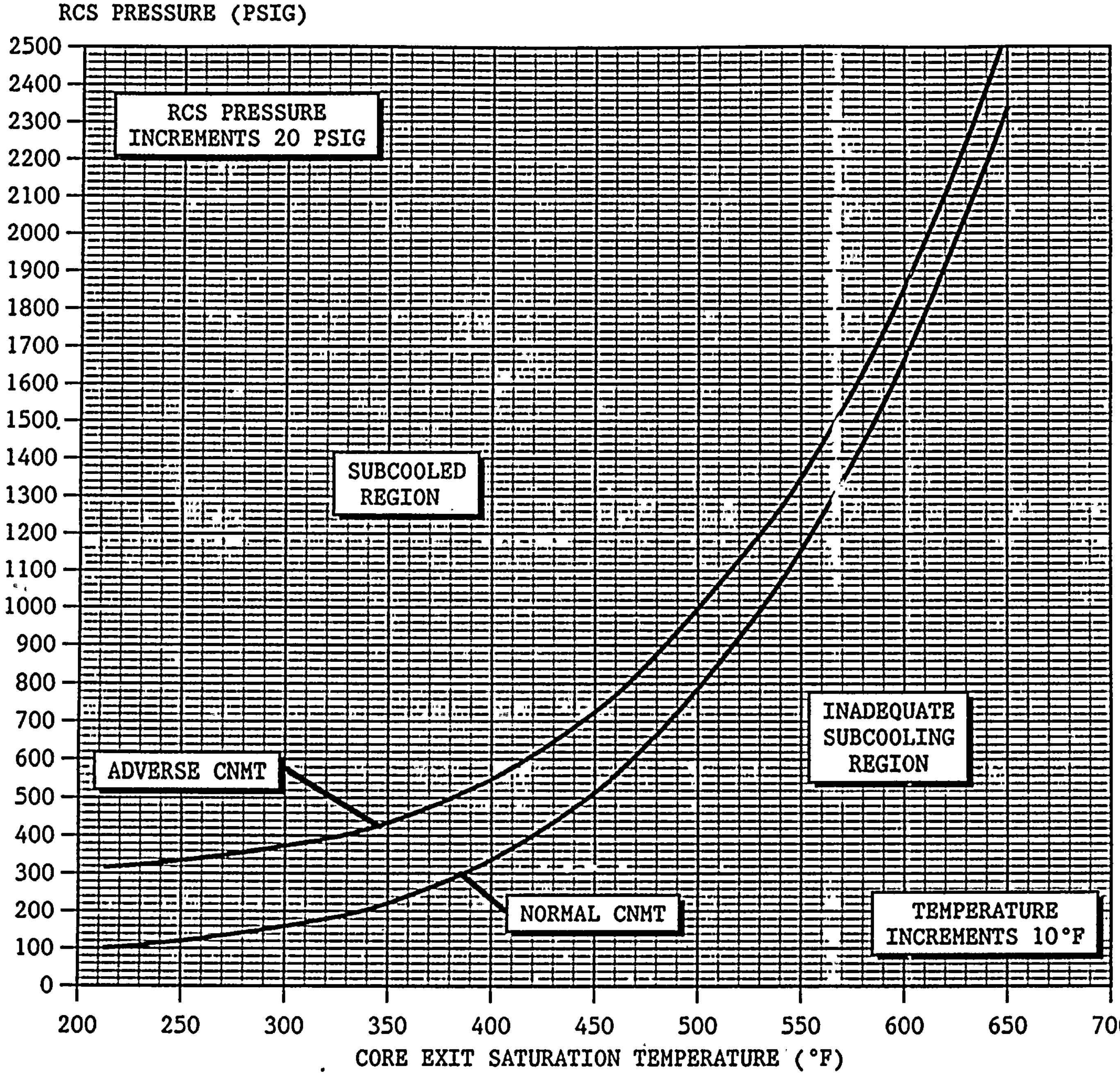
d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

EOP: ES-0.2	TITLE: NATURAL CIRCULATION COOLDOWN	REV: 3 PAGE 1 of 1

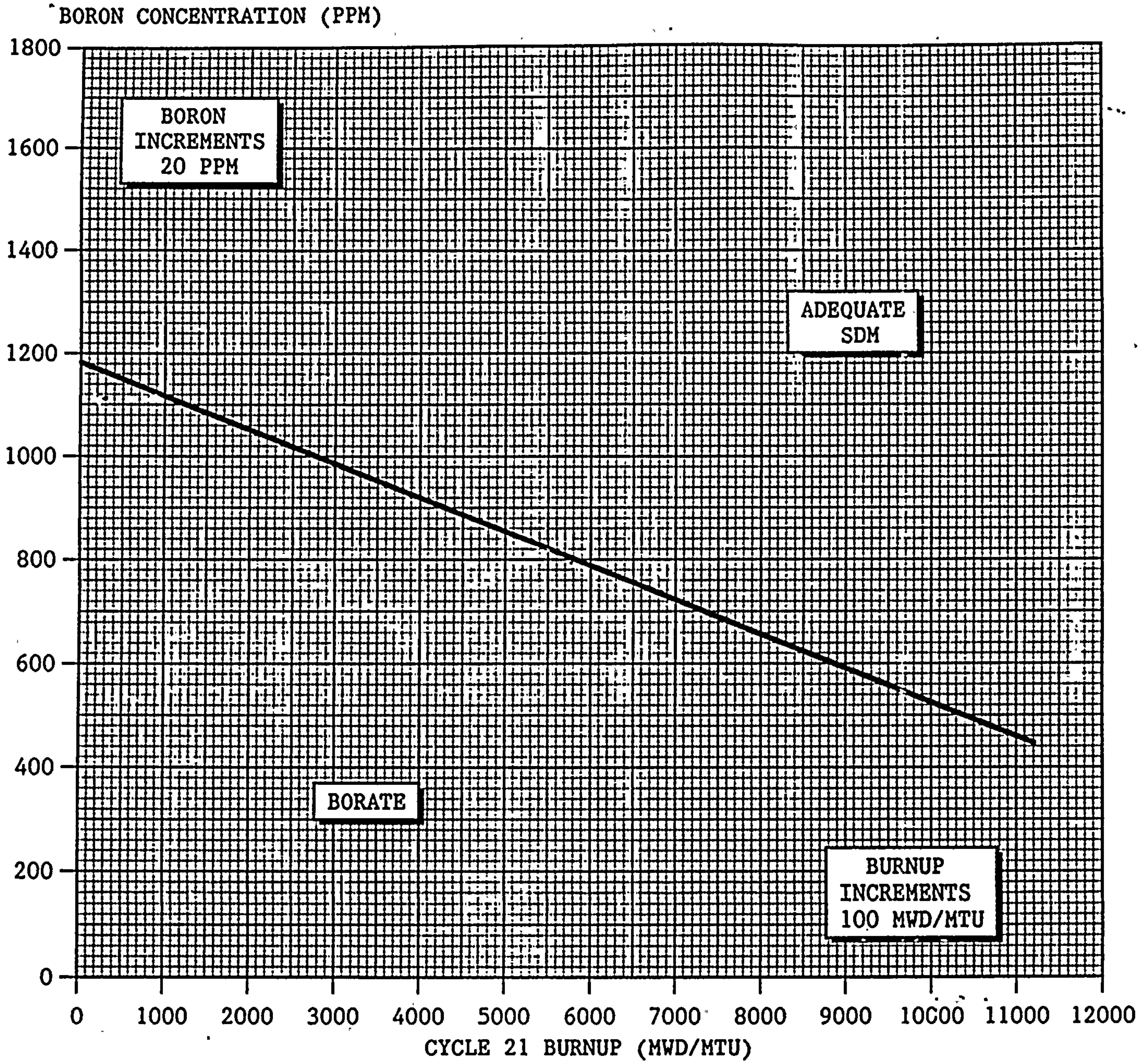
FIGURE MIN SUBCOOLING

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



EOP: ES-0.2	TITLE: NATURAL CIRCULATION COOLDOWN	REV: 3 PAGE 1 of 1

FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

EOP:	TITLE:	
ES-0.2	NATURAL CIRCULATION COOLDOWN	REV: 3 PAGE 1 of 1

FIGURE NAT CIRC C/D WITHOUT SHROUD FANS

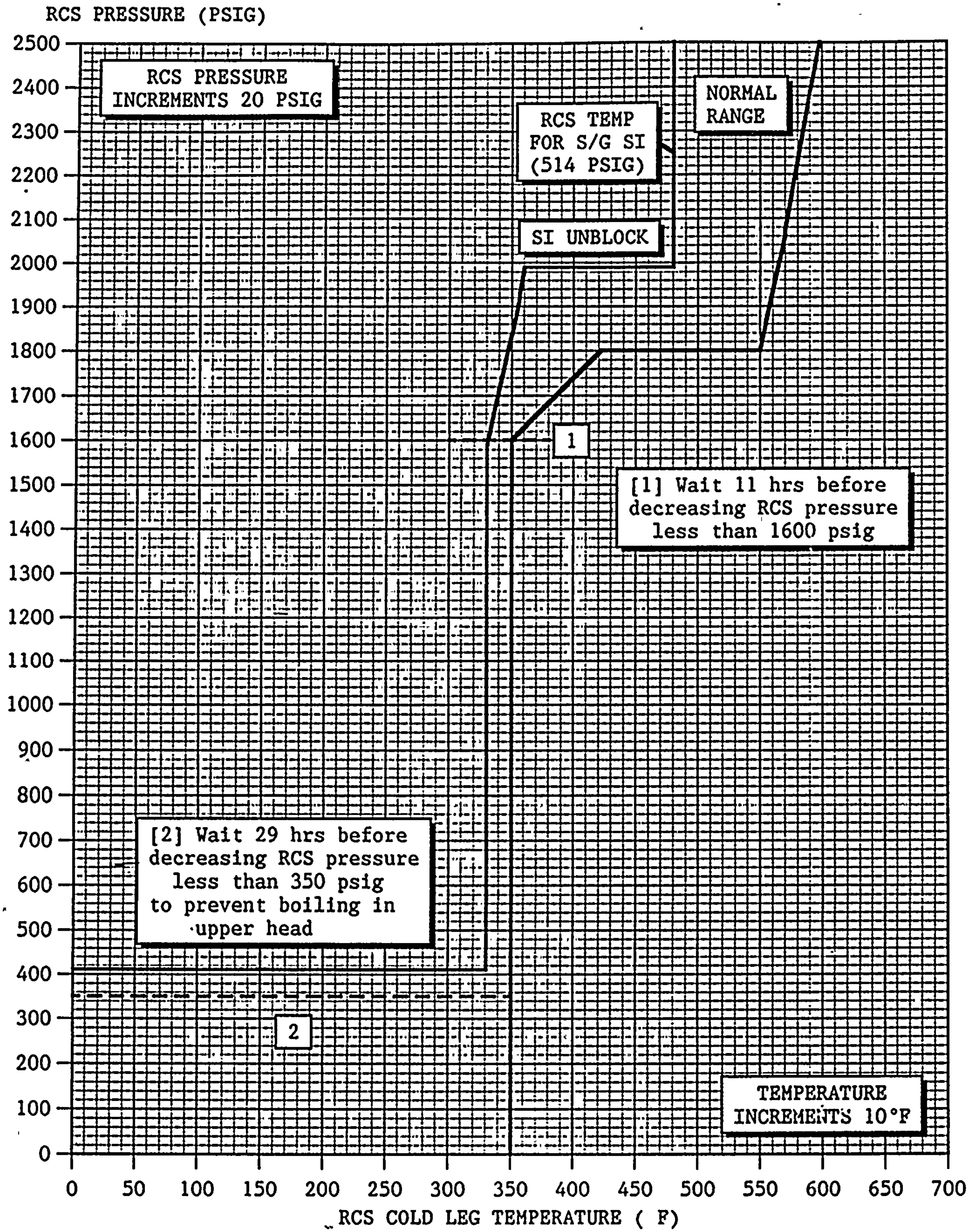
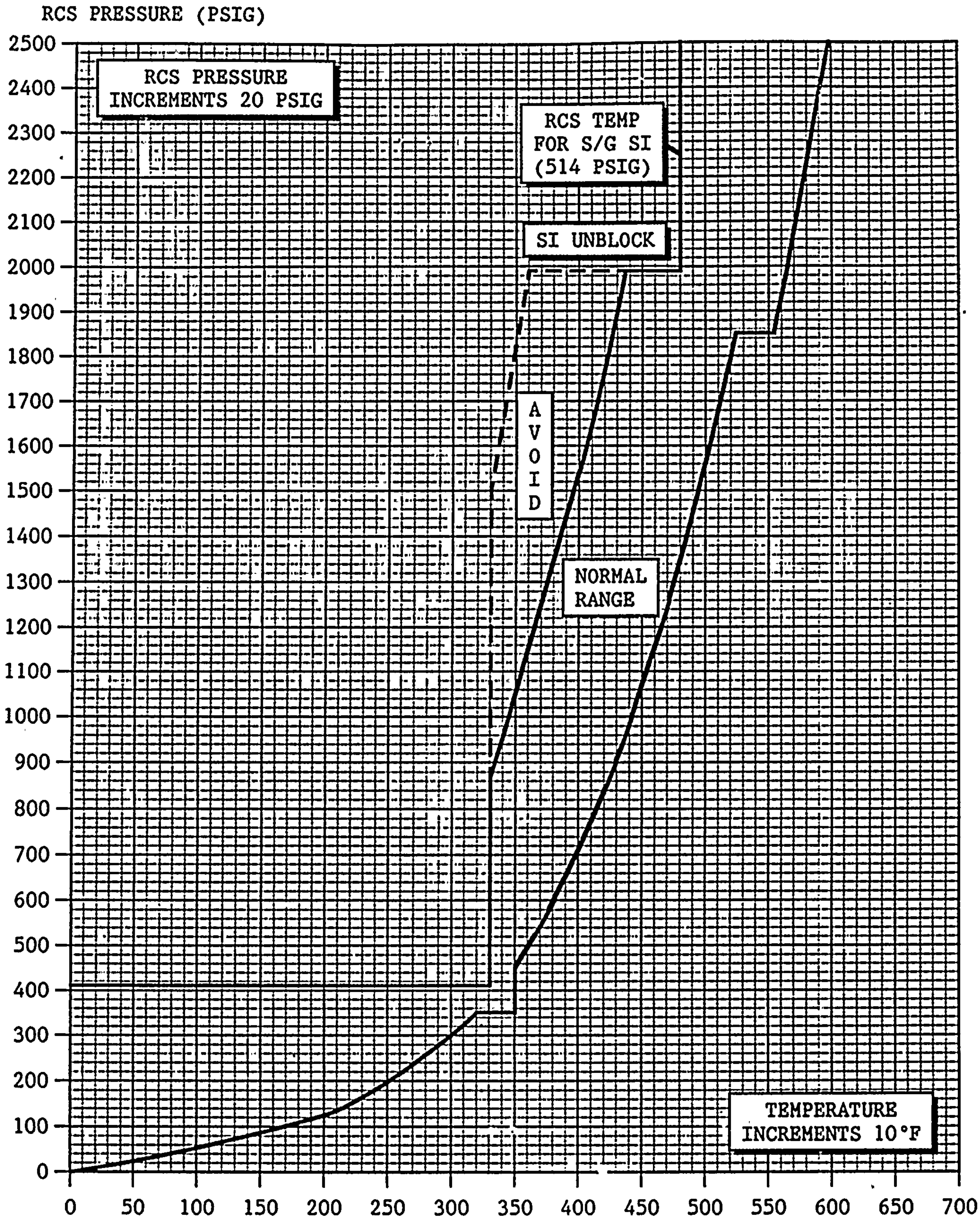


