



Indian Point Energy Center
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R Walpole
Manager, Licensing

October 3, 2008

Re: Indian Point Units 2
Docket Nos. 50-247

NL-08-154

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

**SUBJECT: Supplement to Reply to Request for Additional Information
Regarding Indian Point Unit 2 Proposed Changes to Technical
Specifications Regarding Diesel Generator Endurance Test
Surveillance (TAC NO.MD9214)**

References: 1. Entergy letter NL-08-139 dated September 29, 2008 regarding
"Reply to Request for Additional Information Regarding Indian Point
Unit 2 Proposed Changes to Technical Specifications Regarding
Diesel Generator Endurance Test Surveillance (TAC NO.MD9214)"

Dear Sir or Madam:

Entergy Nuclear Operations, Inc (Entergy) provided additional information in Reference 1 regarding proposed changes to Indian Point 2 Technical Specifications regarding Diesel Generator endurance test surveillance. The procedures in Enclosure 1 were not the correct version of the procedures that Entergy intended to send. Please replace the Enclosure 1 to Reference 1 with the attached Enclosure 1 to correct this error.

There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. R. Walpole, Manager, Licensing at (914) 734-6710.

Sincerely,

R. Walpole
Manager, Licensing
Indian Point Energy

cc (next page)

ADD1
ADD2
NSIR

Enclosure: 1. Copy of Emergency Operating Procedures (EOP) referenced in
Load Studies Provided in Response to Question 8 in NL-08-139

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR
Mr. Samuel J. Collins, Regional Administrator, NRC Region I
NRC Senior Resident Inspectors Office
Mr. Paul Eddy, New York State Dept. of Public Service

Enclosure 1 TO NL-08-154

Copy of Emergency Operating Procedures (EOP)

Referenced in Load Studies

Provided in Response to Question 8 in NL-08-139

List of Procedures included in Enclosure 1

EOP Number	EOP Title	Revision No.
2-E-0	Reactor Trip or Safety Injection	0
2-ES-0.0	Rediagnosis	0
2-ES-0.1	Reactor Trip Response	1
2-ES-0.2	Natural Circulation Cooldown	0
2-ES-0.3	Natural Circulation Cooldown with Steam Void in Vessel (with RVLIS)	0
2-ES-0.4	Natural Circulation Cooldown with Steam Void in Vessel (without RVLIS)	0
2-E-1	Loss of Reactor or Secondary Coolant	0
2-ES-1.1	SI Termination	1
2-ES-1.2	Post LOCA Cooldown and Depressurization	0
2-ES-1.3	Transfer to Cold Leg Recirculation	1
2-ES-1.4	Transfer to Hot Leg Recirculation	1
2-E-2	Faulted Steam Generator Isolation	0
2-E-3	Steam Generator Tube Rupture	0
2-ES-3.1	Post SGTR Cooldown Using Backfill	0
2-ES-3.2	Post SGTR Cooldown Using Blowdown	0
2-ES-3.3	Post SGTR Cooldown Using Steam Dump	0
2-ECA-0.0	Loss of all AC Power	2
2-ECA-0.1	Loss of all AC Power Recovery without SI Required	0
2-ECA-0.2	Loss of all AC Power Recovery with SI Required	0
2-ECA-1.1	Loss of Emergency Coolant Recirculation	0



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-E-0, Revision: 0

REACTOR TRIP OR SAFETY INJECTION

2

Approved By:

M. J. Mull

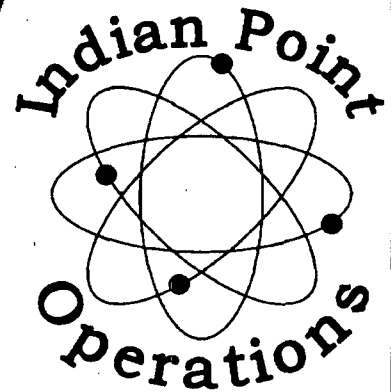
Procedure Sponsor, RPO/ Designer

5/3/2007

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

A. PURPOSE

This procedure provides actions to verify proper response of the automatic protection systems following manual or automatic actuation of a reactor trip or safety injection, to assess plant conditions, and to identify the appropriate recovery procedure.

B. SYMPTOMS AND ENTRY CONDITIONS

1) The following are symptoms that require a reactor trip, if one has not occurred:

<u>REACTOR TRIP</u>	<u>LOGIC</u>	<u>SETPOINT</u>
Overtemperature ΔT	(2/4)	Variable
Overpower ΔT	(2/4)	Variable
High pressurizer pressure	(2/3)	2362 psig
Low pressurizer pressure	(2/4, P-7)	1930 psig
High pressurizer level	(2/3, P-7)	89%
Low flow or RCP breaker open	(2/4, P-7) (1/4, P-8)	N/A
RCP bus undervoltage	(2/4, P-7)	75%
RCP bus underfrequency/RCP bkr open	(2/4, P-7) (1/4, P-8)	57.5 hz
Source range high flux	(1/2, P-10 and P-6)	2.3E5 CPS
Intermediate range high flux	(1/2, P-10)	3.8E-5 amps
Power range high flux low level trip	(2/4, P-10)	25%
Power range high flux high level trip	(2/4)	108%
Low SG level	(1/8)	9%
<u>and</u> low feedwater flow (mismatch of)		1.15 E6 lbs/hr
Low low steam generator level	(2/3)	9%
Low RCS temperature	(2/3)	385°F
Turbine trip signal	(P-7, P-8)	N/A

2) The following are symptoms of a reactor trip:

- o Reactor first out annunciator alarm.
- o Turbine first out annunciator alarm.
- o Rapid decrease in neutron level indicated by nuclear instrumentation.
- o All shutdown and control rods are fully inserted.
- o Rod bottom lights are lit.
- o Rapid decrease in SG level.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

- 3) The following are symptoms that require a reactor trip and safety injection, if one has not occurred:

<u>REACTOR TRIP AND SAFETY INJECTION</u>	<u>LOGIC</u>	<u>SETPoint</u>
Low pressurizer pressure	(2/3)	1840 psig
High steamline ΔP	(1/4)	155 psid
(less than two other loops)		
High steamline flow	(2/4)	1.3 E6 lbs/hr
<u>and</u> TAVE	(2/4)	542°F
<u>or</u> low steamline pressure	(2/4)	570 psig
High containment pressure	(2/3)	2 psig
High High containment pressure	(2/2) of (2/3)	24 psig

- 4) The following are symptoms of a reactor trip and safety injection:

- o Reactor first out annunciator alarm.
- o SI first out annunciator alarm.
- o FW isolation.
- o Safeguards equipment sequence signal start.
- o Phase A isolation.
- o Steamline isolation.

- 5) This procedure should also be entered anytime a manual reactor trip or safety injection is actuated.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>Steps 1 through 4 are IMMEDIATE ACTION steps.</p>		
1.	<p><u>Verify Reactor Trip:</u></p> <ul style="list-style-type: none"> o Reactor trip breakers - OPEN o Neutron flux - DECREASING o Rod bottom lights - LIT o Rod position indicators - ALL RODS LESS THAN 7.5 INCHES 	<p>Manually trip reactor.</p> <p><u>IF</u> reactor will <u>NOT</u> trip, <u>THEN</u> go to 2-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, Step 1.</p>
2.	<p><u>Verify Turbine Trip:</u></p> <ul style="list-style-type: none"> a. All turbine stop valves - CLOSED 	<p>a. Manually trip turbine. <u>IF</u> turbine will <u>NOT</u> trip, <u>THEN</u> close MSIVs.</p> <p><u>IF</u> MSIVs can <u>NOT</u> be closed, <u>THEN</u> manually run back turbine.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<u>Verify Power To 480V Busses:</u>	
	a. 480V busses - AT LEAST ONE ENERGIZED:	a. Go to 2-ECA-0.0, LOSS OF ALL AC POWER, Step 1.
	o 2A AND 3A	
	- OR -	
	o 5A	
	- OR -	
	o 6A	
	b. 480V busses - ALL ENERGIZED	b. Continue with Step 4. <u>WHEN</u> time permits, <u>THEN</u> try to restore power to deenergized 480V busses per:
		o 2-AOP-480V-1, LOSS OF NORMAL POWER TO ANY 480V BUS
		- OR -
		o 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION.	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<p><u>Check SI Status:</u></p> <p>a. Check if SI is actuated:</p> <ul style="list-style-type: none"> o SI annunciator - LIT - OR - o SI system pumps - RUNNING 	<p>a. Check if SI is required:</p> <ul style="list-style-type: none"> o Containment pressure greater than 2 psig - OR - o PRZR pressure less than 1840 psig - OR - o PRZR level less than 14% - OR - o Steamline ΔP greater than 155 psid - OR - o High steamline flow with either TAVE less than 542°F OR steamline pressure less than 570 psig <p><u>IF</u> SI is required, <u>THEN</u> manually actuate.</p> <p><u>IF</u> SI is <u>NOT</u> required, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify AFW pump(s) running as necessary to establish total feed flow greater than 760 gpm. 2) Maintain total feed flow greater than 760 gpm. 3) GO To 2-ES-0.1, REACTOR TRIP RESPONSE, Step 1.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-0

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Both trains of SI - ACTUATED:	<p>b. <u>IF</u> one train is actuated <u>AND</u> safeguards pumps are running. <u>THEN</u> go to Step 5.</p> <p><u>IF</u> NEITHER train is actuated, <u>THEN</u> manually actuate both trains of SI <u>AND</u> verify manual relay(s):</p> <ul style="list-style-type: none"> o Train A master relay SIM-1 (above rack E) o Train B master relay SIM-2 (above rack F)
5.	<u>Perform ATTACHMENT 1 While Continuing With This Procedure</u>	
6.	<u>Verify AFW Pumps Running:</u>	
	<p>a. Motor-driven pumps - RUNNING</p> <p>b. Turbine-driven pump - RUNNING IF NECESSARY</p>	<p>a. Manually start pumps.</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> 1) Manually open steam supply regulator valve: <ul style="list-style-type: none"> o PCV-1139 2) Open turbine-driven AFW pump FCVs as necessary. 3) Adjust turbine speed control valve as necessary: <ul style="list-style-type: none"> o HCV-1118

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Verify Total AFW Flow - GREATER THAN 400 GPM</u>	<p><u>IF</u> SG narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in any SG, <u>THEN</u> control feed flow to maintain narrow range level.</p> <p><u>IF</u> narrow range level less than 10% (27% for ADVERSE CONTAINMENT) in all SGs, <u>THEN</u> perform the following:</p> <p>a. Manually start pumps <u>AND</u> align valves as necessary.</p> <p>b. <u>IF</u> AFW flow greater than 400 gpm can <u>NOT</u> be established, <u>THEN</u> go to 2-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>RCS pressure should be monitored. <u>IF</u> RCS pressure decreases in an uncontrolled manner to less than 320 psig (340 psig FOR ADVERSE CONTAINMENT), any RHR pump placed in PULLOUT must be manually restarted to supply water to the RCS. This pump should <u>ONLY</u> be restarted when the running RHR pump has loop flow indicated.</p> <p>*****</p>		
8.	<u>Verify SI System Flow:</u>	
	a. RCS pressure - LESS THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)	a. Place one RHR pump in PULLOUT. Go to Step 9.
	b. SI pump flow - FLOW INDICATED	b. Manually start pumps and align valves.
	c. RCS pressure - LESS THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)	c. Place one RHR pump in PULLOUT. Go to Step 9.
	d. RHR pump flow - FLOW INDICATED	d. PERFORM the following:
		1) <u>IF</u> NO RHR pumps are running, <u>THEN</u> align valves and manually start ONE pump.
		a) <u>IF</u> RHR loop flow is indicated, <u>THEN</u> start second RHR pump.
		2) <u>IF</u> BOTH RHR pumps are running <u>AND</u> NO RHR lop flow is indicated, <u>THEN</u> place ONE RHR pump in PULLOUT.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 3 provides a list of 480V equipment load ratings.</p>		
9.	<p><u>Check RCP Seal Cooling:</u></p> <p>a. Three CCW pumps - RUNNING</p>	<p>a. Manually start CCW pumps on busses supplied by offsite power.</p> <p><u>IF</u> NO CCW pumps can be started, <u>THEN</u> refer to 2-SOP-4.1.2 COMPONENT COOLING SYSTEM OPERATION to establish backup cooling to:</p> <ul style="list-style-type: none"> o Charging pumps o RHR pumps o SI pumps
<p>This Step continued on the next page.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. CCW flow to RCP thermal barriers - NORMAL:</p> <ul style="list-style-type: none"> o RCP Thermal Barrier CCW alarms - CLEARED <p>c. Check service water system - ALIGNED FOR THREE HEADER OPERATION</p> <p>d. Locally verify following valves in zurn strainer pit - CLOSED:</p> <ul style="list-style-type: none"> o SWN-4 o SWN-5 <p>e. Start one service water pump on NON-essential header on bus supplied by offsite power in preferred order:</p> <ul style="list-style-type: none"> o 22, 23, 21 if 1-2-3 header NON-essential <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o 25, 26, 24 if 4-5-6 header NON-essential 	<p>b. <u>IF</u> CCW to RCPs is lost, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Stop all RCPs. 2) <u>IF</u> NO charging pump running, <u>THEN</u>: <ul style="list-style-type: none"> a) Verify adequate power available to run one charging pump. If necessary, shed sufficient non-essential loads. b) Start one charging pump in MANUAL at maximum speed for pump cooling. <p>c. Locally close the following valves:</p> <ul style="list-style-type: none"> o Service water valve pit: <ul style="list-style-type: none"> o FCV-1111 o FCV-1112 o SWN-6 o SWN-7 <p><u>WHEN</u> valves are closed, <u>THEN</u> do Steps 9d and 9e.</p> <p>Go to Step 10. OBSERVE CAUTION PRIOR TO STEP 10.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* <u>IF</u> adverse containment conditions exist, use wide range cold leg temperatures to determine RCS temperature. *</p> <p>*****</p>	
*10.	<p><u>Check RCS Temperatures:</u></p> <p>o RCS AVERAGE TEMPERATURE STABLE AT OR TRENDING TO 547°F IF ANY RCP RUNNING</p> <p style="text-align: center;">- OR -</p> <p>o RCS COLD LEG TEMPERATURES STABLE AT OR TRENDING TO 547°F IF NO RCP RUNNING</p>	<p><u>IF</u> temperature less than 547°F and decreasing, <u>THEN</u>:</p> <p>a. Stop dumping steam.</p> <p>b. <u>IF</u> cooldown continues, <u>THEN</u> control feed flow. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>c. <u>IF</u> cooldown continues, <u>THEN</u> close MSIVs. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> locally close MSIVs per 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS.</p> <p><u>IF</u> temperature greater than 547°F and increasing, <u>THEN</u>:</p> <p>o Dump steam to condenser.</p> <p style="text-align: center;">- OR -</p> <p>o Dump steam using SG atmospheric steam dumps.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Check PRZR PORVs And Spray Valves:</u>	
	a. PORVs - CLOSED	<p>a. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs.</p> <p><u>IF</u> any PORV can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. <u>IF</u> block valve can <u>NOT</u> be closed, <u>THEN</u> go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p>
	b. Normal PRZR spray valves - CLOSED	<p>b. <u>IF</u> PRZR pressure less than 2210 psig, <u>THEN</u> manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> stop ANY RCP(s) required to stop spray flow.</p>
	c. Auxiliary spray valve - CLOSED	<p>c. Manually close auxiliary spray valve.</p> <p><u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally energize <u>AND</u> close charging line isolation valves:</p> <p>o MOV-205 (At MCC 26AA)</p> <p>- OR -</p> <p>o MOV-226 (At MCC 26BB) <u>AND</u> MOV-227 (At MCC 26AA)</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	<u>Check If RCPs Should Be Stopped:</u>	
	a. SI pumps - AT LEAST ONE RUNNING	a. Go to Step 13.
	b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)	b. Go to Step 13.
	c. Stop all RCPs	
13.	<u>Check If Any SG Is Faulted:</u>	
	a. Check pressures in all SGs:	a. Go to Step 14.
	o ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER	
	- OR -	
	o ANY SG COMPLETELY DEPRESSURIZED	
	b. Go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1	
14.	<u>Check If SG Tubes Are Intact:</u>	Go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	o Main steamline radiation recorder (R-28, R-29, R-30, and R-31) - NORMAL	
	o Condenser air ejector radiation recorder (R-45) - NORMAL	
	o SG blowdown radiation recorder (R-49) - NORMAL	
	o NO SG LEVEL INCREASING IN AN UNCONTROLLED MANNER	

