

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 1 of 27
-----------------	---	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 4-19-95

Thomas A. Markes
PLANT SUPERINTENDENT

4-20-95
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

280011

9504280026	950420
PDR ADDCK	05000244
P	PDR

App
0/1

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 2 of 27

- A. PURPOSE - This procedure provides actions for a SGTR with coincident loss of normal and auxiliary PRZR sprays and PORVs.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-3, STEAM GENERATOR TUBE RUPTURE, when PRZR pressure control is not available.

28

29

30

31

32

33

34

35

36

37

38

39

40

41

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 3 of 27

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>		
1	Check Ruptured S/G Narrow Range Level - LESS THAN 67% [55% adverse CNMT]	Go to Step 8.
2	Check RCP Status - AT LEAST ONE RUNNING	<p>Try to start one RCP:</p> <p>a. Establish conditions for starting RCP.</p> <p> o Bus 11A and Bus 11B energized</p> <p> o Refer to Attachment RCP START</p> <p>b. Start one RCP. <u>IF</u> no RCP can be started, <u>THEN</u> go to Step 4.</p>
3	Check IF Normal PRZR Spray Available:	
	a. Verify IA to CNMT - AVAILABLE	<p>a. Perform the following:</p> <p>1) Place PRZR heater control group to PULL STOP.</p> <p>2) Place PRZR heater backup group to OFF.</p> <p>3) Place normal spray valve controllers to MANUAL at 0%.</p> <p>4) Go to Step 4.</p>
	b. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21	

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 4 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Try To Restore PRZR PORV:	
	<p>a. Block valves - AT LEAST ONE OPEN</p> <ul style="list-style-type: none"> • MOV-516 for PCV-430 • MOV-515 for PCV-431C 	<p>a. Open one block valve unless it was closed to isolate an open PORV.</p> <p>If block valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally ensure breakers to block valves closed.</p> <ul style="list-style-type: none"> • MOV-515, MCC C position 6C • MOV-516, MCC D position 6C
	b. Check IA to CNMT - AVAILABLE	b. Refer to Attachment N2 PORVS to operate PORVs.
	c. Verify at least one PRZR PORV flow path - AVAILABLE	c. Go to Step 5.
	d. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 22	

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 5 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> If auxiliary spray is the only means of RCS pressure control, THEN the 320°F ΔT limit between the spray line and PRZR does not apply.</p>	
5	Try To Establish Auxiliary Spray:	
	<p>a. Charging pumps - AT LEAST ONE RUNNING</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> locally isolate seal injection to affected RCP. <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 demand at 0%. 3) Start charging pumps as necessary. <p><u>IF</u> charging not available, <u>THEN</u> go to Step 6.</p>
	<p>b. Establish auxiliary spray flow:</p> <ol style="list-style-type: none"> 1) Open auxiliary spray valve (AOV-296) 2) Close charging valve to loop B cold leg (AOV-294) 	<p>b. <u>IF</u> auxiliary spray can <u>NOT</u> be established, <u>THEN</u> go to Step 6.</p>
	<p>c. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21b</p>	

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 6 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>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>*****</p> <p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>		
* 6	Monitor 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 at least one S/G.</p> <p>b. <u>IF</u> narrow range level in 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>
7	Check PRZR Level - GREATER THAN 5% [30% adverse CNMT]	Return to Step 1.

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

2026

2027

2028

2029

2030

2031

2032

2033

2034

2035

2036

2037

2038

2039

2040

2041

2042

2043

2044

2045

2046

2047

2048

2049

2050

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 7 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8 Check If SI Can Be Terminated:

- | | |
|---|--|
| <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> | <p>a. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> |
| <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> o Total feed flow to S/Gs - GREATER THAN 200 GPM AVAILABLE <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Narrow range level in intact S/G - GREATER THAN 5% [25% adverse CNMT] | <p>b. <u>IF</u> neither condition satisfied, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> |
| <p>c. RVLIS indication</p> <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 80% | <p>c. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> |
| <p>d. Any ruptured S/G narrow range level - INCREASING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH</p> | <p>d. Do <u>NOT</u> stop SI pumps. Return to Step 2.</p> |

