EOP:	TITLE:	REV: 5
AP-RCS.3	HIGH REACTOR COOLANT ACTIVITY	PAGE 1 of 5

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 11-20-90

Joseph A. Widay
PLANT SUPERINTENDENT

11-20-90
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

A. PURPOSE - This procedure provides guidance necessary to operate the plant with indication of high reactor coolant activity.

B. ENTRY CONDITIONS/SYMPTOMS

1. SYMPTOMS - The symptoms of HIGH REACTOR COOLANT ACTIVITY are;

   a. Unexplained increase in letdown line monitor, R-9, or

   b. Sampling indicates I-131 equivalent GREATER THAN 0.2 uCi/gm, or

   c. Sampling indicates gross degassed activity GREATER THAN 20 uCi/gm, or

   d. Sampling indicates that total specific activity exceeds 84/E.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

IF LETDOWN FLOW EXCEEDS 60 GPM WHEN USING AOV-202, D/P ACROSS THE CVCS DEMINERALIZERS SHOULD BE MONITORED TO VERIFY THAT FLOW IS CONTINUING THROUGH THE DI'S. HOWEVER, FLOW THROUGH THE DI'S SHOULD NOT EXCEED 90 GPM.

* *

1	Verify RCS Activity:	
	a. Direct HP - TO SAMPLE RCS FOR ACTIVITY	
	b. RCS activity - GREATER THAN NORMAL (Check with HP Department for normal activity)	b. IF normal activity verified, THEN direct I&C to check operability of R-9, letdown line monitor, AND return to normal operations.
2	Increase Letdown Flow To 60 GPM:	
	a. Verify deborating DI isolated - DIVERT VLV CATION DEBOR DI AOV-244 IN BYPASS POSITION	a. Place AOV-244 in bypass position.
	b. Place PCV-135 to manual AND adjust as necessary - TO CONTROL LETDOWN PRESSURE	
	c. Change orifices - CLOSE 40 GPM ORIFICE AND OPEN 60 GPM LTDN ORIFICE AOV-202 IMMEDIATELY	
	d. Adjust letdown pressure - TO APPROXIMATELY 250 PSIG	
	e. Return PCV-135 - TO AUTO, IF DESIRED	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Refer to 0-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.

3	Check Area Monitor R9 Letdown Line - LESS THAN 200 MR/HR ABOVE BACKGROUND	Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION.

* *

CAUTION

WHEN A NEW DI IS VALVED IN, THERE MAY BE A PLUS OR MINUS REACTIVITY ADDITION DUE TO A BORON CHANGE. (REFER TO S-3.2B TO PREVENT A REACTIVITY CHANGE.)

* *

4	Verify Proper Operation Of Letdown DI - DECONTAMINATION FACTOR GREATER THAN 10	IF DI efficiency is NOT acceptable, THEN place a new mixed bed in service. (Refer to S-4.5.7A, A LETDOWN MIXED BED DI RESIN REPLACEMENT, OR S-4.5.7B, B LETDOWN MIXED BED DI RESIN REPLACEMENT).
5.	Check Sampling Requirements - REFER TO TECHNICAL SPECIFICATION TABLE 4.1-4	
6	Check If Continued Plant Power Operation Allowed: o Continued plant power operation - ALLOWED, REFER TO TECHNICAL SPECIFICATION SECTION 3.1.4	IF shutdown is required, THEN refer to 0-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check Aux Bldg For Increased Radiation Levels: a. Notify HP Department - TO SURVEY AUX BLDG b. Aux Bldg radiation levels - NORMAL (Check with HP for normal readings)	b. IF Aux Bldg radiation levels indicate above normal, THEN have HP Department establish controls for the higher radiation areas.
8	Complete - NOTIFICATION TO HIGHER SUPERVISION AND THE REACTOR ENGINEER	
9	Check Conditions For Offsite Reporting: o Refer to - EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION	

-END-

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TECHNICAL REVIEW

PORC REVIEW DATE 2-17-93

PLANT SUPERINTENDENT

2-19-93

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

* *

NOTE: Foldout page should be open and monitored periodically.

* 1	Monitor Conditions For RCP Restart:	
	a. Establish conditions for starting an RCP: o Bus 11A or 11B energized o Refer to Attachment RCP START	a. Go to Step 2.
	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

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

* *

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 O-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.

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.

* *

*10 Monitor SI Block Criteria:

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

* *

CAUTION

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

* *

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.

14 Initiate RCS Depressurization:

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 15.
b. Depressurize RCS using auxiliary spray valve (AOV-296)	b. IF auxiliary spray valve NOT available, THEN 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	IF RCS depressurization must continue, THEN 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 O-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.

* *

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.

* *

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 NOT 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 O-2.3, PLANT AT COLD SHUTDOWN)

-END-

ES-0.2 APPENDIX LIST

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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