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- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Check If RCS Is Intact:</u> <ul style="list-style-type: none"> o Containment sump level - NORMAL o Recirculation sump level - NORMAL o Reactor cavity sump level - NORMAL o Containment pressure - NORMAL o Gaseous particulate radiation recorder (R-41, R-42) - NORMAL o Containment radiation (R-25, R-26) - NORMAL o Containment area radiation - NORMAL: <ul style="list-style-type: none"> o Area Monitor High Radiation alarm - CLEARED - OR - o Containment area radiation (R-2, R-7) - NORMAL 	Go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

FOLDOUT PAGE FOR 2-E-0

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IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>Check If SI Flow Should Be Terminated:</u> a. RCS subcooling based on core exit TCs - GREATER THAN 19°F b. Secondary heat sink: o Total feed flow to SGs - GREATER THAN 400 GPM - OR - o Narrow range level in at least one SG - GREATER THAN 10% c. RCS pressure: o Pressure - GREATER THAN 1660 PSIG o Pressure - STABLE OR INCREASING d. PRZR level - GREATER THAN 14% e. Go to 2-ES-1.1, SI TERMINATION, Step 1	a. Go to Step 17. b. <u>IF</u> neither condition satisfied, <u>THEN</u> go to Step 17. c. Go to Step 17. d. Try to stabilize RCS pressure with normal PRZR spray. Go to Step 17.
17.	<u>Check ATTACHMENT 1 - COMPLETE</u>	FRPs should <u>NOT</u> be implemented prior to completion of Automatic Action Verification steps.
18.	<u>Initiate Monitoring Of Critical Safety Function Status Trees</u>	

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(30°F FOR ADVERSE CONTAINMENT)

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Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If offsite power is lost after SI reset, manual action may be required * to restart safeguards equipment. * o Overriding breaker anti-pump/lockout may require placing control * switches to TRIP or may require Containment Spray Reset * o Placing key switches to DEFEAT will prevent auto SI actuation. <p>*****</p>	
19.	<p><u>Reset SI:</u></p> <ul style="list-style-type: none"> a. Check all CCW pumps - RUNNING a. Place non-running CCW pumps CCR control switches in PULLOUT. b. Place controls for main AND bypass feedwater regulating valves to CLOSE c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position: <ul style="list-style-type: none"> o Train A SIA-1 o Train B SIA-2 d. One at a time, depress Safety Injection reset buttons (Panel SB-2): <ul style="list-style-type: none"> o Train A o Train B e. Verify Train A AND B - RESET e. Verify relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1): <ul style="list-style-type: none"> o SIA-1 o SIM-1 o SIA-2 o SIM-2 	

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

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Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* RCS pressure should be monitored. <u>IF</u> RCS pressure decreases in an</p> <p>* uncontrolled manner to less than 320 psig, the RHR pumps must be manually</p> <p>* restarted to supply water to the RCS.</p> <p>*****</p>		
⊛20.	<u>Check If RHR Pumps Should Be Stopped:</u>	
	a. Check RCS pressure:	
	1) Pressure - GREATER THAN 320 PSIG	1) Go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	2) Pressure - STABLE OR INCREASING	2) Go to Step 21.
	b. Stop RHR pumps and place in AUTO	
⊛21.	<u>Check SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10%	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% in at least one SG.
	b. Control feed flow to maintain narrow range level between 10% and 50%	b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
22.	<u>Check PAB Radiation - NORMAL:</u>	Evaluate cause of abnormal conditions:
	o 98 ft. EL area monitor (R-5987)	
	o Charging pump room area monitor (R-4)	o Notify health physics and chemistry.
	o Plant Vent monitors (R-43, R-44)	<u>IF</u> the cause is a loss of RCS inventory outside containment, <u>THEN</u> go to 2-ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.

FOLDOUT PAGE FOR 2-E-0

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(30°F FOR ADVERSE CONTAINMENT)

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IF CST level decreases to less than 2 ft. switch to city water supply.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23.	<u>Check PRT Conditions - NORMAL:</u> <ul style="list-style-type: none"> o Level o Pressure o Temperature 	Evaluate cause of abnormal conditions.
24.	<u>Reset Containment Isolation Phase A And Phase B:</u> <ul style="list-style-type: none"> a. Place IVSW switches to OPEN on SN panel: <ul style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel c. Verify personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel d. Place control switches for all remaining Phase A isolation valves to CLOSE on SN panel e. One at a time, depress Phase A reset buttons: <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B 	

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	f. Verify Train A AND B - RESET	f. <u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u> : 1) Place key switches to BYPASS. 2) One at a time, depress Phase A reset buttons: o CI Phase A Train A o CI Phase A Train B <u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.
	g. Check Phase B - ACTUATED	g. Go To Step 25.
	h. Containment pressure - LESS THAN 17 PSIG	h. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> perform steps 24i, 24j and 24k. 2) Continue with Step 25.
	i. One at a time, depress Containment Spray Reset pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	j. One at a time, depress Phase B reset buttons o CI Phase B Train A o CI Phase B Train B	
	k. Verify Train A AND B - RESET	k. Verify relays reset (top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2): o S1 o S2 o CB1 o CB2

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1. RCP TRIP CRITERIA:

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(30°F FOR ADVERSE CONTAINMENT)

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25.	<u>Establish Instrument Air To Containment:</u> a. Open PCV-1228	a. Verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset: o CA1 o CA2
26.	<u>Check Secondary Radiation - NORMAL:</u> o Request periodic activity samples of all SGs	Go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>ATTACHMENT 3 provides a list of 480V equipment load ratings.</p> </div>		
27.	<u>Check Power Supply To Charging Pumps - OFFSITE POWER AVAILABLE</u>	Verify adequate diesel capacity to run charging pumps. <u>IF</u> necessary, shed sufficient non-essential loads.

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Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	<p><u>Check If Charging Flow Has Been Established:</u></p> <p>a. Charging pumps - AT LEAST ONE RUNNING</p> <p>b. Establish charging flow as necessary:</p> <p>1) Verify speed controller in MANUAL</p> <p>2) Adjust charging pump speed</p>	<p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p>o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p>o MOV-250A, MCC 26AA, A2</p> <p>o MOV-250C, MCC 26AA, B2</p> <p>o MOV-250B, MCC 26BB, L3</p> <p>o MOV-250D, MCC 26BB, M3</p> <p>- OR -</p> <p>o Locally close seal injection needle valves (51 ft. el. Piping Penetration Area):</p> <p>o 241A</p> <p>o 241B</p> <p>o 241C</p> <p>o 241D</p> <p>2) Start charging pump(s) as necessary.</p>

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 3 provides a list of 480V equipment load ratings.</p>		
29.	<p><u>Check If Diesel Generators Should Be Stopped:</u></p> <p>a. Verify 480V busses - ENERGIZED BY OFFSITE POWER</p>	<p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p> <p><u>IF</u> offsite power can <u>NOT</u> be restored, <u>THEN</u> load the following equipment on 480V busses:</p> <ul style="list-style-type: none"> o MCCs: <ul style="list-style-type: none"> o MCC 24A o MCC 27A o MCC 29A o Direct Support Facilities personnel to align lighting to TSC bus per 2-SOP-27.1.5, 480 VOLT SYSTEM via PAB Lighting Transformer 23 Alternate Power Supply as necessary. o Start one cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans.
<p>This Step continued on the next page.</p>		

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<ul style="list-style-type: none"> o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key. <p>Go to Step 29c.</p>
	<p>b. Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o All MCCs as necessary except MCC 28 and MCC 28A o All lighting as necessary o One cable tunnel exhaust fan o Verify radiation monitors R-43/R-44 in service and start PAB ventilation fans o Locally start one 480V switchgear room exhaust fan <ul style="list-style-type: none"> o IF necessary, defeat fan interlock using bypass key <p>c. Locally stop any unloaded diesel generator(s) and place in standby</p>	
30.	<u>Return To Step 10</u>	

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1. RCP TRIP CRITERIA:

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

ATTACHMENT 1
AUTOMATIC ACTION VERIFICATION

(Attachment page 1 of 10)

NOTE

This attachment should be terminated upon CRS transition to 2-ECA-0.0,
LOSS OF ALL AC POWER

1. Verify Proper Charging System
Operation:

a) CHECK Containment Condition -
ADVERSE

a) Perform the following:

1) IF CCW available, THEN
start one charging pump to
maintain RCP seal injection
and PRZR inventory.

2) IF CCW NOT available, THEN
start one charging pump in
MANUAL at maximum speed for
pump cooling.

3) Continue with Step 2. WHEN
Containment Condition is
ADVERSE, THEN perform
Steps 1.b) & 1.c).

b) Start At Least One Charging
Pump In MANUAL At Maximum Speed

b) Go to Attachment 1 Step 2.

c) Align charging pump suction to
the RWST

c) Perform the following:

1) Open charging pump suction
valve from RWST:

o Open emergency boration
valve:

o LCV-112B

o MOV-333

2) Close charging pump suction
valve from VCT:

o Place both boric acid pumps
in high speed mode

o LCV-112C

3) Place RCS makeup control
switch to STOP

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1. RCP TRIP CRITERIA:

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

ATTACHMENT 1
AUTOMATIC ACTION VERIFICATION

(Attachment page 2 of 10)

NOTE

- o Notify CRS of any automatic actions that failed to occur during performance of this Attachment.
- o Equipment found misaligned due to operator action should NOT be repositioned.

2. Check 345 KV M0 Disc Switch F7-9
- OPEN

IF Generator Output Breakers do NOT open 30 seconds after Turbine trip, THEN manually open:

- o BKR7
- o BKR9

3. Check Status Of 480V Busses:

- a) All 480V busses - ENERGIZED BY
OFFSITE POWER

- a) Direct Support Facilities
personnel to align lighting to
TSC bus per 2-SOP-27.1.5, 480
VOLT SYSTEM via PAB Lighting
Transformer 23 Alternate Power
Supply.

Go to Step 3c.

- b) Dispatch NPO to reset:

- o All lighting
- o MCC 24A
- o MCC 27A
- o MCC 29A

- c) Stop all condensate pumps

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">ATTACHMENT 1 (Attachment page 3 of 10) AUTOMATIC ACTION VERIFICATION</p>		
4.	<u>Verify FW Isolation:</u> o Main boiler feed pumps - TRIPPED o Main boiler feed pump discharge valves - CLOSED o FW regulating valves - CLOSED o FW stop valves - CLOSED o SG blowdown isolation valves - CLOSED	Manually trip pumps and close valves as necessary.
5.	<u>Check If Main Steamlines Should Be Isolated:</u> a) Check for either: o High steamline flow with either TAVE less than 542°F OR steamline pressure less than 570 psig - OR - o Containment pressure - EVER GREATER THAN 24 PSIG b) Verify MSIVs - CLOSED	a) Go to Step 6. b) Manually close valves.
6.	<u>Verify Proper Service Water System Operation:</u> a) Three service water pumps - RUNNING ON ESSENTIAL HEADER b) Service water valves from diesel generator - OPEN	a) Manually start pumps. b) Locally open valves.

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">ATTACHMENT 1 (Attachment page 4 of 10) AUTOMATIC ACTION VERIFICATION</p>		
7.	Verify SI System Pumps Running:	
	a) Three SI pumps - RUNNING	<p>a) Perform the following:</p> <p>1) Manually start pumps.</p> <p>2) <u>IF</u> three SI pumps running, <u>THEN</u>:</p> <p>a) Verify MOV-851A <u>AND</u> MOV-851B are open.</p> <p>b) Go to Step 7c.</p> <p>3) <u>IF</u> 21 <u>AND</u> 22 SI pumps running, <u>THEN</u>:</p> <p>a) Verify MOV-851B open.</p> <p>b) Verify MOV-851A closed.</p> <p>c) Go to Step 7c.</p> <p>4) <u>IF</u> 22 <u>AND</u> 23 SI pumps running, <u>THEN</u>:</p> <p>a) Verify MOV-851A open.</p> <p>b) Verify MOV-851B closed.</p> <p>c) Go to Step 7c.</p>
This Step continued on the next page.		

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">ATTACHMENT 1 (Attachment page 5 of 10) <u>AUTOMATIC ACTION VERIFICATION</u></p>	
		<p>5) <u>IF</u> only 22 SI pump running, <u>THEN</u>:</p> <p>a) Open <u>AND</u> de-energize either MOV-851A <u>OR</u> MOV-851B as follows:</p> <p>o Hold control switch in the open position to cycle valve open</p> <p>o De-energize power feed when valve is in OPEN position:</p> <p>o MOV-851A - MCC-26A, Compt. 4DR</p> <p style="text-align: center;">- OR -</p> <p>o MOV-851B - MCC-26B, Compt. 4DR</p> <p>b) Go to Step 7c.</p>
	<p>b) 22 SI pump discharge isolation MOV-851A <u>AND</u> MOV-851B - OPEN</p> <p>c) Two RHR pumps - RUNNING</p>	<p>b) Manually open valves.</p> <p>c) Manually start pump(s) unless previously placed in PULLOUT.</p>
8.	<p><u>Verify Proper Emergency SI System Valve Alignment:</u></p> <p>o RHR Hx CCW outlet valves - OPEN</p> <p>o 822A o 822B</p> <p>o RHR Hx MOVs - OPEN</p> <p>o 746 o 747</p>	<p>Manually align valves as necessary.</p>

FOLDOUT PAGE FOR 2-E-0

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">ATTACHMENT 1 (Attachment page 6 of 10) <u>AUTOMATIC ACTION VERIFICATION</u></p>		
9.	<u>Verify Containment Fan Coolers -</u> <u>IN SERVICE:</u>	
	a) Five fan coolers - RUNNING	a) Manually start fan cooler(s).
	b) NORM OUT valves - OPEN	b) Manually open valve(s). <u>IF</u> any normal outlet valve on any fan cooler can <u>NOT</u> be opened, <u>THEN</u> perform the following: 1) Notify TSC which containment fan cooler(s) are <u>NOT</u> available. 2) Go to Step 9c.
	c) TCV-1104 and TCV-1105 - BOTH OPEN	c) Manually open valve(s).

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Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">ATTACHMENT 1 (Attachment page 7 of 10) AUTOMATIC ACTION VERIFICATION</p>		
10.	<u>Verify AFW Flow To All SGs</u>	Manually align valves as necessary.
11.	<u>Verify Containment Ventilation Isolation:</u>	
	a) Containment purge valves - CLOSED:	a) Manually close valves.
	o FCV-1170	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.
	o FCV-1171	
	o FCV-1172	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator and HP personnel to close outside valves by isolating instrument air:
	o FCV-1173	o FCV-1171, IA-780 o FCV-1173, IA-779
	b) Containment pressure relief valves - CLOSED:	b) Manually close valves.
	o PCV-1190	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.
	o PCV-1191	
	o PCV-1192	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator <u>AND</u> HP personnel to close outside valves by isolating instrument air:
		o PCV-1191, IA-777 o PCV-1192, IA-778
		<u>IF</u> containment pressure relief can <u>NOT</u> be isolated, <u>THEN</u> locally close the following valves (Fan House 88 ft. el):
		o UH-1013, Pressure Relief Fan Inlet Stop
		o UH-1014, Pressure Relief Fan Outlet stop

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
ATTACHMENT 1 <u>AUTOMATIC ACTION VERIFICATION</u>		
(Attachment page 8 of 10)		
<u>NOTE</u> ATTACHMENT 2 provides a list of Phase A valves.		
12.	<u>Verify Containment Isolation</u> <u>Phase A:</u>	
	a) Phase A - ACTUATED o Train A master relay CA1 (above rack E) o Train B master relay CA2 (above rack F)	a) Manually actuate phase A.
	b) Phase A valves - CLOSED	b) Manually close valves.
	c) IVSW valves - OPEN: o 1410 o 1413 o SOV-3518 o SOV-3519	c) Manually open valves.
	d) WCP valves - OPEN: o PCV 1238 o PCV 1239 o PCV 1240 o PCV 1241	d) Manually open valves.
	e) Place personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel	
	f) Dispatch NPO to periodically check:	
	1) IVSW tank: o Level - GREATER THAN 92% o Pressure - GREATER THAN 57 PSIG	1) Direct NPO to fill or pressurize tank as necessary.
	2) WCP header pressures - GREATER THAN 52 PSIG	2) Direct NPO to verify station air backup <u>OR</u> N2 backup are aligned as necessary.