FIGURE NAT CIRC C/D WITH SHROUD FANS



[illegible]

[illegible]

EOP: ES-0.2	TITLE: NATURAL CIRCULATION COOLDOWN	REV: 3 PAGE 1 of 1

FOLDOUT PAGE

1. RCP TRIP CRITERIA

IF BOTH conditions listed below occur, THEN trip both RCPs:

a. SI pumps - AT LEAST TWO RUNNING

b. RCS pressure minus maximum S/G pressure - LESS THAN 175 PSIG

2. SI PUMP AUTO SWITCHOVER CRITERION

WHEN BAST level decreases to 10%, THEN ensure SI pump automatic switchover to RWST.

3. SI ACTUATION CRITERIA

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

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

- OR -

- PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5%

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

TECHNICAL REVIEW

PORC REVIEW DATE 6/20/91

Thomas A. Marlow
PLANT SUPERINTENDENT

6/24/91
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.

* *

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

5) 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

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

* *

2 Check If RHR Pumps Should Be Stopped:

a. Check RCS pressure:

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

2) Pressure - STABLE OR INCREASING

a. Go to Step 3.

b. Stop RHR pumps and place AUTO

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 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 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 - 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	

* *

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check 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).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 operate SI pumps as necessary and go to Step 19.
8	Check SI and RHR Pump Status:	Go to Step 15.
	o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	
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 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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. <u>IF</u> IA to CNMT available, <u>THEN</u> 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 325°F [270°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 325°F [270°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 operated 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]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING	c. <u>IF</u> RCS hot leg temperatures greater than 325°F [270°F adverse CNMT] <u>OR</u> <u>IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 325°F [270°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 13d. <u>IF</u> no RHR pump can be operated in injection mode, <u>THEN</u> go to Step 19.
	d. PRZR level - GREATER THAN 13% [40% adverse CNMT]	d. Do <u>NOT</u> 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 325°F [270°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 325°F [270°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 operated 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	

* *

CAUTION

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check RCP Status:	
	a. RCPs - AT LEAST ONE RUNNING	a. Perform the following: 1) Establish conditions for starting an RCP: o Verify Bus 11A or 11B energized. o Refer to Attachment RCP START. 2) 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, 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

Response not obtained: 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 HP to sample RCS for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.
19	Verify SI Flow Not Required:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually operate SI pumps as necessary and go to Step 20.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually operate 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 (258 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 23.
	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).
	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 5.5 GPM	f. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm, <u>THEN</u>: o Close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP <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 0.25 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) Check IA to CNMT - AVAILABLE	1) Go to Step 26d.
	2) Verify at least one control rod shroud fan - RUNNING	2) Manually start one fan as power supply permits (45 kw)
	3) Verify one Rx compartment cooling fan - RUNNING	3) 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	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 28.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 28.
	c. Stop affected RCP(s)	
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. Return to Step 5.
	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 0-7, 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
30	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 5.
31	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	

-END-

ES-1.2 APPENDIX LIST

EOP:	TITLE:	
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 8 PAGE 1 of 1

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 43% [46% 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

FIGURE MIN SUBCOOLING

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

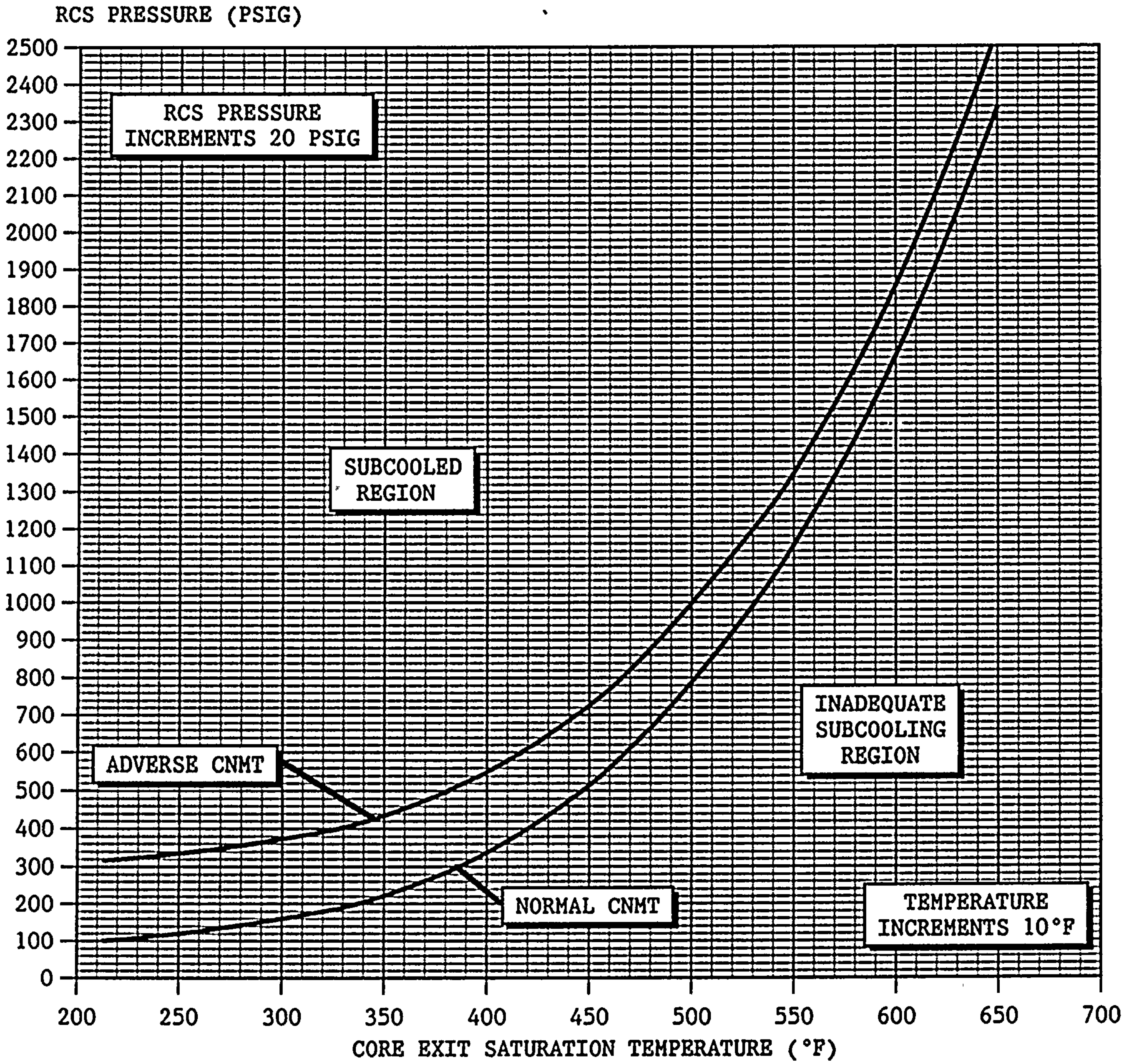
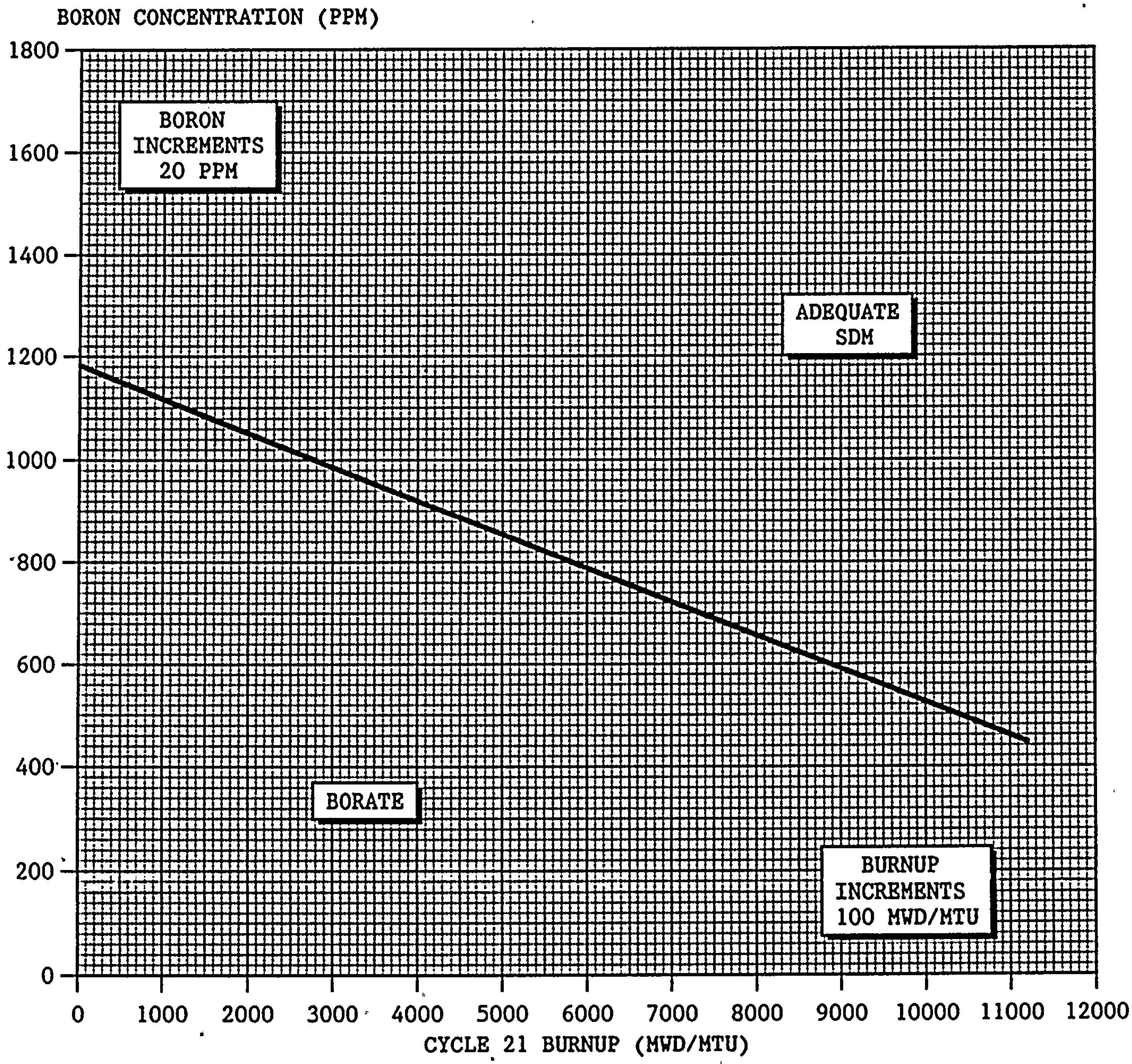


FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually operate 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 go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 10/23/91

Thomas A. Marlow
PLANT SUPERINTENDENT

10/28/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:________________________

A. PURPOSE - This procedure provides the necessary instructions for transferring the Safety Injection system and Containment Spray system to recirculation modes of operation.

B. ENTRY CONDITIONS/SYMPTOMS

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

   a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, or,

   b. ECA-0.2, LOSS OF ALL AC POWER WITH SI REQUIRED, or,

   c. ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, or,

   d. FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, or,

   e. FR-C.2, RESPONSE TO DEGRADED CORE COOLING, or,

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

   g. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, or,

   h. FR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, on low RWST level.

   i. Other procedures whenever RWST level reaches the switchover setpoint (28%).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- o INJECTION FLOW TO THE RCS MUST BE MAINTAINED AT ALL TIMES.
- o 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.
- o CONSULT WITH HEALTH PHYSICS BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING.

* *

<u>NOTE</u>: 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Verify CNMT Sump B Level - GREATER THAN 113 INCHES	<u>IF</u> RWST level is less than 28% <u>AND</u> CNMT sump B level is less than 113 inches, <u>THEN</u> go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.

<u>NOTE</u>: Steps 2 through 8 should be performed without delay. FR procedures should not be implemented prior to completion of these steps.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Reset SI	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Establish Conditions For RHR Suction Swapover:	
	a. Verify at least two SW pumps - RUNNING	a. Start additional SW pumps as power supply permits (258 kw each) <ins>IF</ins> D/Gs supplying emergency AC busses, <ins>THEN</ins> shed non-essential loads as necessary • Rx compartment cooling fans • Control rod shroud fans • PRZR heaters • Charging pumps
	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).
	c. Dispatch AO to perform the following: 1) Close breaker for RHR pump suction from RWST, MOV-856 (MCC C position 10C)	
	2) Verify total SW flow to CCW Hxs - GREATER THAN 5000 GPM	2) Perform the following: a) Isolate SW to screenhouse and air conditioning headers. • MOV-4609 and MOV-4780 • MOV-4663 and MOV-4733 b) Direct AO to locally adjust total SW flow to the CCW Hxs to between 5000 gpm and 6000 gpm (V-4619 and V-4620). c) Direct AO to locally isolate SW return from SFP Hxs: • SFP Hx A (V-4622) • SFP Hx B (V-8689) d) Verify SW portions of Attachment SD-1 are complete.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Establish CCW flow to RHR Hxs:	
	a. Check both CCW pumps - RUNNING	a. Start CCW pumps as power supply permits (124 kw each).
	b. Manually open CCW valves to RHR Hxs • MOV-738A • MOV-738B	b. Dispatch AO to locally open valves.

* *

CAUTION

CONSULT WITH HEALTH PHYSICS BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check RHR Flow: o Both RHR pumps - RUNNING o RHR flow (FI-626) - LESS THAN 1500 GPM PER OPERATING PUMP	Manually adjust RHR Hx outlet valves equally to reduce flow to less than 1500 gpm per operating pump. • HCV-624 B RHR Hx • HCV-625 A RHR Hx <u>IF</u> flow can <u>NOT</u> be reduced manually, <u>THEN</u> dispatch an AO to locally adjust RHR Hx outlet manual valves equally to reduce flow. • V-715 B RHR Hx • V-717 A RHR Hx

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

*

CAUTION

ANY PUMPS TAKING SUCTION FROM RWST SHOULD BE STOPPED UPON REACHING RWST LO-LO LEVEL ALARM.

*

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check IF Unnecessary Pumps Can Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 6c.
	b. Stop SI pump C and place both switches in PULL STOP	
	c. Both CNMT spray pumps - RUNNING	c. Pull stop any idle CNMT spray pump and go to Step 6e.
	d. Pull stop one CNMT spray pump	
	e. Stop both RHR pumps and place in PULL STOP	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Verify RHR System Alignment:	
	a. Verify the following valves - CLOSED o RHR suction valves from loop A hot leg • MOV-700 • MOV-701 o RHR discharge valves to loop B cold leg • MOV-720 • MOV-721	a. Ensure at least one suction valve and one discharge valve closed.
	b. Verify RHR pump suction crosstie valves - OPEN • MOV-704A • MOV-704B	b. Manually open valves. If valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open valves.
	c. Verify the following valves - OPEN o RHR pump discharge to Rx vessel deluge valves • MOV-852A • MOV-852B o RHR suction from sump B (inside CNMT) • MOV-851A • MOV-851B	c. Ensure at least one valve in each set open.
	d. Verify RCDT pump suction valves from sump B - CLOSED • MOV-1813A • MOV-1813B	d. Manually close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RHR FLOW INDICATED ON FI-626 SHOULD BE LIMITED TO 1500 GPM PER OPERATING PUMP TO ENSURE OPTIMUM PUMP PERFORMANCE.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Initiate RHR Sump Recirculation:	
	a. Close RWST outlet valve to RHR pump suction, MOV-856 (turn on DC power key switch)	a. Dispatch AO to locally close valve and continue with Step 8b.
	b. Open both RHR suction valves from sump B (outside CNMT) o MOV-850A - OPEN o MOV-850B - OPEN	b. <u>IF</u> two RHR pump suction paths from sump B can <u>NOT</u> be established, <u>THEN</u> perform the following: 1) Initiate only one train of RHR recirculation (Refer to Attachment RHR NPSH for further guidance). 2) Go to Step 9.
	c. Start both RHR pumps	
	d. Verify at least one RHR pump - RUNNING	d. <u>IF</u> no RHR pump can be started, <u>THEN</u> go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

<u>NOTE</u>: The TSC should be requested to establish periodic monitoring of the AUX BLDG sub-basement, as radiological conditions permit, to monitor RHR pump operation.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Check RWST Level - LESS THAN 15%	DO <u>NOT</u> continue with this procedure until RWST level is less than 15%.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Stop All Pumps Supplied From RWST:	
	a. Stop all SI pumps and place in PULL STOP	
	b. Stop all charging pumps	
	c. Stop operating CNMT spray pump and place in PULL STOP	
	d. Check CNMT pressure - LESS THAN 28 PSIG	d. Go to Step 11.
	e. Reset CNMT spray if necessary	
	f. Close CNMT spray pump discharge valves • MOV-860A • MOV-860B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Align SI And CNMT Spray For Sump Recirculation:	
	a. Verify SI pump suction valves from BASTs - CLOSED • MOV-826A and MOV-826B • MOV-826C and MOV-826D	a. Ensure at least one valve in each flowpath closed.
	b. Close and verify closed RWST outlet valves to SI and CNMT spray pumps (turn on DC power key switches) • MOV-896A • MOV-896B	b. Ensure at least one valve closed.
	c. Close and verify closed SI pump RECIRC valves • MOV-898 • MOV-897	c. Ensure at least one valve closed.
	d. Verify SI pump suction valves from RWST - OPEN • MOV-825A • MOV-825B	d. Ensure at least one valve open.
	e. Open and verify open RHR Hx outlet valves to SI and CNMT spray pump suction • MOV-857A • MOV-857B • MOV-857C	e. Ensure at least one RHR pump(s) aligned to SI and CS pump suction header (Refer to Attachment RHR SYSTEM).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

SI PUMPS SHOULD BE STOPPED IF RCS PRESSURE IS GREATER THAN THEIR SHUTOFF HEAD PRESSURE.

* *

NOTE: SI pump C is preferred since it delivers to both lines.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify Adequate RHR Injection: o Core exit T/Cs - LESS THAN REQUIREMENTS OF FIGURE RHR INJECTION o RCS pressure - LESS THAN 225 psig [425 psig adverse CNMT] o Check RVLIS level (no RCPS) - GREATER THAN 43% [46% adverse CNMT]	Start one SI pump.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF A CNMT SPRAY PUMP IS STARTED, THEN CNMT PRESSURE SHOULD BE CLOSELY MONITORED. CNMT PRESSURE SHOULD NOT BE REDUCED TO LESS THAN 32 PSIG.

* *

13 Check If CNMT Spray Is Required:

a. CNMT pressure - GREATER THAN 37 PSIG

RESPONSE NOT OBTAINED: a. Perform the following:

1) IF CNMT spray previously actuated, THEN consult TSC to determine if CNMT spray should be restarted.

2) Go to Step 14.

b. Verify open CNMT spray pump discharge valves

- MOV-860A
- MOV-860B
- MOV-860C
- MOV-860D

RESPONSE NOT OBTAINED: b. Manually open valve(s) for selected pump.

- MOV-860A or MOV-860B, A pump
- MOV-860C or MOV-860D, B pump

c. Start selected CNMT spray pump

d. Open NaOH tank outlet valves for running pump

- AOV-836A, pump A
- AOV-836B, pump B

e. WHEN CNMT pressure decreases to 32 psig, THEN PULL STOP CNMT spray pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Verify Adequate Core Cooling: o Core exit T/Cs - STABLE OR DECREASING o RVLIS level (no RCPs) - STABLE OR INCREASING o RVLIS level (no RCPs) - GREATER THAN 43% [46% adverse CNMT]	IF both RHR pumps running, THEN ensure two SI pumps running. IF only one RHR pump running, THEN perform the following: a. Ensure one SI pump running. b. WHEN CNMT spray pumps stopped, THEN start one additional SI pump.