24

25

26

27

28

29



EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 8 of 27
-----------------	---	-------------------------

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

48

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

100 100 100

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 9 of 27
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. Manually align valves as necessary. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Verify charging pump A <u>NOT</u> 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) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and adjust charging flow to perform the following: <ul style="list-style-type: none"> o Restore PRZR level o Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING 	

2021

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 10 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*11	<p>Monitor RCS Inventory:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING o RVLIS indication <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 80% 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Manually operate SI pumps as necessary. b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
12	<p>Verify Adequate SW Flow To CCW Hx:</p> <ul style="list-style-type: none"> a. Verify at least two SW pumps - RUNNING b. Verify AUX BLDG SW isolation valves - OPEN <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED 	<ul style="list-style-type: none"> 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 20. b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW). c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 11 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG 	a. Continue with Step 17. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 13 through 16.
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
d.	Charging pump - ANY RUNNING	d. Continue with Step 20. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 14 through 17.

100.

101.

102.

103.

104.

105.

106.

107.

108.

109.

110.

111.

112.

113.

114.

115.

116.

117.

118.

119.

120.

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 12 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> If PRZR level is less than 13%, letdown may be established by placing AOV-427 to OPEN.</p>	
14	Establish Normal Letdown:	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> 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. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p>
	<p>a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM</p> <p>b. Place the following switches to CLOSE:</p> <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx <p>c. Place letdown controllers in MANUAL at 40% open</p> <ul style="list-style-type: none"> • TCV-130 • PCV-135 <p>d. Reset both trains of XY relays for AOV-371 and AOV-427</p> <p>e. Open AOV-371 and AOV-427</p> <p>f. Open letdown orifice valves as necessary</p> <p>g. Place TCV-130 in AUTO at 105°F</p> <p>h. Place PCV-135 in AUTO at 250 psig</p> <p>i. Adjust charging pump speed and HCV-142 as necessary</p>	

100

100

100

100

100

100

100

100

100

100

100

100

100

100



EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 13 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Verify the following:	b. Adjust controls as necessary.
	1) RMW mode selector switch in AUTO	
	2) RMW control armed - RED LIGHT LIT	
	c. Check VCT level:	c. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20%	1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u> , <u>THEN</u> reset MCC C and MCC D UV lockouts as necessary.
	-OR-	
	o Level - STABLE OR INCREASING	2) Place RMW flow control valve HCV-111 in MANUAL.
		3) Increase RMW flow.

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 14 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check Charging Pump Suction Aligned To VCT:	
a.	VCT level - GREATER THAN 20%	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed 2) Continue with Step 17. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 16b.
b.	Verify charging pumps aligned to VCT <ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED 	b. Manually align valves as necessary.