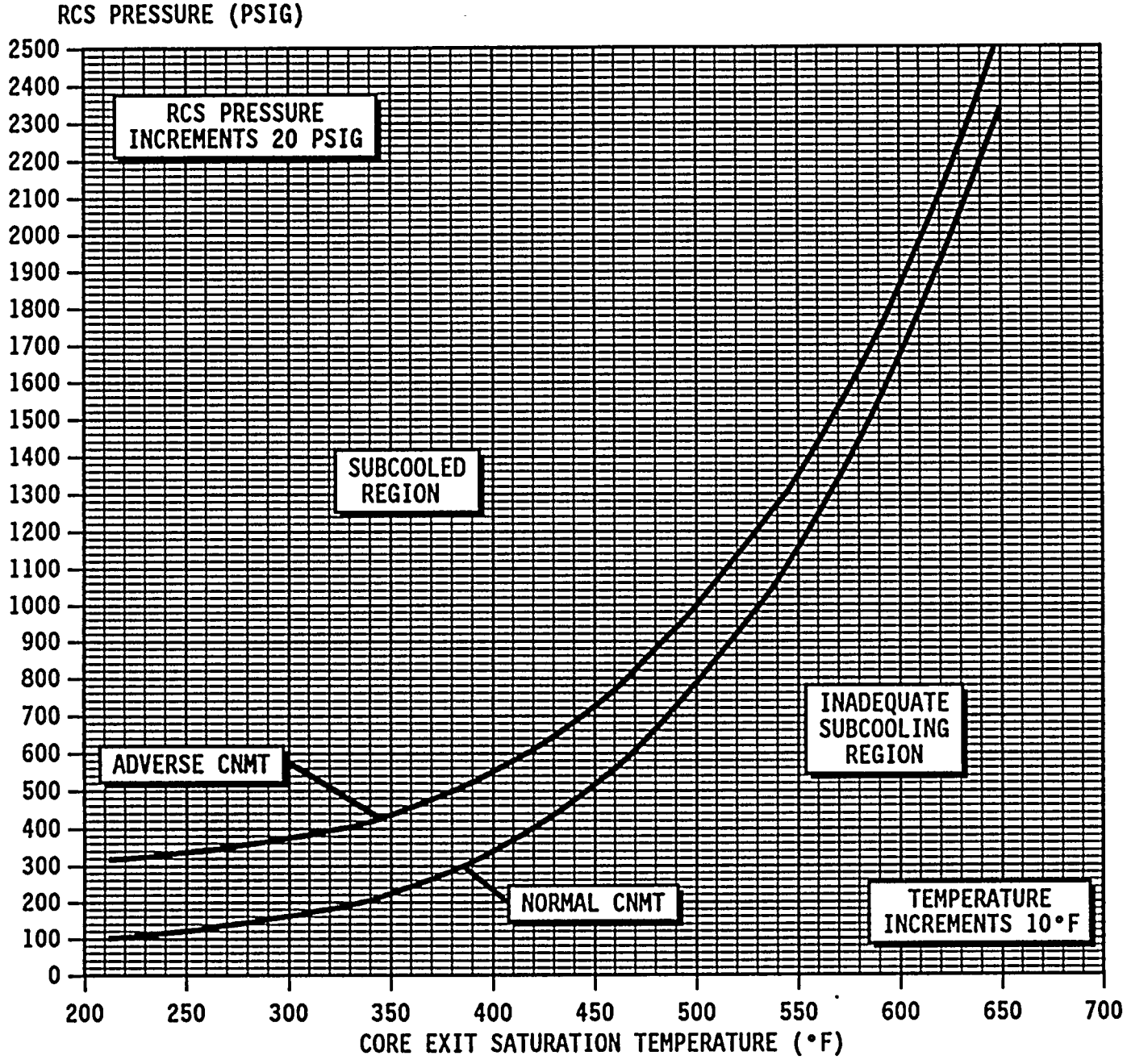
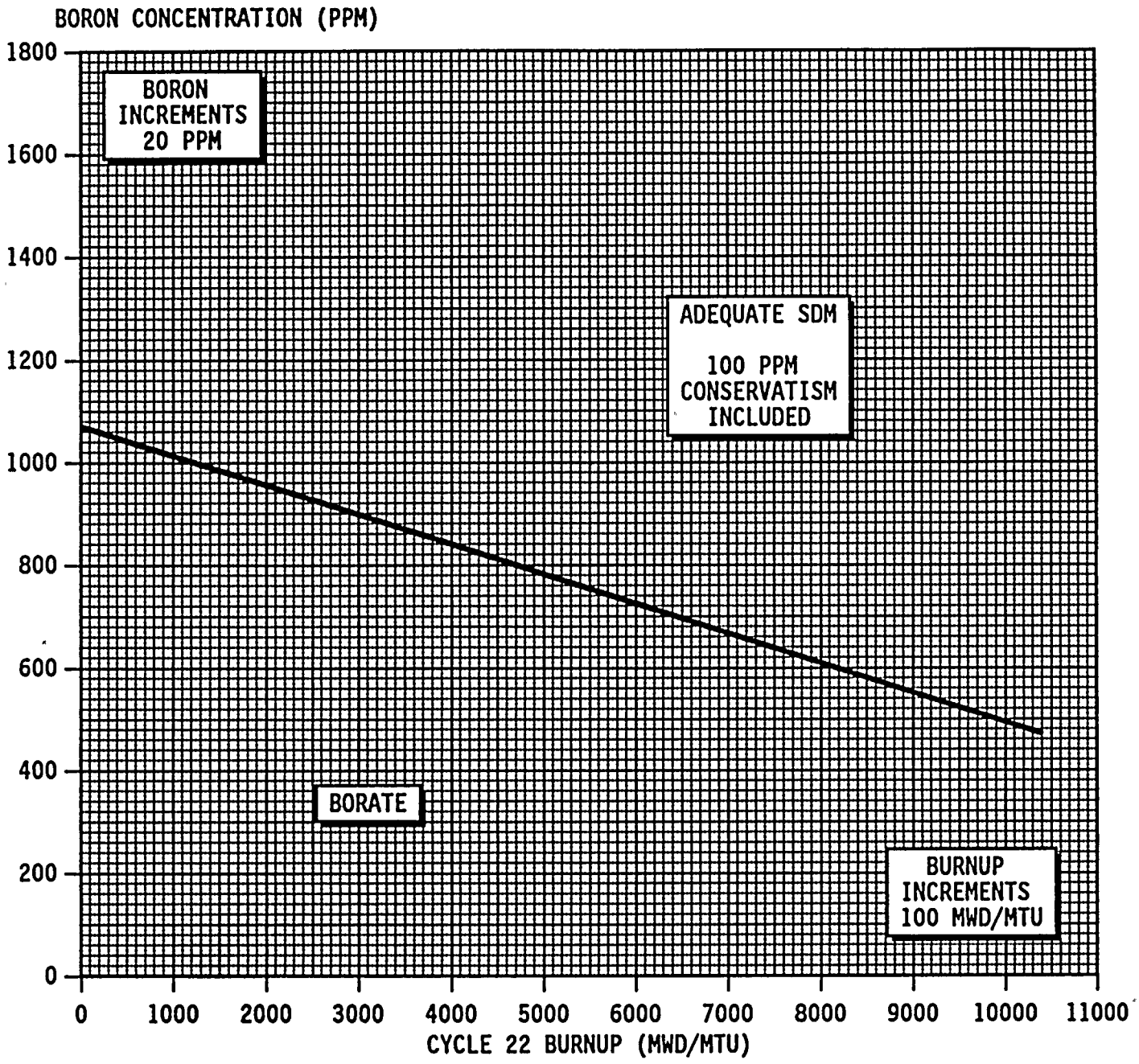


