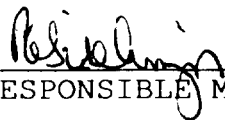


EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 1 of 36
-----------------	---	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

7-25-2002
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 2 of 36
---------------------	---	-----------------------------

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS for an SGTR concurrent with a LOCA (i.e. Ruptured-Faulted S/G).

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G can not be isolated from any intact S/G.
- b. E-3, STEAM GENERATOR TUBE RUPTURE, if PRZR PORV can not be isolated by closing its block valve.
- c. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G is faulted.
- d. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if no intact S/G is available for RCS cooldown.
- e. E-3, STEAM GENERATOR TUBE RUPTURE, if minimum D/P between ruptured and intact S/G cannot be maintained.
- f. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS subcooling is less than required.
- g. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS pressure does not increase after closing PRZR PORV and block valve.
- h. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI can not be terminated.
- i. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI is reinitiated after termination.
- j. E-3, STEAM GENERATOR TUBE RUPTURE, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if SI accumulators should not be isolated.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 3 of 36
---------------------	---	-----------------------------

- k. ES-3.1, POST-SGTR COOLDOWN USING BACKFILL,
ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and
ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if
a non-ruptured S/G is not available for RCS cooldown.

EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -
SUBCOOLED RECOVERY DESIRED

REV: 23

PAGE 4 of 36

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.
 - o IF 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.
 - o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)
- *****

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 Reset SI

2 Reset CI:

a. Depress CI reset pushbutton

b. Verify annunciator A-26, CNMT
ISOLATION - EXTINGUISHED

b. Perform the following:

1) Reset SI.

2) Depress CI reset pushbutton.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 5 of 36
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>3 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:</p> <p>1) Ensure SW isolation.</p> <p>2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1).</p> <p>3) <u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>4) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>5) Go to Step 5.</p>

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 6 of 36
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	4 Establish IA to CNMT:	
	a. Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED 	a. Perform the following: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).
	b. Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	b. Manually align valves.
	c. Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
	d. Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	d. Perform the following: <ul style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 5. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 4e and f.
	e. Reset both trains of XY relays for IA to CNMT AOV-5392	
	f. Verify IA to CNMT AOV-5392 - OPEN	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 7 of 36
---------------------	---	-----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 5	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> 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 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 7) 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).

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 8 of 36
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 6	Monitor If CNMT Spray Should Be Stopped:	
	a. CNMT spray pumps - ANY RUNNING	a. Go to Step 7.
	b. Check the following:	b. Continue with Step 7. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 6c through f.
	o CNMT pressure - LESS THAN 4 PSIG	
	o Sodium hydroxide tank level - LESS THAN 55%	
	c. Reset CNMT spray	
	d. Check NaOH tank outlet valves - CLOSED	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
	• AOV-836A	
	• AOV-836B	
	e. Stop CNMT spray pumps and place in AUTO	
	f. Close CNMT spray pump discharge valves	
	• MOV-860A	
	• MOV-860B	
	• MOV-860C	
	• MOV-860D	

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.

7 Check Ruptured S/G Level:

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

a. IF ruptured S/G NOT faulted, THEN perform the following:

1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].

2) Continue with Step 8. WHEN ruptured S/G level greater than 5% [25% adverse CNMT], THEN do Steps 7b through e.

b. Close MDAFW pump discharge valve to ruptured S/G

b. Dispatch AO to locally close valve.

- S/G A, MOV-4007
- S/G B, MOV-4008

c. Pull stop MDAFW pump for ruptured S/G

d. Close TDAFW pump flow control valve to ruptured S/G

d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.

- S/G A, AOV-4297
- S/G B, AOV-4298

- S/G A, V-4005
- S/G B, V-4006

e. Verify MDAFW pump crosstie valves - CLOSED

e. Manually close valves.

- MOV-4000A
- MOV-4000B

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 10 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
8	<p>Check If RHR Pumps Should Be Stopped:</p> <p>a. Check RCS pressure:</p> <ul style="list-style-type: none"> o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] o Pressure - STABLE OR INCREASING <p>b. Stop RHR pumps and place in AUTO</p>	<p>a. Go to Step 9.</p>

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 11 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Evaluate Plant Status:	
a.	Check auxiliary building radiation - NORMAL	a. Notify RP and refer to appropriate AR-RMS procedure.
	<ul style="list-style-type: none"> • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • Letdown line monitor (R-9) • CHG pump room (R-4) 	
b.	Direct RP to obtain following samples:	
	<ul style="list-style-type: none"> • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron 	
c.	Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw).
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 12 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	<p>Establish 75 GPM Charging Flow:</p> <p>a. Charging pumps - ANY RUNNING</p> <p>b. Align charging pump suction to RWST:</p> <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED <p>c. Start charging pumps as necessary and establish 75 gpm total charging flow</p> <ul style="list-style-type: none"> • Charging line flow • Seal injection 	<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> dispatch AO with RWST area key to 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 open. <p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 13 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 110 PSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> • Steamlines • Feedlines <p><u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
	<p><u>NOTE</u>: TDAFW pump flow control AOVs may drift open on loss of IA.</p>	
*12	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 5% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in intact S/G. b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths: <ul style="list-style-type: none"> • TDAFW pump steam supply valves • S/G blowdown valves • Refer to Attachment RUPTURED S/G

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 14 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE</u>: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).</p>	
13	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, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.
*14	Monitor Conditions For Subcooled Recovery:	
	<p>a. Check RWST level - GREATER THAN 50%</p> <p>b. Check ruptured S/G narrow level - LESS THAN 90% [80% adverse CNMT]</p>	<p>a. <u>IF</u> CNMT sump B level is less than 113 inches, <u>THEN</u> go to ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 1.</p> <p>b. Consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.</p>

EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -
SUBCOOLED RECOVERY DESIRED

REV: 23

PAGE 15 of 36

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

Go to Step 28.

16 Check Safeguards Pump Status

Go to Step 24.

o SI pumps - ANY RUNNING

-OR-

o RHR pumps - ANY RUNNING IN
INJECTION MODE

17 Place PRZR Heater Switches In
The Following Positions:

o PRZR heater control group - PULL
STOP

o PRZR heater backup group - OFF

18 Check PRZR level - LESS THAN
13% [40% adverse CNMT]

Go to Step 20.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 16 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p>*****</p> <p><u>NOTE:</u> o When using PRZR PORV, select one with an operable block valve.</p> <p> o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>19 Depressurize RCS To Refill PRZR:</p> <table><tr><td style="vertical-align: top;"><p>a. Use normal PRZR spray valve associated with running RCP</p><ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B<p>b. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p><p>c. Stop RCS depressurization</p></td><td style="vertical-align: top;"><p>a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p><p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</p><p>b. Continue with Step 20. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p></td></tr></table>			<p>a. Use normal PRZR spray valve associated with running RCP</p> <ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B <p>b. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>c. Stop RCS depressurization</p>	<p>a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</p> <p>b. Continue with Step 20. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p>
<p>a. Use normal PRZR spray valve associated with running RCP</p> <ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B <p>b. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>c. Stop RCS depressurization</p>	<p>a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</p> <p>b. Continue with Step 20. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p>			

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 17 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.</p> <p>*****</p>		
20	<p>Check If An RCP Should Be Started:</p> <p>a. Both RCPs - STOPPED</p> <p>b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>c. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>d. Try to start an RCP</p> <p>1) Establish conditions for starting an RCP</p> <p>o Bus 11A or 11B energized</p> <p>o Refer to Attachment RCP START</p> <p>2) Start one RCP</p>	<p>a. Stop all but one RCP and go to Step 21.</p> <p>b. Go to Step 28.</p> <p>c. Return to Step 18.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

21 Check If One Of Three SI
Pumps Should Be Stopped:

- a. Three SI pumps - RUNNING
- b. RCS subcooling based on core
exit T/Cs - GREATER THAN 35°F
[90°F adverse CNMT] USING FIGURE
MIN SUBCOOLING
- c. Check PRZR level - GREATER THAN
13% [40% adverse CNMT]
- d. Stop one SI pump

a. Go to Step 22.

b. IF RCS hot leg temperatures
greater than 320°F [310°F
adverse CNMT], OR IF RHR normal
cooling in service, THEN go to
Step 28.

IF RHR normal cooling NOT in
service AND RCS hot leg
temperatures less than 320°F
[310°F adverse CNMT], THEN
ensure at least one RHR pump
running in injection mode and go
to Step 21c. IF no RHR pump can
be started in injection mode,
THEN go to Step 28.

c. Do NOT stop SI pump. Return to
Step 18.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

a. Two SI pumps - RUNNING

a. Go to Step 23.

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 320°F [310°F
adverse CNMT], OR IF RHR normal
cooling in service, THEN go to
Step 28.

IF RHR normal cooling NOT in
service AND RCS hot leg
temperatures less than 320°F
[310°F adverse CNMT], THEN
ensure at least one RHR pump
running in injection mode and go
to Step 22d. IF no RHR pump can
be started in injection mode,
THEN go to Step 28.