404

405

406

407

408

409

410

411

412

413

414

415

416

417

418

419

420

421

422

423

424

425

426

427

428

429

430

431

432

433

434

435

436

437

438

439

440

441

442

443

444

445

446

447

448

449

450

451

452

453

454

455

456

457

458

459

460

461

462

463

464

465

466

467

468

469

470

471

472

473

474

475

476

477

478

479

480

481

482

483

484

485

486

487

488

489

490

491

492

493

494

495

496

497

498

499

500

501

502

503

504

505

506

507

508

509

510

511

512

513

514

515

516

517

518

519

520

521

522

523

524

525

526

527

528

529

530

531

532

533

534

535

536

537

538

539

540

541

542

543

544

545

546

547

548

549

550

551

552

553

554

555

556

557

558

559

560

561

562

563

564

565

566

567

568

569

570

571

572

573

574

575

576

577

578

579

580

581

582

583

584

585

586

587

588

589

590

591

592

593

594

595

596

597

598

599

600

601

602

603

604

605

606

607

608

609

610

611

612

613

614

615

616

617

618

619

620

621

622

623

624

625

626

627

628

629

630

631

632

633

634

635

636

637

638

639

640

641

642

643

644

645

646

647

648

649

650

651

652

653

654

655

656

657

658

659

660

661

662

663

664

665

666

667

668

669

670

671

672

673

674

675

676

677

678

679

680

681

682

683

684

685

686

687

688

689

690

691

692

693

694

695

696

697

698

699

700

701

702

703

704

705

706

707

708

709

710

711

712

713

714

715

716

717

718

719

720

721

722

723

724

725

726

727

728

729

730

731

732

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 15 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	<p>Check RCP Cooling:</p> <p>a. Check CCW to RCPs:</p> <ul style="list-style-type: none"> 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 <p>b. Check RCP seal injection:</p> <ul style="list-style-type: none"> o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP seal injection flow to each RCP - GREATER THAN 6 GPM 	<p>Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).</p>

72

47

44

43

42

41

40

39

38

37

36

35

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 16 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 19.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 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. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 3 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 19.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

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

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 17 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	<p>Equalize Charging And Letdown Flows:</p> <ul style="list-style-type: none"> a. Verify charging pump controllers in manual b. Control charging and seal injection flows to equal letdown and seal leakoff flows 	
20	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
21	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G) 	<ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct RP to sample hotwells for activity.

220

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 18 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>		
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: <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration. 2) Continue with Step 23. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 22c through e.
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p>-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with Step 23. <u>WHEN</u> either condition met, <u>THEN</u> 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). <p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 22.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 20 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Plant staff should decide whether to repair PRZR pressure control systems or continue with this procedure. If PRZR pressure control is established, PRZR level should be restored to greater than 5% [30% adverse CNMT] and then further recovery should continue with E-3, STEAM GENERATOR TUBE RUPTURE, Step 37.

24 Check If SI ACCUMs Should Be Isolated:

a. Check the following:

- o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- o RVLIS indication - GREATER THAN 68% [73% adverse CNMT]

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

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

a. Return to Step 11.

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.

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 21 of 27

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.</p>	
25	Verify Adequate Shutdown Margin	
	<ul style="list-style-type: none"> a. Direct RP to sample RCS and ruptured S/G for boron concentration b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM 	<ul style="list-style-type: none"> b. Borate as necessary.
26	Maintain Required RCP Seal Injection Flow And Labyrinth Seal D/P:	Perform the following:
	<ul style="list-style-type: none"> o Labyrinth seal D/P to each RCP - GREATER THAN 15 INCHES OF WATER o RCP seal injection flow - GREATER THAN 6 GPM 	<ul style="list-style-type: none"> o Adjust charging flow to REGEN Hx, HCV-142 as necessary. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to adjust seal injection needle valves V-300A and V-300B if necessary.
27	Initiate RCS Cooldown to 350°F In RCS Cold Legs:	
	<ul style="list-style-type: none"> a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Dump steam to condenser from intact S/G 	<ul style="list-style-type: none"> b. Manually or locally dump steam using intact S/G ARV. <p><u>IF</u> no intact S/G available, <u>THEN</u> use faulted S/G.</p>

1951

1952

1953

1954

1955

1956

1957

1958

1959

1960

1961

1962

1963

1964

1965

1966

1967

1968

1969

1970

1971

1972

1973

1974

1975

1976

1977

1978

1979

1980

1981

1982

1983

1984

1985

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN THE RUPTURED S/G ARV SETPOINT.</p> <p>*****</p>		
28	Control Charging Flow To Maintain RCS Subcooling:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING</p> <p>b. Ruptured S/G narrow range level - LESS THAN 90% [85% adverse CNMT]</p> <p>c. Ruptured S/G narrow range level - STABLE OR DECREASING</p>	<p>a. Increase charging flow to maintain subcooling greater than 20°F using Figure MIN SUBCOOLING and go to Step 29.</p> <p>b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 29.</p> <p>c. <u>IF</u> ruptured S/G level increasing, <u>THEN</u> decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using Figure MIN SUBCOOLING.</p>
29	Check If RCS Cooldown Should Be Stopped:	
	<p>a. RCS cold leg temperatures - LESS THAN 350°F</p> <p>b. Stop RCS cooldown</p>	<p>a. Return to Step 25.</p>