FIGURE SDM



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

FIGURE NAT CIRC C/D WITHOUT SHROUD FANS

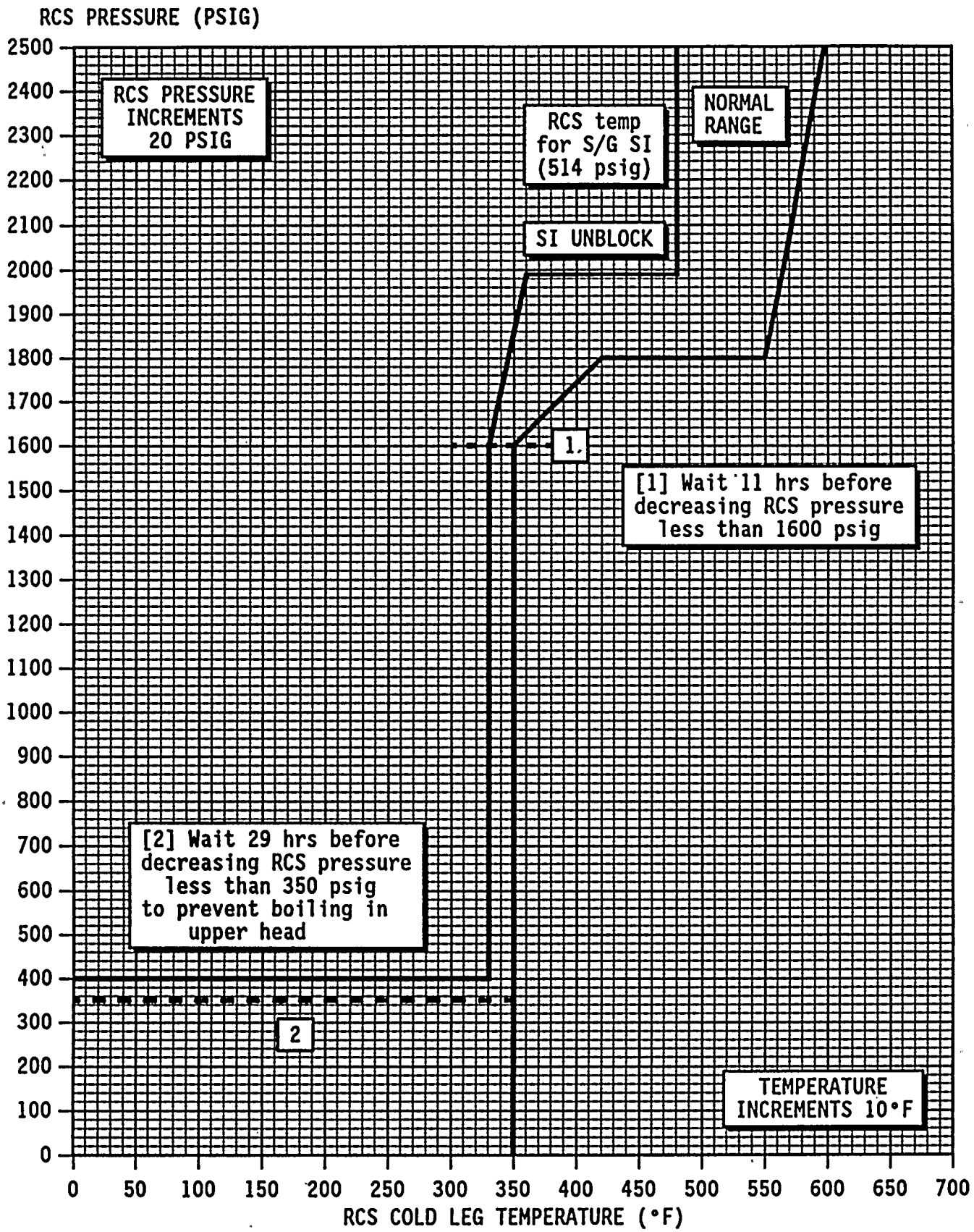
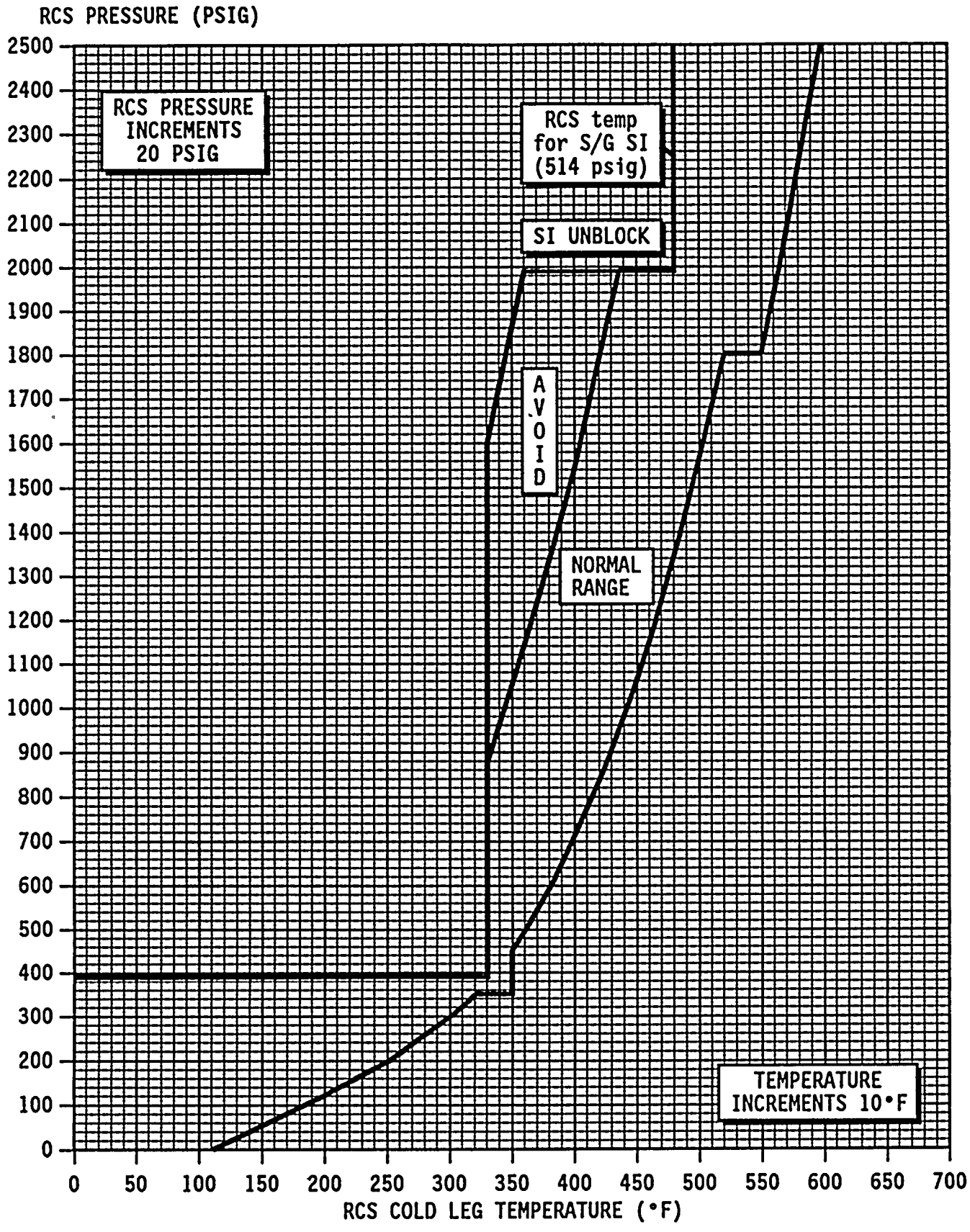


FIGURE NAT CIRC C/D WITH SHROUD FANS



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.

- 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%

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).

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T P Schulz
PLANT SUPERINTENDENT

2-19-93
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY:_____

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

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

* *

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

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2	**Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER** o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN	Perform the following: a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed. b. Perform the following, as necessary: 1) Close non-safeguards bus tie breakers: • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) 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
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 ARMED - LIT

a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 5.

b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO

c. Place steam dump mode selector switch to MANUAL

* *

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.

* 5 Monitor Intact S/G Levels:

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

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

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

b. IF narrow range level in any S/G continues to increase in an uncontrolled manner, THEN go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

6 Initiate RCS Cooldown To Cold Shutdown:

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

b. Use RHR system if in service

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

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

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

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

8 Check SI and RHR Pump Status:

Go to Step 15.

- SI pumps - ANY RUNNING

-OR-

- RHR pumps - ANY RUNNING IN INJECTION MODE

9 Place PRZR Heater Switches In The Following Positions:

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

* *

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

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

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

* *

11	**Check If An RCP Should Be Started:**	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 12.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Go to Step 19.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Return to Step 10.
	d. Try to start an RCP 1) Establish conditions for starting an RCP o Bus 11A or 11B energized o Refer to Attachment RCP START 2) Start one RCP	d. IF IA to CNMT available, THEN ensure at least one control rod shroud fan running (45 kw each).