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>ATTACHMENT 1 (Attachment page 9 of 10)</p> <p><u>AUTOMATIC ACTION VERIFICATION</u></p>		
<p><u>NOTE</u></p> <p>ATTACHMENT 2 provides a list of Phase B valves.</p>		
*13.	<p><u>Check If Containment Spray Should Be Actuated:</u></p> <p>a) Containment pressure - EVER GREATER THAN 24 PSIG</p> <p>b) Verify spray pumps - RUNNING</p> <p>c) Verify spray pump discharge valves - OPEN:</p> <ul style="list-style-type: none"> o MOV-866A o MOV-866B o MOV-866C o MOV-866D <p>d) Verify containment isolation Phase B valves - CLOSED</p> <p>e) Stop all RCPs</p> <p>f) Verify IVSW isolation valves - OPEN:</p> <ul style="list-style-type: none"> o 7864 o 7865 o 7866 o 7867 	<p>a) Go to Step 14.</p> <p>b) Manually initiate spray <u>AND</u> verify both spray pumps running. <u>IF NOT, THEN</u> manually start pumps.</p> <p>c) Manually open valves.</p> <p>d) Manually close valves.</p> <p>f) Manually open valves.</p>

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-0	Title: REACTOR TRIP OR SAFETY INJECTION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">ATTACHMENT 1 (Attachment page 10 of 10) AUTOMATIC ACTION VERIFICATION</p>	
14.	<u>Verify CCR Air Conditioner Train A And Train B - RUNNING IN INCIDENT MODE 2</u>	<p>At CCR Panel PY2, perform the following:</p> <ul style="list-style-type: none"> a) Place mode selector switch to 2 b) Place the following switches to CUTOUT: <ul style="list-style-type: none"> o Unit-1 K-8 fan switch (OT2-3) o OT2-1 o OT2-2 c) Check system aligned for INCIDENT - OUTSIDE AIR FILTERED FOR SI/HI RAD
15.	<u>Notify CRS That ATTACHMENT 1 Is Complete</u>	

-END-

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

ATTACHMENT 2
CONTAINMENT ISOLATION VALVES

(Attachment page 1 of 1)

1. The following valves will close on Phase A isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
CCW from excess letdown Hx	796, 793
CCW to excess letdown Hx	798, 791
Vent header from RCDT	1786, 1787
Gas analyzer PRT	548, 549
Gas analyzer RCDT	1788, 1789
Letdown from regenerative HX	201, 202
Letdown orifice control stop valves	200A, 200B, 200C
Make-up to PRT	519, 552
Containment sump pumps to WDS - hold-up tank	1723, 1728
Instrument air to containment	PCV-1228
RCDT to WDS - hold-up tank	1702, 1705
SG blowdown and sampling system	PCV-1214, 1214A
	PCV-1215, 1215A
	PCV-1216, 1216A
	PCV-1217, 1217A
Radiation monitor return to containment	PCV-1234, 1235
	PCV-1236, 1237
Accumulator samples	956G, 956H
Sample - pressurizer steam	956A, 956B
Sample - pressurizer liquid	956C, 956D
Sample - RCS loops	21, 22, 23
	MOV-956E, 956F
SJAE to containment	1229, 1230
Hi-Rad sample system return to containment sump	MOV-4399, 5132
Recirculation pump discharge sample line	MOV-990A, 990B
Accumulator N2 Supply Line Stop	863

2. The following valves will close on Phase B isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
Component cooling to RCS pumps	MOV-769, 797
Component cooling from RCS thermal barrier return	MOV-789, FCV-625
Component cooling from RCS motor bearing return	MOV-786, 784
Seal water return containment isolation valve	MOV-222

-END-

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-0	REACTOR TRIP OR SAFETY INJECTION	REV. 0

ATTACHMENT 3
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS			
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP			
23 AFW PUMP		384 KW	
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT			
25 FAN COOLER UNIT		250 KW	250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW	
23 SI PUMP			345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

-END-

FOLDOUT PAGE FOR 2-E-0

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur; trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F
(30°F FOR ADVERSE CONTAINMENT)

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



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Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-0.0, Revision: 0

REDIAGNOSIS

2

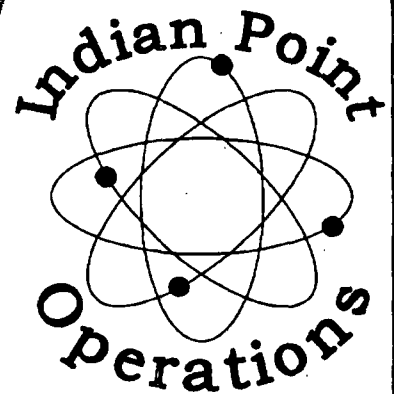
Approved By:

Mark J. M...

Procedure Sponsor, RPO/ Designer

4/26/07
Date

Team P
Procedure Owner



EDITORIAL REVISION

Number: 2-ES-0.0	Title: REDIAGNOSIS	Revision Number: REV. 0
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A. PURPOSE

This procedure provides a mechanism to allow the operator to determine or confirm the most appropriate post accident recovery procedure.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered based on operator judgement.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

o Containment radiation levels greater than 1E5 R/hr.

- OR -

o Containment pressure greater than 4 psig.

Number: 2-ES-0.0	Title: REDIAGNOSIS	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

This procedure should only be used if SI is in service or is required.

1. Check If Any SG Secondary Pressure Boundary Is Intact:

a. Check pressures in all SGs -
ANY STABLE OR INCREASING

a. IF a controlled cooldown is in progress, THEN go to Step 2.
IF NOT, THEN the following applies:

o IF main steamlines NOT isolated, THEN you should be in 2-E-2, FAULTED STEAM GENERATOR ISOLATION.

- OR -

o IF main steamlines isolated, THEN you should be in 2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS.

2. Check If Any SG Is Faulted:

a. Check pressures in all SGs -
o ANY SG PRESSURE DECREASING
IN AN UNCONTROLLED MANNER

a. Go to Step 3.

- OR -

o ANY SG COMPLETELY
DEPRESSURIZED

b. Verify all faulted SG(s)
isolated:

b. You should be in 2-E-2,
FAULTED STEAM GENERATOR
ISOLATION.

o Steamlines
o Feedlines

Number: 2-ES-0.0	Title: REDIAGNOSIS	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<u>Check If SG Tubes Are Intact:</u> <ul style="list-style-type: none"> o Main steamline radiation recorder (R-28, R-29, R-30, and R-31) - NORMAL o Condenser air ejector radiation recorder (R-45) - NORMAL o SG blowdown radiation recorder (R-49) - NORMAL o NO SG LEVEL INCREASING IN AN UNCONTROLLED MANNER 	You should be in an E-3 or ECA-3 series procedure.
4.	<u>You Should Be In An E-1 Or ECA-1 Series Procedure</u>	

-END-



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Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 4/12/08

2-ES-0.1, Revision: 1

REACTOR TRIP RESPONSE

2

Approved By:

[Signature]

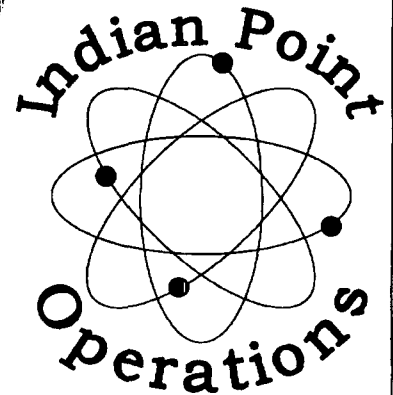
Procedure Sponsor, RPO/ Designee

4/8/08

Date

Team P

Procedure Owner



EDITORIAL REVISION

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

A. PURPOSE

This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip without a safety injection.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 4, when SI is neither actuated nor required.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.1	Title: REACTOR TRIP RESPONSE	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If SI actuation occurs during this procedure, transition to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, step 1. * * o Radiation levels and harsh environment conditions should be evaluated prior to performing local actions. * <p>*****</p>		
⊛ 1.	<u>Check SG Levels:</u> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 10% b. Control feed flow to maintain narrow range level between 10% and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% in at least one SG. b. <u>IF</u> narrow range level in any SG continues to increase, <u>THEN</u> stop feed to that SG.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2.	<u>Check RCS Temperatures -</u> <ul style="list-style-type: none"> o RCS AVERAGE TEMPERATURE STABLE AT OR TRENDING TO 547°F IF ANY RCP RUNNING - OR - o RCS COLD LEG TEMPERATURES STABLE AT OR TRENDING TO 547°F IF NO RCP RUNNING 	<p><u>IF</u> temperature less than 547°F and decreasing, <u>THEN</u>:</p> <ul style="list-style-type: none"> a. Stop dumping steam. b. Verify SG blowdown isolation valves closed. c. <u>IF</u> cooldown continues, <u>THEN</u> control TOTAL feed flow. Maintain TOTAL feed flow greater than 400 gpm until narrow range level greater than 10% in at least one SG. d. <u>IF</u> cooldown continues, <u>THEN</u> close MSIVs. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> locally close MSIVs per 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS. <p><u>IF</u> temperature greater than 547°F and increasing, <u>THEN</u>:</p> <ul style="list-style-type: none"> o Dump steam to condenser. - OR - o Dump steam using SG atmospheric steam dumps.
3.	<u>Check 345 KV MO Disc Switch F7-9 - OPEN</u>	<p><u>IF</u> Generator Output Breakers do <u>NOT</u> open 30 seconds after Turbine trip, <u>THEN</u> manually open:</p> <ul style="list-style-type: none"> o BKR7 o BKR9

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
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1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.1	Title: REACTOR TRIP RESPONSE	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE

ATTACHMENT 1 provides a list of 480V equipment load ratings.

⊛ 4. Verify All 480V Busses -
ENERGIZED BY OFFSITE POWER

Perform the following:

a. IF necessary, THEN verify diesel generators have assumed the following loads:

- o CCW pumps.
- o Essential Service water pumps.
- o Motor-driven AFW pumps as necessary.

b. Try to restore offsite power per:

- o 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 AND/OR BUS 6.
- o 2-SOP-27.1.3, OPERATION OF 13.8KV SYSTEM.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>c. <u>IF</u> necessary, <u>THEN</u> manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o One charging pump. o FCUs. o All MCCs. o One Non Essential Service Water Pump o All lighting. o One cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans. o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key. <p>d. OPEN the ABFP room roll-up door until room ventilation is restored.</p>

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
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801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	<p><u>Check PRZR Level Control:</u></p> <p>a. Level - GREATER THAN 18%</p> <p>b. Verify charging and letdown - IN SERVICE</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify letdown isolation. <u>IF NOT, THEN</u> manually isolate: <ul style="list-style-type: none"> o LCV-459 o 200A o 200B o 200C 2) Verify PRZR heaters off. <u>IF NOT, THEN</u> manually turn off. 3) Control charging to restore PRZR level greater than 18%. 4) <u>WHEN</u> PRZR level greater than 18%, <u>THEN</u> place letdown in service per 2-SOP-3.1, CHARGING, SEAL WATER <u>AND</u> LETDOWN CONTROL <u>AND</u> reenergize PRZR heaters as necessary. 5) Go to Step 5c. <p>b. Manually place in service:</p> <ol style="list-style-type: none"> 1) Start charging pumps as necessary. 2) Establish charging flow as necessary. 3) Establish letdown as necessary per 2-SOP-3.1, CHARGING, SEAL WATER <u>AND</u> LETDOWN CONTROL.
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.1	Title: REACTOR TRIP RESPONSE	Revision Number: REV. 1
---------------------	---------------------------------	----------------------------

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Any CCW pump - RUNNING	<p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Align charging pump in MANUAL at maximum speed for pump cooling. 2) Manually start CCW pumps. <p><u>IF</u> NO CCW pumps can be started, <u>THEN</u> refer to 2-SOP-4.1.2 COMPONENT COOLING SYSTEM OPERATION to establish backup cooling to charging pumps.</p>
	d. Level - TRENDING TO 37%	<p>d. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> Reactor Trip was UNPLANNED, <u>THEN</u> control charging and letdown to maintain pressurizer level at 37%. 2) <u>IF</u> Reactor Trip was PLANNED, <u>THEN</u> maintain pressurizer level as directed by CRS.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
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801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>Check PRZR Pressure Control:</u>	
	a. Pressure - GREATER THAN 1840 PSIG	a. Verify SI actuation. <u>IF NOT</u> , <u>THEN</u> manually actuate SI. Go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.
	b. Pressure - STABLE AT OR TRENDING TO 2235 PSIG	b. <u>IF</u> pressure less than 2235 psig and decreasing, <u>THEN</u> : <ul style="list-style-type: none"> 1) Verify PRZR PORVs closed. <u>IF NOT</u>, <u>THEN</u> manually close. <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. 2) Verify PRZR spray valves closed. <u>IF NOT</u>, <u>THEN</u> place controller in manual and close valves. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> stop ANY RCP(s) required to stop spray flow. 3) Verify PRZR heaters on. <u>IF NOT</u>, <u>THEN</u> manually turn on. Refer to ATTACHMENT 1. <u>IF</u> pressure greater than 2235 psig and increasing, <u>THEN</u> : <ul style="list-style-type: none"> 1) Verify PRZR heaters off. <u>IF NOT</u>, <u>THEN</u> manually turn off. 2) Control pressure using normal PRZR spray. <u>IF NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray if differential temperature between PRZR and aux spray (TI-126) is less than 320°F: <ul style="list-style-type: none"> o Refer to 2-SOP-1.4. PRESSURIZER PRESSURE CONTROL. <u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use PRZR PORV(s) in automatic or manual.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Verify All Control Rods Fully Inserted:</u>	
	a. Check IRPI Indicators - ENERGIZED	a. Implement 2-SOP-3.2, REACTOR COOLANT SYSTEM BORON CONCENTRATION CONTROL.
	b. Check IRPI Indicators - ALL RODS LESS THAN 7.5 INCHES	b. Check all rod positions LESS THAN 12 STEPS using PICS. Refer to ATTACHMENT 2.
		1) <u>IF</u> 2 <u>OR</u> more rod positions are greater than 12 steps withdrawn <u>OR</u> can <u>NOT</u> be determined, <u>THEN</u> emergency borate 255 PPM/Rod not fully inserted:
		a) Open emergency boration valve:
		o MOV-333
		b) Place both boric acid pumps in high speed mode.
		c) Place charging pump control(s) in MAN.
		d) Establish a minimum charging flow of 75 gpm.
		e) <u>WHEN</u> emergency boration is complete, <u>THEN</u> secure per 2-SOP-3.2, REACTOR COOLANT SYSTEM BORON CONCENTRATION CONTROL.

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Check FW Status:</u>	
	a. Check RCS average temperatures - LESS THAN 554°F	a. Continue with Step 9. <u>WHEN</u> temperature less than 554°F, <u>THEN</u> do Steps 8b, 8c and 8d.
	b. Verify main FW regulating valves - CLOSED	b. Manually close valves.
	c. Verify bypass FW regulating valves - CLOSED	c. Manually close valves.
	d. Verify total feed flow to SGs - GREATER THAN 400 GPM	d. Establish AFW flow to the SGs as necessary.
9.	<u>Transfer Condenser Steam Dump To Pressure Control Mode:</u>	
	a. Check condenser - AVAILABLE	a. <u>IF</u> condenser <u>NOT</u> available, <u>THEN</u> use SG atmospheric steam dumps: o Control pressure as directed by CRS
	b. Place steam dump controller switch to manual and adjust for zero output.	
	c. Transfer condenser steam dump to pressure control mode and adjust manual switch as necessary	
	d. Place controller in AUTO and CONTROL pressure as directed by CRS	

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.1	Title: REACTOR TRIP RESPONSE	Revision Number: REV. 1
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.

10. Check RCP Status - 24 RCP RUNNING

Perform the following to provide normal PRZR spray:

 - a. Establish conditions for starting RCP(s) per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.
 - b. Start 24 RCP.

