

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 1 of 8
----------------	---	-----------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/10/92

Thomas H. Marlow
PLANT SUPERINTENDENT

5/8/92
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

9206160403 920605
PDR ADOCK 05000244
PDR

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 2 of 8
----------------	---	-----------------------

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.

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

EOP:	TITLE:	REV: 5
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 3 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> o FOLDOUT page should be open AND monitored periodically.</p> <p> 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.</p> <p>1 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure</p> <p>2 Check If SI ACCUMs Should Be Isolated:</p> <p> a. Check the following:</p> <p> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p> o PRZR level - GREATER THAN 5% [30% adverse CNMT]</p> <p> b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <p> • MOV-841, MCC C position 12F</p> <p> • MOV-865, MCC D position 12C</p> <p> c. Close SI ACCUM outlet valves</p> <p> • ACCUM A, MOV-841</p> <p> • ACCUM B, MOV-865</p> <p> d. Locally reopen breakers for MOV-841 and MOV-865</p> <p> a. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p> c. Vent any unisolated ACCUMs:</p> <p> 1) Open vent valves for unisolated SI ACCUMs.</p> <p> • ACCUM A, AOV-834A</p> <p> • ACCUM B, AOV-834B</p> <p> 2) Open HCV-945.</p>		

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 4 of 8
--------------------	---	---------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.</p>		
3	Verify Adequate Shutdown Margin	
	<p>a. Direct HP to sample RCS and ruptured S/G for boron concentration</p> <p>b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM</p>	<p>b. Borate as necessary.</p>
<p>***** <u>CAUTION</u> 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). *****</p>		
<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>		
4	Check Intact S/G Level:	
	<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in the intact S/G.</p> <p>b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24



EOP:	TITLE:	REV: 5
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 5 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> 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.</p>	
5	Initiate RCS Cooldown To Cold Shutdown:	
	<p>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Use RHR system if in service</p> <p>c. Dump steam to condenser from intact S/G</p>	<p>c. Manually or locally dump steam using intact S/G ARV.</p> <p><u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p>-OR-</p> <ul style="list-style-type: none"> 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]	<p>Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow.</p> <p><u>IF</u> either of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig.

10

11

12
13
14

15
16

17
18

19
20

21
22

23

EOP:	TITLE:	REV: 5
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 6 of 8

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.
	<p><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.</p>	
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	



11



EOP:	TITLE:	REV: 5
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 7 of 8

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 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)	
11	Check If RCPs Must Be Stopped:	
	a. RCPs - ANY RUNNING	a. Go to Step 12.
	b. Check the following:	b. Go to Step 12.
	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)	

10

11

12

13

14



EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 8 of 8
----------------	---	-----------------------

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-

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 1 of 1
----------------	---	-----------------------