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]

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 13d. 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 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.

* *

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

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	Monitor SI Reinitiation Criteria:	
	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). IF less than two SW pumps can be operated, THEN go to Step 23.
	b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. 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. IF any RCP seal leakoff flow greater than 5.5 gpm, THEN perform the following: o Close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP IF both RCP seal discharge valves are shut, THEN 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:

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

-OR-

- 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:	b. Go to Step 28.
	o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o RCP #1 seal leakoff - LESS THAN 0.25 GPM	
	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 1.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 30.
	c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
	d. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 30.	
30	Check CNMT Hydrogen Concentration:	
	a. Direct HP to start CNMT hydrogen monitors as necessary	
	b. Hydrogen concentration - LESS THAN 0.5%	b. Consult TSC to determine if hydrogen recombiners should be placed in service.
31	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 1.
32	Evaluate Long Term Plant Status:	
	a. Maintain cold shutdown conditions	
	b. Consult TSC	

-END-

ES-1.2 APPENDIX LIST

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

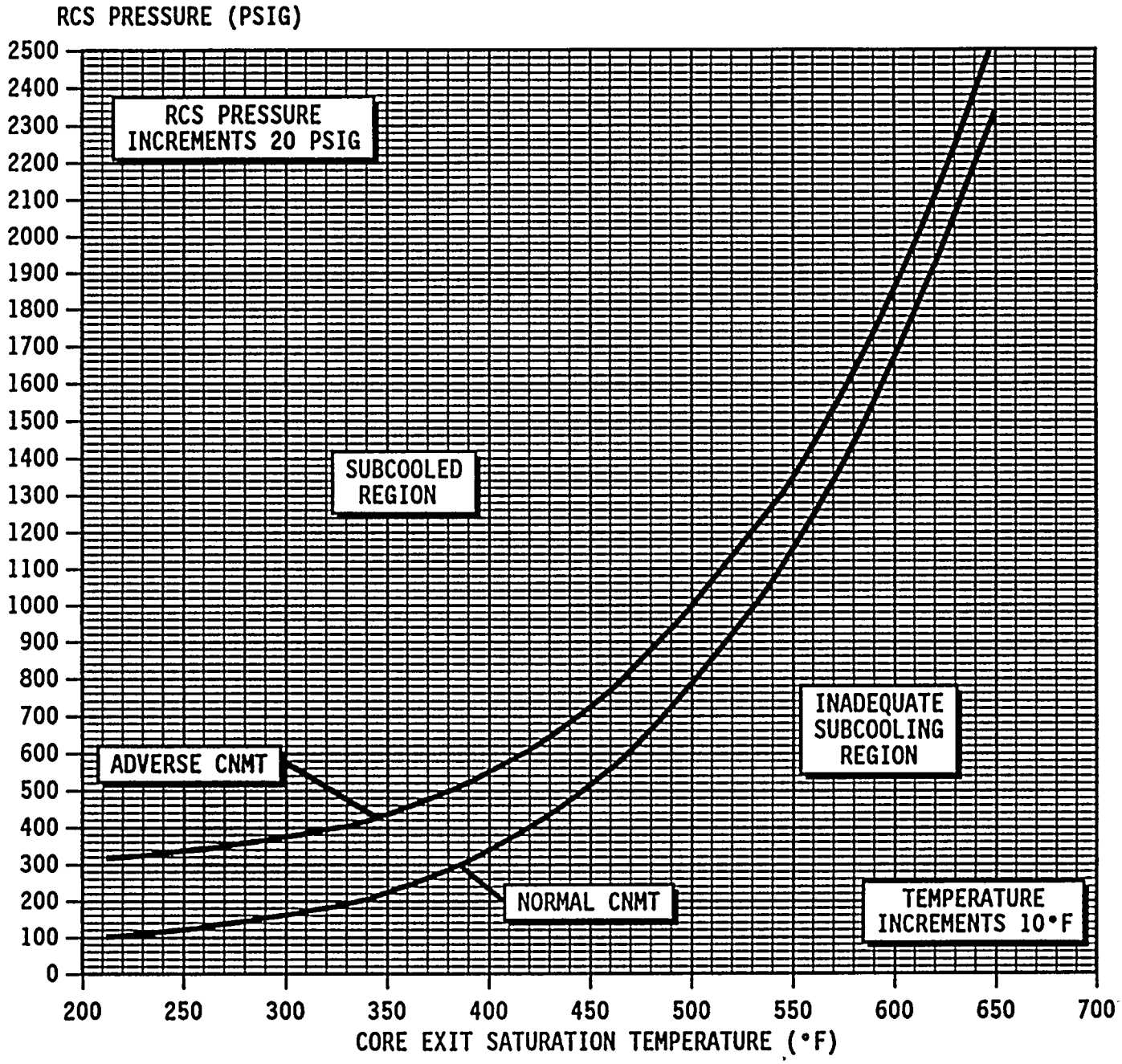
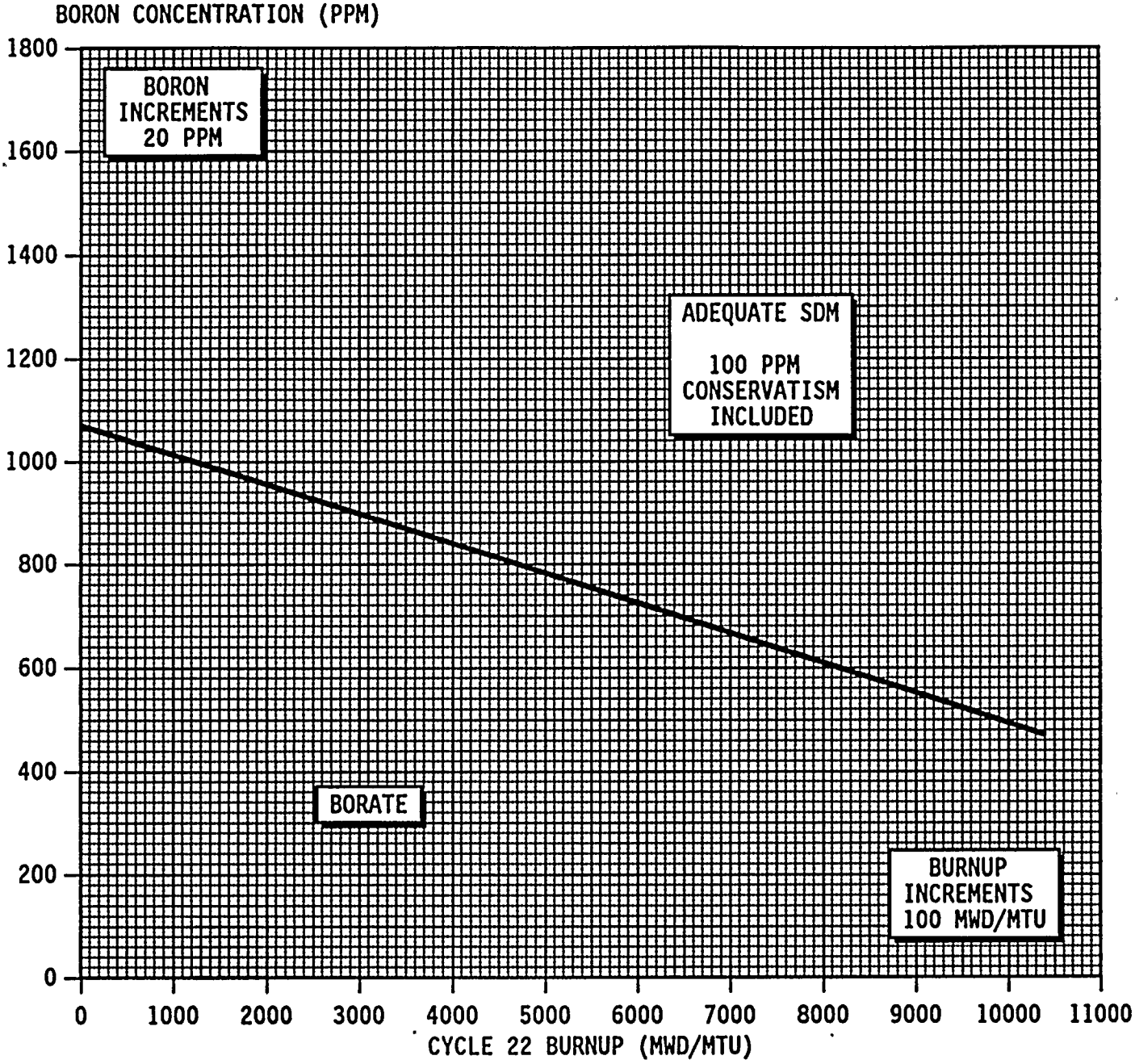