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

d. Do NOT stop SI pump. Return to
Step 18.

e. Stop one SI pump

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 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 28. IF NOT, THEN go to
Step 24.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 SUBCOOLINGc. IF RCS hot leg temperatures
greater than 320°F [310°F
adverse CNMT] OR IF RHR normal
cooling in service, THEN go to
Step 28.IF RHR normal cooling NOT in
service AND RCS hot leg
temperatures less than 320°F
[310°F adverse CNMT], THEN
ensure at least one RHR pump
running in injection mode and go
to Step 23d. IF no RHR pump can
be started in injection mode,
THEN go to Step 28.d. PRZR level - GREATER THAN 13%
[40% adverse CNMT]d. Do NOT stop SI pump. Return to
Step 18.

e. Stop running SI pump

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 21 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	<p>Check If Charging Flow Should Be Controlled To Maintain PRZR Level:</p> <p>a. Check RHR pumps - RUNNING IN INJECTION MODE</p> <p>b. Go to Step 28</p>	<p>a. Start charging pumps and control charging flow to maintain PRZR level and go to Step 25.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.
 - o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.
- *****

25 Check RCP Status:

a. RCPs - AT LEAST ONE RUNNING

a. Try to start one RCP

- 1) IF RVLIS level (no RCPs) less than 95%, THEN perform the following:

- o Increase PRZR level to greater than 65% [82% adverse CNMT]
- o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING
- o Energize PRZR heaters as necessary to saturate PRZR water

- 2) Establish conditions for starting an RCP:

- o Verify bus 11A or 11B energized.
- o Refer to Attachment RCP START.

- 3) 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

<u>CAUTION</u>		
VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.		

<u>NOTE:</u>		
o WHEN using a PRZR PORV, THEN select one with an operable block valve.		
o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.		
26 Depressurize RCS To Minimize RCS Subcooling:		
a. Depressurize using normal PRZR spray if available		
a. Depressurize using one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.		
<u>IF</u> no PORV available, <u>THEN</u> 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]		

EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -
SUBCOOLED RECOVERY DESIRED

REV: 23

PAGE 24 of 36

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.

27 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.

***28** Monitor SI Reinitiation Criteria:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- b. PRZR level - GREATER THAN 5% [30% adverse CNMT]

a. Manually start SI pumps as necessary and go to Step 29.

b. Manually start SI pumps as necessary and return to Step 18.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29 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 29c.

IF NOT, THEN go to Step 30.

- b. PRZR level - GREATER THAN 5% [30% adverse CNMT]

- b. Return to Step 18.

- c. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves

- MOV-841, MCC C position 12F
- MOV-865, MCC D position 12C

- d. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

- d. Vent any unisolated ACCUMs:

- 1) Open vent valves for unisolated SI ACCUMs.

- ACCUM A, AOV-834A
- ACCUM B, AOV-834B

- 2) Open HCV-945.

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

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 26 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	<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).
31	<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.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 27 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	<p>Verify Adequate SW Flow To CCW Hx:</p> <p>a. Verify at least two SW pumps - RUNNING</p> <p>b. Verify AUX BLDG SW isolation valves - OPEN</p> <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 33.</p> <p>b. Manually align valves.</p>
This Step continued on the next page.		

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 28 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
------	--------------------------	-----------------------

(Step 32 continued from previous page)

c. Verify CNMT RECIRC fan
annunciator C-2, HIGH
TEMPERATURE ALARM - EXTINGUISHED

c. Perform the following:

1) Determine required SW flow to
CCW HXs per table:

SW DISCHARGE ALIGNMENT	CCW HXs IN SERVICE	REQUIRED SW FLOW
Normal	2	Total of 5000 - 6000 gpm equally divided to both HXs
Normal	1	5000 - 6000 gpm to in-service HX
Alternate	2	30-33" d/p across each HX
Alternate	1	95-100" d/p across in-service HX

2) Direct AO to adjust SW flow
to required value.

o IF on normal SW discharge:

- V-4619, CCW Hx A
- V-4620, CCW Hx B

-OR-

o IF on alternate SW
discharge:

- V-4619C, CCW Hx A
- V-4620B, CCW Hx B

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 29 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
a.	Check CCW to RCPs	
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
b.	Check RCP seal injection	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER -OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 30 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	<p>Check If Seal Return Flow Should Be Established:</p> <p>a. Verify instrument bus D - ENERGIZED</p> <p>b. Verify RCP #1 seal outlet temperature - LESS THAN 235°F</p> <p>c. Verify RCP seal outlet valves - OPEN</p> <ul style="list-style-type: none"> • AOV-270A • AOV-270B <p>d. Reset both trains of XY relays for RCP seal return isolation valve MOV-313</p> <p>e. Open RCP seal return isolation valve MOV-313</p> <p>f. Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM</p> <p>g. Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply). <p>b. Go to Step 35.</p> <p>c. Manually open valves as necessary.</p> <p>e. Perform the following:</p> <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. <p>f. Perform the following:</p> <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 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 35.</p> <p>g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.</p>

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 31 of 36
-----------------	---	--------------------------

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>	
35	Check If Source Range Detectors Should Be Energized:	
a.	Source range channels - DEENERGIZED	a. Go to Step 35e.
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 36. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 35c, d and e.
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with Step 36. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 35d 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 36.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 32 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	<p>Establish Normal Shutdown Alignment:</p> <ul style="list-style-type: none"> a. Check condenser - AVAILABLE b. Perform the following: <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump c. Verify Attachment SD-1 - COMPLETE 	<ul style="list-style-type: none"> a. Dispatch A0 to perform Attachment SD-2.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 33 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
*37	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% 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 unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig.
*38	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 39.
	b. Check the following:	b. Stop affected RCP(s).
	<ul style="list-style-type: none"> 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 	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 34 of 36
-----------------	---	------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	<p>Manually or locally dump steam using intact S/G ARV.</p> <p><u>IF</u> no intact S/G available, <u>THEN</u>:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p>-OR-</p> <ul style="list-style-type: none"> o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 35 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 41.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 41.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 41.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 36 of 36
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> This procedure should be continued while obtaining CNMT hydrogen sample in Step 41.</p>	
41	Check CNMT Hydrogen Concentration:	
	<ul style="list-style-type: none"> a. Direct RP to start CNMT hydrogen monitors as necessary b. Hydrogen concentration - LESS THAN 0.5% 	<ul style="list-style-type: none"> b. Consult TSC to determine if hydrogen recombiners should be placed in service.
42	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 8.
43	Evaluate Long Term Plant Status:	
	<ul style="list-style-type: none"> a. Maintain cold shutdown conditions b. Consult TSC 	
	-END-	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 1 of 1
---------------------	---	----------------------------

ECA-3.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 6) ATTACHMENT SI/UV (ATT-8.4)
- 7) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 8) ATTACHMENT N2 PORVS (ATT-12.0)
- 9) ATTACHMENT RCP START (ATT-15.0)
- 10) ATTACHMENT D/G STOP (ATT-8.1)
- 11) ATTACHMENT SEAL COOLING (ATT-15.2)
- 12) ATTACHMENT SD-1 (ATT-17.0)
- 13) ATTACHMENT SD-2 (ATT 17.1)
- 14) ATTACHMENT RHR COOL (ATT-14.1)
- 15) ATTACHMENT NC (ATT-13.0)
- 16) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 17) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 17) FOLDOUT

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 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 52% [55%
adverse CNMT]
- c. HEAT SINK - Narrow range level in all S/Gs less than 5%
[25% adverse CNMT] AND total feedwater flow
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than
100°F in last 60 minutes AND RCS cold leg
temperature less than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 23 PAGE 1 of 1
-----------------	---	----------------------------

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SATURATED RECOVERY CRITERIA

IF ruptured S/G narrow range level increases to greater than 90% [80% adverse CNMT], THEN consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

3. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

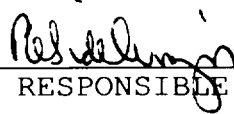
IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS)

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 1 of 27
-----------------	---	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

7-25-2002

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 2 of 27
---------------------	---	-----------------------------

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, when RWST level is low without a corresponding increase in containment sump level.
- b. ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, when the ruptured S/G level is high and plant staff selects saturated recovery method.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 3 of 27
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>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.</p> <p>*****</p> <p><u>NOTE:</u> o Steps 1 through 14 of ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, should be performed before continuing with this procedure.</p> <p> 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 Add Makeup To RWST As Necessary:</p> <p> o Refer to S-9J, BLENDING TO RWST</p> <p style="text-align: center;">-OR-</p> <p> o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST TO SFP</p> <p style="text-align: center;">-OR-</p> <p> o Refer to Attachment SFP-RWST</p>		

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 4 of 27
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
2	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 5% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].</p> <p>2) Continue with Step 3. <u>WHEN</u> ruptured S/G level greater than 5% [25% adverse CNMT], <u>THEN</u> do Steps 2b through e.</p>
b.	Close MDAFW pump discharge valve to ruptured S/G	b. Dispatch AO to locally close valve.
	<ul style="list-style-type: none"> • S/G A, MOV-4007 • S/G B, MOV-4008 	
c.	Pull stop MDAFW pump for ruptured S/G	
d.	Close TDAFW pump flow control valve to ruptured S/G	d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.
	<ul style="list-style-type: none"> • S/G A, AOV-4297 • S/G B, AOV-4298 	<ul style="list-style-type: none"> • S/G A, V-4005 • S/G B, V-4006
e.	Verify MDAFW pump crosstie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> • MOV-4000A • MOV-4000B 	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>o RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
3	Check If RHR Pumps Should Be Stopped:	
	a. Check RCS pressure:	a. Go to Step 4.
	1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	
	2) RCS pressure - STABLE OR INCREASING	
	b. Stop RHR pumps and place in AUTO	
4	Check If S/G Secondary Side Is Intact:	
	o Pressure in both S/Gs - STABLE OR INCREASING	<u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:
	o Pressure in both S/Gs - GREATER THAN 110 PSIG	<ul style="list-style-type: none"> • Steamlines • Feedlines
		<u>IF NOT</u> , <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 6 of 27
-----------------	---	-----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE</u>: TDAFW pump flow control AOVs may drift open on loss of IA. </p>	
	<p>★ 5 Monitor Intact S/G Level:</p>	
	<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 the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths:</p> <ul style="list-style-type: none"> • TDAFW pump steam supply valves • S/G blowdown valves • Refer to Attachment RUPTURED S/G
	<p><u>NOTE</u>: Shutdown margin should be monitored during RCS cooldown. Refer to Figure SDM.</p>	
	<p>6 Initiate RCS Cooldown To Cold Shutdown:</p>	
	<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, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 7 of 27
-----------------	---	-----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	Go to Step 19.
8	Check Safeguards Pump Status o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE	Go to Step 15.
9	Place PRZR Heater Switches In The Following Positions: o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
------	--------------------------	-----------------------

CAUTION

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

NOTE:

- o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.
- o When using PRZR PORV, select one with an operable block valve.