IF an 24 RCP can NOT be started, THEN start RCP(s) as required to provide PRZR spray flow.

IF no RCP can be started, THEN refer to ATTACHMENT 3 to verify natural circulation.

IF natural circulation NOT verified, THEN increase dumping steam.
11. Check If Source Range Detectors Should Be Energized:
 - a. Check intermediate range flux - LESS THAN 1E-10 AMPS
 - a. Continue with Step 12. WHEN flux less than 1E-10 amps, THEN do Steps 11b and 11c.
 - b. Verify source range detectors - ENERGIZED
 - b. Manually energize source range detectors.
 - c. Transfer nuclear recorders to source range scale

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

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- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	<u>Shut Down Unnecessary Plant Equipment:</u> <ul style="list-style-type: none"> o Verify secondary plant automatic actions: <ul style="list-style-type: none"> o Heater drain pumps - TRIPPED o 22 condensate pump - TRIPPED o Main and UAT transformer cooling equipment - SHUTDOWN o Reheater steam supply valves - CLOSED o Extraction steam valves - CLOSED o MBFP turbine reheat steam supply non-return valve "A" valves - CLOSED o Circulating water pumps not required o Condensate pumps not required o Service water pumps not required o Evaluate secondary plant status and shut down equipment as required 	

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. Maintain Stable Plant Conditions:

- o PRZR pressure - AT 2235 PSIG
- o PRZR level -
 - o IF Reactor Trip was UNPLANNED, THEN control charging and letdown to maintain PRZR level at 37%
 - OR -
 - o IF Reactor Trip was PLANNED, THEN maintain PRZR level as directed by CRS
- o SG narrow range levels - BETWEEN 10% AND 50%
- o RCS temperature -
 - o AVERAGE TEMPERATURE AT 547°F IF ANY RCP RUNNING
 - OR -
 - o COLD LEG TEMPERATURES AT 547°F IF NO RCP RUNNING

14. Determine If Natural Circulation Cooldown Is Required:

- a. Consult operations manager
- b. Natural circulation cooldown - REQUIRED
- c. Go to 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1
- b. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY.

-END-

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
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801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

ATTACHMENT 1
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS		554 KW	
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP		384 KW	
23 AFW PUMP			384 KW
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT		250 KW	
25 FAN COOLER UNIT			250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW 316 KW	
23 SI PUMP			345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

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FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

ATTACHMENT 2 (Attachment page 1 of 1)
OBTAINING PICS ROD POSITION INDICATION

1. Obtain PICS Rod Position Indication by the following method:
 - o Obtain PICS Rod Indication from any screen:
 - a) Depress Cancel on screen using mouse or depress escape key on keyboard
 - b) Depress NSSS and BOP on screen using mouse
 - c) Depress ROD SUPERVISION on screen using mouse
 - d) Depress ALL ROD view or INDIVIDUAL BANK on screen using mouse
 - e) Check all rods less than 12 steps withdrawn

-END-

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.1	REACTOR TRIP RESPONSE	REV. 1

ATTACHMENT 3
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-0.1

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

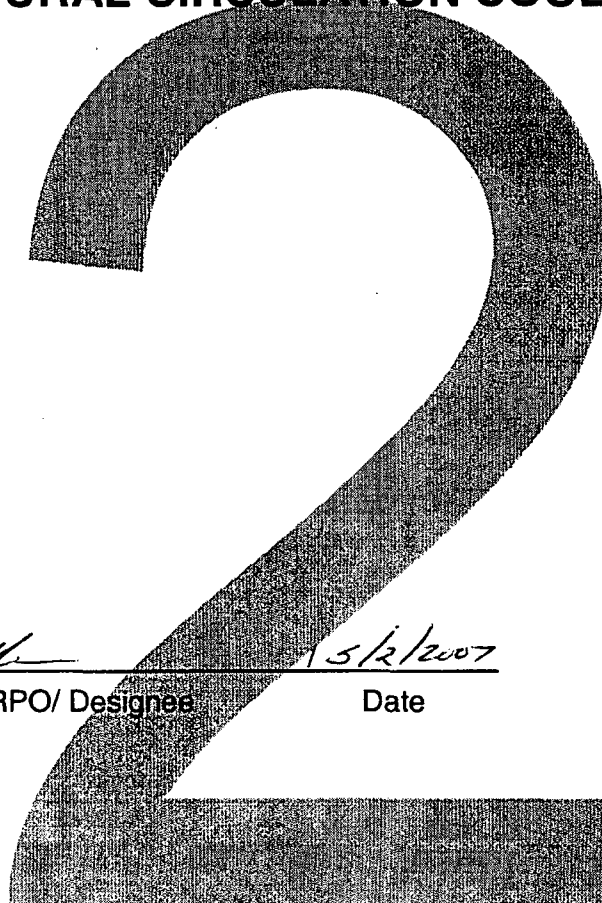
☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-0.2, Revision: 0

NATURAL CIRCULATION COOLDOWN



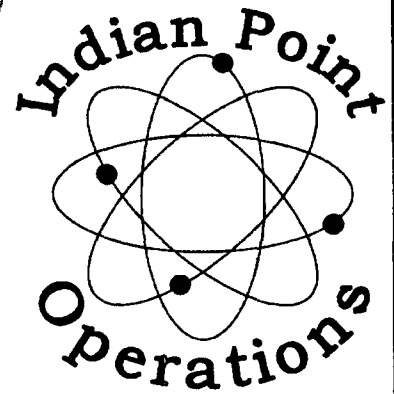
Approved By:

Procedure Sponsor, RPO/ Designer

5/2/2007

Date

Team P
Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-0.2	NATURAL CIRCULATION COOLDOWN	REV. 0

A. PURPOSE

This procedure provides actions to perform a natural circulation RCS cooldown and depressurization to cold shutdown, with no accident in progress, under requirements that will preclude any upper head void formation.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-ES-0.1, REACTOR TRIP RESPONSE, Step 14, when it has been determined that a natural circulation cooldown is required.
- 2) 2-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 19, after the plant conditions have been stabilized following the restoration of 480V bus power.

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED						
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o If SI actuation occurs during this procedure, transition to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, step 1.</p> <p>o If RCP seal cooling had previously been lost, the affected RCP should <u>NOT</u> be started prior to a status evaluation.</p> <p>*****</p>								
<p style="text-align: center;"><u>NOTE</u></p> <p>o RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p> <p>o If conditions can be established for starting an RCP during this procedure, Step 1 should be repeated.</p>								
* 1.	<p><u>Try To Restart An RCP:</u></p> <table border="0"> <tr> <td>a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION</td> <td>a. Go to Step 2.</td> </tr> <tr> <td>b. Start one RCP</td> <td>b. Go to Step 2.</td> </tr> <tr> <td>c. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY</td> <td></td> </tr> </table>		a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION	a. Go to Step 2.	b. Start one RCP	b. Go to Step 2.	c. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY	
a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION	a. Go to Step 2.							
b. Start one RCP	b. Go to Step 2.							
c. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY								
2.	<p><u>Borate RCS To Cold Shutdown Boron Concentration</u></p>							
3.	<p><u>Verify Cold Shutdown RCS Boron Concentration By Sampling:</u></p> <table border="0"> <tr> <td>a. Verify Boration Complete</td> <td>a. Return to Step 2.</td> </tr> <tr> <td>b. Verify RCS Boron Concentration exceeds cold shutdown requirement by sampling prior to continuing with next step</td> <td>b. Return to Step 2.</td> </tr> </table>		a. Verify Boration Complete	a. Return to Step 2.	b. Verify RCS Boron Concentration exceeds cold shutdown requirement by sampling prior to continuing with next step	b. Return to Step 2.		
a. Verify Boration Complete	a. Return to Step 2.							
b. Verify RCS Boron Concentration exceeds cold shutdown requirement by sampling prior to continuing with next step	b. Return to Step 2.							

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Check VCT Makeup Control System:</u> a. Makeup set for cold shutdown boron concentration b. RCS makeup control switch placed to START	Adjust controls as necessary.
⊛ 5.	<u>Verify All CRDM Fans - RUNNING</u>	Start all fans.
6.	<u>Initiate RCS Cooldown To Cold Shutdown:</u> a. Maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR b. Dump steam to condenser: 1) Check condenser - AVAILABLE 2) Place steam dump controller switch to manual and adjust for zero output. 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary. c. Maintain SG narrow range level - BETWEEN 46% AND 52% d. RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1	b. Dump steam using SG atmospheric steam dumps. c. Control feed flow as necessary.
7.	<u>Check RCS Hot Leg Temperatures - LESS THAN 550°F</u>	Return to Step 6.

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Depressurize RCS To 1890 psig:</u>	
	a. Check letdown - IN SERVICE	a. Try to establish letdown per 2-SOP-3.1, CHARGING, SEAL WATER <u>AND</u> LETDOWN CONTROL.
		<u>IF</u> letdown can <u>NOT</u> be established, <u>THEN</u> use one PRZR PORV. Go to Step 9. OBSERVE CAUTION PRIOR TO STEP 9.
	b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F	b. Use one PRZR PORV. Go to Step 9. OBSERVE CAUTION PRIOR TO STEP 9.
	c. Use auxiliary spray:	
	o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL	
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>SI actuation circuits will automatically unblock if PRZR pressure increases to greater than 1940 psig.</p> <p>*****</p>	
9.	<u>Block Low PRZR Pressure SI</u>	
10.	<u>Maintain Following RCS Conditions:</u>	
	o RCS pressure - AT 1890 PSIG	
	o PRZR level - AT 37%	
	o Cooldown rate in RCS cold legs - LESS THAN 25°F/HR	
	o RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Monitor RCS Cooldown:</u> <ul style="list-style-type: none"> o Core exit TCs - DECREASING o RCS hot leg temperatures - DECREASING o RCS subcooling based on core exit TCs - INCREASING 	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
<p style="text-align: center;"><u>NOTE</u></p> <p>If at any time it is determined that a natural circulation cooldown and depressurization must be performed at a rate that may form a steam void in the vessel, one of the following procedures should be used:</p> <ul style="list-style-type: none"> o 2-ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS) <li style="text-align: center;">-OR- o 2-ES-0.4, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS) 												
12.	<p><u>Initiate RCS Depressurization:</u></p> <ul style="list-style-type: none"> a. Check CRDM fans - ALL RUNNING a. Maintain RCS temperature and pressure per ATTACHMENT 1 and FIGURE ES02-2. Go to Step 12c. b. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>102</td> </tr> <tr> <td>401 - 800</td> <td>86</td> </tr> <tr> <td>801 - 1200</td> <td>73</td> </tr> <tr> <td>1201 - 2500</td> <td>69</td> </tr> </tbody> </table> <ul style="list-style-type: none"> c. Check letdown - IN SERVICE c. Use one PRZR PORV. Go to Step 13. OBSERVE NOTE PRIOR TO STEP 13. d. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F d. Use one PRZR PORV. Go to Step 13. OBSERVE NOTE PRIOR TO STEP 13. e. Use auxiliary spray: <ul style="list-style-type: none"> o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL 		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F	0 - 400	102	401 - 800	86	801 - 1200	73	1201 - 2500	69
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F											
0 - 400	102											
401 - 800	86											
801 - 1200	73											
1201 - 2500	69											

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.</p>		
13.	<p><u>Continue RCS Cooldown And Depressurization:</u></p> <ul style="list-style-type: none"> a. Maintain cooldown rate in RCS cold legs - LESS THAN 25°F/HR b. Maintain subcooling requirements of Step 12 c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES02-1 	<ul style="list-style-type: none"> b. Stop depressurization and re-establish subcooling.
14.	<p><u>Verify Steam Void In Reactor Vessel Does Not Exist:</u></p> <ul style="list-style-type: none"> o PRZR level - NO UNEXPECTED LARGE VARIATIONS o RVLIS natural circulation range indication - GREATER THAN 100% 	<p>Repressurize RCS within limits of FIGURE ES02-1 to collapse potential voids in system and continue cooldown. <u>IF</u> RCS depressurization must continue, <u>THEN</u> go to one of the following:</p> <ul style="list-style-type: none"> o 2-ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS) <li style="text-align: center;">- OR - o 2-ES-0.4, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated *</p> <p>* prior to performing local actions. *</p> <p>*****</p>		
15.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <p>a. RCS pressure - LESS THAN 1000 PSIG</p> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 	<p>a. Continue with Step 16. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 15b through 15d.</p>
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>Check If SI Pumps Should Be Locked Out:</u> a. RCS hot leg temperature - LESS THAN 350°F b. Place SI pump control switches in PULLOUT	a. Continue with Step 17. <u>WHEN</u> RCS hot leg temperature less than 350°F, <u>THEN</u> do Step 16b.
17.	<u>Maintain Letdown Flow:</u> a. Open letdown orifice isolation valves as necessary b. Adjust low pressure letdown control valve PCV-135 setpoint as necessary	
18.	<u>Maintain Required RCP Seal Injection Flow:</u> o 6 gpm to 10 gpm per pump	
19.	<u>Check If RHR System Can Be Placed In Service:</u> a. RCS temperature - LESS THAN 350°F b. RCS pressure - LESS THAN 370 PSIG c. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM	a. Return to Step 13. OBSERVE NOTE PRIOR TO STEP 13. b. Return to Step 13. OBSERVE NOTE PRIOR TO STEP 13.
20.	<u>Continue RCS Cooldown To Cold Shutdown</u>	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.2	Title: NATURAL CIRCULATION COOLDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Depressurizing the RCS before the entire RCS is less than 200°F may result in void formation in the RCS.</p> <p>*****</p>	
21.	<p><u>Continue Cooldown Of Inactive Portion Of RCS:</u></p> <ul style="list-style-type: none"> o Cool upper head region using CRDM fans o Cool SG U-tubes by dumping steam from all SGs <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>If CRDM fans are <u>NOT</u> running, a waiting period of 27 hours is necessary to allow the head to cool to less than 200°F.</p> </div>	
22.	<p><u>Determine If RCS Depressurization Is Permitted:</u></p> <ul style="list-style-type: none"> a. Entire RCS - LESS THAN 200°F a. Return to Step 20. b. Go to 2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN <p style="text-align: center;">-END-</p>	

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.2	NATURAL CIRCULATION COOLDOWN	REV. 0

FIGURE ES02-1

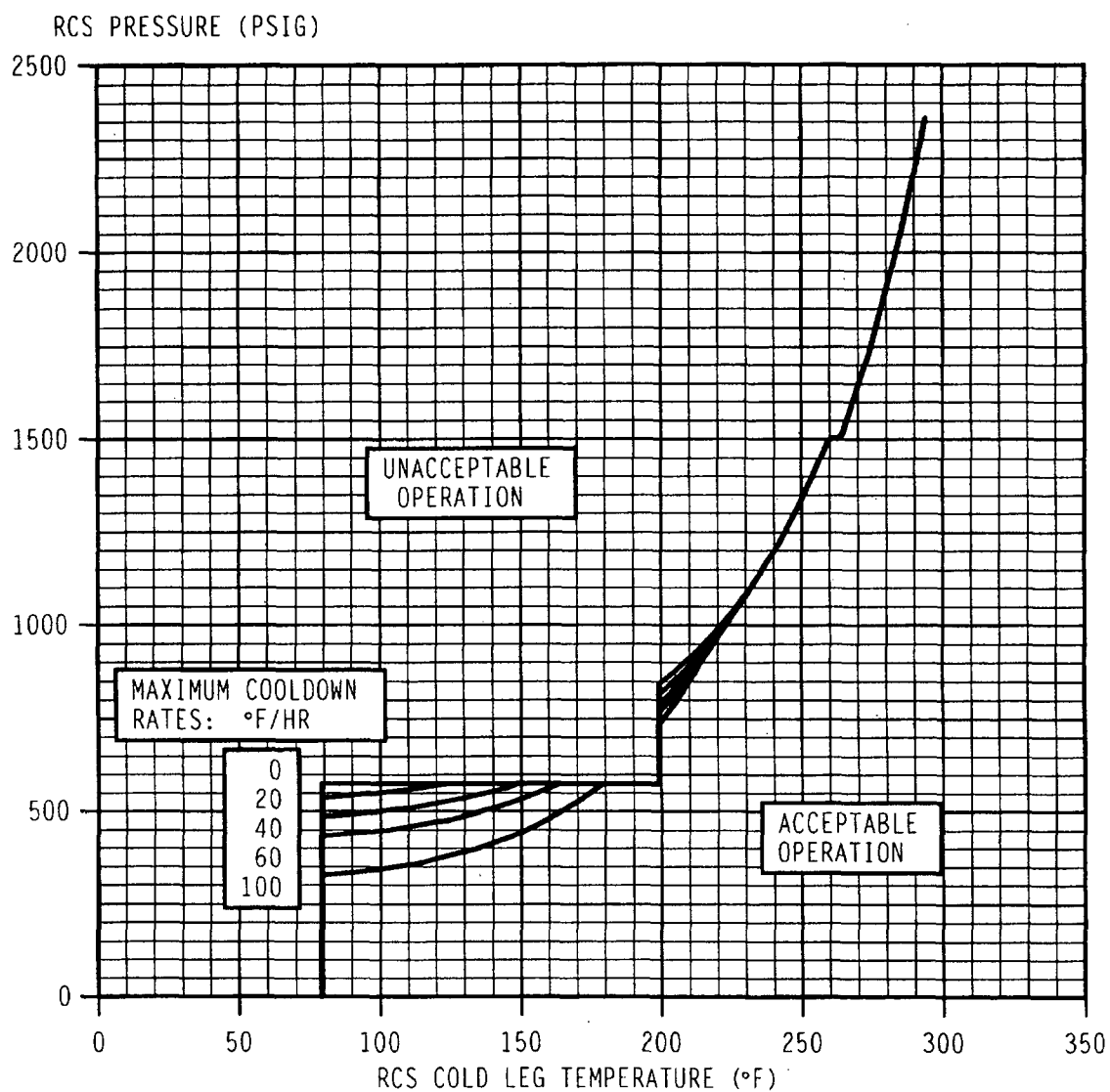


FIGURE ES02-1, REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS
-END-

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.2	NATURAL CIRCULATION COOLDOWN	REV. 0