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

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

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

344

345

346

347

348

349

350

351

352

353

354

355

356

357

358

359

360

361

362

363

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

383

384

385

386

387

388

389

390

391

392

393

394

395

396

397

398

399

400

401

402

403

404

405

406

407

408

409

410

411

412

413

414

415

416

417

418

419

420

421

422

423

424

425

426

427

428

429

430

<

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 23 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check RCS Pressure - GREATER THAN 400 PSIG [300 PSIG adverse CNMT]	Go to Step 33.
*31	Monitor Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<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.

21

22

23
24
25

26

27

28

29

30
31

32

33

34

35

36

37

38

39

40

41 42 43 44 45



EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 24 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>		
<ul style="list-style-type: none">o STEAM SHOULD NOT BE RELEASED FROM A RUPTURED S/G IF WATER MAY EXIST IN ITS STEAMLINE.o RUPTURED S/G PRESSURE MAY DECREASE RAPIDLY WHEN STEAM IS RELEASED.		

<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.		
32	Depressurize RCS And Ruptured S/G To 400 PSIG [300 PSIG adverse CNMT]	
	a. Perform the following:	
	<ul style="list-style-type: none">o Decrease charging and increase letdown to initiate backfill	
	-OR-	
	<ul style="list-style-type: none">o Initiate blowdown from ruptured S/G	
	-OR-	
	<ul style="list-style-type: none">o Dump steam from ruptured S/G	
	b. Check RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 31.
	c. Stop RCS depressurization	

10-1

10-2

10-3

10-4

10-5

10-6

10-7

10-8

10-9

10-10

10-11

10-12

10-13

10-14

10-15

10-16

10-17

10-18

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 25 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 27.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 31.
	c. Place RCS overpressure protection system in service (Refer to 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)	
	<u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.	
34	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM	b. Borate as necessary.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 26 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Initiate RCS Cooldown To Cold Shutdown:	
	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> c. Manually or locally dump steam from intact S/G using ARVs. <p><u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> use faulted S/G.</p>
36	Control Charging Flow To Maintain RCS Subcooling:	
	<ul style="list-style-type: none"> a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING b. Ruptured S/G narrow range level - LESS THAN 90% [85% adverse CNMT] c. Ruptured S/G narrow range level - STABLE OR DECREASING 	<ul style="list-style-type: none"> a. Increase charging flow to maintain subcooling greater than 20°F using Figure MIN SUBCOOLING and go to Step 37. b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 37. c. <u>IF</u> ruptured S/G level increasing, <u>THEN</u> decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using Figure MIN SUBCOOLING.

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 12 PAGE 27 of 27
-----------------	---	--------------------------

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

EOP:	TITLE:	REV: 12
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 1 of 1

ECA-3.3 APPENDIX LIST

<u>TITLE</u>	<u>PAGES</u>
1) RED PATH SUMMARY	1
2) FIGURE MIN SUBCOOLING	1
3) FIGURE SDM	1
4) FIGURE RCP SEAL LEAKOFF	1
5) ATTACHMENT RCP START	2
6) ATTACHMENT N2 PORVS	1
7) ATTACHMENT RUPTURED S/G	2
8) ATTACHMENT D/G STOP	1
9) ATTACHMENT SD-1	1
10) ATTACHMENT SEAL COOLING	2
11) ATTACHMENT SD-2	1
12) ATTACHMENT RHR COOL	2
13) ATTACHMENT AUX BLDG SW	1
14) FOLDOUT	1

9

1

2

3

4

5

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 12

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:

ECA-3.3

TITLE:

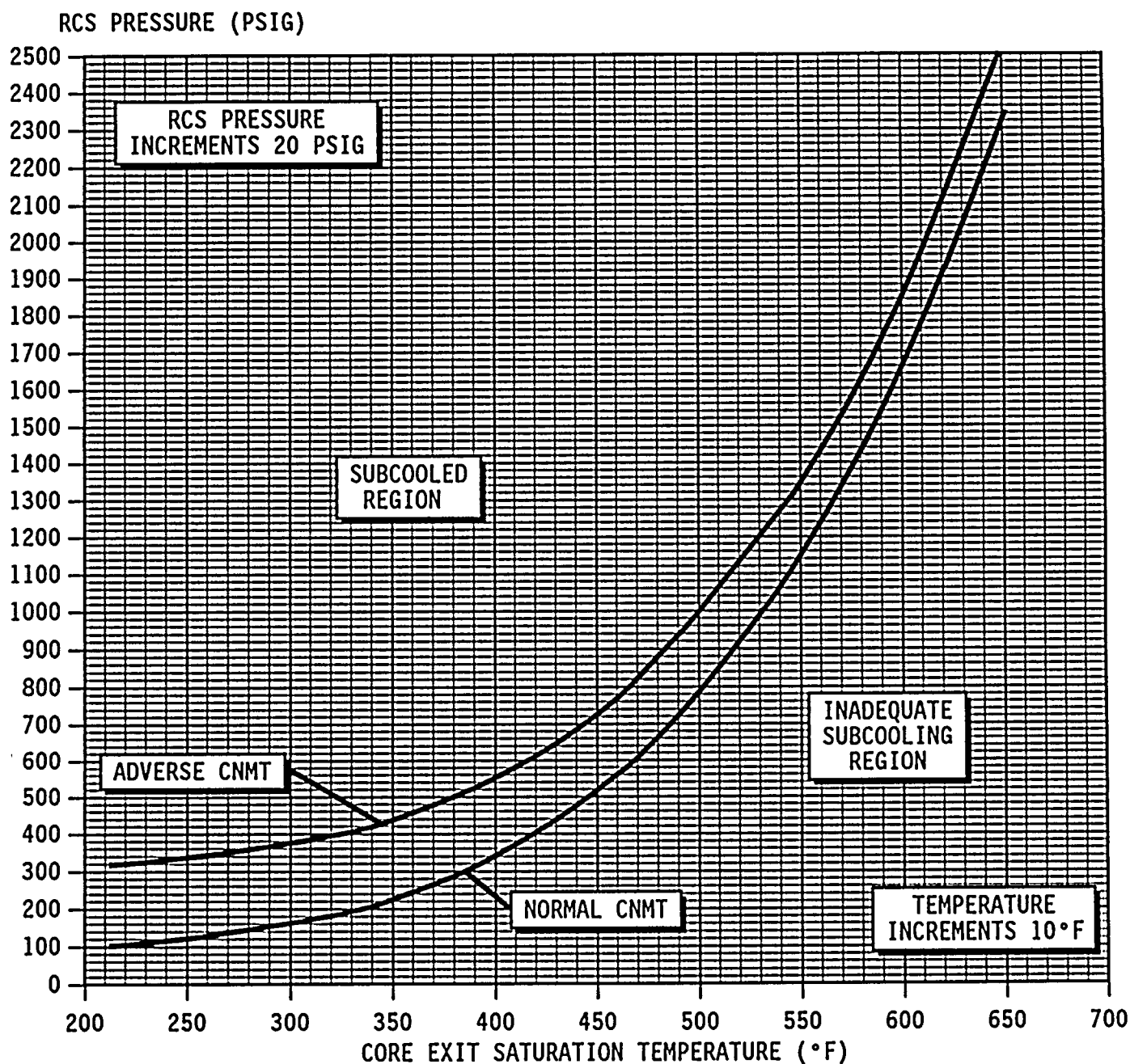
SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 12

PAGE 1 of 1

FIGURE MIN SUBCOOLING

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



EOP:

EQA-3.3

TITLE:

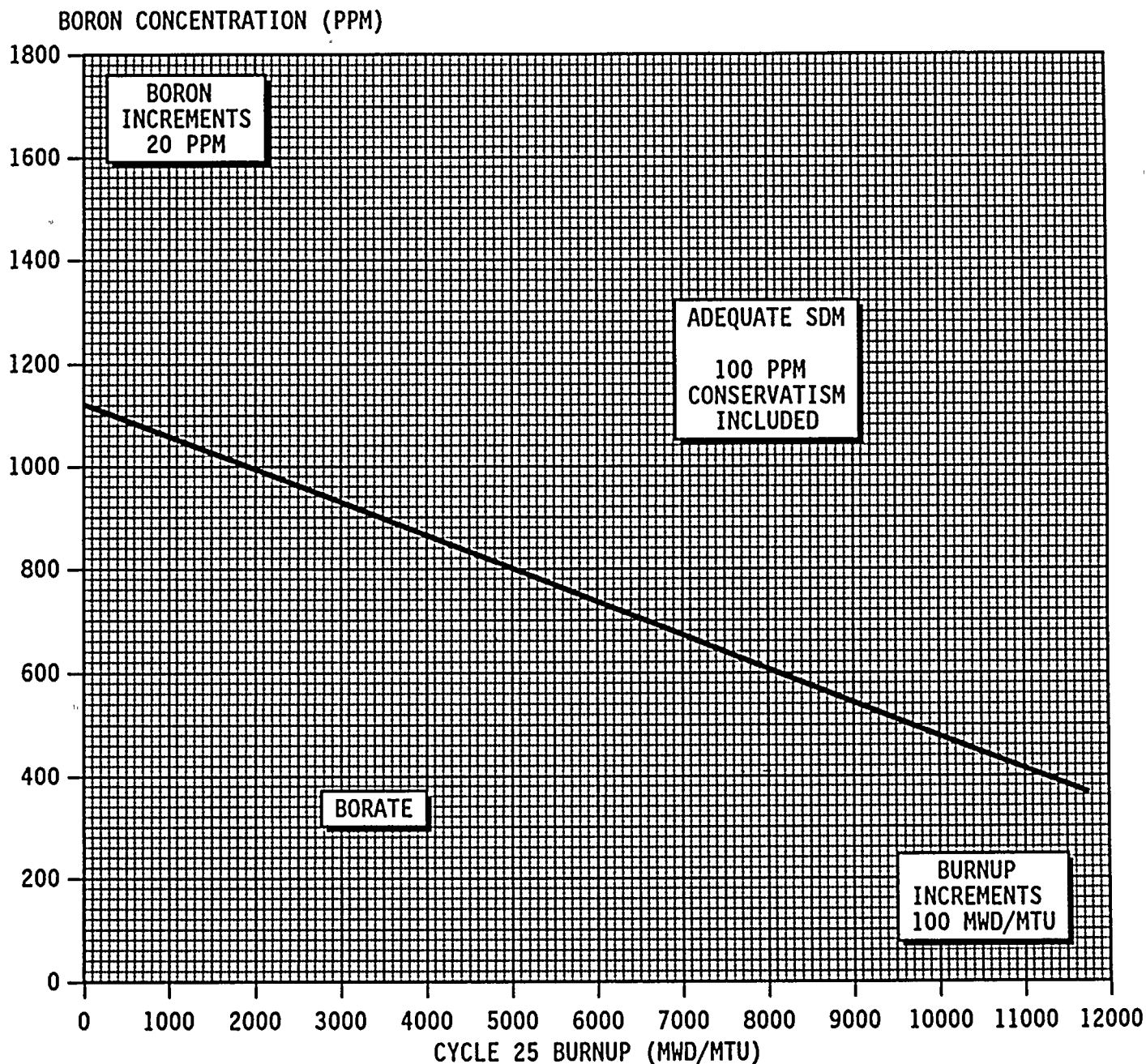
SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 12

PAGE 1 of 1

FIGURE SDM

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



100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 12

PAGE 1 of 1

FIGURE RCP SEAL LEAKOFF

#1 SEAL LEAK RATE (GPM)