10 Depressurize RCS To Refill PRZR:

a. Use normal PRZR spray valve associated with running RCP <ul style="list-style-type: none">• PCV-431A for A RCP• PCV-431B for B RCP	a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.
b. PRZR level - GREATER THAN 13% [40% adverse CNMT]	b. Continue with Step 11. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.
c. Stop RCS depressurization	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 9 of 27
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.</p> <p>*****</p>		
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	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 10 of 27
-----------------	---	--------------------------

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 10°F [10°F adverse CNMT] USING FIGURE MIN SUBCOOLING	<p>b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19.</p> <p><u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 12c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 19.</p>
c.	Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 10.
d.	Stop one SI pump	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 11 of 27
-----------------	---	------------------------------

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.	RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [35°F adverse CNMT] USING FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 13c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 19.
c.	PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 10.
d.	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	215°F [215°F adverse CNMT]
TWO	150°F [150°F adverse CNMT]
THREE	80°F [80°F adverse CNMT]

c. RCS subcooling based on core
exit T/Cs - GREATER THAN VALUE
FROM TABLE ABOVE USING FIGURE
MIN SUBCOOLINGc. IF RCS hot leg temperatures
greater than 320°F [310°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 320°F
[310°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 started 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

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 13 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	<p>Check If Charging Flow Should Be Controlled To Maintain RCS Inventory:</p> <p>a. Check RHR pumps - RUNNING IN INJECTION MODE</p> <p>b. Go to Step 19</p>	<p>a. Perform the following:</p> <p>1) Control charging flow to maintain RCS inventory:</p> <ul style="list-style-type: none"> o RVLIS level (no RCPs) - BETWEEN 77% <u>AND</u> 82% [82% <u>AND</u> 85% adverse CNMT] -OR- o RVLIS fluid fraction (any RCP running) - BETWEEN 84% <u>AND</u> 90% <p>2) Go to Step 16.</p>

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 14 of 27
-----------------	---	------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.</p> <p>*****</p>		
16	Check RCP Status:	
a.	RCPs - AT LEAST ONE RUNNING	<p>a. Try to start one RCP</p> <p>1) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT] o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING o Energize PRZR heaters as necessary to saturate PRZR water <p>2) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. <p>3) Start one RCP.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
b.	Stop all but one RCP	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 15 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p>o IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG.</p> <p>*****</p> <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>o When using PRZR PORV, select one with an operable block valve.</p> <p>17 Depressurize RCS To Saturation At Core Exit:</p> <p>a. Determine saturation pressure for core exit T/Cs using Figure TSAT</p> <p>b. Use normal PRZR spray valves associated with running RCP</p> <ul style="list-style-type: none"> • PCV-431A for A RCP • PCV-431B for B RCP <p>c. Energize PRZR heaters as necessary</p> <p>d. Depressurize RCS until EITHER of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 75% [65% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCS pressure - AT SATURATION FROM STEP 17a <p>b. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> PORV <u>NOT</u> available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p>		

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 16 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	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.
*19	Monitor SI Reinitiation Criteria:	
	<ul style="list-style-type: none"> a. Core exit T/Cs - DECREASING b. Check RVLIS indication: <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] 	<ul style="list-style-type: none"> a. Manually start SI pumps as necessary. b. Manually start SI pumps as necessary.
	-OR-	
	<ul style="list-style-type: none"> o Fluid Fraction (any RCP running) - GREATER THAN 84% 	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 17 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 5% [30% adverse CNMT]</p> <p>c. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>d. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>e. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. <u>IF</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> go to Step 20c.</p> <p><u>IF NOT</u>, <u>THEN</u> go to Step 21.</p> <p>b. Return to Step 10.</p> <p>d. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p>

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 18 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<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).
22	<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.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 19 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	<p>Verify Adequate SW Flow To CCW Hx:</p> <p>a. Verify at least two SW pumps - RUNNING</p> <p>b. Verify AUX BLDG SW isolation valves - OPEN</p> <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER. 3) Go to Step 24. <p>b. Manually align valves.</p>
This Step continued on the next page.		

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 20 of 27
-----------------	---	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 23 continued from previous page)

c. Verify CNMT RECIRC fan
annunciator C-2, HIGH
TEMPERATURE ALARM - EXTINGUISHED

c. Perform the following:

1) Determine required SW flow to
CCW HXs per table:

SW DISCHARGE ALIGNMENT	CCW HXs IN SERVICE	REQUIRED SW FLOW
Normal	2	Total of 5000 - 6000 gpm equally divided to both HXs
Normal	1	5000 - 6000 gpm to in-service HX
Alternate	2	30-33" d/p across each HX
Alternate	1	95-100" d/p across in-service HX

2) Direct AO to adjust SW flow
to required value.

o IF on normal SW discharge:

- V-4619, CCW Hx A
- V-4620, CCW Hx B

-OR-

o IF on alternate SW
discharge:

- V-4619C, CCW Hx A
- V-4620B, CCW Hx B

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 21 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	<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 -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM 	<p>Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).</p>

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 22 of 27
-----------------	---	------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Check If Seal Return Flow Should Be Established:	
a.	Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
b.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 26.
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 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down. <u>THEN</u> close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 26.
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 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.

26 Check If Source Range
Detectors Should Be Energized:

- | | |
|--|--|
| <p>a. Source range channels -
DEENERGIZED</p> <p>b. Check intermediate range flux -
EITHER CHANNEL LESS THAN
10⁻¹⁰ AMPS</p> <p>c. Check the following:</p> <ul style="list-style-type: none">o Both intermediate range
channels - LESS THAN
10⁻¹⁰ AMPS <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none">o Greater than 20 minutes since
reactor trip <p>d. Verify source range detectors -
ENERGIZED</p> <p>e. Transfer Rk-45 recorder to one
source range and one
intermediate range channel</p> | <p>a. Go to Step 26e.</p> <p>b. Perform the following:</p> <ul style="list-style-type: none">1) <u>IF</u> neither intermediate range
channel is decreasing, <u>THEN</u>
initiate boration.2) Continue with Step 27. <u>WHEN</u>
flux is LESS THAN 10⁻¹⁰ amps
on any operable channel, <u>THEN</u>
do Steps 26c, d and e. <p>c. Continue with Step 27. <u>WHEN</u>
either condition met, <u>THEN</u> do
Steps 26d and e.</p> <p>d. Manually energize source range
detectors by depressing P-6
permissive defeat pushbuttons (2
of 2).</p> <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 27.</p> |
|--|--|

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 24 of 27
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 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 <p>c. Verify adequate Rx head cooling:</p> <ol style="list-style-type: none"> 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING <p>d. Verify Attachment SD-1 - COMPLETE</p>	<p>a. Dispatch A0 to perform Attachment SD-2.</p> <p>1) Manually start one fan as power supply permits (45 kw)</p> <p>2) Perform the following:</p> <ul style="list-style-type: none"> o Dispatch A0 to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
*28	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% 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 unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig.
*29	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 30.
	b. Check the following:	b. Stop the affected RCP(s).
	<ul style="list-style-type: none"> 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 	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 26 of 27
-----------------	---	------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.
31	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 32.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 32.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 32.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

EOP:

ECA-3.2

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -
SATURATED RECOVERY DESIRED

REV: 26

PAGE 27 of 27

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 32.

32 Check CNMT Hydrogen
Concentration:

a. Direct RP 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.

33 Check Core Exit T/Cs - LESS
THAN 200°F

Return to Step 3.