* *

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check 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%	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	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) Check IA to CNMT - AVAILABLE	1) Go to Step 16d.
	2) Verify at least one control rod shroud fan - RUNNING	2) Manually start one fan as power supply permits (45 kw)
	3) Verify one Rx compartment cooling fan - RUNNING	3) 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
17	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
18	Check If SI ACCUMs Should Be Isolated:	
	a. Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 19. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 18b through 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 • ACCUM A, MOV-841 • ACCUM B, 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

* *

CAUTION

IF FUEL DAMAGE IS SUSPECTED, MAINTAIN S/G PRESSURE SLIGHTLY GREATER THAN RCS PRESSURE.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check If Intact S/Gs Should Be Depressurized To RCS Pressure:	
	a. RCS pressure - LESS THAN INTACT S/G PRESSURES	a. Go to Step 20.
	b. Check S/G radiation - NORMAL o Steamline Monitors (R-31, R-32) o Direct HP to sample S/Gs for activity	b. Do NOT dump steam from a S/G with high radiation. Isolate feed flow to a S/G with high radiation.
	c. Dump steam to condenser from intact S/G(s) until S/G pressure less than RCS pressure	c. IF steam dump to condenser NOT available, THEN dump steam using intact S/G ARVs until S/G pressure less than RCS pressure.
20	Consult TSC to Determine If Rx Vessel Head Should Be Vented	

NOTE: The TSC should be consulted before changing recirculation lineups.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check Event Duration - GREATER THAN 19 HOURS AFTER EVENT INITIATION	Consult TSC to evaluate long term plant status.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Place CNMT Spray Pumps In PULL STOP	
23	Verify Two SI Pumps - RUNNING	Manually start pumps.
24	Check Core Exit T/Cs - LESS THAN REQUIREMENTS OF FIGURE RHR INJECTION	Perform the following: a. Manually open both PRZR PORVs and block valves. b. Verify core exit T/Cs decreasing to less than requirements of Figure RHR INJECTION. <u>IF NOT</u>, <u>THEN</u> dump steam from intact S/Gs until core exit T/Cs less than required.
25	Consult TSC To Evaluate Long Term Plant Status	

-END-

ES-1.3 APPENDIX LIST

EOP:	TITLE:	REV: 13
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	PAGE 1 of 1

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 43% [46% adverse CNMT]

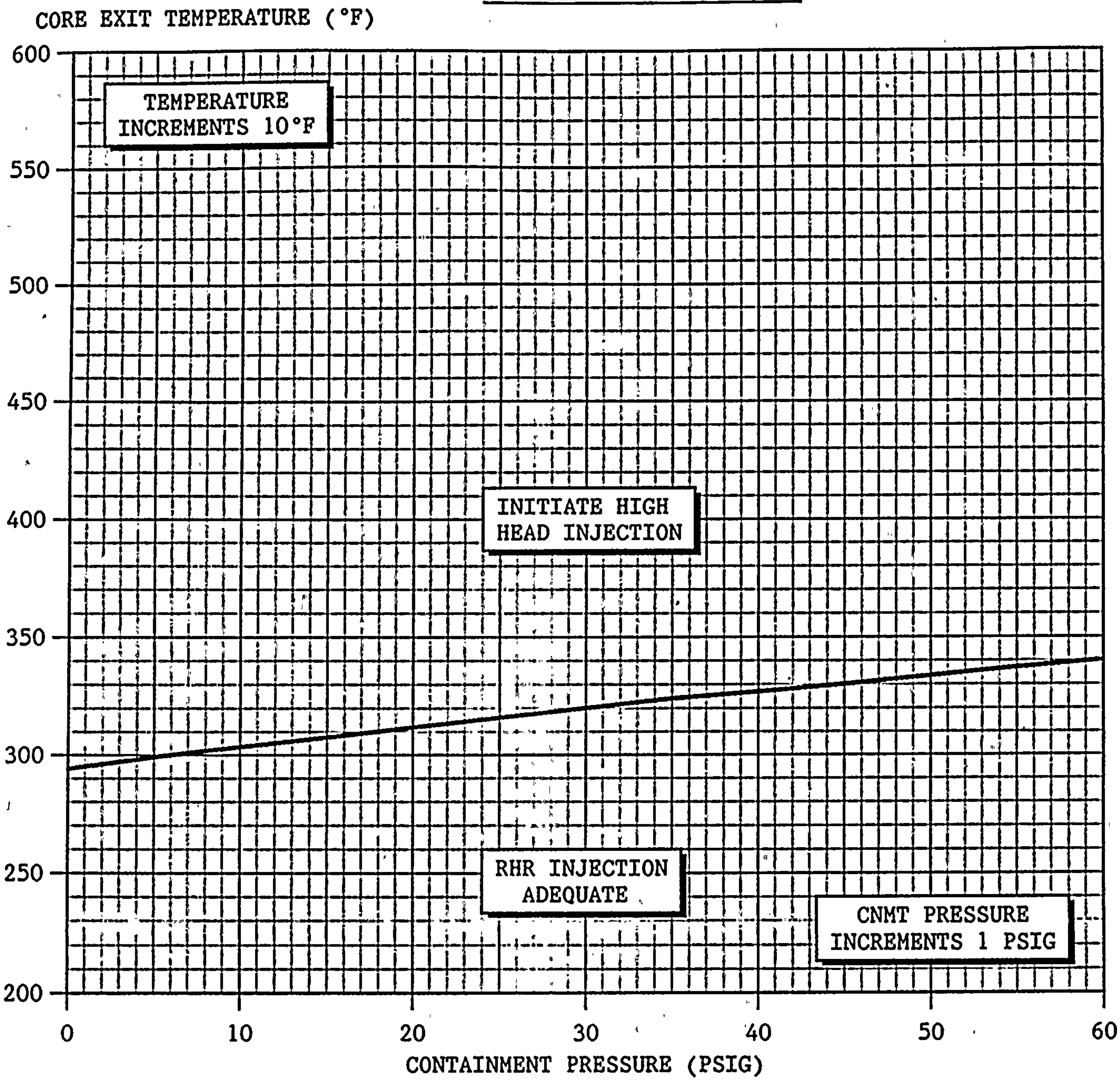
c. HEAT SINK - Narrow range level in all S/Gs less than 5% [25% adverse CNMT] AND total feedwater flow less than 200 gpm

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

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 13 PAGE 1 of 1

FIGURE RHR INJECTION



FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

- o Core exit TCs - GREATER THAN REQUIREMENTS OF FIGURE RHR INJECTION

OR

- o RVLIS level - LESS THAN 43% [46% adverse CNMT]

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).

ATTACHMENT D/G STOP

To stop any unloaded D/G and place in standby, perform the following:

1) Place emergency D/G SYNCHROSCOPE switch to either AC emergency bus

2) Using emergency D/G GOVERNOR, adjust D/G speed until frequency synchroscope is rotating slowly in the fast direction.

3) Using AUTO VOLTAGE CONTROL RHEOSTAT set D/G voltage at approximately 480 volts.

4) Place emergency D/G SYNCHROSCOPE to OFF

5) Place emergency D/G CONTROL switch to STOP and immediately depress voltage shutdown button

6) After 60 seconds, perform the following:

   o Depress emergency D/G FIELD RESET
   o Depress emergency D/G RESET
   o Verify AIR START SOLENOID lights - LIT
   o Verify START RELAY (1 and 2) lights - LIT

ATTACHMENT SD-1

Perform the following local actions to complete normal secondary system shutdown:

- o Throttle service water as necessary to main lube oil coolers, and seal oil unit coolers.
- o Isolate service water to main feed pump oil coolers, bus duct coolers, and exciter cooler.
- o WHEN turbine shaft stops, THEN engage the turning gear if adequate power available (Consult Control Room).
- o Secure secondary chemical addition pumps (hydrazine and ammonia pumps).
- o Open condensate feed system cooldown RECIRC valves:
  - o V-3982B, V-3983B, and V-4363 (at #5 heater outlet header)
  - o V-4362 (#5 heater line SE corner oil reservoir overhead)
  - o V-4365 (by MFW regulating valves)
  - o V-4361 (southwest corner of condenser, middle floor)
  - o V-3976A and V-3977A (MFP discharge valve bypass valves)
- o Close flange heating isolation valves (MOV-3601A and MOV-3601B).
- o Close reheater steam chain valves.
- o Close Reheater 4th pass temperature control valves:
  - o V-2432 (SW corner 1A MSR)
  - o V-2433 (SW corner 1B MSR)
  - o V 2434 (SW corner 2A MSR)
  - o V 2435 (SW corner 2B MSR)
- o Open Reheater steamline vents (at condenser north of 1A MSR):
  - o V-8500
  - o V-8501
  - o V-8502
  - o V-8504
  - o V-8505
- o Transfer house heating steam to house heating boiler if necessary (Refer to T-35H, NUCLEAR HOUSE HEATING STEAM TO BOILER STEAM SUPPLY CHANGE).
- o Perform T-14G, STEAM GENERATOR BLOWDOWN HEAT RECOVERY SYSTEM SHUTDOWN.
- o Restore makeup to CSTs as directed by Control Room.

ATTACHMENT SD-2

Perform the following to complete secondary system shutdown:

1. Transfer main steam header upstream traps from condenser to Blowdown Tank.

   o Open support trap outlet to blowdown tank (V-3683).

   o Close support trap outlet to condenser (V-3684).

   o Open A steam header trap to blowdown tank (V-3617).

   o Close A steam header trap to condenser (V-3605).

   o Open B steam header trap to blowdown tank (V-3604).

   o Close B steam header trap to condenser (V-3616).

2. Secure air ejectors and break vacuum:

   o Close steam to air ejector (V-3583).

   o Open vacuum breaker.

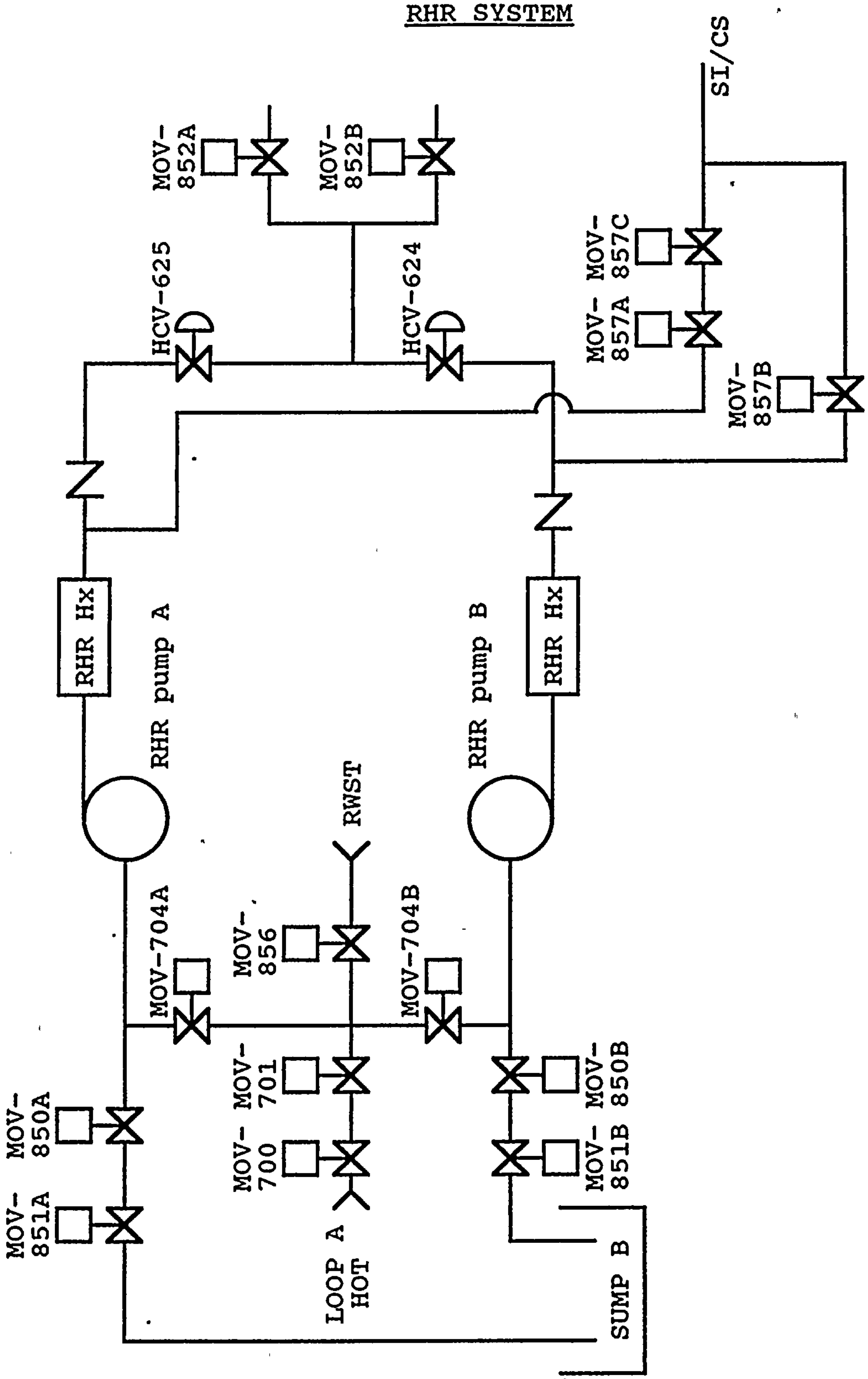
3. WHEN condenser vacuum at 0 inches Hg, THEN secure gland steam (V-3872) and stop gland steam condenser exhauster.