FIGURE ES02-2

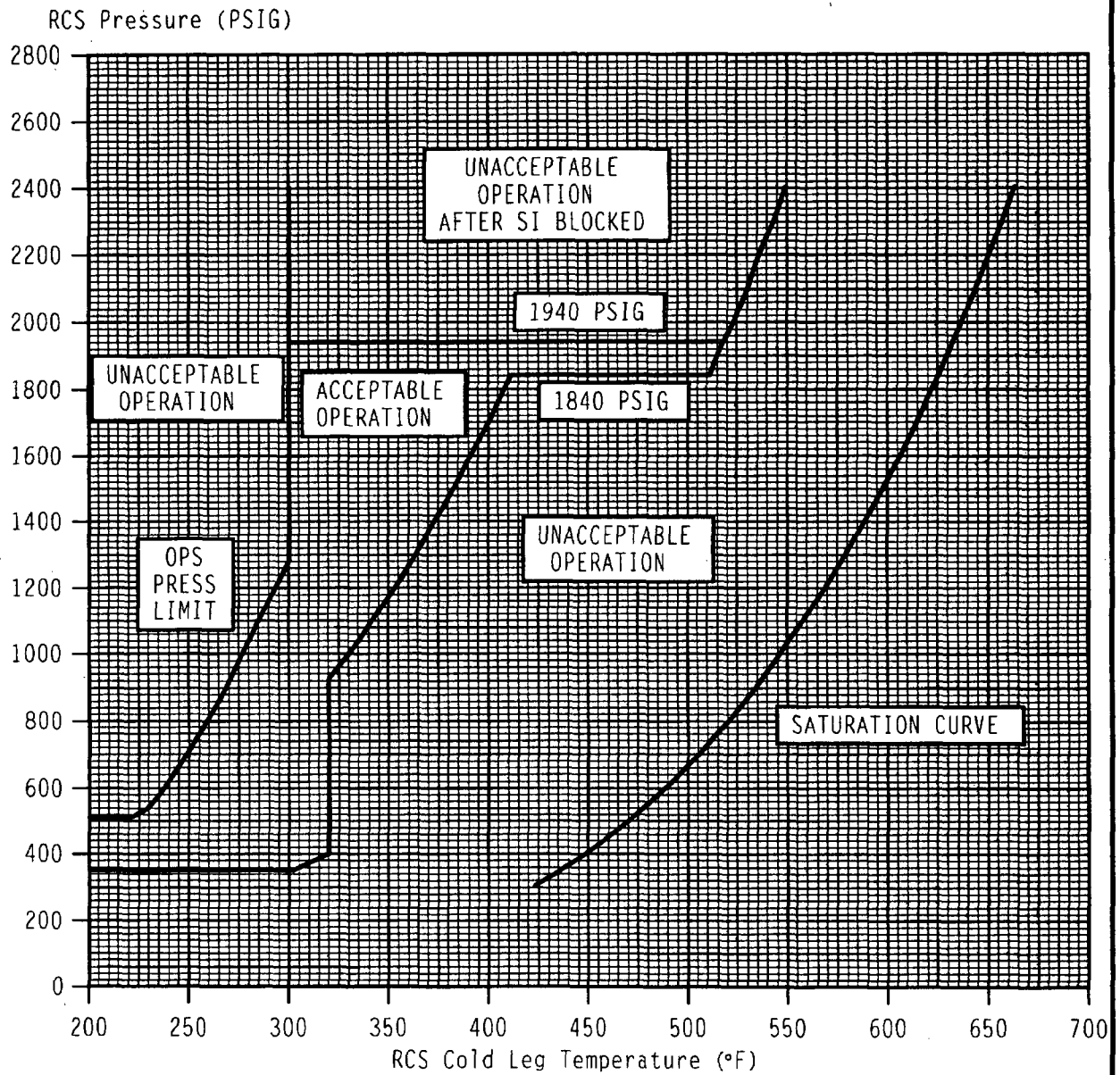


FIGURE ES02-2, NATURAL CIRCULATION COOLDOWN WITHOUT CRDM FANS
-END-

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.2	NATURAL CIRCULATION COOLDOWN	REV. 0

ATTACHMENT 1
RCS SUBCOOLING WITHOUT CRDM FANS

(Attachment page 1 of 1)

1. Perform the following in conjunction with Procedure Steps.
 - a) Refer to FIGURE ES02-2 for the acceptable operating region.
 - b) Maintain RCS pressure approximately 1890 psig until RCS cold leg temperature is decreased to 400°F at a rate less than 25°F/hr.
 - c) Continue the cooldown at a rate less than 25°F/hr and initiate a depressurization of the RCS while maintaining a minimum of 150°F subcooling (or the Tech Spec limit) until RCS pressure is 1100 psig.
 - d) Maintain RCS pressure approximately 1100 psig until RCS cold leg temperature is decreased below 320°F at a rate less than 25°F/hr.
 - e) Wait 8 hours to allow the upper head to cool before continuing depressurization.
 - f) Continue the cooldown at a rate less than 25°F/hr and initiate a depressurization of the RCS while maintaining a minimum of 50°F subcooling (or the Tech Spec limit) until RCS pressure is between 350 psig and 370 psig.
 - g) With RHR in service for cooldown, maintain RCS pressure between 350 psig and 370 psig for 27 hours until the entire RCS is decreased below 200°F.

-END-

FOLDOUT PAGE FOR 2-ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE, OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-0.3, Revision: 0
NATURAL CIRCULATION COOLDOWN
WITH STEAM VOID IN VESSEL
(WITH RVLIS)

Approved By:

Mark J. Miller

Procedure Sponsor, RPO/Designee

15 June 07
Date

Team P
Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-0.3	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	REV. 0

A. PURPOSE

This procedure provides actions to continue plant cooldown and depressurization to cold shutdown, with no accident in progress, under conditions that allow for the potential formation of a void in the upper head region with a vessel level system available to monitor void growth.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, after completing the first eleven steps.

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If SI actuation occurs during this procedure, transition to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, step 1. * o The first eleven steps of 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, should be performed before continuing with this procedure. * o If RCP seal cooling had previously been lost, the affected RCP should <u>NOT</u> be started prior to a status evaluation. <p>*****</p>	
	<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <ul style="list-style-type: none"> o RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow. o If conditions can be established for starting an RCP during this procedure, Step 1 should be repeated. </div>	
	<p>* 1. <u>Try To Restart An RCP:</u></p> <ul style="list-style-type: none"> a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION a. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2. 	
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft. switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. Check RVLIS natural circulation range indication - GREATER THAN 100%</p>	<p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) Increase PRZR level to 62% using charging and letdown. 2) Establish subcooling based on core exit TCs greater than value obtained from table using steam dump: <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74</td> </tr> <tr> <td>401 - 800</td> <td>58</td> </tr> <tr> <td>801 - 1200</td> <td>45</td> </tr> <tr> <td>1200 - 2500</td> <td>41</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F	0 - 400	74	401 - 800	58	801 - 1200	45	1200 - 2500	41
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F											
0 - 400	74											
401 - 800	58											
801 - 1200	45											
1200 - 2500	41											
	<p>c. Start one RCP</p>	<p>3) Use PRZR heaters, as necessary to saturate the pressurizer water.</p>										
	<p>d. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY</p>	<p>c. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2.</p>										

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

Saturated conditions in the PRZR should be established before trying to decrease PRZR level.

2. Establish PRZR Level To
Accommodate Void Growth:

- a. Check PRZR level - BETWEEN 28% AND 38%
- a. Control charging and letdown as necessary.
- b. Place charging pump speed controls in manual

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

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1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
<p style="text-align: center;"><u>NOTE</u></p> <p>2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.</p>												
3.	<p><u>Continue RCS Cooldown And Initiate Depressurization:</u></p> <p>a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>72</td> </tr> <tr> <td>401 - 800</td> <td>56</td> </tr> <tr> <td>801 - 1200</td> <td>43</td> </tr> <tr> <td>1201 - 2500</td> <td>39</td> </tr> </tbody> </table> <p>c. Maintain temperature and pressure - WITHIN LIMITS OF FIGURE ES03-1</p> <p>d. Check letdown - IN SERVICE</p> <p>e. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F</p> <p>f. Depressurize RCS using auxiliary spray:</p> <p>o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F	0 - 400	72	401 - 800	56	801 - 1200	43	1201 - 2500	39	<p>d. Depressurize RCS using one PRZR PORV. Go to Step 4.</p> <p>e. Depressurize RCS using one PRZR PORV. Go to Step 4.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F											
0 - 400	72											
401 - 800	56											
801 - 1200	43											
1201 - 2500	39											

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛ 4.	<u>Control PRZR Level:</u>	
	a. Level - GREATER THAN 28%	a. Control charging and letdown, as necessary, to increase PRZR level to greater than 28%.
	b. Level - LESS THAN 90%	b. Perform the following: <ul style="list-style-type: none"> 1) Turn on PRZR heaters to maintain PRZR pressure stable. 2) Decrease PRZR level to less than 90% by one of the following: <ul style="list-style-type: none"> o Control charging and letdown as necessary. - OR - o Continue cooldown to shrink RCS inventory.
⊛ 5.	<u>Check RVLIS Natural Circulation Range Indication - GREATER THAN 76%</u>	Repressurize RCS to maintain RVLIS natural circulation range greater than 76%. Return to Step 3.

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>Radiation levels and harsh environment conditions should be evaluated prior to performing local actions.</p> <p>*****</p>		
6.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <p>a. RCS pressure - LESS THAN 1000 PSIG</p> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 	<p>a. Continue with Step 7. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 6b through 6d.</p>
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <ol style="list-style-type: none"> 1) Close nitrogen supply valve to accumulators: HCV-863. <ul style="list-style-type: none"> o IF HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves: <ul style="list-style-type: none"> o 1809 o 1811A o 1811B 2) Open the following valves as necessary: <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
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801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Check If SI Pumps Should Be Locked Out:</u>	
	a. RCS hot leg temperature - LESS THAN 350°F	a. Continue with Step 8. <u>WHEN</u> RCS hot leg temperature less than 350°F, <u>THEN</u> do Step 7b.
	b. Place SI pump control switches in PULLOUT	
8.	<u>Maintain Letdown Flow:</u>	
	a. Open letdown orifice isolation valves as necessary	
	b. Adjust low pressure letdown control valve PCV-135 setpoint as necessary	
9.	<u>Maintain Required RCP Seal Injection Flow:</u>	
	o 6 gpm to 10 gpm per pump	
10.	<u>Check If RHR System Can Be Placed In Service:</u>	
	a. RCS temperature - LESS THAN 350°F	a. Return to Step 3.
	b. RCS pressure - LESS THAN 370 PSIG	b. Return to Step 3.
	c. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM	
11.	<u>Continue RCS Cooldown To Cold Shutdown</u>	

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.3	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Depressurizing the RCS before the entire RCS is less than 200°F may</p> <p>* result in additional void formation in the RCS.</p> <p>*****</p>		
12.	<p><u>Continue Cooldown Of Inactive Portion Of RCS:</u></p> <p>a. Cool upper head region using CRDM fans</p> <p>b. Cool SG U-tubes by dumping steam from all SGs</p> <p>c. RVLIS natural circulation range indication - GREATER THAN 100%</p>	<p>c. Return to Step 11.</p>
<p style="text-align: center;"><u>NOTE</u></p> <p>If CRDM fans are <u>NOT</u> running, a waiting period of 27 hours is necessary to allow the head to cool to less than 200°F.</p>		
13.	<p><u>Determine If RCS Depressurization Is Permitted:</u></p> <p>a. Entire RCS - LESS THAN 200°F</p> <p>b. Go to 2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN</p>	<p>a. Return to Step 11.</p>
-END-		

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
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WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.3	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN	REV. 0

FIGURE ES03-1

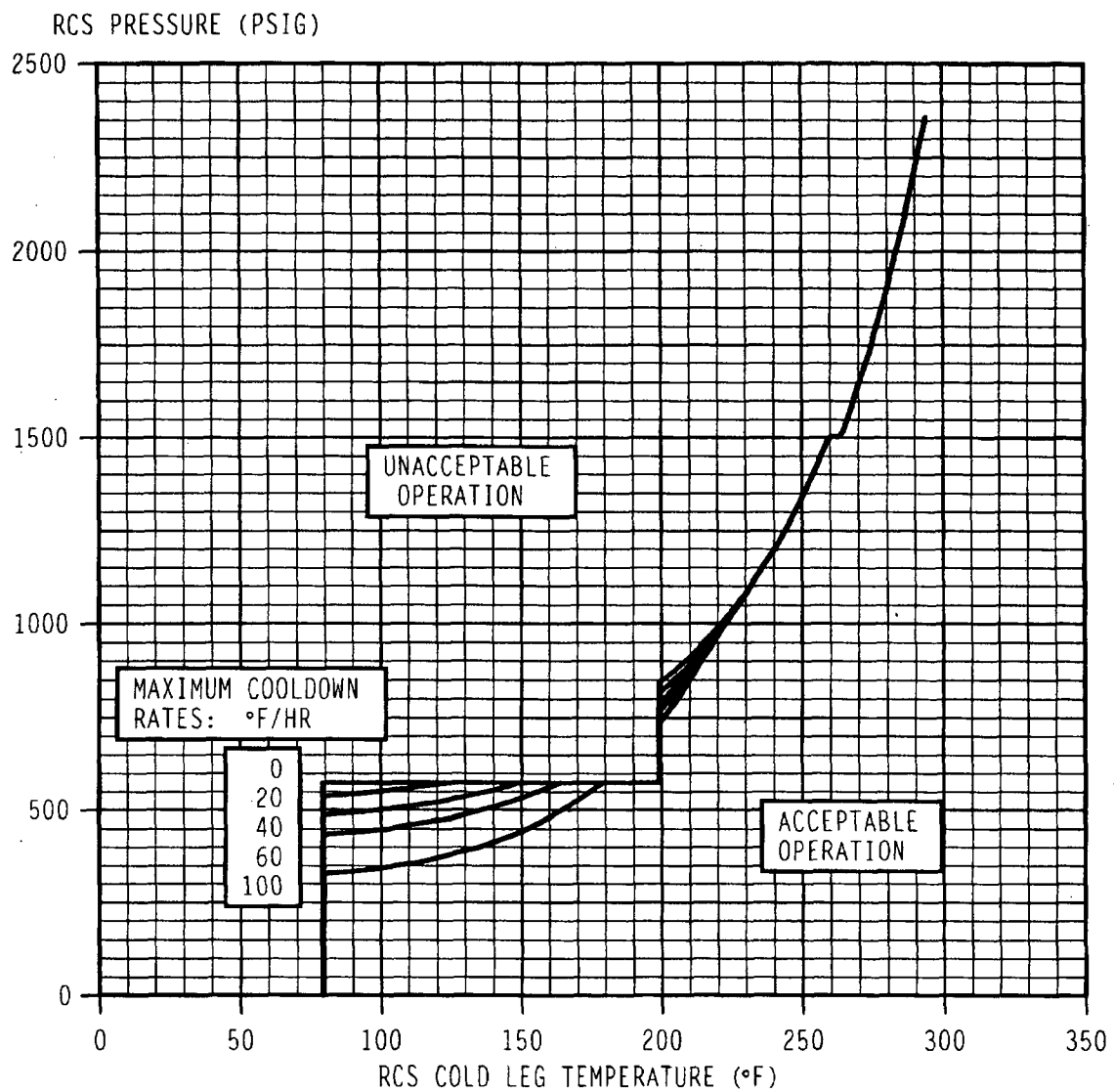


FIGURE ES03-1, REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS
-END-

FOLDOUT PAGE FOR 2-ES-0.3

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
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2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-0.4, Revision: 0

**NATURAL CIRCULATION COOLDOWN
WITH STEAM VOID IN VESSEL
(WITHOUT RVLIS)**

Approved By:

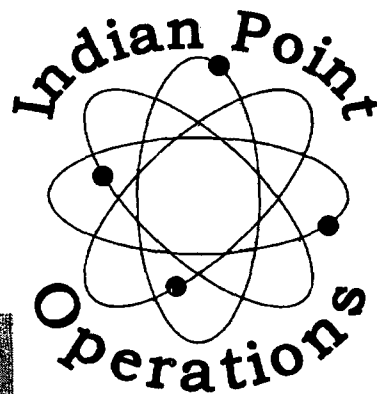
Mark J. Malt

Procedure Sponsor, RPO/ Designee

13/5/07
Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-0.4	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	REV. 0

A. PURPOSE

This procedure provides actions to continue plant cooldown and depressurization to cold shutdown, with no accident in progress, under conditions that allow for the potential formation of a void in the upper head region without a vessel level system available to monitor void growth.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, after completing the first eleven steps.