34 Evaluate Long Term Plant
Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 1 of 1
-----------------	---	----------------------------

ECA-3.2 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE TSAT (FIG-8.0)
- 5) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 6) ATTACHMENT SFP-RWST (ATT-18.0)
- 7) ATTACHMENT N2 PORVS (ATT-12.0)
- 8) ATTACHMENT NC (ATT-13.0)
- 9) ATTACHMENT SEAL COOLING (ATT-15.2)
- 10) ATTACHMENT RCP START (ATT-15.0)
- 11) ATTACHMENT D/G STOP (ATT-8.1)
- 12) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 13) ATTACHMENT SD-1 (ATT-17.0)
- 14) ATTACHMENT SD-2 (ATT-17.1)
- 15) ATTACHMENT RHR COOL (ATT-14.1)
- 16) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 17) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 18) FOLDOUT

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 26 PAGE 1 of 1
-----------------	---	----------------------------

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

- o Core exit T/Cs - INCREASING

-OR-

- o Check RVLIS indication:

Level (no RCPs) - LESS THAN 77% [82% adverse CNMT]

Fluid fraction (any RCP running) - LESS THAN 84%

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized, and has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

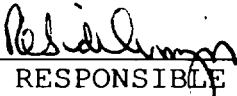
IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 1 of 29
-----------------	---	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

7-25-2002
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 2 of 29
-----------------	---	-------------------------

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.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 3 of 29
-----------------	---	-------------------------

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 80% [60% 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:	
	<p>a. Verify the following:</p> <p>1) Verify IA to CNMT - AVAILABLE</p> <p>2) Verify spray valve associated with running RCP - OPERABLE</p> <p>b. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21</p>	<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>

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 4 of 29
-----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>4 Try To Restore PRZR PORV:</p> <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>b. Check IA to CNMT - AVAILABLE</p> <p>c. Verify at least one PRZR PORV flow path - AVAILABLE</p> <p>d. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 22</p>	<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 A0 to locally ensure breakers to block valves closed.</p> <ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C <p>b. Refer to Attachment N2 PORVS to operate PORVs.</p> <p>c. Go to Step 5.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: 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.

5 Try To Establish Auxiliary Spray:

a. Charging pumps - AT LEAST ONE 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 locally isolate seal injection to affected RCP.

- RCP A, V-300A
- RCP B, V-300B

- 2) Ensure HCV-142 demand at 0%.

- 3) Start charging pumps as necessary.

IF charging not available, THEN go to Step 6.

b. Establish auxiliary spray flow:

b. IF auxiliary spray can NOT be established, THEN go to Step 6.

- 1) Open auxiliary spray valve (AOV-296)

- 2) Close charging valve to loop B cold leg (AOV-294)

c. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21b

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 27

PAGE 6 of 29

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: TDAFW pump flow control AOVs may drift open on loss of IA. |

*** 6 Monitor Intact S/G Level:**

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

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

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. IF narrow range level in 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.

7 Check PRZR Level - GREATER THAN 5% [30% adverse CNMT]

Return to Step 1.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8 Check If SI Can Be Terminated:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

- a. Do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

- b. Secondary heat sink:

- o Total feed flow to intact S/Gs - GREATER THAN 200 GPM AVAILABLE

- b. IF neither condition satisfied, THEN do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

-OR-

- o Narrow range level in intact S/G - GREATER THAN 5% [25% adverse CNMT]

- c. Do NOT stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

- c. RVLIS indication

- o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 84%

- d. Any ruptured S/G narrow range level - INCREASING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH

- d. Do NOT stop SI pumps. Return to Step 2.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 8 of 29
-----------------	---	-------------------------

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

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10 Check If Charging Flow Has Been Established:

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 key to RWST gate to close seal injection needle valve(s) to affected RCP:

- RCP A, V-300A
- RCP B, V-300B

- 2) Ensure HCV-142 open, demand at 0%.

b. Charging pump suction aligned to RWST:

b. Manually align valves as necessary.

- o LCV-112B - OPEN
- o LCV-112C - CLOSED

IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).

IF LCV-112C can NOT be closed, THEN perform the following:

- 1) Verify charging pump A NOT running and place in PULL STOP.
- 2) 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:

- o Restore PRZR level
- o Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 27

PAGE 10 of 29

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

***11 Monitor RCS Inventory:**

- o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- o RVLIS indication
- o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 84%

Perform the following:

- a. Manually start SI pumps as necessary.
- b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 11 of 29
-----------------	---	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12 Verify Adequate SW Flow To
CCW Hx:

a. Verify at least two SW pumps -
RUNNING

a. Manually start pumps as power
supply permits (257 kw per
pump). IF less than two SW
pumps can be operated, THEN
perform the following:

1) IF NO SW pumps running, THEN
refer to ATT-2.4, ATTACHMENT
NO SW PUMPS.

2) IF only one SW pump running.
THEN refer to AP-SW.2, LOSS
OF SERVICE WATER.

3) Go to Step 20.

b. Verify AUX BLDG SW isolation
valves - OPEN

b. Manually align valves.

- MOV-4615 and MOV-4734
- MOV-4616 and MOV-4735

This Step continued on the next page.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 12 continued from previous page)

c. Verify CNMT RECIRC fan
annunciator C-2, HIGH
TEMPERATURE ALARM - EXTINGUISHED

c. Perform the following:

1) Determine required SW flow to
CCW HXs per table:

SW DISCHARGE ALIGNMENT	CCW HXs IN SERVICE	REQUIRED SW FLOW
Normal	2	Total of 5000 - 6000 gpm equally divided to both HXs
Normal	1	5000 - 6000 gpm to in-service HX
Alternate	2	30-33" d/p across each HX
Alternate	1	95-100" d/p across in-service HX

2) Direct AO to adjust SW flow
to required value.

o IF on normal SW discharge:

- V-4619, CCW Hx A
- V-4620, CCW Hx B

-OR-

o IF on alternate SW
discharge:

- V-4619C, CCW Hx A
- V-4620B, CCW Hx B

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 13 of 29
-----------------	---	--------------------------

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.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 14 of 29
-----------------	---	--------------------------

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>
a.	Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM	
b.	Place the following switches to CLOSE: <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 	
c.	Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> • TCV-130 • PCV-135 	
d.	Reset both trains of XY relays for AOV-371 and AOV-427	
e.	Open AOV-371 and AOV-427	
f.	Open letdown orifice valves as necessary	
g.	Place TCV-130 in AUTO at 105°F	
h.	Place PCV-135 in AUTO at 250 psig	
i.	Adjust charging pump speed and HCV-142 as necessary	

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. Adjust RMW flow control valve in AUTO to 40 gpm
- c. Verify the following:
 - 1) RMW mode selector switch in AUTO
 - 2) RMW control armed - RED LIGHT LIT
- d. Check VCT level:
 - o Level - GREATER THAN 20%
-OR-
 - o Level - STABLE OR INCREASING
- c. Adjust controls as necessary.
- d. Manually increase VCT makeup flow as follows:
 - 1) Ensure BA transfer pumps and RMW pumps running. IF NOT, THEN reset MCC C and MCC D UV lockouts as necessary.
 - 2) Place RMW flow control valve HCV-111 in MANUAL.
 - 3) Increase RMW flow.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Check Charging Pump Suction
Aligned To VCT:

a. VCT level - GREATER THAN 20%

a. IF VCT level can NOT be
maintained greater than 5%, THEN
perform the following:

1) Ensure charging pump suction
aligned to RWST

o LCV-112B open

o LCV-112C closed

2) Continue with Step 17. WHEN
VCT level greater than 40%,
THEN do Step 16b.

b. Verify charging pumps aligned to
VCT

o LCV-112C - OPEN

o LCV-112B - CLOSED

b. Manually align valves as
necessary.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 17 of 29
-----------------	---	--------------------------

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 -OR- o RCP seal injection flow to each RCP - GREATER THAN 6 GPM 	<p>Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).</p>

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 18 of 29
-----------------	---	--------------------------

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 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 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.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 19 of 29
-----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Equalize Charging And Letdown Flows: a. Verify charging pump controllers in manual b. Control charging and seal injection flows to equal letdown and seal leakoff flows	
20	Check If Emergency D/Gs Should Be Stopped: a. Verify AC emergency busses energized by offsite power: o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
21	Minimize Secondary System Contamination: a. Isolate reject from hotwell to CST: o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)	a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct RP to sample hotwells for activity.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

22 Check If Source Range Detectors Should Be Energized:

a. Source range channels -
DEENERGIZED

a. Go to Step 22e.

b. Check intermediate range flux -
EITHER CHANNEL LESS THAN
10⁻¹⁰ AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 23. WHEN flux is LESS THAN 10⁻¹⁰ amps on any operable channel, THEN do Steps 22c through e.

c. Check the following:

c. Continue with Step 23. WHEN either condition met, THEN do Steps 22d and e.

o Both intermediate range channels - LESS THAN
10⁻¹⁰ AMPS

-OR-

o Greater than 20 minutes since reactor trip

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 22.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 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) Verify at least one control rod shroud fan - RUNNING

1) Manually start one fan as power supply permits (45 kw)

2) Verify one Rx compartment cooling fan - RUNNING

2) Perform the following:

o Dispatch AO to reset UV relays at MCC C and MCC D.

o Manually start one fan as power supply permits (23 kw)

d. Verify Attachment SD-1 - COMPLETE

EOP:	TITLE:	REV: 27
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 22 of 29

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 32.

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
- o Level (no RCPs - GREATER THAN 77% [82% adverse CNMT])

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 84%

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

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.

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.

25 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.

26 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 RCP seal injection flow - 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 V-300A and V-300B if necessary.

27 Initiate RCS Cooldown to 350°F In RCS Cold Legs:

- 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 using intact S/G ARV.

IF no intact S/G available, THEN use faulted S/G.

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 24 of 29
-----------------	---	--------------------------

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% [80% 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>

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]

Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.

IF any 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.