NOTE: Before securing the condensate system, check that the house heating boiler return tank makeup pump is energized.

4. Operate condensate pump for 5 hours after turbine shutdown to cool heaters.

EOP:	TITLE:	REV: 0
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	PAGE 1 of 1

RHR SYSTEM



FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

o Core exit TCs - GREATER THAN REQUIREMENTS OF FIGURE RHR INJECTION

OR

o RVLIS level - LESS THAN 43% [46% adverse CNMT]

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).

EOP:	TITLE:	REV: 4
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 1 of 8

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:________________

A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by draining it through the ruptured S/G tubes into the RCS.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

   a. E-3 STEAM GENERATOR TUBE RUPTURE, if plant staff selects backfill method.

   b. ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, when blowdown is not available and plant staff selects backfill method.

[illegible]

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 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure

2 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]

Response not obtained: a. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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 outlet valves

- ACCUM A, MOV-841
- ACCUM B, MOV-865

Response not obtained: 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.

3	Verify Adequate Shutdown Margin	
	a. Direct HP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.

* *

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.

4	Check 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 the 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 go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should be completed as quickly as possible, not to exceed 100°F/hr.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	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 and RHR system NOT in service, THEN perform the following: o Use faulted S/G. -OR- o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
6	Check Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow. IF either 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Control RCS Makeup Flow And Letdown To Maintain PRZR Level:	
	a. PRZR level - GREATER THAN 13% [40% adverse CNMT]	a. Increase RCS makeup flow as necessary and go to Step 8.
	b. PRZR level - LESS THAN 75% [65% adverse CNMT]	b. Decrease RCS makeup flow to decrease level and go to Step 10.

<u>NOTE</u>: The upper head region may void during RCS depressurization if RCPs are not running. This may result in a rapidly increasing PRZR level.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Depressurize RCS To Backfill From Ruptured S/G:	
	a. Depressurize using normal PRZR spray	a. <u>IF</u> letdown is in service, <u>THEN</u> depressurize using auxiliary spray valve (AOV-296). <u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.
	b. Maintain PRZR level - BETWEEN 13% AND 75% [BETWEEN 40% AND 65% adverse CNMT]	
	c. Check ruptured S/G level - GREATER THAN 5% [25% adverse CNMT]	c. Stop RCS depressurization.
	d. Energize PRZR heaters as necessary	
	e. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	
9	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 Or O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 11.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 11.
	c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
11	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 12.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 12.
	c. Stop affected RCP(s)	
12	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 3.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions (Refer to 0-2.3, PLANT AT COLD OR REFUELING SHUTDOWN) b. Consult TSC	

-END-

ES-3.1 APPENDIX LIST

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 43% [46% 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

FIGURE MIN SUBCOOLING

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

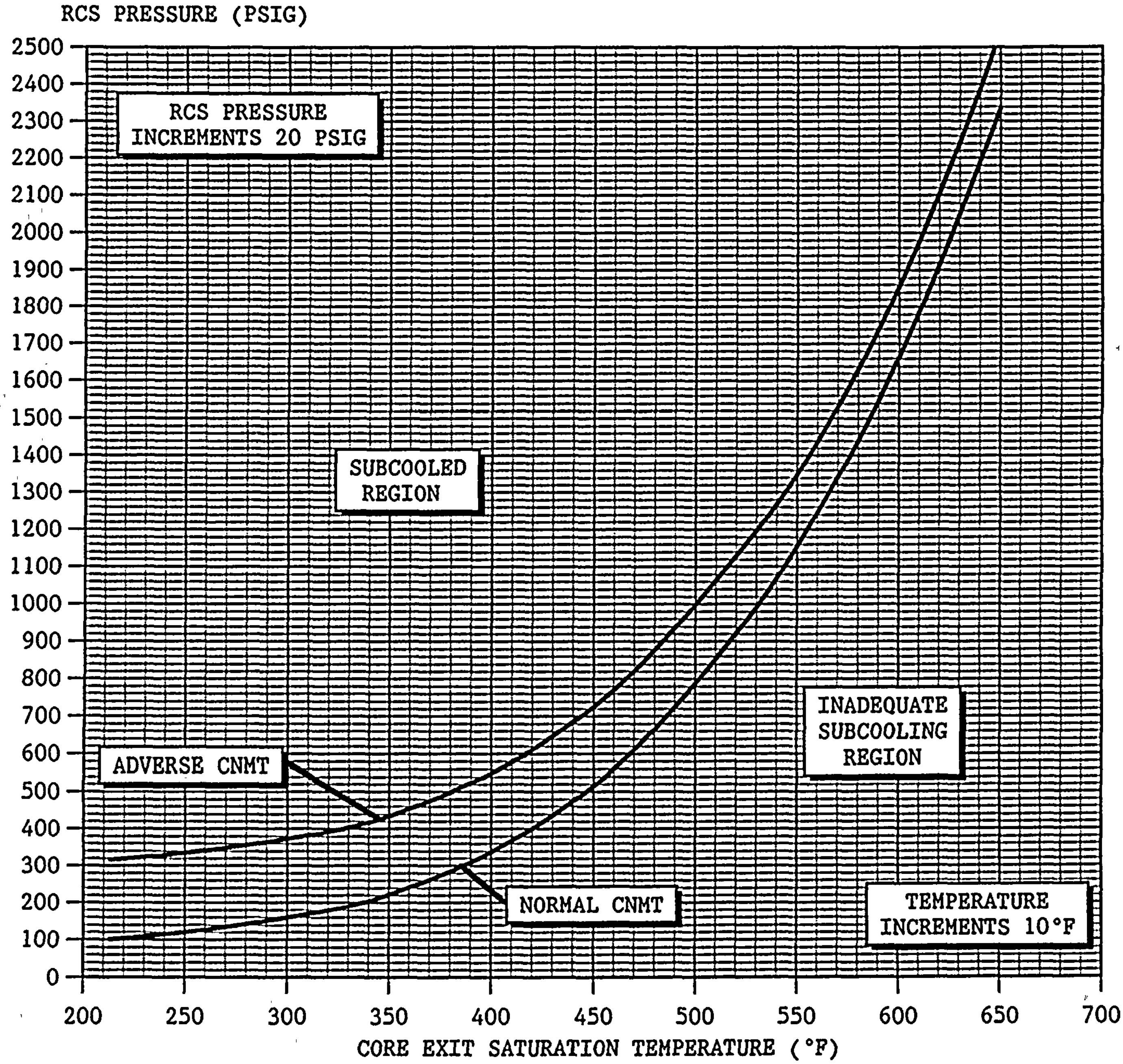
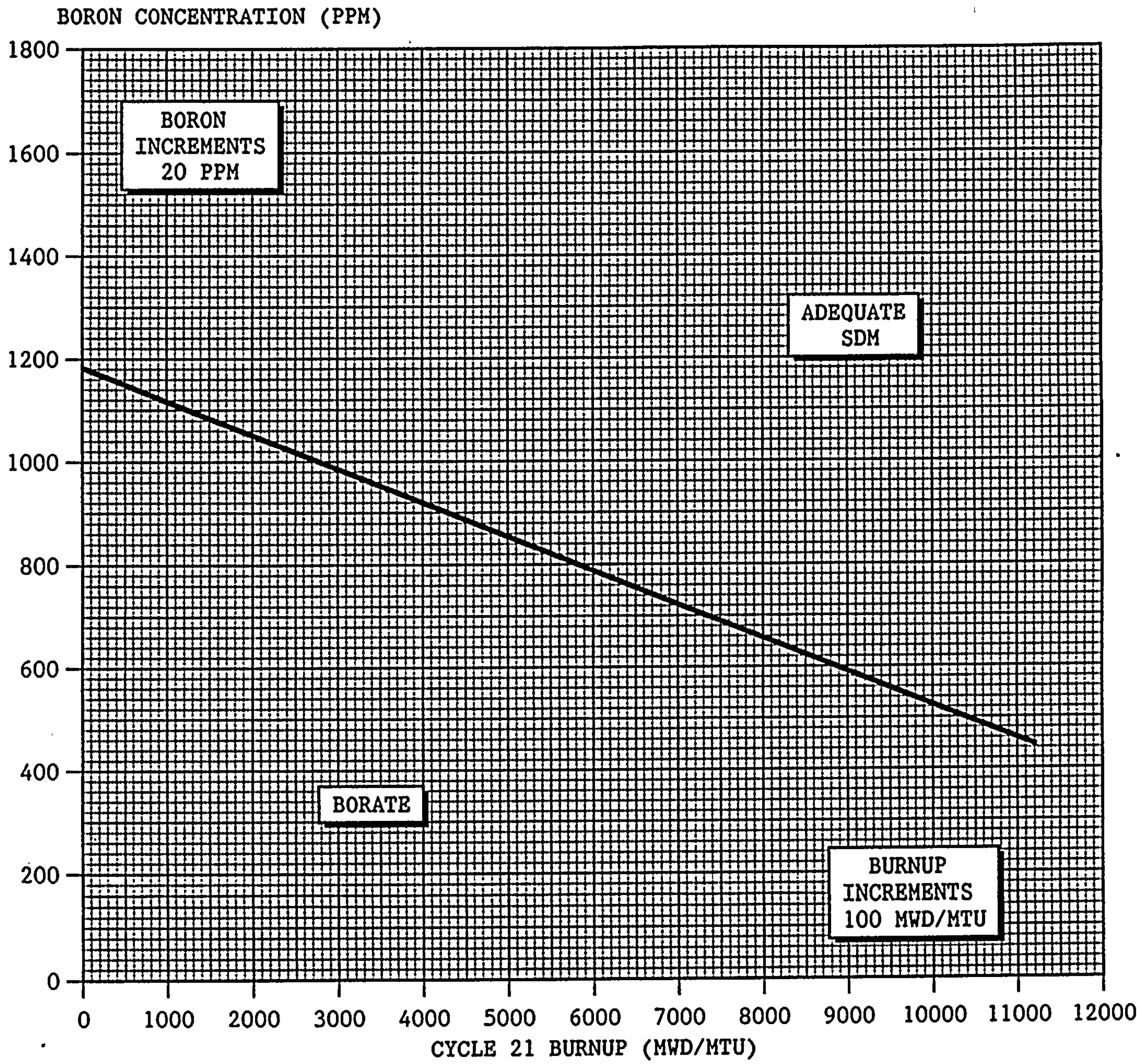


FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF either condition listed below occurs, THEN operate SI pumps manually 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 T/Cs - LESS THAN 0°F USING REQUIREMENTS OF 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. 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

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: ____________________

A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by draining via S/G blowdown.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

   a. E-3 STEAM GENERATOR TUBE RUPTURE, if plant staff selects the blowdown method.

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure	
2	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 ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	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 outlet valves • ACCUM A, MOV-841 • ACCUM B, 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.

3	Verify Adequate Shutdown Margin	
	a. Direct HP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.

* *

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.

4	Check 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 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 go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should be completed as quickly as possible, not to exceed 100°F/hr.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Initiate RCS Cooldown To 350°F:	
	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 from intact S/G using S/G ARV. IF no intact S/G available, THEN perform the following: o Use faulted S/G. -OR- o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP — ACTION/EXPECTED RESPONSE — RESPONSE NOT OBTAINED

* *

CAUTION

RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN 1050 PSIG.

