ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/6/92

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PLANT SUPERINTENDENT

5/8/92
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.

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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).

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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	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

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CAUTION

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

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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 b. Stop RCS cooldown	a. Return to Step 3.
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. 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	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. 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. <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.
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

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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

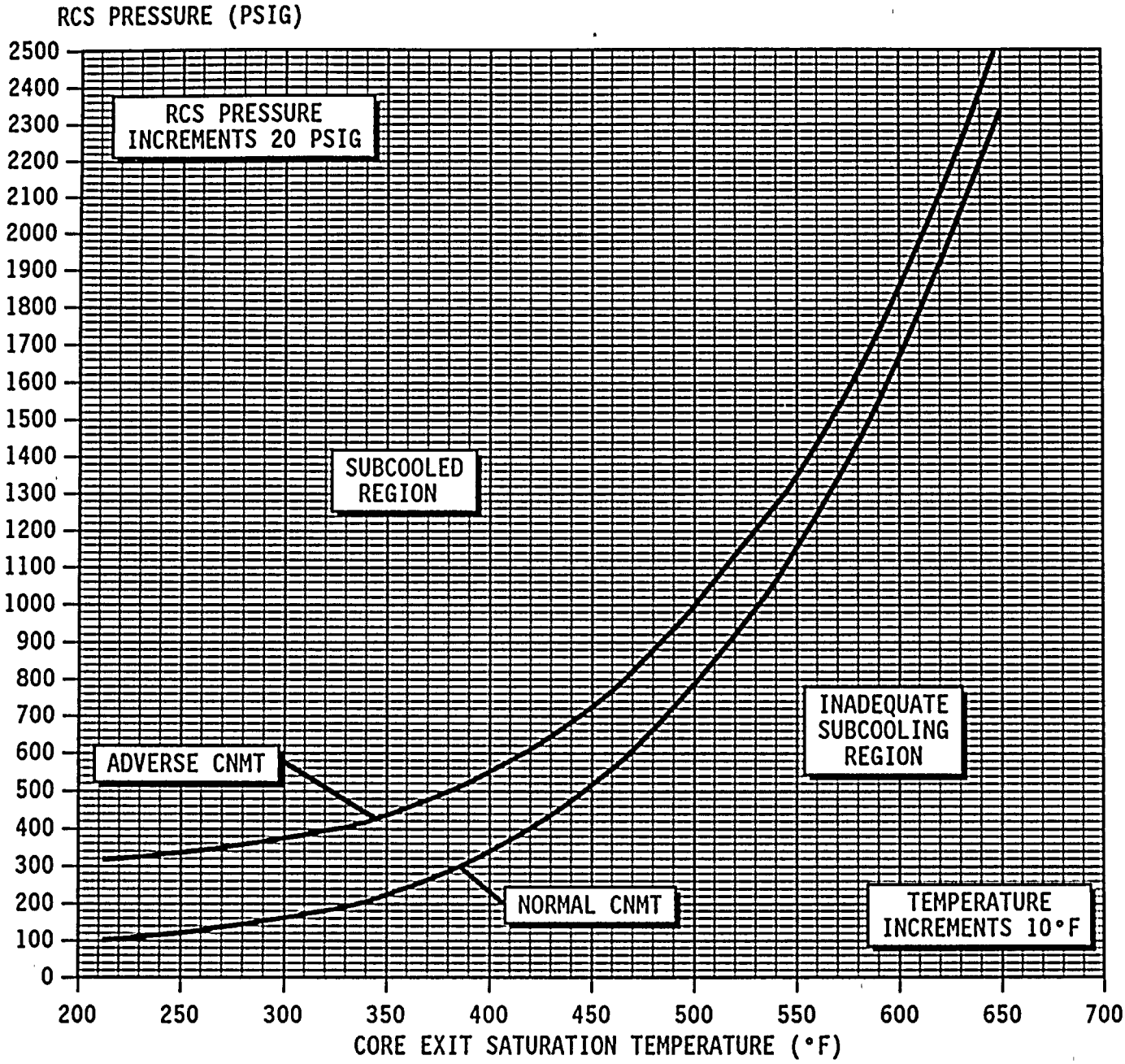
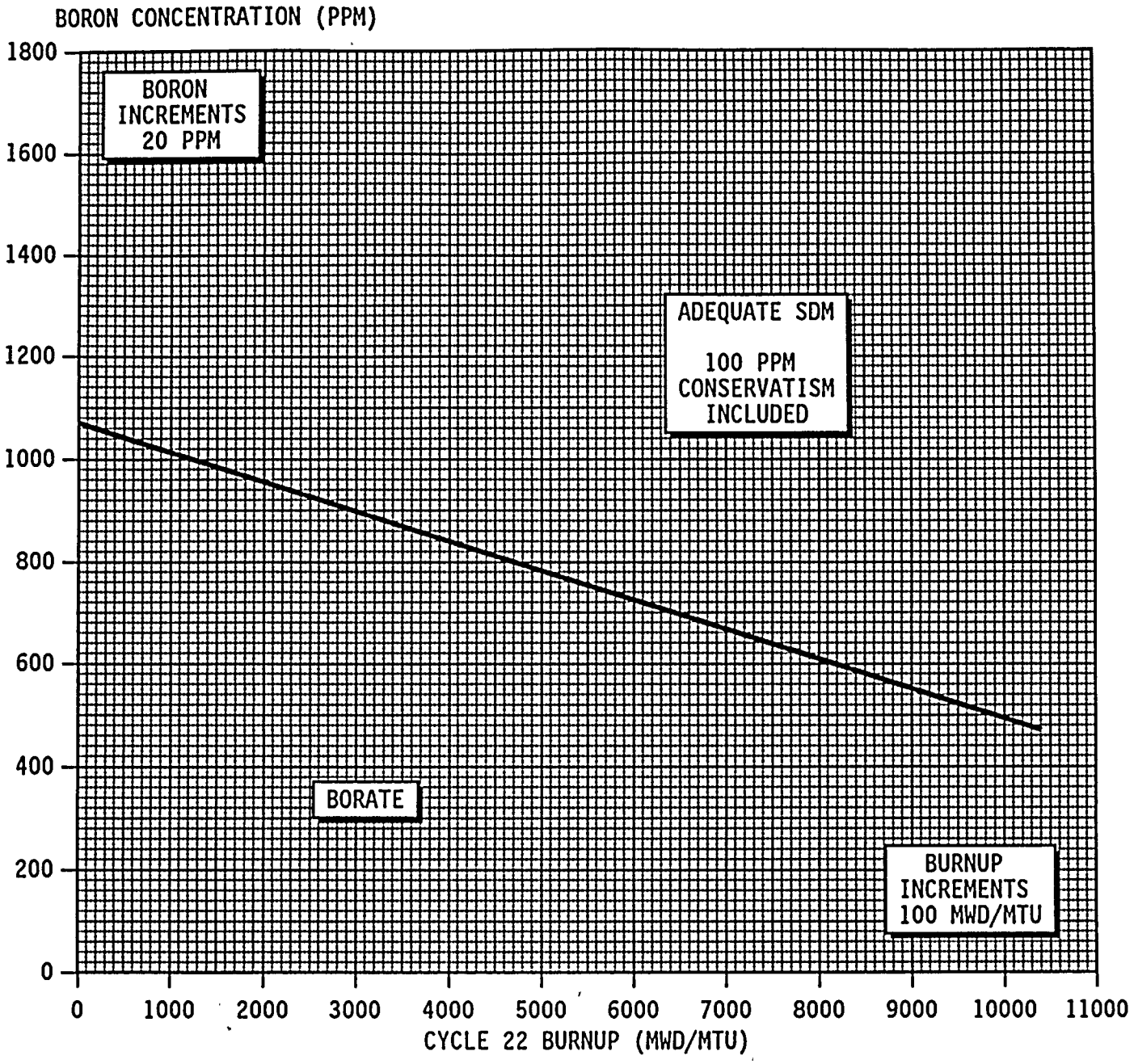


FIGURE SDM



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

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).