-OR-

- o Ruptured S/G pressure decreases to 350 psig AND ruptured S/G level greater than 5% [25% adverse CNMT]

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 27

PAGE 26 of 29

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- 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.
- *****

32 Depressurize RCS And Ruptured
S/G To 400 PSIG [300 PSIG
adverse CNMT]

a. Perform the following:

- o Decrease charging and
increase letdown to initiate
backfill

-OR-

- o Initiate blowdown from
ruptured S/G

-OR-

- 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

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 27 PAGE 27 of 29
-----------------	---	--------------------------

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.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35 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 from intact S/G using ARVs.

IF no intact S/G available and RHR system NOT in service, THEN use faulted S/G.

36 Control Charging Flow To Maintain RCS Subcooling:

- 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% [80% adverse CNMT]
- c. Ruptured S/G narrow range level - STABLE OR DECREASING

- 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. IF ruptured S/G level increasing, THEN decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using Figure MIN SUBCOOLING.

EOP:

ECA-3.3

TITLE:

SGTR WITHOUT PRESSURIZER PRESSURE CONTROL

REV: 27

PAGE 29 of 29

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: 27
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 1 of 1

ECA-3.3 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT RCP START (ATT-15.0)
- 6) ATTACHMENT N2 PORVS (ATT-12.0)
- 7) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 8) ATTACHMENT D/G STOP (ATT-8.1)
- 9) ATTACHMENT SD-1 (ATT-17.0)
- 10) ATTACHMENT SEAL COOLING (ATT-15.2)
- 11) ATTACHMENT SD-2 (ATT-17.1)
- 12) ATTACHMENT RHR COOL (ATT-14.1)
- 13) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 14) FOLDOUT

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

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps 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 TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING

- OR -

- o Check RVLIS indication:

Level (no RCPs) - LESS THAN 77% [82% adverse CNMT]
Fluid Fraction (any RCP running) - LESS THAN 84%

2. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, UNLESS faulted S/G needed for RCS cooldown.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

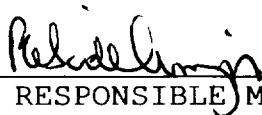
IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 1 of 19
----------------	---------------------------------	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

7-25-2002
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 2 of 19
--------------------	-------------------------------------	-----------------------------

- A. PURPOSE - This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip without a safety injection.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-0, REACTOR TRIP OR SAFETY INJECTION,
when SI is neither actuated nor required.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 3 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF SI ACTUATION OCCURS DURING THIS PROCEDURE, THEN E-0, REACTOR TRIP OR SAFETY INJECTION, SHOULD BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open and monitored periodically. o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.) o Refer to AP(s) that were in effect prior to the reactor trip. 		
* 1	Monitor RCS Tav _g - STABLE AT OR TRENDING TO 547°F	<p><u>IF</u> temperature less than 547°F and decreasing, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Stop dumping steam. b. Ensure S/G blowdown and sample valves closed. c. Ensure reheater steam supply valves are closed. d. <u>IF</u> MDAFW pumps supplying greater than 200 gpm, <u>THEN</u> ensure TDAFW pump steam supply valves in PULL STOP. e. <u>IF</u> cooldown continues, <u>THEN</u> control total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G. <u>WHEN</u> S/G level greater than 5% in one S/G, <u>THEN</u> limit feed flow to that required to maintain S/G level. f. <u>IF</u> cooldown continues below 540°F, <u>THEN</u> close both MSIVs. <p><u>IF</u> temperature greater than 547°F and increasing, <u>THEN</u> dump steam to stabilize and slowly decrease temperature to 547°F.</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 4 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	2 Check S/G Feed Flow Status:	
	a. Check RCS Tavg - LESS THAN 554°F	a. Continue with Step 3. <u>WHEN</u> temperature less than 554°F, <u>THEN</u> do Steps 2b through f.
	b. Verify MFW flow control valves - CLOSED <ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves 	b. Place A and B MFW regulating valve and bypass valve controllers in MANUAL at 0% demand.
	c. Verify total AFW flow - GREATER THAN 200 GPM	c. Manually start both MDAFW pumps. <u>IF</u> total AFW flow greater than 200 gpm can <u>NOT</u> be established, <u>THEN</u> perform the following: <ul style="list-style-type: none"> o Manually start TDAFW pump. <p>-OR-</p> <ul style="list-style-type: none"> o Perform the following: <ul style="list-style-type: none"> 1) Establish MFW on bypass valves. 2) Go to step 3.
	d. Close MFW pump discharge valves <ul style="list-style-type: none"> • MOV-3977, A MFW pump • MOV-3976, B MFW pump 	
	e. Stop MFW pumps and place in PULL STOP	
	f. WHEN both MFP pumps are stopped, THEN place A and B MFW regulating valve and bypass valve controllers in MANUAL at 0% demand.	

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 5 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	3 Monitor S/G Levels:	
	a. Narrow range level - GREATER THAN 5%	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% in at least one S/G.
	b. Control feed flow to maintain narrow range level between 17% and 52%.	b. <u>IF</u> narrow range level in any S/G continues to increase, <u>THEN</u> stop feed to that S/G.
	4 Verify MRPI Indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	<u>IF</u> one or more control rods <u>NOT</u> fully inserted, <u>THEN</u> perform the following:
		a. Place RMW mode selector switch to BORATE.
		b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate.
		c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted).
		d. Place RMW control to start and verify flow. <u>IF</u> flow can <u>NOT</u> be established, <u>THEN</u> refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 6 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 volt bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following as necessary: <ul style="list-style-type: none"> 1) Ensure one CCW pump running. 2) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 3) Reset Bus 13 and Bus 15 lighting breakers. 4) Dispatch AO to locally reset and start adequate air compressors. 5) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 6) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 7) Start HP seal oil backup pump 8) Establish 2 CNMT RECIRC fans in service (205 kw each). 9) Ensure D/G load within limits. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 7 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Verify At Least Two SW Pumps - RUNNING	<p>Manually start SW pumps as necessary.</p> <p><u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p><u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p>
7	Verify IA Available:	<p>Dispatch AO to locally reset and start adequate air compressors.</p> <p><u>IF</u> adequate electric air compressor(s) can <u>NOT</u> be operated, <u>THEN</u> use diesel air compressor. (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)</p> <p><u>IF</u> IA pressure can <u>NOT</u> be maintained, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> Refer to AP-IA.1, LOSS OF INSTRUMENT AIR. Verify charging pump A <u>NOT</u> running and place in PULL STOP. Dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room). <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
	o Adequate air compressor(s) - RUNNING	
	o IA pressure - GREATER THAN 60 PSIG	

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 8 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check PRZR Level Control:	
a.	Verify charging pumps - ANY RUNNING	a. Perform the following: 1) Close letdown isolation. AOV-427. 2) Manually start one charging pump.
b.	PRZR level - GREATER THAN 13%	b. Perform the following: 1) Place letdown isolation AOV-427 switch to close. 2) Verify excess letdown isolation valve AOV-310 closed. 3) Ensure PRZR heaters off. 4) Control charging to restore PRZR level greater than 13%. 5) Continue with Step 9. <u>WHEN</u> PRZR level greater than 13%, <u>THEN</u> do Steps 8c through e.
c.	Verify letdown - IN SERVICE	c. Verify excess letdown in service. <u>IF NOT</u> , <u>THEN</u> manually place letdown in service (Refer to ATT-9.0, ATTACHMENT LETDOWN).
d.	PRZR level - TRENDING TO 35%	d. Control charging and letdown to maintain PRZR level at 35%.
e.	Check PRZR heaters - ENERGIZED o PRZR proportional heaters o PRZR heater backup group	e. Reset PRZR heaters and energize to restore PRZR pressure.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 9 of 19
----------------	---------------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>9 Check PRZR Pressure Control:</p> <p>a. PRZR pressure - GREATER THAN 1750 PSIG</p> <p>b. PRZR pressure - GREATER THAN 2210 PSIG</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify SI actuation. <u>IF NOT</u>, <u>THEN</u> manually actuate SI and CI. 2) Go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1. <p>b. <u>IF</u> pressure less than 2210 PSIG and decreasing, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure PRZR PORVs closed. <ul style="list-style-type: none"> <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. <ul style="list-style-type: none"> • PCV-430, MOV-516 • PCV-431C, MOV-515 2) Ensure normal PRZR spray valves closed. <ul style="list-style-type: none"> • PCV-431A • PCV-431B <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> stop associated RCP(s).</p> 3) Ensure PRZR heaters energized.
	This Step continued on the next page.	

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 10 of 19
----------------	---------------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 9 continued from previous page)	
c.	PRZR pressure - LESS THAN 2260 PSIG	<p>c. <u>IF</u> pressure greater than 2260 psig and increasing, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify demand on PRZR pressure controller 431K greater than 50%. <u>IF NOT</u>, <u>THEN</u> place controller in <u>MANUAL</u> and adjust to restore PRZR pressure to approximately 2235 psig. 2) Ensure PRZR heaters off. 3) Control pressure using normal PRZR spray. <p><u>IF</u> normal PRZR spray <u>NOT</u> available and letdown is in service, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> a) Verify spray line fluid to PRZR ΔT less than 320°F. <u>IF NOT</u>, <u>THEN</u> use one PORV. b) Use auxiliary spray. <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 11 of 19
----------------	---------------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10 Check If TDAFW Pump Can Be Stopped:

- a. Both MDAFW pumps - RUNNING
- b. PULL STOP TDAFW pump steam supply valves
 - MOV-3504A
 - MOV-3505A

a. Go to Step 11.