* *

6 Control RCS Pressure And Makeup Flow To Minimize RCS-To-Secondary Leakage:

a. Perform appropriate action(s) from table:

PRZR LEVEL	RUPTURED S/G NARROW RANGE LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 13% [40% ADVERSE CNMT]	o Increase RCS makeup flow o Depressurize RCS using Step 6b.	Increase RCS makeup flow	o Increase RCS makeup flow o Maintain RCS and ruptured S/G pressure equal
BETWEEN 13% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 6b.	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	o Depressurize RCS using Step 6b. o Decrease RCS makeup flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
GREATER THAN 75% [65% ADVERSE CNMT]	o Decrease RCS makeup flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal

b. Use normal PRZR spray to obtain desired results for Step 6a

b. IF letdown is in service, THEN use auxiliary spray (AOV-296). IF NOT, THEN use one PRZR PORV.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 OR O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
8	Check If RCS Cooldown Should Be Stopped:	
	a. RCS cold leg temperatures - LESS THAN 350°F	a. Return to Step 3.
	b. Stop RCS cooldown	
9	Check Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow. <u>IF</u> either of the following conditions occurs, <u>THEN</u> 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.

<u>NOTE</u>: Blowdown from ruptured S/G may be stopped when RHR system is placed in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Consult TSC To Determine Appropriate Procedure To Establish Blowdown From Ruptured S/G	<u>IF</u> blowdown can <u>NOT</u> be initiated, <u>THEN</u> go to alternate post-SGTR cooldown procedure, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 1, <u>OR</u> ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Control RCS Makeup Flow And Letdown To Maintain PRZR Level:	
	a. PRZR level - GREATER THAN 13% [40% adverse CNMT]	a. Increase RCS makeup flow as necessary and go to Step 12.
	b. PRZR level - LESS THAN 75% [65% adverse CNMT]	b. Decreases RCS makeup flow to decrease level and go to Step 13.

<u>NOTE</u>: The upper head region may void during depressurization if RCPs are not running. This may result in a rapidly increasing PRZR level.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Depressurize RCS To Minimize RCS-To-Secondary Leakage:	
	a. Depressurize using normal PRZR spray	a. <u>IF</u> letdown is in service, <u>THEN</u> depressurize using auxiliary spray valve (AOV-296). <u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.
	b. Energize PRZR heaters as necessary	
	c. Maintain RCS pressure at ruptured S/G pressure	
	d. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 14.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 14.
	c. Stop affected RCP(s)	
14	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 9.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 9.
	c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Continue RCS Cooldown To Cold Shutdown:	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Use RHR System	
	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 and RHR system NOT in service, THEN perform the following: o Use faulted S/G. -OR- o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
16	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 9.
17	Evaluate Long Term Plant Status:	
	a. Maintain cold shutdown conditions - (Refer to 0-2.3, PLANT AT COLD OR REFUELING SHUTDOWN)	
	b. Consult TSC	

-END-

ES-3.2 APPENDIX LIST

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 43% [46% 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

EOP:	TITLE:	REV: 5
ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	PAGE 1 of 1

FIGURE MIN SUBCOOLING

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

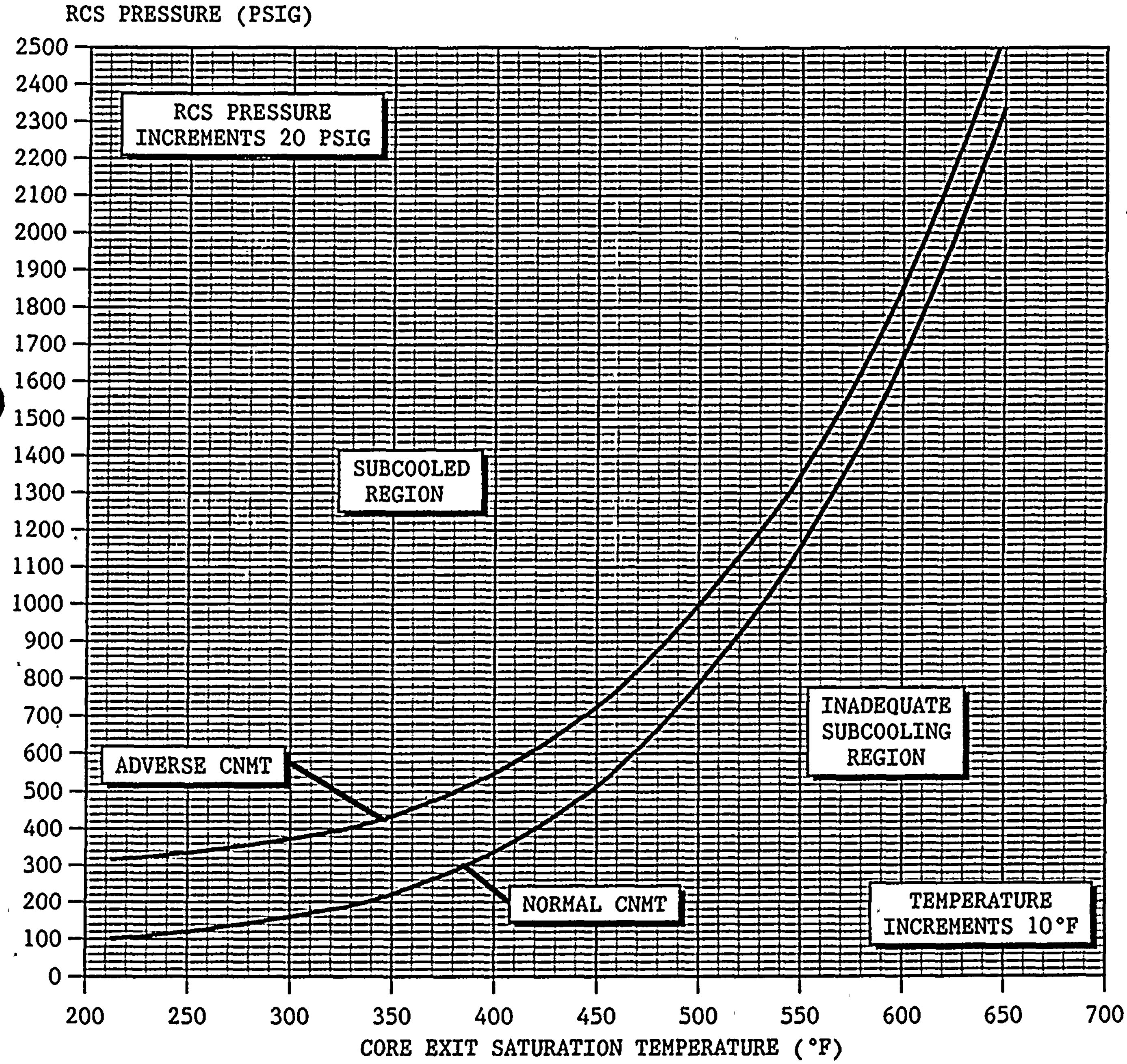
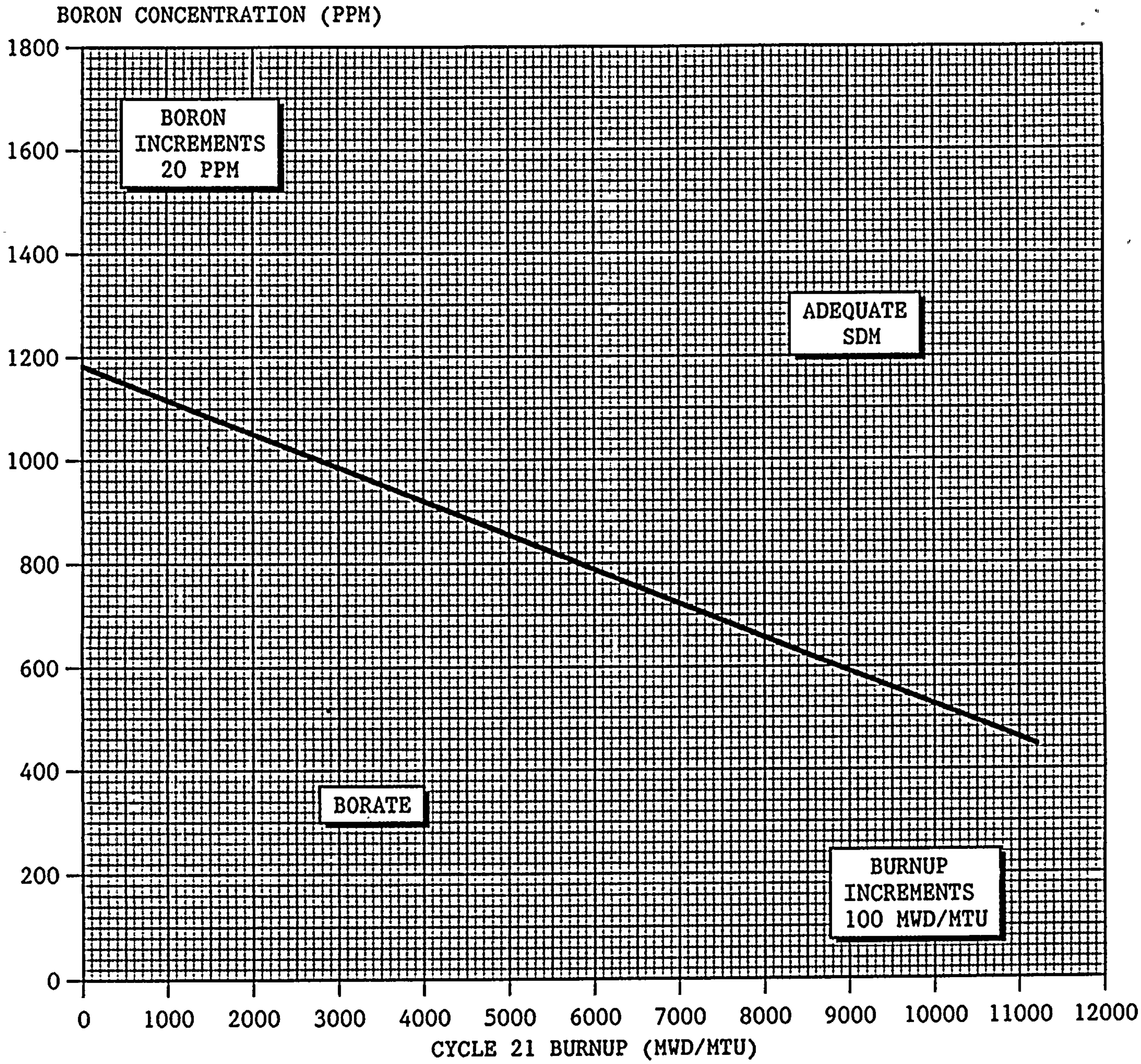


FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF either condition listed below occurs, THEN operate SI pumps manually 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 T/Cs - LESS THAN 0°F USING REQUIREMENTS OF 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. 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: 5
ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	PAGE 1 of 12

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:________________________

A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by dumping steam.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

   a. E-3 STEAM GENERATOR TUBE RUPTURE, if plant staff selects steam dump method.

   b. ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, when blowdown is not available and plant staff selects steam dump method.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

- o STEAM SHOULD NOT BE RELEASED FROM ANY RUPTURED S/G IF WATER MAY EXIST IN ITS STEAMLINE.
- o AN OFFSITE DOSE EVALUATION SHOULD BE COMPLETED PRIOR TO USING THIS PROCEDURE.

* *

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 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	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 ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	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 outlet valves • ACCUM A, MOV-841 • ACCUM B, 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.

3	Verify Adequate Shutdown Margin	
	a. Direct HP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.

* *

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.

4	Check 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 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 go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should be completed as quickly as possible, not to exceed 100°F/hr.

5 Initiate RCS Cooldown To 350°F:

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

b. Dump steam to condenser from intact S/G

RESPONSE NOT OBTAINED:

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

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

- o Use faulted S/G.

-OR-

- o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN 1050 PSIG.