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED				
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o If SI actuation occurs during this procedure, transition to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, step 1.</p> <p>o The first eleven steps of 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, should be performed before continuing with this procedure.</p> <p>o If RCP seal cooling had previously been lost, the affected RCP should <u>NOT</u> be started prior to a status evaluation.</p> <p>*****</p>						
<p style="text-align: center;"><u>NOTE</u></p> <p>o RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p> <p>o If conditions can be established for starting an RCP during this procedure, Step 1 should be repeated.</p>						
<p>* 1. <u>Try To Restart An RCP:</u></p> <table border="0"> <tr> <td>a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION</td> <td>a. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2.</td> </tr> <tr> <td>b. Check PRZR level - GREATER THAN 62%</td> <td>b. Control charging and letdown as necessary to increase level to greater than 62%.</td> </tr> </table>			a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION	a. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2.	b. Check PRZR level - GREATER THAN 62%	b. Control charging and letdown as necessary to increase level to greater than 62%.
a. Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION	a. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2.					
b. Check PRZR level - GREATER THAN 62%	b. Control charging and letdown as necessary to increase level to greater than 62%.					
<p>This Step continued on the next page.</p>						

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>c. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74</td> </tr> <tr> <td>401 - 800</td> <td>58</td> </tr> <tr> <td>801 - 1200</td> <td>45</td> </tr> <tr> <td>1200 - 2500</td> <td>41</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F	0 - 400	74	401 - 800	58	801 - 1200	45	1200 - 2500	41	<p>c. Establish subcooling based on core exit TCs greater than value obtained from table using steam dump:</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F											
0 - 400	74											
401 - 800	58											
801 - 1200	45											
1200 - 2500	41											
	<p>d. Use PRZR heaters, as necessary to saturate the pressurizer water</p>											
	<p>e. Start one RCP</p>	<p>e. Go to Step 2. OBSERVE NOTE PRIOR TO STEP 2.</p>										
	<p>f. Go to 2-POP-3.2, PLANT RECOVERY FROM TRIP, HOT STANDBY</p>											
<p style="text-align: center;"><u>NOTE</u></p> <p>Saturated conditions in the PRZR should be established before trying to decrease PRZR level.</p>												
2.	<p><u>Establish PRZR Level To Accommodate Void Growth:</u></p>											
	<p>a. Check PRZR level - BETWEEN 28% AND 38%</p>	<p>a. Control charging and letdown as necessary.</p>										
	<p>b. Place charging pump speed controls in manual</p>											

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
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WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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2. AFW SUPPLY SWITCHOVER CRITERION:

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Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<u>Decrease RCS Hot Leg Temperatures To 500°F:</u>	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 50°F/HR	
	b. Maintain RCS pressure - LESS THAN 1890 PSIG	
	c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES04-1	
	d. Maintain stable PRZR level using charging	
	e. Check RCS hot leg temperatures - LESS THAN 500°F	e. Return to Step 3a.
	f. Stop RCS cooldown	
4.	<u>Depressurize RCS To 1600 psig:</u>	
	a. Check letdown - IN SERVICE	a. Use one PRZR PORV. Go to Step 4d.
	b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F	b. Use one PRZR PORV. Go to Step 4d.
	c. Use auxiliary spray:	
	o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL	
	d. Check RCS pressure - LESS THAN 1600 PSIG	d. Return to Step 4a.
	e. Stop RCS depressurization	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

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- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

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Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

- o 2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.
- o After cooldown is stopped, RCS hot leg temperatures will decrease due to decrease in heat transfer rate.

5. Decrease RCS Hot Leg Temperatures
To 450°F:

- a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR
- b. Maintain RCS pressure - AT 1600 PSIG
- c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES04-1
- d. Maintain stable PRZR level using charging
- e. Check RCS hot leg temperatures - LESS THAN 450°F
- e. Return to Step 5a.
- f. Stop RCS cooldown

6. Equalize Charging And Letdown
Flows:

- a. Place charging and letdown controls in manual
- b. Control charging and seal injection flows to equal letdown and seal return flows

7. Maintain Required RCP Seal
Injection Flow:

- o 6 gpm to 10 gpm per pump

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
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IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated</p> <p>* prior to performing local actions.</p> <p>*****</p>			
8.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. RCS pressure - LESS THAN 1000 PSIG</p> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) </td> <td style="vertical-align: top;"> <p>a. Continue with Step 9. OBSERVE NOTE PRIOR TO STEP 9. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 8b through 8d.</p> </td> </tr> </table>		<p>a. RCS pressure - LESS THAN 1000 PSIG</p> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 	<p>a. Continue with Step 9. OBSERVE NOTE PRIOR TO STEP 9. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 8b through 8d.</p>
<p>a. RCS pressure - LESS THAN 1000 PSIG</p> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 	<p>a. Continue with Step 9. OBSERVE NOTE PRIOR TO STEP 9. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> do Steps 8b through 8d.</p>			
<p>This Step continued on the next page.</p>				

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <p>o Accumulator 21:</p> <ul style="list-style-type: none"> o 891A o HCV-943 <p>o Accumulator 22:</p> <ul style="list-style-type: none"> o 891B o HCV-943 <p>o Accumulator 23:</p> <ul style="list-style-type: none"> o 891C o HCV-943 <p>o Accumulator 24:</p> <ul style="list-style-type: none"> o 891D o HCV-943
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>The upper head region may void during depressurization. This will result in a rapidly increasing PRZR level.</p>		
9.	<p><u>Depressurize RCS:</u></p> <ul style="list-style-type: none"> a. Check letdown - IN SERVICE b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F c. Use auxiliary spray: <ul style="list-style-type: none"> o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL d. Depressurize RCS until either of the following conditions satisfied: <ul style="list-style-type: none"> o RCS pressure - LESS THAN 800 PSIG - OR - o PRZR level - GREATER THAN 90% e. Stop RCS depressurization 	<ul style="list-style-type: none"> a. Use one PRZR PORV. Go to Step 9d. b. Use one PRZR PORV. Go to Step 9d.

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>In order to continue overall system depressurization, it may be necessary to cycle PRZR level (cycle pressure) to enhance upper head cooling.</p>		
10.	<u>Check PRZR Level - LESS THAN 90%</u>	Increase RCS pressure by 100 psi using PRZR heaters. Return to Step 9. OBSERVE NOTE PRIOR TO STEP 9.
11.	<u>Decrease RCS Hot Leg Temperatures To 400°F:</u>	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Maintain RCS pressure - STABLE	
	c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES04-1	
	d. Maintain stable PRZR level using charging	
	e. Check RCS hot leg temperatures - LESS THAN 400°F	e. Return to Step 11a.
	f. Stop RCS cooldown	
12.	<u>Equalize Charging And Letdown Flows:</u>	
	a. Place charging and letdown controls in manual	
	b. Control charging and seal injection flows to equal letdown and seal return flows	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	<u>Depressurize RCS:</u>	
	a. Check letdown - IN SERVICE	a. Use one PRZR PORV. Go to Step 13d.
	b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F	b. Use one PRZR PORV. Go to Step 13d.
	c. Use auxiliary spray:	
	o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL	
	d. Depressurize RCS until either of the following conditions satisfied:	
	o RCS pressure - LESS THAN 600 PSIG	
	- OR -	
	o PRZR level - GREATER THAN 90%	
	e. Stop RCS depressurization	
14.	<u>Check PRZR Level - LESS THAN 90%</u>	Increase RCS pressure by 100 psi using PRZR heaters. Return to Step 13.

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Decrease RCS Hot Leg Temperatures To 350°F:</u> a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Maintain RCS pressure - STABLE c. Maintain RCS temperature and pressure - WITHIN LIMITS OF FIGURE ES04-1 d. Maintain stable PRZR level using charging e. Check RCS hot leg temperatures - LESS THAN 350°F f. Stop RCS cooldown	e. Return to Step 15a.
16.	<u>Place SI Pump Control Switches In PULLOUT</u>	
17.	<u>Equalize Charging And Letdown Flows:</u> a. Place charging and letdown controls in manual b. Control charging and seal injection flows to equal letdown and seal return flows	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	<u>Depressurize RCS:</u>	
	a. Check letdown - IN SERVICE	a. Use one PRZR PORV. Go to Step 18d.
	b. Check differential temperature between PRZR and auxiliary spray (TI-126) - LESS THAN 320°F	b. Use one PRZR PORV. Go to Step 18d.
	c. Use auxiliary spray:	
	o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL	
	d. Depressurize RCS until either of the following conditions satisfied:	
	o RCS pressure - LESS THAN 370 PSIG	
	- OR -	
	o PRZR level - GREATER THAN 90%	
	e. Stop RCS depressurization	
19.	<u>Check PRZR Level - LESS THAN 90%</u>	Increase RCS pressure by 100 psi using PRZR heaters. Return to Step 18.
20.	<u>Check If RHR System Can Be Placed In Service:</u>	
	a. RCS temperature - LESS THAN 350°F	a. Return to Step 15.
	b. RCS pressure - LESS THAN 370 PSIG	b. Return to Step 18.
	c. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM	
21.	<u>Continue RCS Cooldown To Cold Shutdown</u>	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-0.4	Title: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS)	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Depressurizing the RCS before the entire RCS is less than 200°F may * result in additional void formation in the RCS. * * * *****</p>	
22.	<p><u>Continue Cooldown Of Inactive Portion Of RCS:</u></p> <ul style="list-style-type: none"> o Cool upper head region using CRDM fans o Cool SG U-tubes by dumping steam from all SGs <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>If CRDM fans are <u>NOT</u> running, a waiting period of 27 hours is necessary to allow the head to cool to less than 200°F.</p> </div>	
23.	<p><u>Determine If RCS Depressurization Is Permitted:</u></p> <ul style="list-style-type: none"> a. Entire RCS - LESS THAN 200°F a. Return to Step 21. b. Go to 2-POP-3.3, PLANT COOLDOWN, HOT TO COLD SHUTDOWN <p style="text-align: center;">-END-</p>	

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-0.4	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN	REV. 0

FIGURE ES04-1

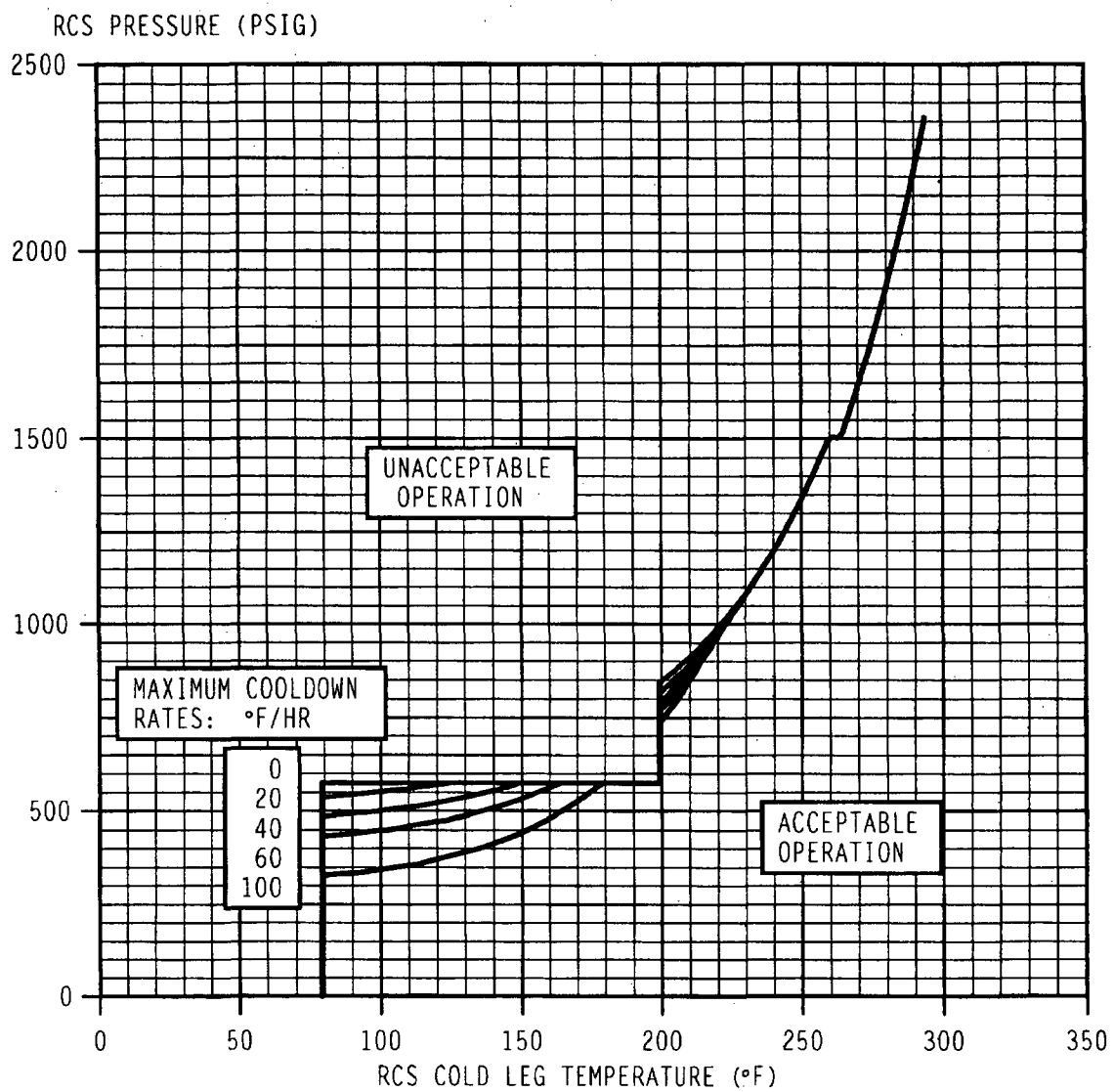


FIGURE ES04-1, REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS
-END-

FOLDOUT PAGE FOR 2-ES-0.4

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-E-1, Revision: 0

LOSS OF REACTOR OR SECONDARY COOLANT

2

Approved By:

Mary M. Miller

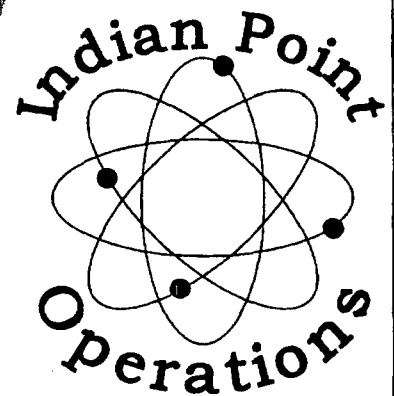
Procedure Sponsor, RPO/ Designee

5/3/07

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

A. PURPOSE

This procedure provides actions to recover from a loss of reactor or secondary coolant.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 11, and 2-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 26, when a PRZR PORV is stuck open and its block valve can not be closed.
- 2) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 15, with any of the following symptoms: high containment radiation, high containment pressure, or high containment recirculation sump levels.
- 3) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 20, and 2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 6, 2-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 28, when RCS pressure is less than the shutoff head pressure of the RHR pumps.
- 4) 2-ES-1.1, SI TERMINATION, Step 6 and 24, and 2-FR-I.2, RESPONSE TO LOW PRESSURIZER LEVEL, Step 5, if SI has to be reinitiated.
- 5) 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 7, after identification and isolation of a faulted SG.
- 6) 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 12, after normal injection mode conditions are established.
- 7) 2-ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 6, when a LOCA outside containment is isolated.
- 8) 2-FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, Step 17 and 26, and 2-FR-C.2, RESPONSE TO DEGRADED CORE COOLING, Step 17, after core cooling has been reestablished.
- 9) 2-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 26, after heat sink has been reestablished and all PRZR PORVs are closed.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

o Containment radiation levels greater than 1E5 R/hr.