11 Establish Condenser Steam Dump Pressure Control:

- a. Verify condenser available:
 - o Any MSIV - OPEN
 - o Annunciator G-15, STEAM DUMP ARMED - LIT
- b. Adjust condenser steam dump controller HC-484 to 1005 psig in AUTO
- c. Place steam dump mode selector switch to MANUAL
- d. Verify RCS Tavg - STABLE AT OR TRENDING TO 547°F

a. Perform the following:

- 1) Place S/G ARV controller in AUTO at 1005 psig and verify proper operation. IF S/G ARV NOT controlling in AUTO, THEN control S/G ARV manually.

2) Go to Step 11d.

d. Adjust steam dump to restore Tavg. IF steam dumps not available, THEN use ARVs.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 12 of 19
----------------	---------------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check RCP Status - AT LEAST ONE RUNNING	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Establish conditions for starting an RCP: <ul style="list-style-type: none"> o Verify bus 11A or 11B energized. o Refer to ATT-15.0, ATTACHMENT RCP START. b. Start one RCP. <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 13 of 19
----------------	---------------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Loss of forced air cooling may result in failure of NIS detectors.

13 Check If Source Range
Detectors Should Be Energized:

a. Source range channels -
DEENERGIZED

a. Go to Step 13e.

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 14. WHEN
flux is less than 10⁻¹⁰ amps
on any operable channel, THEN
do Steps 13c, d and e.

c. Check the following:

c. Continue with Step 14. When
either condition met, THEN do
Steps 13d and e.

- o Both intermediate range
channels - LESS THAN
10⁻¹⁰ AMPS

-OR-

- o Greater than 20 minutes since
reactor trip

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 14.

e. Transfer Rk-45 recorder to one
source range and one
intermediate range channel

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 14 of 19
----------------	---------------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	<p>Establish Normal Shutdown Alignment:</p> <ul style="list-style-type: none"> a. Check condenser - AVAILABLE b. Perform the following: <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 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 (Refer to T-5F, STARTING OR STOPPING THE CONDENSATE PUMPS) c. Verify adequate Rx head cooling: <ul style="list-style-type: none"> 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING d. Dispatch AO to perform ATT-17.0, ATTACHMENT SD-1 	<ul style="list-style-type: none"> a. Dispatch AO to perform ATT-17.1, ATTACHMENT SD-2. 1) Manually start one fan as power supply permits (45 kw). 2) Manually start one fan as power supply permits (23 kw).

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

15 Maintain Stable Plant Conditions:

- | | |
|--|---|
| a. PRZR pressure - BETWEEN 1800 PSIG AND 2260 PSIG | a. Control PRZR heaters and spray as necessary. |
| b. PRZR level - BETWEEN 35% AND 40% | b. Control charging as necessary. |
| c. S/G narrow range levels - BETWEEN 17% AND 52% | c. Control S/G feed flow as necessary. |
| d. RCS Tavg - GREATER THAN 540°F | d. Close both MSIVs. |

16 Check VCT Makeup System:

- | | |
|--|--|
| a. Verify the following: | |
| 1) Adjust boric acid flow control valve to 9.5 gpm | |
| 2) Adjust RMW flow control valve to 40 gpm | |
| 3) RMW mode selector switch in AUTO | |
| 4) RMW control armed - RED LIGHT LIT | |
| b. Check VCT level | b. Manually increase VCT makeup flow as follows: |
| o Level - GREATER THAN 20% | 1) Ensure BA transfer pumps and RMW pumps running. |
| -OR- | |
| o Level - STABLE OR INCREASING | 2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow. |

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 16 of 19
----------------	---------------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

17 Check Charging Pump Suction
Aligned To VCT:

a. VCT level - GREATER THAN 20%

a. IF VCT level can NOT be
maintained greater than 5%, THEN
perform the following:

1) Ensure charging pump suction
aligned to RWST

o LCV-112B open

o LCV-112C closed

2) Continue with Step 18. WHEN
VCT level greater than 40%,
THEN do Step 17b.

b. Align charging pumps to VCT

o LCV-112C - OPEN

o LCV-112B - CLOSED

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 17 of 19
--------------------	-------------------------------------	------------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify TDAFW Pump Aligned For AUTO Start:	
a.	Any MDAFW pump - AVAILABLE	a. Verify TDAFW pump operating to maintain required S/G level and go to Step 20.
b.	Verify AMSAC TRIPPED status light - EXTINGUISHED	b. Reset AMSAC.
c.	Verify both S/G levels - GREATER THAN 17%	c. Continue with Step 20. <u>WHEN</u> S/G level greater than 17%, <u>THEN</u> do Steps 18d, e and 19.
d.	Verify Bus 11A and Bus 11B - AT LEAST ONE ENERGIZED	d. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> TDAFW pump <u>NOT</u> required to maintain S/G level, <u>THEN</u> pull stop TDAFW pump steam supply valves: <ul style="list-style-type: none"> • MOV-3504A • MOV-3505A 2) Go to Step 19.
e.	Verify the following: <ul style="list-style-type: none"> 1) TDAFW pump - OFF 2) TDAFW pump steam supply valve switches in AUTO 3) Verify TDAFW flow control valves - OPEN, DEMAND AT 0 <ul style="list-style-type: none"> • AOV-4297 • AOV-4298 	<ul style="list-style-type: none"> 1) Perform the following: <ul style="list-style-type: none"> a) <u>IF</u> TDAFW pump required to maintain S/G level, <u>THEN</u> go to Step 20. b) Stop TDAFW pump. 2) Place TDAFW pump steam supply valve switches in AUTO. 3) Open TDAFW flow control valves.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 18 of 19
----------------	---------------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19 Establish Normal AFW Pump Shutdown Alignment:

a. Verify the following:

- o Both S/G levels - GREATER THAN 17% AND STABLE OR INCREASING
- o Total AFW flow - LESS THAN 200 GPM

b. Close MDAFW pump discharge valves

- MOV-4007
- MOV-4008

c. Place AFW bypass switches to DEF

d. Stop all but one MDAFW pump

e. Open AFW discharge crossover valves

- MOV-4000A
- MOV-4000B

f. Adjust AFW bypass valves to control S/G levels

- AOV-4480
- AOV-4481

a. Continue with Step 20. WHEN conditions met, THEN do Steps 19b through f.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 19 of 19
----------------	---------------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20 Determine If Cooldown Is Required:

a. Consult Plant Staff - COOLDOWN REQUIRED

b. At least one RCP - RUNNING

c. Go to 0-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN

a. Go to 0-3, HOT SHUTDOWN WITH XENON PRESENT.

b. Perform the following:

1) Ensure 2 control rod shroud fans running.

2) Go to ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1.

-END-

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 1 of 1
----------------	---------------------------------	------------------------

ES-O.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT LETDOWN (ATT-9.0)
- 4) ATTACHMENT RCP START (ATT-15.0)
- 5) ATTACHMENT NC (ATT-13.0)
- 6) ATTACHMENT SD-1 (ATT-17.0)
- 7) ATTACHMENT SD-2 (ATT-17.1)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 10) FOLDOUT

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 20 PAGE 1 of 1
----------------	---------------------------------	------------------------

FOLDOUT PAGE

1. SI ACTUATION CRITERIA

IF ANY condition listed below occurs, THEN actuate SI and CI 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 FIG-1.0, FIGURE MIN SUBCOOLING

- OR -

- o PRZR level - LESS THAN 5% [30% adverse CNMT]
AND RCS subcooling based on core exit T/Cs - LESS THAN 20°F USING FIG-1.0, FIGURE MIN SUBCOOLING

- OR -

- o Any automatic SI setpoint is reached

2. AFW SUPPLY SWITCHOVER CRITERION

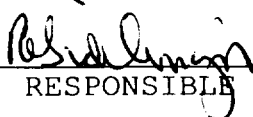
IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 1 of 24
----------------	--------------------------	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

7-25-2002
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 2 of 24
--------------------	------------------------------	-----------------------------

A. PURPOSE - This procedure provides the necessary instructions to terminate safety injection and stabilize plant conditions.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, and E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when specified termination criteria are satisfied.
- b. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, after secondary heat sink has been reestablished and SI has been terminated.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 3 of 24
----------------	--------------------------	-------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)

NOTE: o FOLDOUT page should be open AND monitored periodically.

 o Critical Safety Function Status Trees should be monitored (Refer to Appendix I for Red Path Summary).

 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 Reset SI

2 Reset CI:

a. Depress CI reset pushbutton

b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED

b. Perform the following:

1) Reset SI.

2) Depress CI reset pushbutton.

3 Maintain PRZR Pressure Between 1800 PSIG And 2235 PSIG

o Reset PRZR heaters

o Use normal PRZR spray

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 4 of 24
----------------	--------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>4 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:</p> <p>1) Ensure SW isolation.</p> <p>2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1).</p> <p>3) <u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>4) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>5) Go to Step 7.</p>

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 5 of 24
----------------	--------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED 	a. Perform the following: <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	b. Manually align valves.
c.	Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	d. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 6. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 5e and f.
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6 Check If Charging Flow Has Been Established:

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 key to RWST gate to close seal injection needle valve(s) to affected RCP:

- RCP A, V-300A
- RCP B, V-300B

- 2) Ensure HCV-142 open, demand at 0%.

b. Charging pump suction aligned to RWST:

b. Manually align valves as necessary.