FIGURE SDM



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 2-17-93

PLANT SUPERINTENDENT

2-19-93
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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION

INADVERTANT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.

* *

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 Monitor Intact S/G Level:

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

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in 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 not be delayed.

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 Monitor Ruptured S/G Narrow Range Level - 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.
	NOTE: The upper head region may void during RCS depressurization if RCPs are not running. This may result in a rapidly increasing PRZR level.	
* 8	Depressurize RCS To Backfill From Ruptured S/G:	
	a. Depressurize using normal PRZR spray	a. IF letdown is in service, THEN depressurize using auxiliary spray valve (AOV-296). IF NOT, THEN 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	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 Or O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
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. IF RCS overpressure protection system can NOT be placed in service, THEN notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
*11	Monitor RCP Operation:	
	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)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 3.
13	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions (Refer to O-2.3, PLANT AT COLD OR REFUELING SHUTDOWN) b. Consult TSC	

-END-

ES-3.1 APPENDIX LIST

	TITLE	PAGES
1)	RED PATH SUMMARY	1
2)	FIGURE MIN SUBCOOLING	1
3)	FIGURE SDM	1
4)	ATTACHMENT RHR COOL	2
5)	FOLDOUT	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

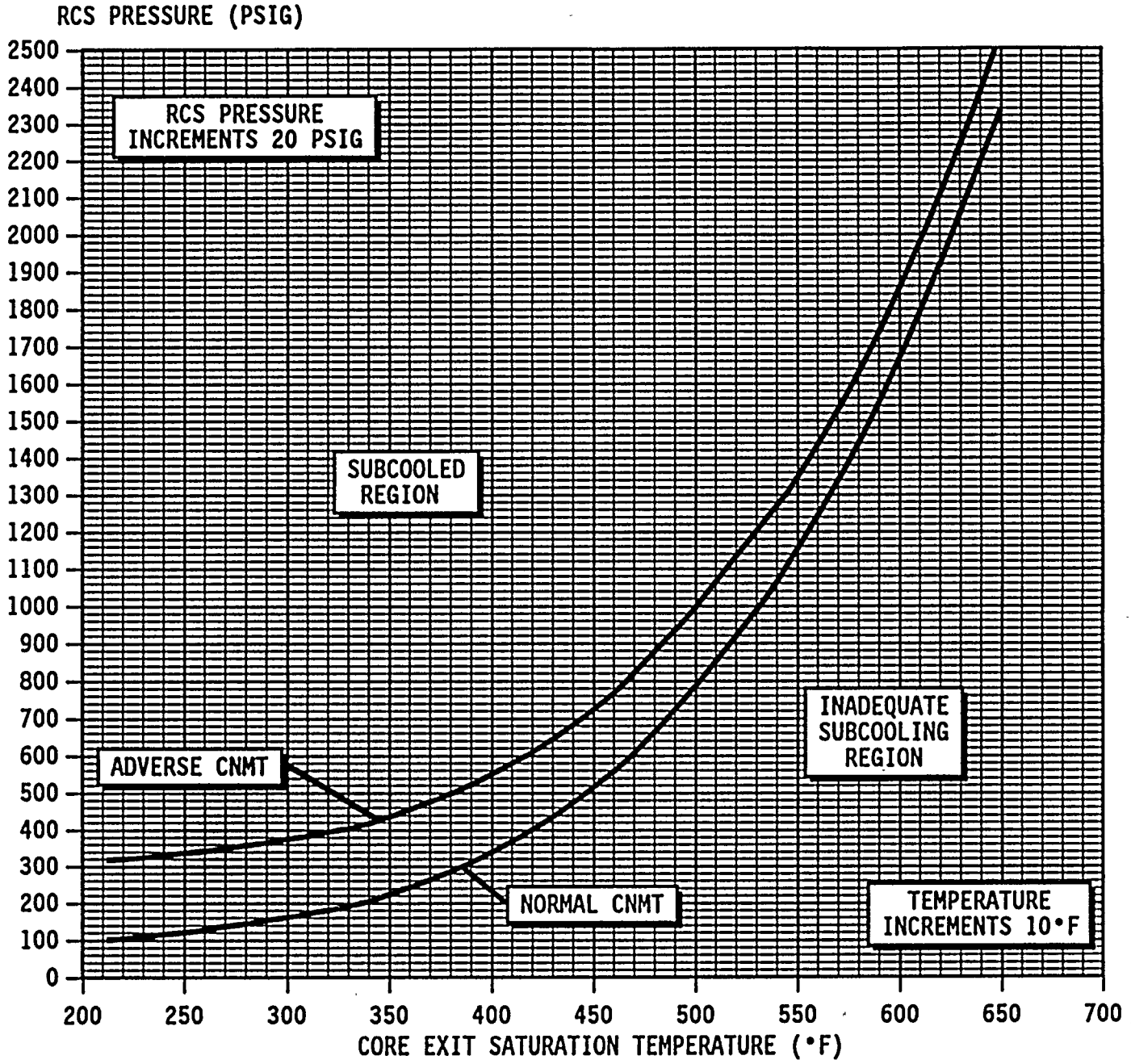
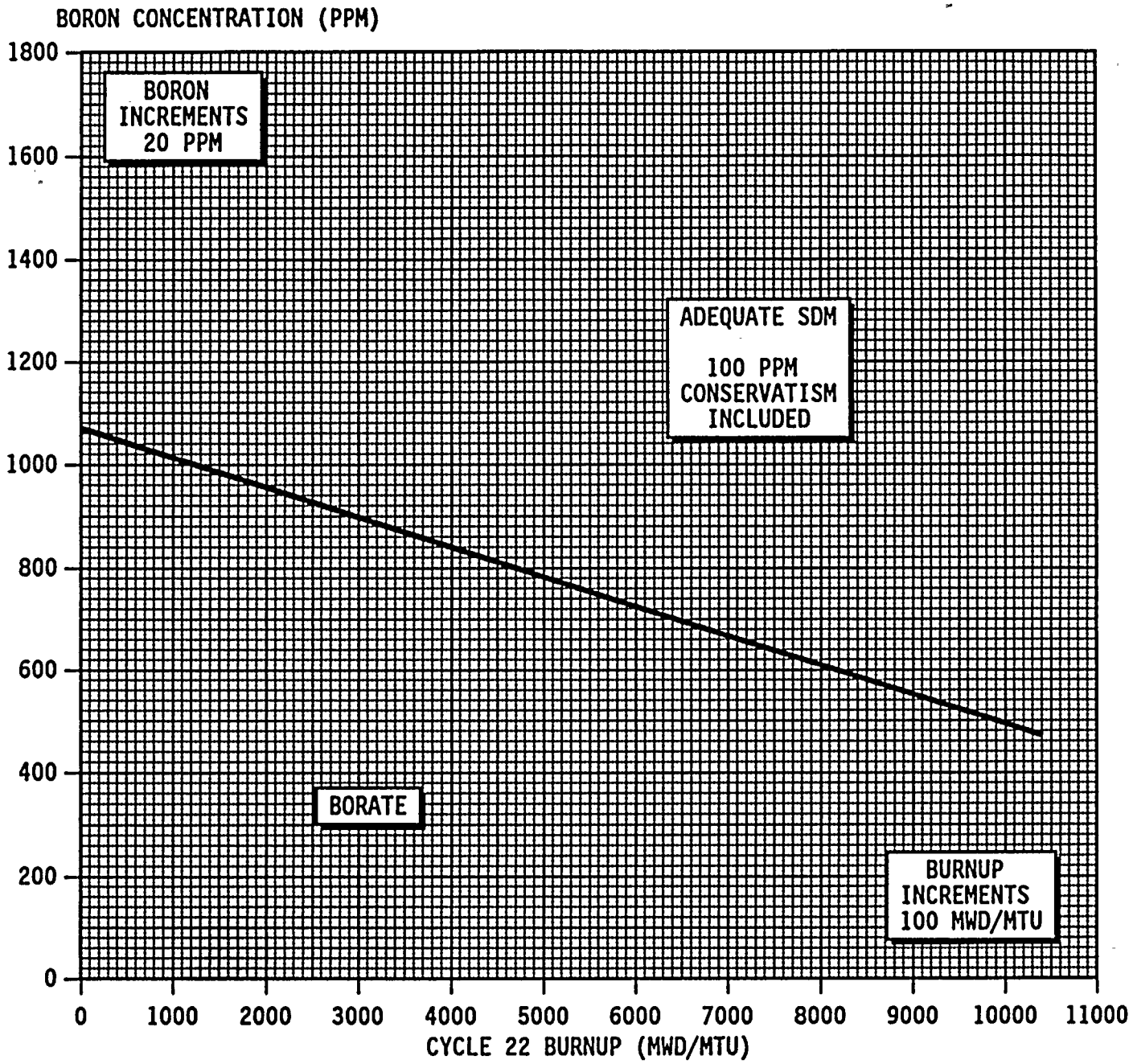