- OR -

o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* FRPs should <u>NOT</u> be implemented prior to completion of 2-E-0, REACTOR TRIP * * OR SAFETY INJECTION, ATTACHMENT 1, AUTOMATIC ACTION VERIFICATION. *</p> <p>*****</p>		
1.	<p><u>Check If RCPs Should Be Stopped:</u></p> <p>a. SI pumps - AT LEAST ONE RUNNING</p> <p>b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)</p> <p>c. Stop all RCPs</p>	<p>a. Go to Step 2.</p> <p>b. Go to Step 2.</p>
2.	<p><u>Check If Any SG Is Faulted:</u></p> <p>a. Check pressures in all SGs -</p> <p style="padding-left: 40px;">o ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER</p> <p style="text-align: center;">- OR -</p> <p style="padding-left: 40px;">o ANY SG COMPLETELY DEPRESSURIZED</p> <p>b. Verify all faulted SG(s) isolated:</p> <p style="padding-left: 40px;">o Steamlines</p> <p style="padding-left: 40px;">o Feedlines</p>	<p>a. Go to Step 3.</p> <p>b. Go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛ 3.	<u>Check Intact SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.
	b. Control feed flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%	b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>o <u>IF</u> any PRZR PORV opens because of high PRZR pressure, Step 4b should be repeated after pressure decreases to less than the PORV setpoint.</p> <p>o Radiation levels and harsh environment conditions should be evaluated prior to performing local actions.</p> <p>*****</p>	
⊛ 4.	<u>Check PRZR PORVs And Block Valves:</u>	
	a. Power to block valves - AVAILABLE	a. Restore power to block valves by closing the following breakers as necessary:
		o MCC 26B/1H (MOV-535)
		o MCC 26A/1H (MOV-536)
	b. PORVs - CLOSED	b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs. <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.
	c. Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If offsite power is lost after SI reset, manual action may be required * to restart safeguards equipment. * o Overriding breaker anti-pump/lockout may require placing control * switches to TRIP or may require Containment Spray Reset * o Placing key switches to DEFEAT will prevent auto SI actuation. <p>*****</p>	
5.	<p><u>Reset SI:</u></p> <ul style="list-style-type: none"> a. Check all CCW pumps - RUNNING a. Place non-running CCW pumps CCR control switches in PULLOUT. b. Place controls for main AND bypass feedwater regulating valves to CLOSE c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position: <ul style="list-style-type: none"> o Train A SIA-1 o Train B SIA-2 d. One at a time, depress Safety Injection reset buttons (Panel SB-2) <ul style="list-style-type: none"> o Train A o Train B e. Verify Train A AND B - RESET e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1): <ul style="list-style-type: none"> o SIA-1 o SIM-1 o SIA-2 o SIM-2 	

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>Reset Containment Isolation Phase A And Phase B:</u> <ol style="list-style-type: none"> a. Place IVSW switches to OPEN on SN panel: <ol style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel c. Verify personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel d. Place control switches for all remaining Phase A isolation valves to CLOSE on SN panel e. One at a time, depress Phase A reset buttons <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B f. Verify Train A AND B - RESET 	<p>f. <u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Place key switches to BYPASS. 2) One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B <p><u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.</p>
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	g. Check Phase B - ACTUATED	g. Go To Step 7.
	h. Containment pressure - LESS THAN 17 PSIG	h. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 6i, 6j and 6k. 2) Continue with Step 7.
	i. One At A Time, Depress Containment Spray Reset Pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	j. One at a time, depress Phase B reset buttons o CI Phase B Train A o CI Phase B Train B	
	k. Verify Train A AND B - RESET	k. Verify Relays reset (Top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2): o S1 o S2 o CB1 o CB2
7.	<u>Establish Instrument Air To Containment:</u> a. Open PCV-1228	a. Verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset: o CA1 o CA2

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Check Secondary Radiation - NORMAL:</u> <ul style="list-style-type: none"> o Main steamline radiation recorder (R-28, R-29, R-30, and R-31) o Condenser air ejector radiation recorder (R-45) o SG blowdown radiation recorder (R-49) o Request periodic activity samples of all SGs 	Go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of 480V equipment load ratings.</p> </div>		
9.	<u>Check Power Supply To Charging Pumps - OFFSITE POWER AVAILABLE</u>	Verify adequate diesel capacity to run charging pumps. <u>IF</u> necessary, shed sufficient non-essential loads.

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* If RWST level decreases to less than 15 ft, charging pumps that are * started or running should be monitored for loss of suction which may * result in pump damage. * *****</p>	
10.	<p><u>Check If Charging Flow Has Been Established:</u></p> <p>a. Charging pumps - AT LEAST ONE RUNNING</p> <p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p>o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p>o MOV-250A, MCC 26AA, A2 o MOV-250C, MCC 26AA, B2 o MOV-250B, MCC 26BB, L3 o MOV-250D, MCC 26BB, M3</p> <p style="text-align: center;">- OR -</p> <p>o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):</p> <p>o 241A o 241B o 241C o 241D</p> <p>2) Start charging pump(s) as necessary.</p> <p>b. Establish charging flow as necessary:</p> <p>1) Verify speed controller in MANUAL</p> <p>2) Adjust charging pump speed</p>	

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*11.	<u>Check If SI Flow Should Be Terminated:</u>	
	a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)	a. Go to Step 12.
	b. Secondary heat sink:	b. <u>IF</u> neither condition satisfied, <u>THEN</u> go to Step 12.
	o Total feed flow to intact SGs - GREATER THAN 400 GPM	
	- OR -	
	o Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	
	c. RCS pressure:	c. Go to Step 12.
	o Pressure - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)	
	o Pressure - STABLE OR INCREASING	
	d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)	d. Try to stabilize RCS pressure with normal PRZR spray. Go to Step 12.
	e. Go to 2-ES-1.1, SI TERMINATION, Step 1	

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛12.	<u>Check If Containment Spray Should Be Stopped:</u>	
	a. Spray pumps - RUNNING	a. Go to Step 13. OBSERVE CAUTION PRIOR TO STEP 13.
	b. Containment pressure - LESS THAN 17 PSIG	b. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 12c through 12f. 2) Continue with Step 13. OBSERVE CAUTION PRIOR TO STEP 13.
	c. One at a time, depress containment spray reset pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	d. Containment area radiation - NORMAL o R-25, R-26 o R-41, R-42 o R-2, R-7	d. Perform the following: 1) <u>WHEN</u> containment spray has been in service for 3.5 hours, <u>THEN</u> do Steps 12e and 12f. 2) Go to Step 13. OBSERVE CAUTION PRIOR TO STEP 13.
	e. Stop containment spray pumps and place in AUTO	
	f. Close containment spray pump discharge valves: o MOV-866A o MOV-866B o MOV-866C o MOV-866D	

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 320 psig (340 psig FOR ADVERSE CONTAINMENT), the RHR pumps must be manually restarted to supply water to the RCS.</p> <p>*****</p>		
⑬.	<u>Check If RHR Pumps Should Be Stopped:</u> <ol style="list-style-type: none"> a. Check RCS pressure: <ol style="list-style-type: none"> 1) Pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT) 2) Pressure - STABLE OR INCREASING b. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST c. Stop RHR pumps and place in AUTO 	<ol style="list-style-type: none"> 1) Go to Step 15. 2) Go to Step 14. b. Go to Step 14.
14.	<u>Check RCS And SG Pressures:</u> <ol style="list-style-type: none"> o Check pressure in all SGs - STABLE OR INCREASING o Check RCS pressure - STABLE OR DECREASING 	Return to Step 1.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of 480V equipment load ratings.</p>		
15.	<p><u>Check If Diesel Generators Should Be Stopped:</u></p> <p>a. Verify 480V busses - ENERGIZED BY OFFSITE POWER</p>	<p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p> <p><u>IF</u> offsite power can <u>NOT</u> be restored, <u>THEN</u> load the following equipment on 480V busses:</p> <ul style="list-style-type: none"> o MCCs: <ul style="list-style-type: none"> o MCC 24A o MCC 27A o MCC 29A o Direct Support Facilities personnel to align PAB LIGHTING TRANSFORMER 23 ALTERNATE POWER SUPPLY to TSC bus per 2-SOP-27.1.5, 480 VOLT SYSTEM, as necessary. o Start one cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans.
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<ul style="list-style-type: none"> o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key. <p>Go to Step 15c.</p>
	<p>b. Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o All MCCs as necessary except MCC 28 and MCC 28A o All lighting as necessary o One cable tunnel exhaust fan o Verify radiation monitors R-43/R-44 in service and start PAB ventilation fans o Locally start one 480V switchgear room exhaust fan <ul style="list-style-type: none"> o IF necessary, defeat fan interlock using bypass key <p>c. Locally stop any unloaded diesel generator(s) and place in standby</p>	

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<p><u>Initiate Evaluation Of Plant Status:</u></p> <p>a. Verify cold leg recirculation capability:</p> <ul style="list-style-type: none"> o Power to recirculation pump(s) and discharge header valve(s) - AVAILABLE <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o Power to RHR pump(s) and associated valve(s) - AVAILABLE <p>b. Check PAB radiation - NORMAL:</p> <ul style="list-style-type: none"> o 98 ft. EL area monitor (R-5987) o Charging pump room area monitor (R-4) o Plant vent monitors (R-43, R-44) <p>c. Obtain samples:</p> <ul style="list-style-type: none"> o RCS boron concentration o RCS activity o Containment atmosphere o Containment sump boron concentration <p>d. Evaluate plant equipment:</p> <ul style="list-style-type: none"> o Routinely check operating safeguards equipment for proper operation as necessary <p>e. Start additional plant equipment to assist in recovery as necessary:</p> <ul style="list-style-type: none"> o House service boilers o Ventilation systems o Circulating water pumps o Instrument air closed cooling system 	<p>a. <u>IF</u> at least one train of cold leg recirculation capability can <u>NOT</u> be verified, <u>THEN</u> go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.</p> <p>b. Try to identify and isolate leakage:</p> <ul style="list-style-type: none"> o Notify health physics and chemistry. <p><u>IF</u> the cause is a loss of RCS inventory outside containment, <u>THEN</u> go to 2-ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.</p>

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	<u>Check If RCS Cooldown And Depressurization Is Required:</u>	
	a. RCS pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)	a. <u>IF</u> RHR pump flow greater than 240 gpm (400 gpm FOR ADVERSE CONTAINMENT), <u>THEN</u> go to Step 18.
	b. Go to 2-ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1	
18.	<u>Check If Transfer To Cold Leg Recirculation Is Required:</u>	
	a. RWST level - LESS THAN 9.24 FT	a. Return to Step 16.
	b. Go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1 unless previously performed	
19.	<u>Check If SI Accumulators Should Be Isolated:</u>	
	a. At least two RCS hot leg temperatures - LESS THAN 350°F	a. Continue with Step 20. <u>WHEN</u> at least two RCS hot leg temperatures less than 350°F <u>THEN</u> do steps 19b through 19d.
	b. Locally restore power to isolation valves:	
	o 894A (MCC 26A)	
	o 894C (MCC 26A)	
	o 894B (MCC 26B)	
	o 894D (MCC 26B)	
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <p>o Accumulator 21:</p> <ul style="list-style-type: none"> o 891A o HCV-943 <p>o Accumulator 22:</p> <ul style="list-style-type: none"> o 891B o HCV-943 <p>o Accumulator 23:</p> <ul style="list-style-type: none"> o 891C o HCV-943 <p>o Accumulator 24:</p> <ul style="list-style-type: none"> o 891D o HCV-943
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>To prevent main steamline isolation, steam dump to condenser should <u>NOT</u> exceed 0.5 E6 lbs/hr per SG.</p> <p>*****</p>	
20.	<p><u>Check If Intact SGs Should Be Depressurized To RCS Pressure:</u></p> <p>a. RCS pressure - LESS THAN INTACT SG PRESSURES</p> <p>b. Sample all SGs for radioactivity levels</p> <p>c. Request a dose projection on steaming SGs from the TSC</p> <p>d. Dose projection for each SG - ACCEPTABLE</p> <p>e. Dump steam to condenser from intact SGs, NOT to exceed 0.5 E6 lbs/hr per intact SG, until SG pressure less than RCS pressure:</p> <p>1) Check condenser - AVAILABLE</p> <p>2) Place steam dump controller switch to manual and adjust for zero output.</p> <p>3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.</p>	
		<p>a. Go to Step 21.</p> <p>d. Do <u>NOT</u> dump steam from a SG with an unacceptable dose projection.</p> <p>e. Dump steam using intact SG atmospheric steam dumps until SG pressure less than RCS pressure.</p>

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-E-1	Title: LOSS OF REACTOR OR SECONDARY COOLANT	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21.	<u>Determine If Reactor Vessel Head Should Be Vented:</u>	
	a. Consult TSC	
22.	<u>Check Containment Hydrogen Concentration:</u>	
	a. Obtain a hydrogen concentration measurement:	
	o Dispatch chemistry personnel to obtain sample	
	- OR -	
	o Use H2-O2 analyzer on Accident Assessment Panel	
	b. Hydrogen concentration - LESS THAN 3.0% IN DRY AIR	b. Consult TSC for additional recovery actions.