- o LCV-112B - OPEN
- o LCV-112C - CLOSED

IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).

IF LCV-112C can NOT be closed, THEN perform the following:

- 1) Verify charging pump A NOT running and place in PULL STOP.
- 2) 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 restore PRZR level

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 7 of 24
----------------	--------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>7 Stop SI And RHR Pumps And Place In AUTO</p> <p>* 8 Monitor SI Reinitiation Criteria:</p> <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 5% [30% adverse CNMT]</p>	<p>a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p> <p>b. Control charging flow to maintain PRZR level.</p> <p>IF PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p>

EOP:

ES-1.1

TITLE:

SI TERMINATION

REV: 22

PAGE 8 of 24

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

*** 9 Monitor If CNMT Spray Should Be Stopped:**

- a. CNMT spray pumps - RUNNING
- b. Check CNMT pressure - LESS THAN 4 PSIG
- c. Reset CNMT spray
- d. Check NaOH tank outlet valves - CLOSED
 - AOV-836A
 - AOV-836B
- e. Stop CNMT spray pumps and place in AUTO
- f. Close CNMT spray pump discharge valves
 - MOV-860A
 - MOV-860B
 - MOV-860C
 - MOV-860D

- a. Go to Step 10.
- b. Continue with Step 10. WHEN CNMT pressure less than 4 psig, THEN do Steps 9c through f.
- d. Place NaOH tank outlet valve controllers to MANUAL and close valves.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 9 of 24
----------------	--------------------------	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Verify MRPI Indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM	<p><u>IF</u> one or more control rods <u>NOT</u> fully inserted, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Place RMW mode selector switch to BORATE. b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate. c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted). d. Place RMW control to start and verify flow. <u>IF</u> flow can <u>NOT</u> be established, <u>THEN</u> refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.
11	Establish Condenser Steam Dump Pressure Control:	
	<ul style="list-style-type: none"> a. Verify condenser available: <ul style="list-style-type: none"> o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO. c. Place steam dump mode selector switch to MANUAL. 	<ul style="list-style-type: none"> a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 12.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 10 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following: 1) <u>IF NO</u> SW pumps running, <u>THEN</u> refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER. 3) Go to Step 18.
b.	Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
c.	Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Manually start an additional SW pump as power supply permits (257 kw each).

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13 Check If Normal CVCS
Operation Can Be Established

a. Verify IA restored:

- o IA to CNMT (AOV-5392) - OPEN
- o IA pressure - GREATER THAN 60 PSIG

b. Verify instrument bus D -
ENERGIZED

c. CCW pumps - ANY RUNNING

d. Charging pump - ANY RUNNING

a. Continue with Step 18. WHEN IA can be restored, THEN do Steps 13 through 17.

b. Energize MCC B. IF MCC B NOT available, THEN perform the following:

- 1) Verify MCC A energized.
- 2) Place instrument bus D on maintenance supply.

c. Perform the following:

- 1) IF any RCP #1 seal outlet temperature offscale high, THEN isolate CCW to thermal barrier of affected RCP(s).

- RCP A, MOV-749A and MOV-759A
- RCP B, MOV-749B and MOV-759B

- 2) Manually start one CCW pump.

d. Continue with Step 18. WHEN any charging pump running, THEN do Steps 14 through 17.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14 Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]		Continue with Step 16. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 15.
15 Establish Normal Letdown:		<u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:
a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM		o Place excess letdown divert valve, AOV-312, to NORMAL.
b. Place the following switches to CLOSE:		o Ensure CCW from excess letdown open, (AOV-745).
• Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)		o Open excess letdown isolation valve AOV-310.
• AOV-371, letdown isolation valve		o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.
• AOV-427, loop B cold leg to REGEN Hx		o Adjust charging pump speed as necessary.
c. Place letdown controllers in MANUAL at 40% open		<u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult Plant Staff to determine if excess letdown should be placed in service.
• TCV-130		
• PCV-135		
d. Reset both trains of XY relays for AOV-371 and AOV-427		
e. Open AOV-371 and AOV-427		
f. Open letdown orifice valves as necessary		
g. Place TCV-130 in AUTO at 105°F		
h. Place PCV-135 in AUTO at 250 psig		
i. Adjust charging pump speed and HCV-142 as necessary to control PRZR level		

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 13 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	<p>Check VCT Makeup System:</p> <ul style="list-style-type: none"> a. Adjust boric acid flow control valve in AUTO to 9.5 gpm b. Adjust RMW flow control valve in AUTO to 40 gpm c. Verify the following: <ul style="list-style-type: none"> 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT d. Check VCT level: <ul style="list-style-type: none"> o Level - GREATER THAN 20% -OR- o Level - STABLE OR INCREASING 	<ul style="list-style-type: none"> c. Adjust controls as necessary. d. Manually increase VCT makeup flow as follows: <ul style="list-style-type: none"> 1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u>, <u>THEN</u> dispatch AO to locally reset MCC C and MCC D UV lockouts as necessary. 2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow. 3) Increase boric acid flow as necessary.

EOP:

ES-1.1

TITLE:

SI TERMINATION

REV: 22

PAGE 14 of 24

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

17 Check Charging Pump Suction
Aligned To VCT:

a. VCT level - GREATER THAN 20%

a. IF VCT level can NOT be
maintained greater than 5%. THEN
perform the following:

1) Ensure charging pump suction
aligned to RWST

o LCV-112B open

o LCV-112C closed

2) Continue with Step 18. WHEN
VCT level greater than 40%.
THEN do Step 17b.

b. Verify charging pumps aligned to
VCT

b. Manually align valves as
necessary.

o LCV-112C - OPEN

o LCV-112B - CLOSED

18 Check RCS Hot Leg
Temperatures - STABLE

Control steam dump and total feed
flow as necessary to stabilize RCS
temperature.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 15 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> o WHEN using a PRZR PORV, THEN select one with an operable block valve.</p> <p>o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p>	
19	Control PRZR Heaters And Operate Normal Spray To Stabilize RCS Pressure	<p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> perform the following:</p> <p>a. Verify Regen Hx Chg outlet temp to PRZR Vapor temp ΔT less than 320°F. <u>IF NOT</u>, <u>THEN</u> control pressure using one PRZR PORV and go to Step 20.</p> <p>b. Control pressure using auxiliary spray.</p> <p><u>IF</u> auxiliary spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p>
	<p><u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA. </p>	
*20	Monitor Intact S/G Levels:	
	<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 any S/G continues to increase, <u>THEN</u> stop feed flow to that S/G.</p>

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 16 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> SW should be aligned to CCW Hxs before restoring RCP seal cooling.</p>	
21	Check RCP Cooling:	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
	a. Check CCW to RCPs:	
	o Annunciator A-7. RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15. RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	b. Check RCP seal injection:	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 17 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 23.
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 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 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 23.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Verify All AC Busses -
ENERGIZED BY OFFSITE POWER

- o Normal feed breakers to all 480 volt busses - CLOSED
- o 480 volt 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) Reset Bus 13 and Bus 15 lighting breakers.
 - 3) Dispatch A0 to locally reset and start two IA compressors.
 - 4) Place the following pumps in PULL STOP:
 - EH pumps
 - Turning gear oil pump
 - HP seal oil backup pump
 - 5) Restore power to MCCs.
 - A from Bus 13
 - B from Bus 15
 - E from Bus 15
 - F from Bus 15
 - 6) Start HP seal oil backup pump.
 - 7) Start CNMT RECIRC fans as necessary.
 - 8) Ensure D/G load within limits.
 - 9) 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).

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 19 of 24
----------------	--------------------------	--------------------------

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>	
24	Check If Source Range Channels Should Be Energized:	
a.	Source range channels - DEENERGIZED	a. Go to Step 24e.
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 25. <u>WHEN</u> flux is LESS THAN 10^{-10} amps on any operable channel, <u>THEN</u> do Steps 24c, d and 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 25. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 24d 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 25.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 20 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	<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).

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 21 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>	
26	Check RCP Status - AT LEAST ONE RUNNING	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following: <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% (82% adverse CNMT). o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water. b. Establish conditions for starting an RCP: <ul style="list-style-type: none"> o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. c. Start one RCP. <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam from intact S/Gs.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27 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) Verify at least one control rod shroud fan - RUNNING
- 2) Verify one Rx compartment cooling fan - RUNNING

1) Manually start one fan as power supply permits (45 kw)

2) Perform the following:

- o Dispatch AO to reset UV relays at MCC C and MCC D.
- o Manually start one fan as power supply permits (23 kw)

d. Verify Attachment SD-1 - COMPLETE

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 23 of 24
----------------	--------------------------	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	Maintain Plant Conditions Stable:	
	a. RCS pressure - BETWEEN 1800 PSIG AND 2235 PSIG	a. Control PRZR heaters and spray as necessary.
	b. PRZR level - BETWEEN 35% AND 40%	b. Control charging as necessary.
	c. Intact S/G narrow range levels - BETWEEN 17% AND 52%	c. Control S/G feed flow as necessary.
	d. RCS cold leg temperature - STABLE	d. Control dumping steam as necessary. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.
*29	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 24 of 24
----------------	--------------------------	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30 Implement Plant Recovery
Procedures:

- a. Review plant systems for
realignment to normal conditions
(Refer to ATT-26.0, ATTACHMENT
RETURN TO NORMAL OPERATIONS)
- b. Go to O-2.1, NORMAL SHUTDOWN TO
HOT SHUTDOWN

-END-

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 1 of 1
----------------	--------------------------	------------------------

ES-1.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 4) ATTACHMENT D/G STOP (ATT-8.1)
- 5) ATTACHMENT NC (ATT-13.0)
- 6) ATTACHMENT SEAL COOLING (ATT-15.2)
- 7) ATTACHMENT RCP START (ATT-15.0)
- 8) ATTACHMENT SD-1 (ATT-17.0)
- 9) ATTACHMENT SD-2 (ATT-17.1)
- 10) ATTACHMENT SI/UV (ATT-8.4)
- 11) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 12) ATTACHMENT RETURN TO NORMAL OPERATIONS (ATT-26.0)
- 13) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 14) FOLDOUT

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 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 52% [55%
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

FOP: ES-1.1	TITLE: SI TERMINATION	REV: 22 PAGE 1 of 1
--------------------	------------------------------	----------------------------

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- 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. 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. AFW SUPPLY SWITCHOVER CRITERION


IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 1 of 26
----------------	---	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

7-25-2002
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 2 of 26
--------------------	---	-----------------------------

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.