FIGURE SDM



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

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF either condition listed below occurs, THEN 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).

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 2-17-93

PLANT SUPERINTENDENT

2-19-93
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.

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 Monitor Intact S/G Level:

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

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in 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 not be delayed.

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	
	c. Maintain RCS cold leg temperature - LESS THAN 350°F	
* 9	Monitor Ruptured S/G Narrow Range Level - 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.
	NOTE: Blowdown from ruptured S/G may be stopped when RHR system is placed in service.	
10	Consult TSC To Determine Appropriate Procedure To Establish Blowdown From Ruptured S/G	IF blowdown can NOT be initiated, THEN go to alternate post-SGTR cooldown procedure, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 1, OR 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.
	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	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	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*13	**Monitor RCP Operation:**	
	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. IF RCS overpressure protection system can NOT be placed in service, THEN notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	

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 O-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

FIGURE MIN SUBCOOLING

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

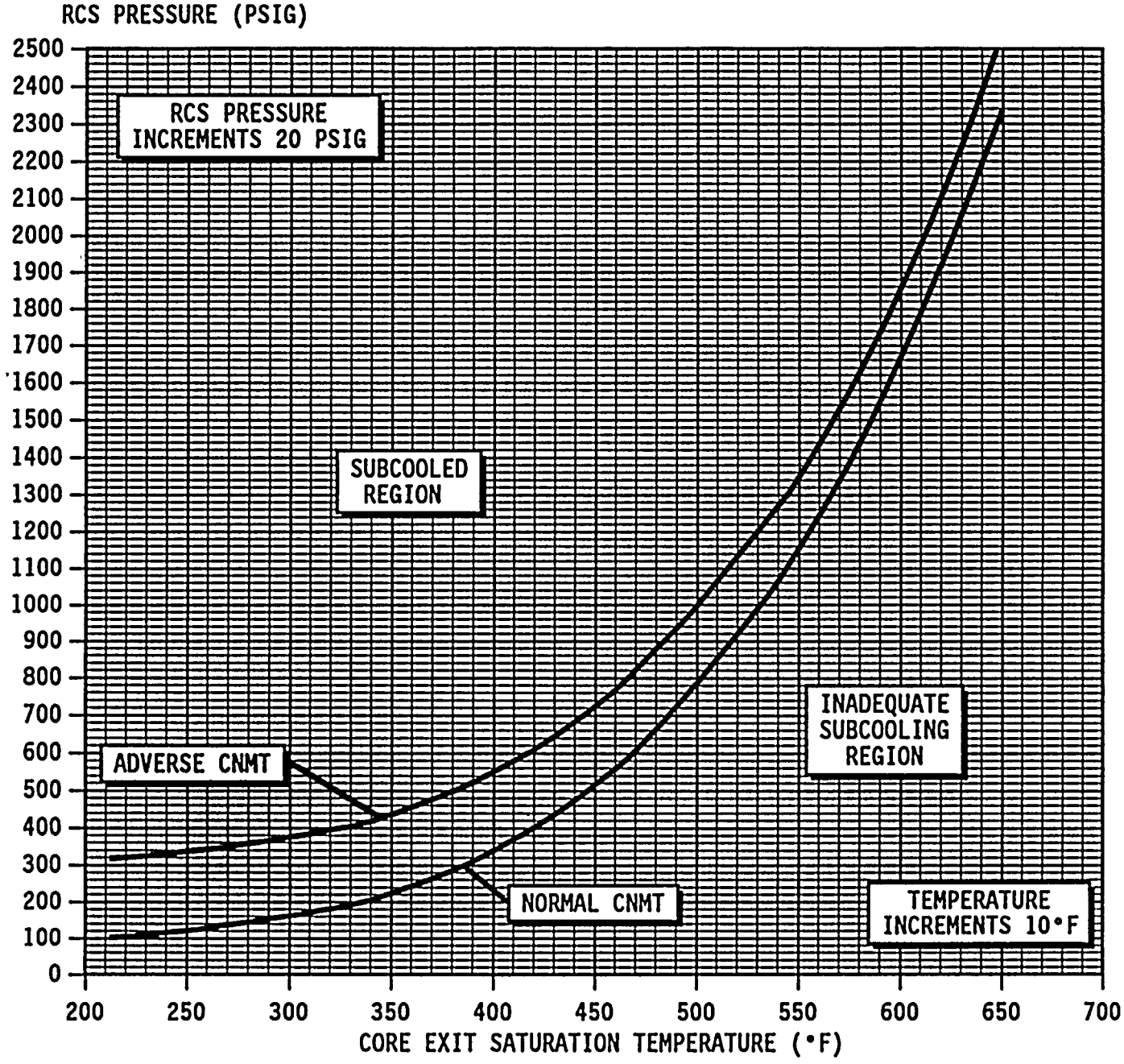
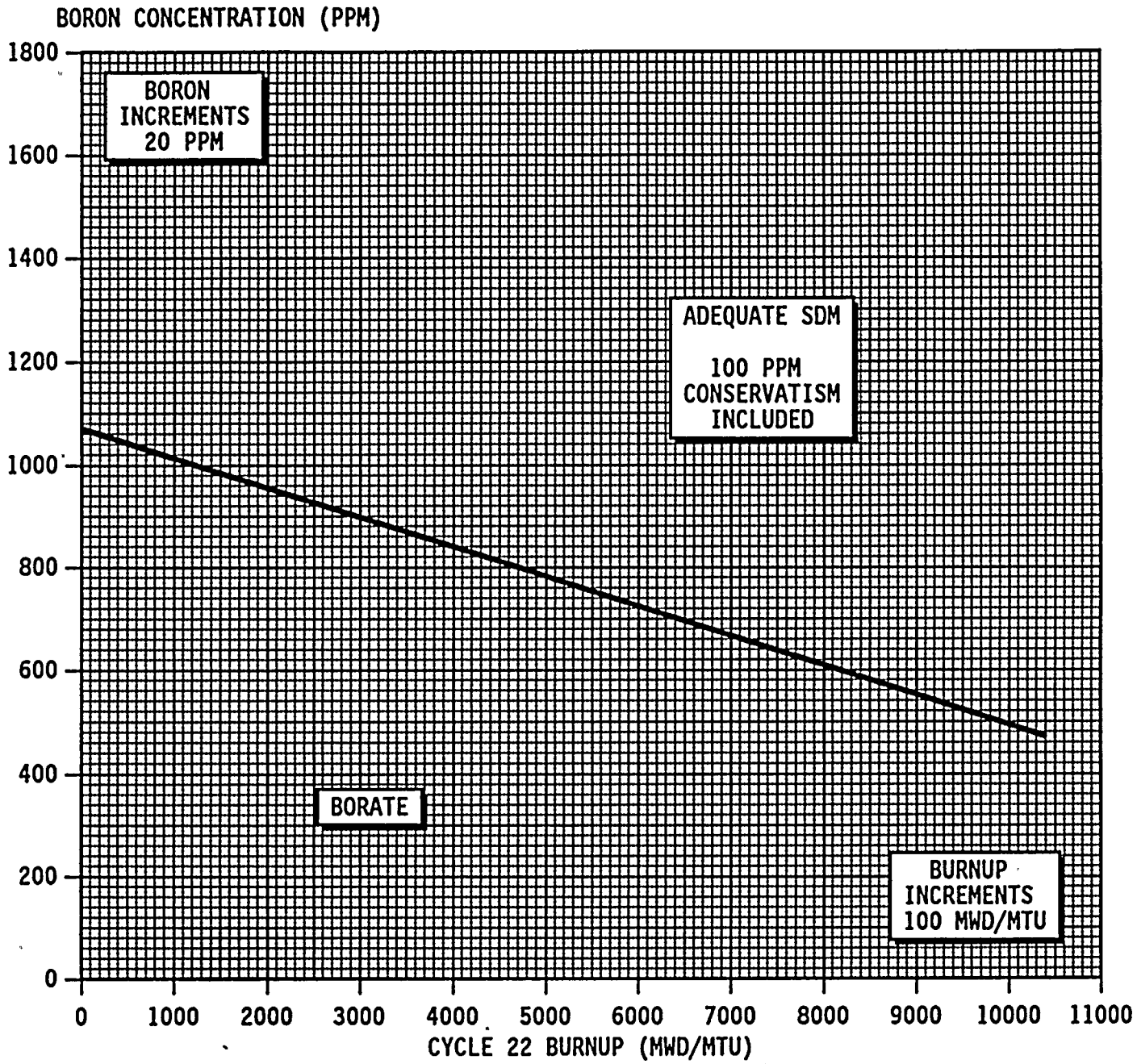


FIGURE SDM



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).

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 2-17-93

T B Schuler
PLANT SUPERINTENDENT

2-19-93
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

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

* *

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

1 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 Monitor Intact S/G Level:

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

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in 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 not be delayed.

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:

- Use faulted S/G.

-OR-

- 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	
	c. Maintain RCS cold leg temperature - LESS THAN 350°F	
* 9	Monitor Ruptured S/G Narrow Range Level - 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

* *

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.

10 Initiate Cooldown Of Ruptured S/G:

a. Verify condenser available:

- o Intact S/G MSIV - OPEN
- o Annunciator G-15, STEAM DUMP ARMED - 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 Monitor RCP Operation:

a. RCPs - ANY RUNNING

a. Go to Step 14.

b. Check the following:

b. Go to Step 14.

- o RCP #1 seal D/P - LESS THAN 220 PSID

-OR-

- o Check RCP seal leakage - LESS THAN 0.25 GPM

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 O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. IF RCS overpressure protection system can NOT be placed in service, THEN notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to Attachment RHR COOL)	
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.