* *

6 Control RCS Pressure And Makeup Flow To Minimize RCS-To-Secondary Leakage:

a. Perform appropriate action(s) from table:

PRZR LEVEL	RUPTURED S/G NARROW RANGE LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 13% [40% ADVERSE CNMT]	o Increase RCS makeup flow o Depressurize RCS using Step 6b.	Increase RCS makeup flow	o Increase RCS makeup flow o Maintain RCS and ruptured S/G pressure equal
BETWEEN 13% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 6b.	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	o Depressurize RCS using Step 6b. o Decrease RCS makeup flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
GREATER THAN 75% [65% ADVERSE CNMT]	o Decrease RCS makeup flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal

b. Use normal PRZR spray to obtain desired results for Step 6a

Response not obtained: b. IF letdown is in service, THEN use auxiliary spray (AOV-296). IF NOT, THEN use one PRZR PORV.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 OR O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
8	Check If RCS Cooldown Should Be Stopped:	
	a. RCS cold leg temperatures - LESS THAN 350°F	a. Return to Step 3.
	b. Stop RCS cooldown	
9	Check Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow. <u>IF</u> either of the following conditions occurs, <u>THEN</u> 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RUPTURED S/G PRESSURE MAY DECREASE RAPIDLY WHEN STEAM IS RELEASED.

* *

NOTE: Steam release from ruptured S/G may be stopped when RHR System is in service.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Initiate Cooldown Of Ruptured S/G:	
	a. Verify condenser available: o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP - LIT	a. Manually or locally dump steam using ruptured S/G ARV and go to Step 11.
	b. Dispatch AO to locally open ruptured S/G MSIV bypass valve	
	c. Dump steam to condenser using steam dump pressure controller	
11	Control RCS Makeup Flow And Letdown To Maintain PRZR Level:	
	a. PRZR level - GREATER THAN 13% [40% adverse CNMT]	a. Increase RCS makeup flow as necessary and go to Step 12.
	b. PRZR level - LESS THAN 75% [65% adverse CNMT]	b. Decrease RCS makeup flow to decrease level and go to Step 13.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: The upper head region may void during depressurization if RCPs are not running. This may result in a rapidly increasing PRZR level.

12	Depressurize RCS To Minimize RCS-To-Secondary Leakage:	
	a. Depressurize using normal PRZR spray associated with running RCP	a. IF letdown is in service, THEN depressurize using auxiliary spray valve (AOV-296). IF NOT, THEN use one PRZR PORV.
	b. Energize PRZR heaters as necessary	
	c. Maintain RCS pressure at ruptured S/G pressure	
	d. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	
13	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 14.
	b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM	b. Go to Step 14.
	c. Stop affected RCP(s)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If RHR Normal Cooling Can Be Established	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 9.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 9.
	c. Place RCS overpressure protection system in service (Refer to 0-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
15	Continue RCS Cooldown To Cold Shutdown:	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Use RHR System	
	c. Dump steam to condenser from intact S/G	c. Manually or locally dump steam using intact S/G ARV <u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following: o Use faulted S/G. -OR- o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 9.
17	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions (Refer to 0-2.3, PLANT AT COLD OR REFUELING SHUTDOWN) b. Consult TSC	

-END-

ES-3.3 APPENDIX LIST

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 43% [46% 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

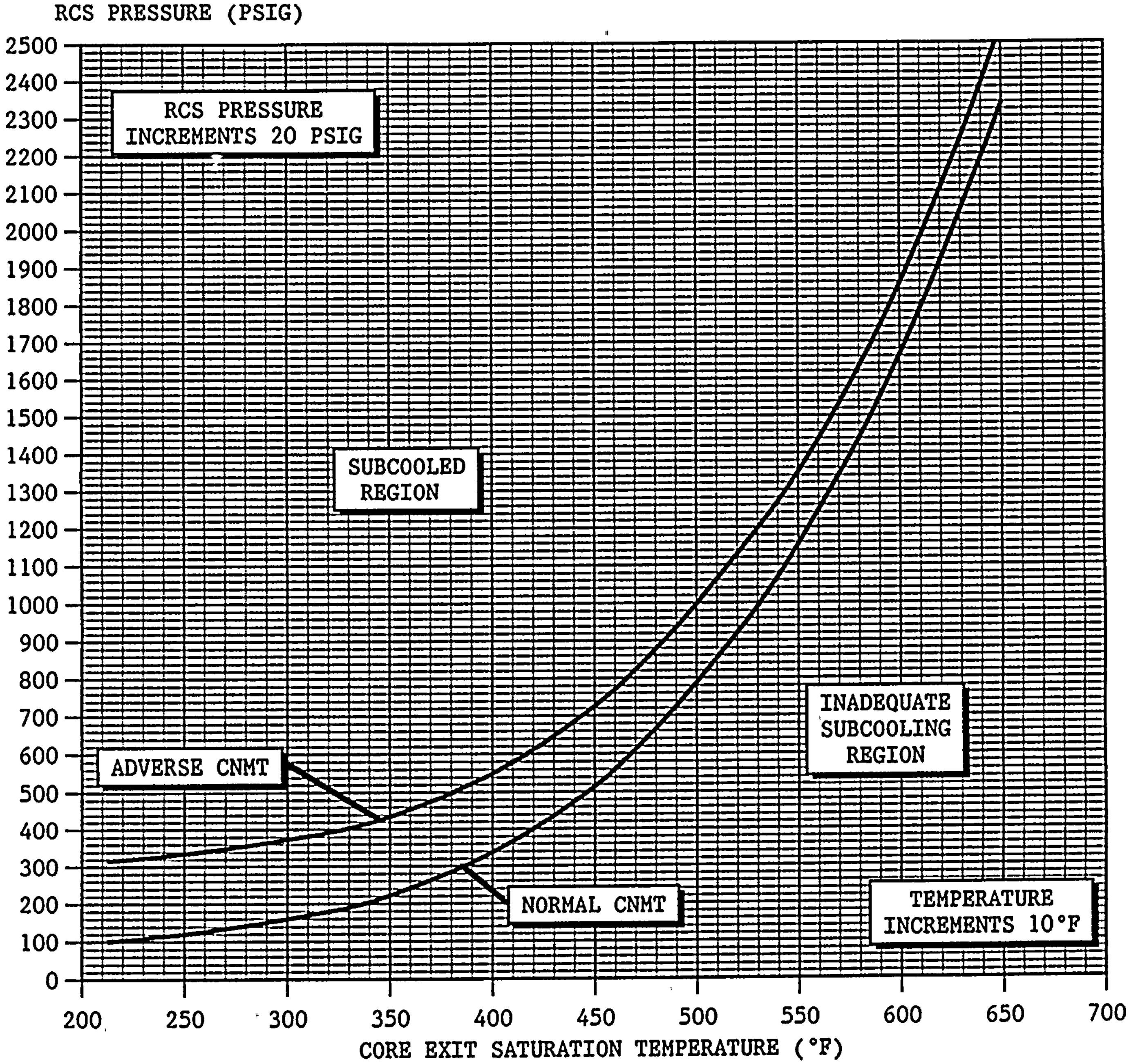
d. INTEGRITY - Cold leg temperatures decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 285°F

e. CONTAINMENT - CNMT pressure greater than 60 psig

EOP:	TITLE:	
ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV: 5 PAGE 1 of 1

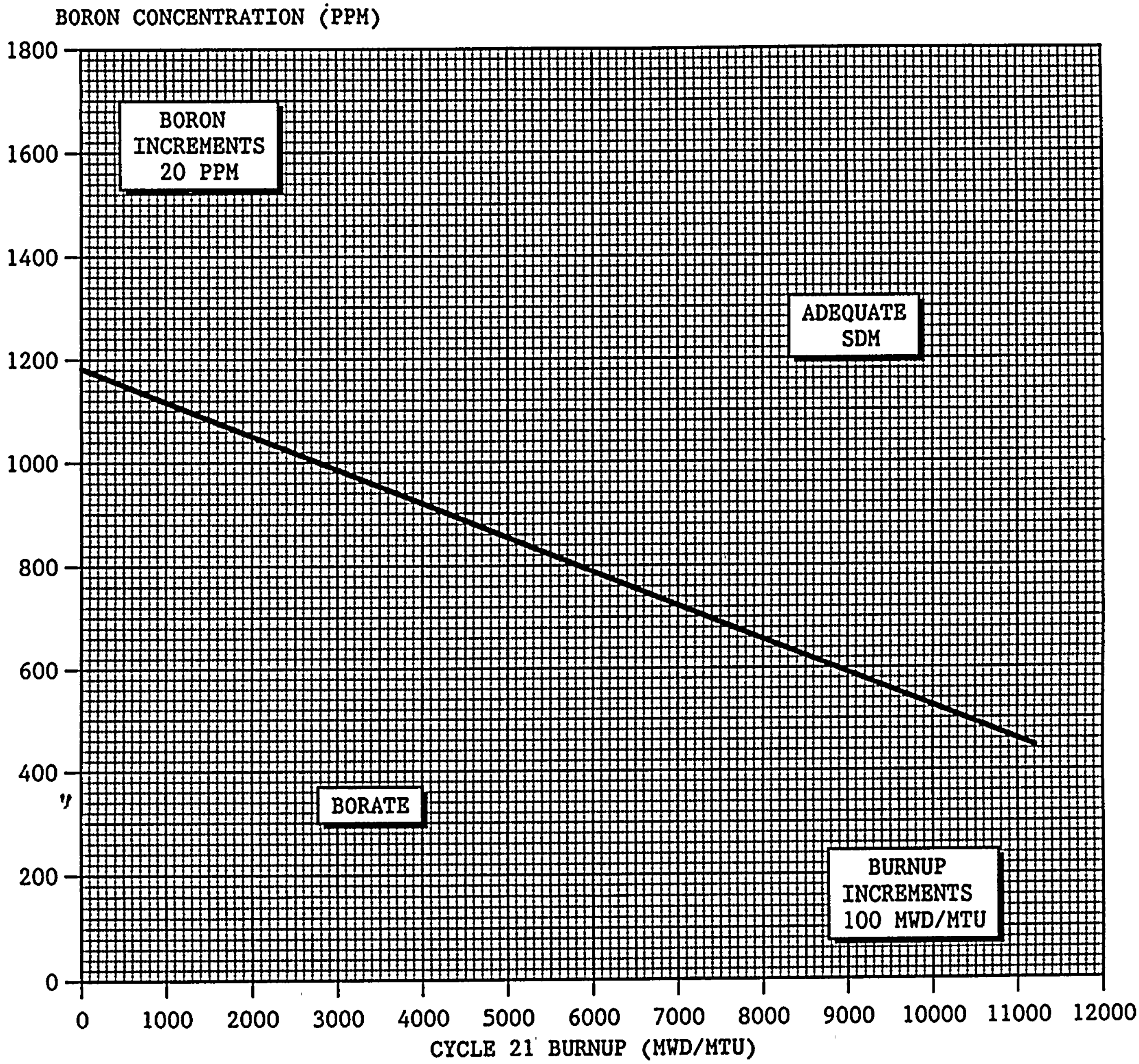
FIGURE MIN SUBCOOLING

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



EOP:	TITLE:	REV: 5
ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	PAGE 1 of 1

FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

[illegible]

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 12-13-89

Joseph A. Widay
PLANT SUPERINTENDENT

12-19-89
EFFECTIVE DATE

QA X NON-QA ______ CATEGORY 1.0

REVIEWED BY: ____________________

GINNA STATION

START:

DATE ____________

TIME ____________

COMPLETED:

DATE ____________

TIME: ____________

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

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from;

   a. AP-RCS.1, REACTOR COOLANT LEAK, when conditions indicate a CVCS leak.