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 3 of 26
----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
------	--------------------------	-----------------------

CAUTION

- o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, STEP 1.
- o 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.
- o RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN 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:
 - 1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]
 - 2) Pressure - STABLE OR INCREASING
- a. Go to Step 2.
- b. Stop RHR pumps and place AUTO

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 4 of 26
----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> 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 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 7) 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:

- b. IF LCV-112B can NOT be opened, THEN dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).

- o LCV-112B - OPEN
- o LCV-112C - CLOSED

IF LCV-112C can NOT be closed, THEN perform the following:

- 1) Verify charging pump A NOT running and place in PULL STOP.

- 2) 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
- b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO
- c. Place steam dump mode selector switch to MANUAL

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

NOTE: TDAFW pump flow control AOVs may drift open on loss of IA. |

* 5 Monitor Intact S/G Levels:

- a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]
- b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

- 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. 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.

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 7 of 26
----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).</p>		
6	<p>Initiate RCS Cooldown To Cold Shutdown:</p> <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(s) 	<ul style="list-style-type: none"> c. Manually or locally dump steam using intact S/Gs ARV.
7	<p>Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p>	<p>Manually start SI pumps as necessary and go to Step 19.</p>
8	<p>Check SI and RHR Pump Status:</p> <ul style="list-style-type: none"> o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE 	<p>Go to Step 15.</p>
9	<p>Place PRZR Heater Switches In The Following Positions:</p> <ul style="list-style-type: none"> o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF 	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 9 of 26
----------------	---	-------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>		
11	<p>Check If An RCP Should Be Started:</p> <p>a. Both RCPs - STOPPED</p> <p>b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>c. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>d. Try to start an RCP</p> <p>1) Establish conditions for starting an RCP</p> <p>o Bus 11A or 11B energized</p> <p>o Refer to Attachment RCP START</p> <p>2) Start one RCP</p>	<p>a. Stop all but one RCP and go to Step 12.</p> <p>b. Go to Step 19.</p> <p>c. Return to Step 10.</p> <p>d. Ensure at least one control rod shroud fan running (45 kw each).</p>

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 10 of 26
----------------	---	--------------------------

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	<p>b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19.</p> <p><u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 12c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 19.</p>
c.	Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 10.
d.	Stop one SI pump	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 11 of 26
----------------	---	--------------------------

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 320°F [310°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 320°F
[310°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 started 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

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 12 of 26
----------------	---	--------------------------

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 320°F [310°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 320°F [310°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 started 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

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 13 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	<p>Check If Charging Flow Should Be Controlled To Maintain PRZR Level:</p> <p>a. Check RHR pumps - RUNNING IN INJECTION MODE</p> <p>b. Go to Step 19</p>	<p>a. Start charging pump and control charging flow to maintain PRZR level and go to Step 16.</p>

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 14 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>		
16	Check RCP Status:	
a.	RCPs - AT LEAST ONE RUNNING	<p>a. Perform the following:</p> <p>1) Try to start one RCP:</p> <p>a) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT]. o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water. <p>b) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> o Verify Bus 11A or 11B energized. o Refer to Attachment RCP START. <p>c) Start one RCP.</p> <p>2) <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>
b.	Stop all but one RCP	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>		
VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.		

<u>NOTE:</u>	<ul style="list-style-type: none"> 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. <u>IF</u> normal spray <u>NOT</u> available. <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS. <u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).
b.	Energize PRZR heaters as necessary	
c.	Depressurize RCS until EITHER of the following conditions satisfied: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING 	
-OR-		
	<ul style="list-style-type: none"> o PRZR level - GREATER THAN 75% [65% adverse CNMT] 	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 16 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate Shutdown Margin	
	a. Direct RP 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 start SI pumps as necessary and go to Step 20.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually start SI pumps as necessary and return to Step 10.

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 17 of 26
----------------	---	--------------------------

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. <u>IF</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> go to Step 20c. <u>IF NOT</u> , <u>THEN</u> 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 <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C 	
d.	Close SI ACCUM discharge valves <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 	d. Vent any unisolated ACCUMs: <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945.
e.	Locally reopen breakers for MOV-841 and MOV-865	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 18 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<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).

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

22 Verify Adequate SW Flow To
CCW Hx:

a. Verify at least two SW pumps -
RUNNING

a. Manually start pumps as power
supply permits (257 kw per
pump). IF less than two SW
pumps can be operated, THEN
perform the following:

1) IF NO SW pumps running, THEN
refer to ATT-2.4, ATTACHMENT
NO SW PUMPS.

2) IF only one SW pump running,
THEN refer to AP-SW.2, LOSS
OF SERVICE WATER.

3) Go to Step 23.

b. Verify AUX BLDG SW isolation
valves - OPEN

b. Manually align valves.

- MOV-4615 and MOV-4734
- MOV-4616 and MOV-4735

This Step continued on the next page.

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 20 of 26
----------------	---	--------------------------

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 22 continued from previous page)

c. Verify CNMT RECIRC fan
annunciator C-2, HIGH
TEMPERATURE ALARM - EXTINGUISHED

c. Perform the following:

1) Determine required SW flow to
CCW HXs per table:

SW DISCHARGE ALIGNMENT	CCW HXs IN SERVICE	REQUIRED SW FLOW
Normal	2	Total of 5000 - 6000 gpm equally divided to both HXs
Normal	1	5000 - 6000 gpm to in-service HX
Alternate	2	30-33" d/p across each HX
Alternate	1	95-100" d/p across in-service HX

2) Direct AO to adjust SW flow
to required value.

o IF on normal SW discharge:

- V-4619, CCW Hx A
- V-4620, CCW Hx B

-OR-

o IF on alternate SW
discharge:

- V-4619C, CCW Hx A
- V-4620B, CCW Hx B

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 21 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
a.	Check CCW to RCPs	
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
b.	Check RCP seal injection	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 22 of 26
----------------	---	--------------------------

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 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down. <u>THEN</u> close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 25.
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 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:

c. Continue with Step 26. WHEN either condition met, THEN do Steps 25d and e.

o Both intermediate range channels - LESS THAN
10⁻¹⁰ AMPS

-OR-

o Greater than 20 minutes since reactor trip

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) Verify at least one control rod shroud fan - RUNNING
- 2) Verify one Rx compartment cooling fan - RUNNING

1) Manually start one fan as power supply permits (45 kw)

2) Perform the following:

- o Dispatch AO to reset UV relays at MCC C and MCC D.
- o Manually start one fan as power supply permits (23 kw)

d. Verify Attachment SD-1 - COMPLETE

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 25 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*27 Monitor RCP Operation:		
a. RCPs - ANY RUNNING		a. Go to Step 28.
b. Check the following:		b. Stop affected RCP(s).
o RCP #1 seal D/P - GREATER THAN 220 PSID		
o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF		
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. Go to Step 30.
b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]		b. Go to Step 30.
c. Place RCS overpressure protection system in service (Refer to 0-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)		
d. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL		

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 26 of 26
----------------	---	--------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> This procedure should be continued while obtaining CNMT hydrogen sample in Step 30.</p>	
30	Check CNMT Hydrogen Concentration:	
	<ul style="list-style-type: none"> a. Direct RP to start CNMT hydrogen monitors as necessary b. Hydrogen concentration - LESS THAN 0.5% 	<ul style="list-style-type: none"> 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:	
	<ul style="list-style-type: none"> a. Maintain cold shutdown conditions b. Consult TSC 	
	-END-	

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 1 of 1
----------------	---	------------------------

ES-1.2 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT SEAL COOLING (ATT-15.2)
- 6) ATTACHMENT RCP START (ATT-15.0)
- 7) ATTACHMENT NC (ATT-13.0)
- 8) ATTACHMENT D/G STOP (ATT-8.1)
- 9) ATTACHMENT SD-1 (ATT-17.0)
- 10) ATTACHMENT SD-2 (ATT-17.1)
- 11) ATTACHMENT SI/UV (ATT-8.4)
- 12) ATTACHMENT N2 PORVS (ATT-12.0)
- 13) ATTACHMENT RHR COOL (ATT-14.1)
- 14) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 15) FOLDOUT

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 24 PAGE 1 of 1
----------------	---	------------------------

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start 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 manually start SI Pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.