ES-3.1 APPENDIX LIST

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

at

at

at

at

at

at

at

at

at

at

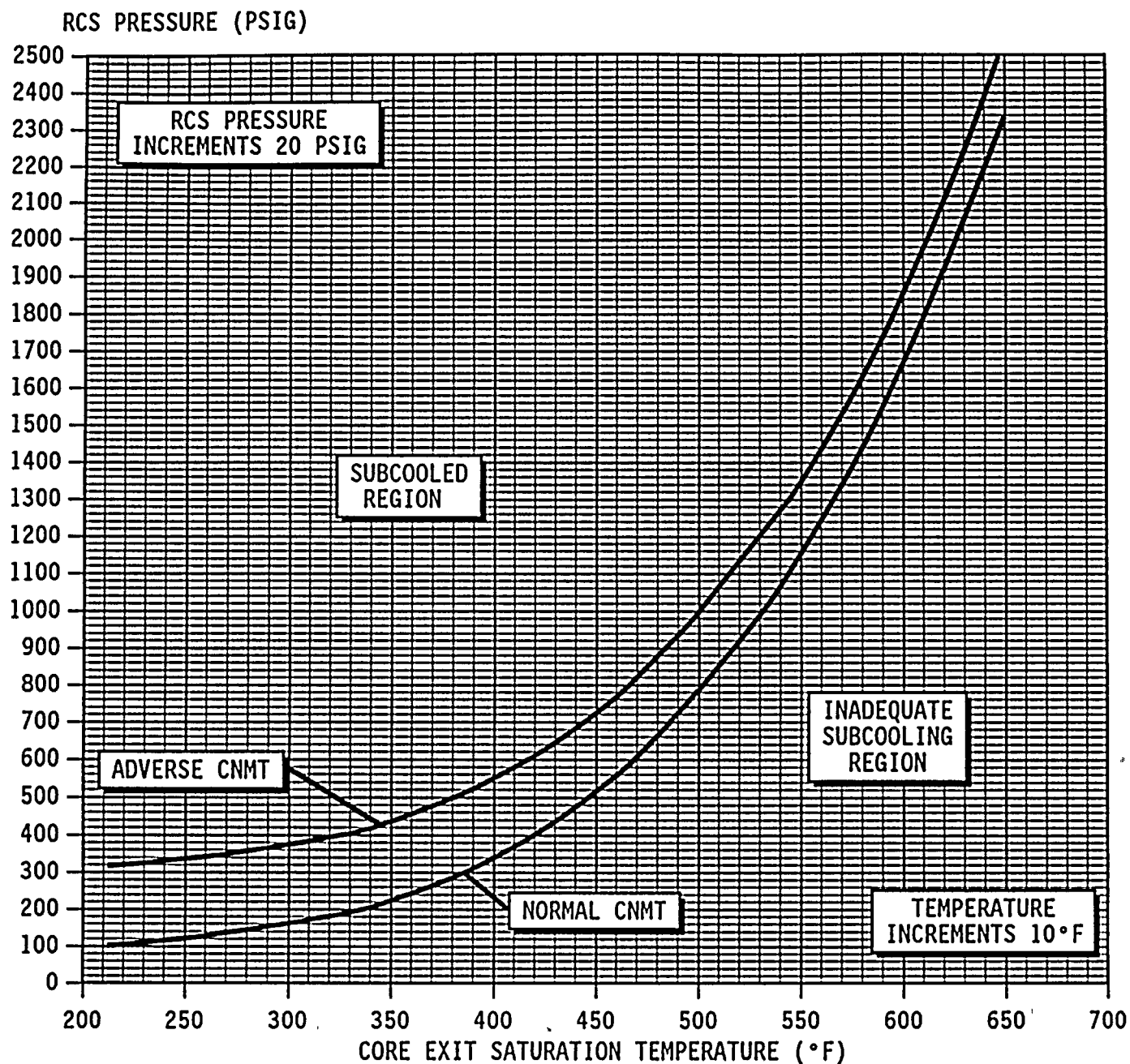
at



EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 1 of 1
----------------	---	-----------------------

FIGURE MIN SUBCOOLING

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



470

2

100

100

Witnesses:

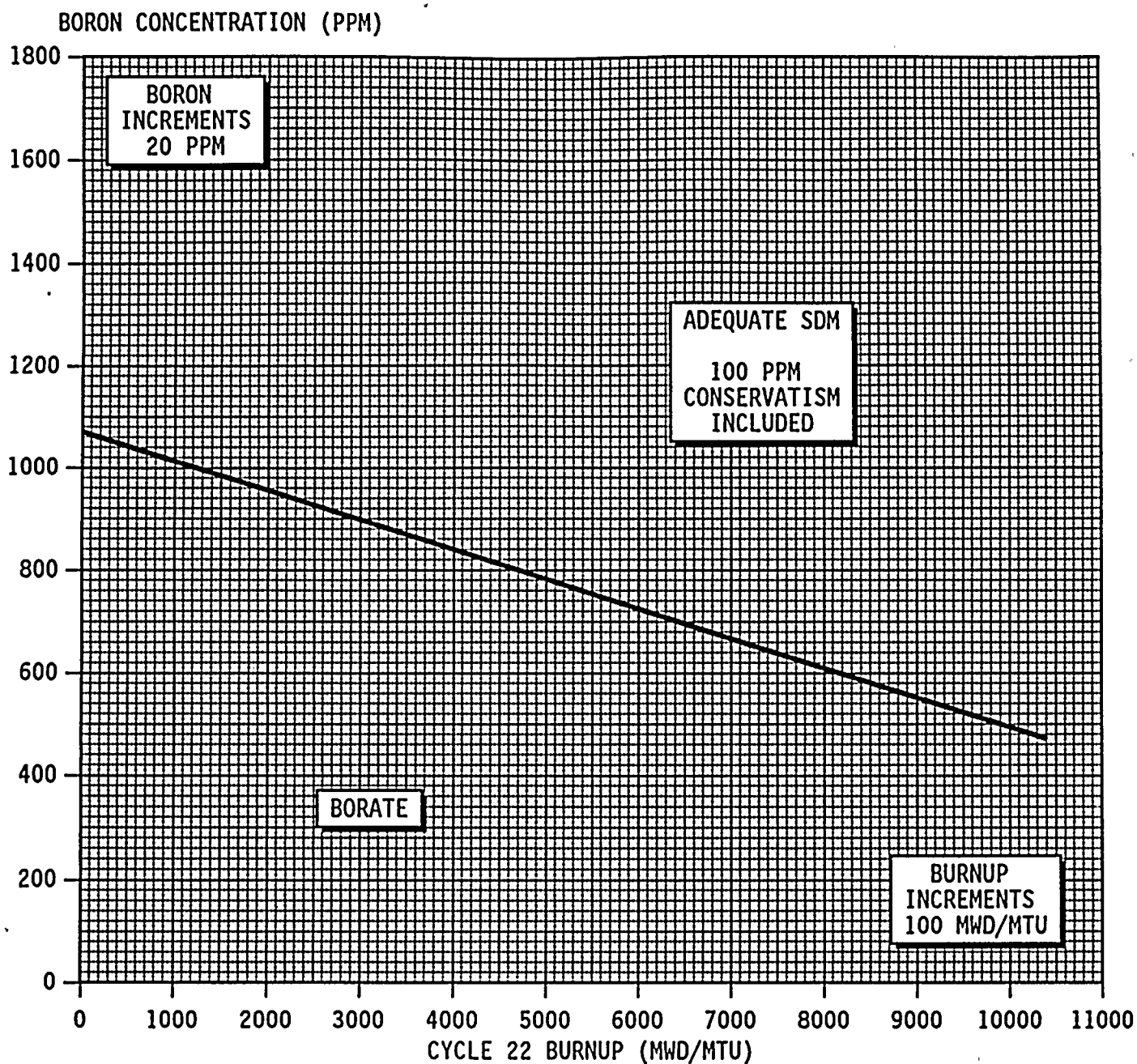
1

100

1

EOP:	TITLE:	REV: 5
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 1 of 1

FIGURE SDM



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

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 5 PAGE 1 of 1
----------------	---	-----------------------

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).