2. SYMPTOMS - The symptoms of CVCS leak are;

   a. Annunciator B-9 (B-10) RCP LABYR SEAL LO DIFF PRESS ALARM, or

   b. Charging line pressure low, or

   c. Annunciator F-14, CHARGING PUMP SPEED ALARM, or

   d. Annuciator A-4, REGEN HX LETDOWN OUT HI TEMP 395°F ALARM, or

   e. Letdown line low pressure and low flow, or

   f. Charging Pump Room AREA MONITOR R-4 ALARM

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Check RCS Inventory o PRZR level - DECREASING	IF PRZR level is stable, THEN go to Step 4.
2	Increase PRZR Level: a. Start - ADDITIONAL CHARGING PUMPS AND INCREASE SPEED AS NECESSARY b. Check PRZR level - STABLE OR INCREASING	 b. Close LTDN loop B cold leg to RHx (AOV-427).
3	Check PRZR Level: o PRZR level - GREATER THAN 13% AND STABLE OR INCREASING	IF available charging pumps are running at maximum speed with letdown isolated, AND PRZR level is still decreasing in an uncontrolled manner, THEN trip the reactor and go to E-0, REACTOR TRIP or SAFETY INJECTION.
4	Check For Component Cooling System Leak: o CCW radiation monitor (R-17) - NORMAL (Check RMS recorder for trend) o CCW surge tank level - NORMAL (approximately 50%)	IF CCW leak indicated, THEN go to AP-CCW.1, LEAKAGE INTO THE COMPONENT COOLING LOOP.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF LEAK EXISTS IN THE LETDOWN LINE, H2 GASES FROM THE VCT MAY DIFFUSE OUT THE LEAK AND CAUSE A HAZARDOUS CONDITION.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check For Letdown Line Leak: o Letdown line flow - APPROXIMATELY 40 GPM o Low press LTDN pressure - APPROXIMATELY 250 PSIG	IF abnormal letdown flow or pressure exist, THEN close LTDN loop B cold leg to RHx AOV-427, AND IF RCS leakage returns to normal (normal leakage found on latest RCS Leakage Surveillance Sheet), THEN go to Step 8, OR IF RCS leakage does not return to normal (normal leakage found on latest RCS Leakage Surveillance Sheet), THEN go to Step 6.
6	Check For Charging Line Leak: a. Charging pump discharge pressure - NORMAL (approximately 2400 psig) b. REGEN Hx LTDN outlet temp TI-127 - NORMAL (approximately 300°F) c. Go to Step 12	IF charging line leak is indicated, THEN go to Step 7.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	**Check Aux Bldg For Leak:**	
	a. Operation personnel - DISPATCHED TO AUX BLDG WITH NECESSARY LOCKED AREA KEYS TO INVESTIGATE FOR LEAK	
	b. CVCS leak - NOT IN AUX BLDG	b. IF charging line leak is in the Aux Bldg AND isolable, THEN go to Step 8. IF charging line leak is in the Aux Bldg AND is not isolable, THEN: 1) IF leak is manageable (i.e., pressurizer level, seal injection, and makeup can be maintained), shut the plant down as quickly as possible (Refer to 0-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN), AND go to Step 16. 2) IF leak is not manageable, THEN trip the reactor AND go to E-0, REACTOR TRIP or SAFETY INJECTION.
8	**Establish Isolation Of Letdown Flow to REGEN Hx:**	
	o LTDN loop B cold leg to RHx AOV-427 - CLOSED	
	o LTDN orifices valves AOV-200A, AOV-200B, and AOV-202 - CLOSED	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish Isolation Of Charging Flow to REGEN Hx: o HCV-142 - CLOSED	
10	Establish Control Of Charging Pumps As Necessary To Maintain RCP Labyrinth Seal ΔP - LESS THAN 80 INCHES	
11	Establish Excess Letdown: a. Place excess letdown divert valve, AOV-312, to NORMAL b. Ensure CCW from excess letdown open, (AOV-745) c. Ensure RCP seal return isolation valve open, (MOV-313) d. Open excess letdown isolation valve, AOV-310 e. Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig f. Go to - STEP 13	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

RCP OPERATION MAY CONTINUE WITHOUT SEAL INJECTION IF CCW IS BEING SUPPLIED TO THE THERMAL BARRIER. HOWEVER, SINCE SEAL SUPPLY WILL NOW BE UNFILTERED, RCP OPERATION WITHOUT SEAL INJECTION SHOULD BE MINIMIZED.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check For RCP Seal Injection Leak:	
	a. RCP labyrinth seal D/P - GREATER THAN 15 INCHES	a. IF RCP labyrinth seal D/P is low or zero, THEN suspect leak in seal injection line. Dispatch AO to investigate AND go to Step 14.
	b. Go to Step 14	

* *

CAUTION

THE NORMAL METHOD OF VCT DIVERSION (AOV-112A) IS NOT AVAILABLE WHILE ON EXCESS LETDOWN. VCT LEVEL MAY BE DECREASED BY MANUALLY DIVERTING EXCESS LETDOWN TO THE RCDT USING AOV-312.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Establish Control Of Charging And Excess Letdown Flows - TO RESTORE PRZR LEVEL TO PROGRAMMED LEVEL	
14	Establish The Location Of CVCS Leak And Have Personnel - COMPLETE MANUAL ISOLATION AS REQUIRED	IF the leak can NOT be isolated, THEN go to AP-RCS.1, REACTOR COOLANT LEAK, Step 6.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Allow Conditions To Stabilize, THEN Perform An RCS Leakage Calculation - TO VERIFY THAT LEAK HAS BEEN ISOLATED	<u>IF</u> the leak can <u>NOT</u> be isolated, <u>THEN</u> go to AP-RCS.1, REACTOR COOLANT LEAK, Step 6.

<u>NOTE</u>: Refer to 0-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Complete - NOTIFICATION TO HIGHER SUPERVISION	

-END-

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 12-13-89

Joseph A. Widay
PLANT SUPERINTENDENT

12-19-89
EFFECTIVE DATE

QA X NON-QA ______ CATEGORY 1.0

REVIEWED BY: ______________________

GINNA STATION
START:
DATE ______
TIME ______
COMPLETED:
DATE ______
TIME: ______

A. PURPOSE - This procedure provides the steps necessary to respond to a loss of CCW while the plant is at power.

B. ENTRY CONDITIONS/SYMPTOMS

1. SYMPTOMS - The symptoms of LOSS OF CCW DURING POWER OPERATION are;

   a. Annunciator A-13 COMP COOLING SURGE TANK LO LEVEL 41.2%, alarm, or

   b. Annunciator A-22 CCW PUMP DISCHARGE LO PRESS 60 PSI, alarm, or

   c. Annunciator A-17, MOTOR OFF, RCP, CCP alarm, or

   d. Annunciator A-9, RHR PUMP COOLING WATER OUTLET LO FLOW 15 GPM alarm, or

   e. Annunciator A-6, CONT SPRAY PUMP COOLING WATER OUT LOW FLOW 15 GPM alarm, or

   f. Annunciator A-14, SAFETY INJ PUMPS COOLING WATER OUT LO FLOW 25 GPM alarm, or

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

   h. Annunciator A-24 (A-32), RCP 1A (1B) OIL LEVEL ± 1.25, alarm.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF CCW FLOW TO A RCP IS INTERRUPTED FOR GREATER THAN 2 MINUTES OR IF EITHER RCP MOTOR BEARING TEMPERATURE EXCEEDS 200°F, THEN CCW SHOULD BE CONSIDERED LOST TO THAT RCP, REFER TO STEP 3.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Check CCW Pump Status: o Annunciator A-17, Motor Off RCP CCP - EXTINGUISHED o Both CCW pump breaker white disagreement lights - EXTINGUISHED	Perform the following: a. Verify auto start of standby CCW pump or start manually. b. IF Annunciator A-22, CCW pump discharge lo press 60 psi LIT, THEN, check closed CCW to RHR HXs (MOV-738A and MOV-738B).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>NOTE</u>: CCW surge tank level should be verified locally in the Aux Bldg, if possible.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Verify CCW Surge Tank Level Normal:	
	a. CCW surge tank level - APPROXIMATELY 50% AND STABLE	a. Open RMW to CCW surge tank (MOV-823) and start a RMW pump and perform the following: <u>IF</u> surge tank level is stable or increasing, <u>THEN</u> go to Step 3. <u>IF</u> surge tank level can <u>NOT</u> be maintained greater than 10%, <u>THEN</u>: 1) Trip the Rx. 2) Trip the RCPs. 3) Place both CCW pumps in pull stop. 4) Go to E-0, REACTOR TRIP or SAFETY INJECTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF AN RCP(S) IS TRIPPED DUE TO A LOSS OF CCW, SEAL INJECTION SHOULD BE MAINTAINED TO THE IDLE RCP(S) UNTIL RCS TEMPERATURE IS LESS THAN 200°F, OR UNTIL CCW IS RESTORED.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Check CCW To Both RCPs: o Annunciator A-7 (A-15), RCP 1A (1B) CCW return Hi temp or low flow 165 gpm 125°F alarm - EXTINGUISHED o RCP motor bearings temperature (PPCS address GD-RCPS OR RCP temperature monitor RK-30A recorder) - ≤ 200°F	IF CCW lost to RCP(s), THEN: a. Trip the Rx. b. Trip affected RCP(s). c. Go to E-0, REACTOR TRIP or SAFETY INJECTION.
4	Check CCW Valve Alignment - NORMAL (Refer to Attachment CONTROL ROOM CCW ALIGNMENT DURING POWER OPERATION)	Align CCW valves as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- o An evaluation must be made to determine if operation may continue while investigating a CCW leak in containment.
- o Operation may continue with the reactor support coolers isolated. If this occurs, notify higher supervision.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check For CCW Leakage In CNMT:	
	a. CNMT sump A levels - NOT INCREASING NOTICABLY	a. IF abnormal increase in CNMT sump level, THEN: 1) Direct HP Tech to sample sump A for chromates. 2) Prepare to make CNMT entry to check for CCW leak.
	b. RCP oil levels - NOT INCREASING	b. IF any RCP oil level increasing uncontrollably, THEN: 1) Close CCW to and from affected RCP(s), (MOVs 749A and 759A for "A" RCP; MOVs 749B and 759B for "B" RCP). 2) Trip Rx. 3) Trip affected RCP(s). 4) Go to E-0, REACTOR TRIP or SAFETY INJECTION.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check For CCW Leakage In AUX BLDG: o Aux Bldg sump pump - INCREASED START FREQUENCY -OR- o Waste holdup tank level - UNEXPLAINED INCREASE -OR- o Aux Bldg - VISUAL LEAKAGE IDENTIFIED	<u>IF</u> no leakage indicated in Aux Bldg, <u>THEN</u>: a. Direct HP Tech to sample CCW HX SW outlet for chromates. b. Go to step 10.
7	Establish - THE SOURCE OF THE CCW LEAKAGE AND ISOLATE	
8	Verify CCW Surge Tank Level Normal: o CCW surge tank level - APPROXIMATELY 50%	<u>IF</u> CCW surge tank level <u>NOT</u> approximately 50%, <u>THEN</u> open RMW to CCW surge tank, MOV-823 and start a RMW pump to fill CCW surge tank to approximately 50%.
9	Direct HP To Sample For Chromates	
10	Verify - CONDITIONS PERMIT CONTINUED POWER OPERATION, (Refer to Technical Specification Section 3.3.3)	<u>IF</u> shutdown required, <u>THEN</u> refer to O-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: Refer to 0-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.	
11	Complete - NOTIFICATION TO HIGHER SUPERVISION	
12	Establish Further Guidance:	
	a. Problem or leakage - CORRECTED	a. IF problem NOT corrected or leakage NOT found or isolated, THEN return to Step 4.
	b. Return to - APPROPRIATE OPERATING PROCEDURE	

-END-

ATTACHMENT CONTROL ROOM CCW ALIGNMENT DURING POWER OPERATION

1.	CCW to RHR Hx A	MOV-738A Closed
2.	CCW to RHR Hx B	MOV-738B Closed
3.	CCW from RCP 1A Thermal Barrier	AOV-754A Open
4.	CCW from RCP 1B Thermal Barrier	AOV-754B Open
5.	CCW from Ex Ltdn Hx Isol Vlv	AOV-745 Open
6.	CCW Surge Tk Vent	RCV-017 Open
7.	CCW to CNMT Isol Vlv	MOV-817 Open
8.	CCW to Rx Supp Clrs Isol Vlv	MOV-813 Open
9.	CCW from Rx Supp Clrs Isol Vlv	MOV-814 Open
10.	CCW to RCP 1A Isol Vlv	MOV-749A Open
11.	CCW to RCP 1B Isol Vlv	MOV-749B Open
12.	CCW from RCP 1A Isol Vlv	MOV-759A Open
13.	CCW from RCP 1B Isol Vlv	MOV-759B Open
14.	NRHX Ltdn Outlet Temp (Controller)	TCV-130 Auto