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 O-2.3, PLANT AT COLD OR REFUELING SHUTDOWN) b. Consult TSC	

-END-

ES-3.3 APPENDIX LIST

	TITLE	PAGES
1)	RED PATH SUMMARY	1
2)	FIGURE MIN SUBCOOLING	1
3)	FIGURE SDM	1
4)	ATTACHMENT RHR COOL	2
5)	FOLDOUT	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

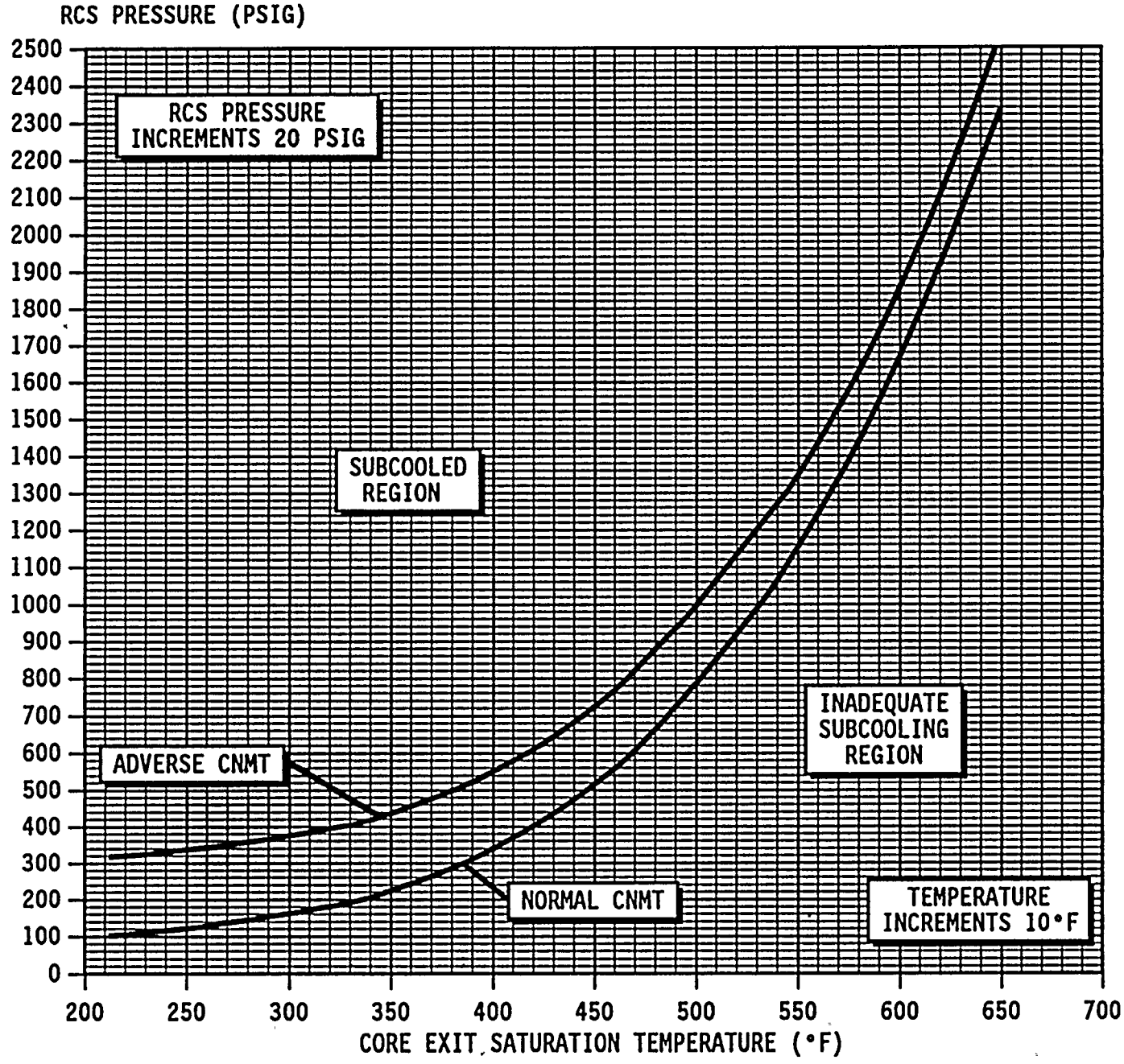
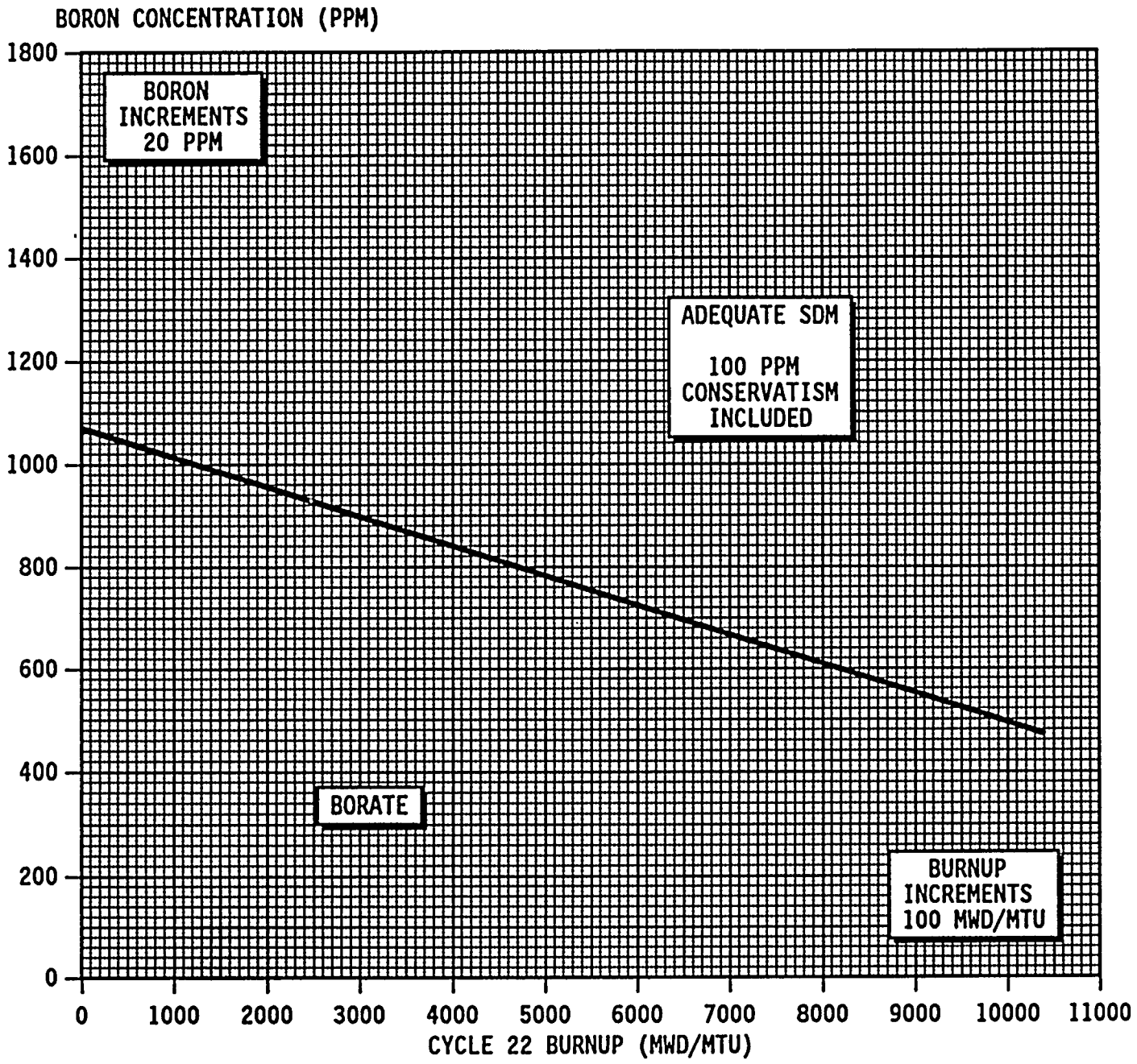


FIGURE SDM



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

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF either condition listed below occurs, THEN 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).

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.