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23.	<u>At 3.5 Hours After Event</u> <u>Initiation. Prepare For Hot Leg</u> <u>Recirculation</u>	
	a. Check hot leg injection valves in the following position: <ul style="list-style-type: none"> o MOV-856B - CLOSED o MOV-856F - CLOSED 	a. Place valve switches in proper position.
	b. Dispatch NPO to energize cold leg and hot leg injection valves: <ul style="list-style-type: none"> o MOV-856A (MCC 26A) o MOV-856C (MCC 26A) o MOV-856F (MCC 26A) o MOV-856D (MCC 26B) o MOV-856E (MCC 26B) o MOV-856B (MCC 26B) 	b. Close circuit breakers as necessary.
	c. Check RHR spray header isolation valves - CLOSED: <ul style="list-style-type: none"> o MOV-889A o MOV-889B 	c. Manually close valves.
24.	<u>At 6.5 Hours After Event</u> <u>Initiation. Go To 2-ES-1.4.</u> <u>TRANSFER TO HOT LEG</u> <u>RECIRCULATION. Step 1</u>	
25.	<u>Evaluate Long Term Plant Status</u>	
	a. Consult TSC	
	-END-	

FOLDOUT PAGE FOR 2-E-1

1. **RCP TRIP CRITERIA:**

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. **SI TERMINATION CRITERIA:**

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. **SI REINITIATION CRITERIA:**

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. **SECONDARY INTEGRITY CRITERIA:**

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA:**

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION CRITERION:**

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **AFW SUPPLY SWITCHOVER CRITERION:**

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-E-1	LOSS OF REACTOR OR SECONDARY COOLANT	REV. 0

ATTACHMENT 1
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS		554 KW	
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP		384 KW	
23 AFW PUMP			384 KW
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT		250 KW	
25 FAN COOLER UNIT			250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW 316 KW	
23 SI PUMP			345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

-END-

FOLDOUT PAGE FOR 2-E-1

1. RCP TRIP CRITERIA:

IF BOTH conditions listed below occur, trip all RCPs:

- a. SI pumps - AT LEAST ONE RUNNING
- b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)

2. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - STABLE OR INCREASING
 - GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

3. SI REINITIATION CRITERIA:

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

- PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

4. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 4/12/08

2-ES-1.1, Revision: 1

SI TERMINATION

2

Approved By:

Cyril Pe

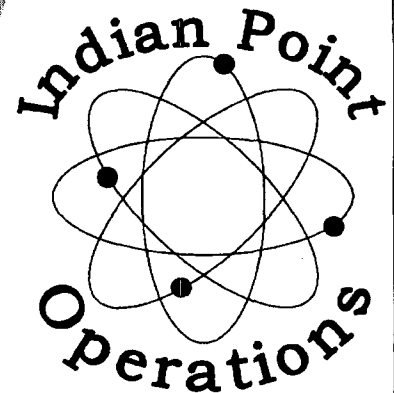
Procedure Sponsor, RPO/ Designee

4/12/08

Date

Team P

Procedure Owner



EDITORIAL REVISION

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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A. PURPOSE

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

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from: .

- 1) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 16, and 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 11, when specified termination criteria are satisfied.
- 2) 2-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 30, after heat sink has been reestablished and SI has been terminated.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

o Containment radiation levels greater than 1E5 R/hr.

- OR -

o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none">* o If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. ** o Overriding breaker anti-pump/lockout may require placing control switches to TRIP or may require Containment Spray Reset ** o FRPs should <u>NOT</u> be implemented prior to completion of 2-E-0, REACTOR TRIP OR SAFETY INJECTION, ATTACHMENT 1, AUTOMATIC ACTION VERIFICATION. ** o Placing key switches to DEFEAT will prevent auto SI actuation. * <p>*****</p>			
1.	<p><u>Reset SI:</u></p> <table border="0"><tr><td style="vertical-align: top;"><ul style="list-style-type: none">a. Check all CCW pumps - RUNNINGb. Place controls for main AND bypass feedwater regulating valves to CLOSEc. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:<ul style="list-style-type: none">o Train A SIA-1o Train B SIA-2d. One at a time, depress Safety Injection reset buttons (Panel SB-2)<ul style="list-style-type: none">o Train Ao Train Be. Verify Train A AND B - RESET</td><td style="vertical-align: top;"><ul style="list-style-type: none">a. Place non-running CCW pumps CCR control switches in PULLOUT.e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):<ul style="list-style-type: none">o SIA-1o SIM-1o SIA-2o SIM-2</td></tr></table>		<ul style="list-style-type: none">a. Check all CCW pumps - RUNNINGb. Place controls for main AND bypass feedwater regulating valves to CLOSEc. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:<ul style="list-style-type: none">o Train A SIA-1o Train B SIA-2d. One at a time, depress Safety Injection reset buttons (Panel SB-2)<ul style="list-style-type: none">o Train Ao Train Be. Verify Train A AND B - RESET	<ul style="list-style-type: none">a. Place non-running CCW pumps CCR control switches in PULLOUT.e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):<ul style="list-style-type: none">o SIA-1o SIM-1o SIA-2o SIM-2
<ul style="list-style-type: none">a. Check all CCW pumps - RUNNINGb. Place controls for main AND bypass feedwater regulating valves to CLOSEc. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:<ul style="list-style-type: none">o Train A SIA-1o Train B SIA-2d. One at a time, depress Safety Injection reset buttons (Panel SB-2)<ul style="list-style-type: none">o Train Ao Train Be. Verify Train A AND B - RESET	<ul style="list-style-type: none">a. Place non-running CCW pumps CCR control switches in PULLOUT.e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):<ul style="list-style-type: none">o SIA-1o SIM-1o SIA-2o SIM-2			

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	<u>Reset Containment Isolation</u> <u>Phase A And Phase B:</u> <ol style="list-style-type: none"> a. Place IVSW switches to OPEN on SN panel: <ol style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel c. Verify personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel d. Place control switches for all remaining Phase A isolation valves to CLOSE on SN panel e. One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B f. Verify Train A AND B - RESET 	f. <u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u> : <ol style="list-style-type: none"> 1) Place key switches to BYPASS. 2) One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B <p><u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.</p>
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	g. Check Phase B - ACTUATED	g. Go To Step 3.
	h. Containment pressure - LESS THAN 17 PSIG	h. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 2i, 2j and 2k. 2) Continue with Step 3.
	i. One At A Time, Depress Containment Spray Reset Pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	j. One at a time, depress Phase B reset buttons: o CI Phase B Train A o CI Phase B Train B	
	k. Verify Train A AND B - RESET	k. Verify Relays reset (Top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2): o S1 o S2 o CB1 o CB2
3.	<u>Establish Instrument Air To Containment:</u> a. Open PCV-1228	a. Verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset: o CA1 o CA2

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>STOP SI Pumps AND PLACE In AUTO:</u> a. STOP SI pumps AND PLACE in AUTO b. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST c. STOP RHR pumps AND PLACE in AUTO	b. GO To Step 5.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated</p> <p>* prior to performing local actions.</p> <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of 480V equipment load ratings.</p>	
5.	<p><u>Check If Charging Flow Has Been Established:</u></p> <p>a. Charging pumps - AT LEAST ONE RUNNING</p> <p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p>o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p>o MOV-250A, MCC 26AA, A2</p> <p>o MOV-250C, MCC 26AA, B2</p> <p>o MOV-250B, MCC 26BB, L3</p> <p>o MOV-250D, MCC 26BB, M3</p> <p style="text-align: center;">- OR -</p> <p>o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):</p> <p>o 241A</p> <p>o 241B</p> <p>o 241C</p> <p>o 241D</p> <p>2) Start charging pump(s) as necessary.</p> <p>b. Establish charging flow as necessary:</p> <p>1) Verify speed controller in MANUAL</p> <p>2) Adjust charging pump speed</p>	

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⑦ 7.	<u>Check If Containment Spray Should Be Stopped:</u>	
	a. Spray pumps - RUNNING	a. Go to Step 8.
	b. Containment pressure - LESS THAN 17 PSIG	b. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 7c through 7f. 2) Continue with Step 8.
	c. One at a time, depress containment spray reset pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	d. Containment area radiation - NORMAL o R-25, R-26 o R-41, R-42 o R-2, R-7	d. Perform the following: 1) <u>WHEN</u> containment spray has been in service for 3.5 hours, <u>THEN</u> do Steps 7e and 7f. 2) Go to Step 8.
	e. Stop containment spray pumps and place in AUTO	
	f. Close containment spray pump discharge valves: o MOV-866A o MOV-866B o MOV-866C o MOV-866D	

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Verify All Control Rods Fully Inserted:</u>	
	a. Check IRPI Indicators - ENERGIZED	a. Implement 2-SOP-3.2, REACTOR COOLANT SYSTEM BORON CONCENTRATION CONTROL.
	b. Check IRPI Indicators - ALL RODS LESS THAN 7.5 INCHES	b. Check all rod positions LESS THAN 12 STEPS using PICS. Refer to ATTACHMENT 2.
		1) <u>IF</u> 2 <u>OR</u> more rod positions are greater than 12 steps withdrawn <u>OR</u> can <u>NOT</u> be determined, <u>THEN</u> emergency borate 255 PPM/Rod not fully inserted:
		a) Open emergency boration valve:
		o MOV-333
		b) Place both boric acid pumps in high speed mode.
		c) Place charging pump control(s) in MAN.
		d) Establish a minimum charging flow of 75 GPM.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. Check If Letdown Can Be Established:

a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)

b. CCW pumps - ANY RUNNING

a. Continue with Step 10. WHEN level increases to greater than 28% (47% for ADVERSE CONTAINMENT), THEN do Steps 9b through 9d.

b. Perform the following:

1) Check for adequate power to run one CCW pump:

o Any 480V bus supplying CCW pump energized from offsite power.

- OR -

o Load on any running diesel generator less than 1775 KW.

IF NOT, THEN go to Step 10.

2) Start one CCW pump.

IF no CCW pump can be started, THEN go to Step 10.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Service water pumps - ANY RUNNING ON NON-ESSENTIAL HEADER</p> <p>d. Establish letdown:</p> <ol style="list-style-type: none"> 1) Close letdown orifice stops: <ul style="list-style-type: none"> o 200A o 200B o 200C 2) Open letdown line isolation valves 201 and 202 3) Place letdown flow control valves 200 A B C switch to REMOTE 4) Open letdown stop valve LCV 459 and return to AUTO 5) Place low pressure letdown backpressure controller PCV-135 in MANUAL and adjust to 75 percent open 6) Open letdown orifice stops to establish desired flow: <ul style="list-style-type: none"> o 200A, 75 gpm o 200B, 45 gpm o 200C, 75 gpm 7) Set PCV-135 to maintain pressure between 225 psig and 275 psig 8) Place PCV-135 in AUTO 	<p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Check for adequate power to run one service water pump on non-essential header: <ul style="list-style-type: none"> o Any 480V bus energized from offsite power. <p>- OR -</p> <ul style="list-style-type: none"> o Load on any running diesel generator less than 1725 KW. <p><u>IF NOT, THEN</u> go to Step 9d.</p> 2) Start one service water pump on non-essential header. <p>d. Establish excess letdown:</p> <ol style="list-style-type: none"> 1) Establish CCW flow through excess letdown heat exchanger by opening CCW valves: <ul style="list-style-type: none"> o Inlet valves 791,798 o Outlet valves 793,796 2) Position excess letdown diversion valve 215 to NORMAL to direct flow to the VCT. 3) Verify seal water return containment isolation valve 222 open. 4) Verify excess letdown flow control valve HCV-123 closed. 5) Open excess letdown isolation stop valve 213. 6) Slowly open HCV-123 to warmup the excess letdown heat exchanger. 7) Establish desired excess letdown flow using HCV-123. 8) Maintain excess letdown heat exchanger outlet temperature less than 195°F.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<u>Check VCT Makeup Control System:</u>	Adjust controls as necessary.
	a. Makeup set for greater than RCS boron concentration	
	b. Place RCS makeup control switch to START	
11.	<u>Check Charging Pump Suction - ALIGNED TO VCT</u>	Align suction to VCT:
		a. Open charging pump suction valve from VCT and return to AUTO:
		o LCV-112C
		b. Close charging pump suction valve from RWST and return to AUTO:
		o LCV-112B
12.	<u>Transfer Condenser Steam Dump To Pressure Control Mode:</u>	<u>IF</u> condenser <u>NOT</u> available, <u>THEN</u> use SG atmospheric steam dumps.
	a. Check condenser - AVAILABLE	
	b. Place steam dump controller switch to manual and adjust for zero output.	
	c. Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.	
13.	<u>Check RCS Hot Leg Temperatures - STABLE</u>	Control steam dump and total feed flow as necessary to stabilize RCS temperature.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Check RCP Cooling - NORMAL:</u> a. RCP CCW system alarms - CLEARED b. RCP seal injection flow - BETWEEN 6 GPM AND 10 GPM PER RCP	IF all seal cooling has <u>NOT</u> been lost, <u>THEN</u> establish normal cooling to RCPs. Refer to the following as necessary: o 2-SOP-1.3, REACTOR COOLANT PUMP STARTUP <u>AND</u> SHUTDOWN. o 2-SOP-3.1, CHARGING, SEAL WATER, <u>AND</u> LETDOWN CONTROL.
15.	<u>Check If RCP Seal Return Flow Should Be Established:</u> a. RCP thermal barrier ΔP - POSITIVE b. CCW pump - AT LEAST ONE RUNNING c. Establish seal return flow: 1) Check No. 1 seal return valves - OPEN: o 261A o 261B o 261C o 261D 2) Open seal return containment isolation valve: o MOV-222	a. Go to Step 16. b. Go to Step 16. 1) Manually open valves.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>Control PRZR Pressure:</u>	
	a. Maintain pressure stable using PRZR heaters and normal PRZR spray as necessary	<p>a. <u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow. <p><u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⑩17.	<u>Check Intact SG Levels:</u> a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT) b. Control feed flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG. b. <u>IF</u> narrow range level in any SG continues to increase, <u>THEN</u> stop feed flow to that SG.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

ATTACHMENT 1 provides a list of 480V equipment load ratings.

⊕18. Check Status Of 480V Busses:

- | | |
|--|---|
| <p>a. All 480V busses - ENERGIZED BY OFFSITE POWER</p> | <p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p> <p><u>IF</u> necessary, <u>THEN</u> manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o MCCs: <ul style="list-style-type: none"> o MCC 24A o MCC 27A o MCC 29A o Direct Support Facilities personnel to align PAB LIGHTING TRANSFORMER 23. ALTERNATE POWER SUPPLY to TSC per 2-SOP-27.1.5, 480 VOLT SYSTEM, as necessary. o Start one cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans. o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key. |
|--|---|

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o All MCCs as necessary except MCC 28 and MCC 28A o All lighting as necessary o One cable tunnel exhaust fan o Verify radiation monitors R-43/R-44 in service and start PAB ventilation fans o Locally start one 480V switchgear room exhaust fan o IF necessary, defeat fan interlock using bypass key 	<p>Go to Step 19. OBSERVE CAUTION <u>AND</u> NOTE PRIOR TO STEP 19.</p>

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft. switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* If RCP seal cooling had previously been lost, the affected RCP(s) should * <u>NOT</u> be started prior to a status evaluation. * *****</p>											
	<p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p>											
①9.	<p><u>Check RCP Status - 24 RCP RUNNING</u></p>	<p>Perform the following to provide normal PRZR spray:</p> <p>a. <u>IF</u> RVLIS natural circulation range indication less than 100%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level greater than 62% (81% FOR ADVERSE CONTAINMENT) o Increase RCS subcooling based on core exit TCs greater than value obtained from table: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74 (105)</td> </tr> <tr> <td>401 - 800</td> <td>58 (71)</td> </tr> <tr> <td>801 - 1200</td> <td>45 (52)</td> </tr> <tr> <td>1201 - 2500</td> <td>41 (48)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> o Use PRZR heaters, as necessary to saturate the pressurizer water. 	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	74 (105)	401 - 800	58 (71)	801 - 1200	45 (52)	1201 - 2500	41 (48)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	74 (105)											
401 - 800	58 (71)											
801 - 1200	45 (52)											
1201 - 2500	41 (48)											
<p>This Step continued on the next page.</p>												

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>b. <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Reset MCC 28 and MCC 28A. 2) Establish conditions for starting RCP(s) per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION. 3) Start 24 RCP. 4) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow. <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 3 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam from intact SGs.</p>
20.	<p><u>Check If Source Range Detectors Should Be Energized:</u></p> <ol style="list-style-type: none"> a. Check intermediate range flux - LESS THAN 1E-10 AMPS b. Verify source range detectors - ENERGIZED c. Transfer nuclear recorders to source range scale 	<ol style="list-style-type: none"> a. Continue with Step 21. <u>WHEN</u> flux less than 1E-10 amps, <u>THEN</u> do Steps 20b and 20c. b. Manually energize source range detectors.

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21.	<u>Check If Diesel Generators Should Be Stopped:</u>	
	a. Verify 480V busses - ENERGIZED BY OFFSITE POWER	a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.
	b. Locally stop any unloaded diesel generator(s) and place in standby	
22.	<u>Shut Down Unnecessary Plant Equipment And Reset Ventilation:</u>	
	o Verify secondary plant automatic actions:	
	o Heater drain pumps - TRIPPED	
	o 22 condensate pump - TRIPPED	
	o Main and UAT transformer cooling equipment - SHUTDOWN	
	o Reheater steam supply valves - CLOSED	
	o Extraction steam valves - CLOSED	
	o MBFP turbine reheat steam supply non-return valve "A" valves - CLOSED	
	o Circulating water pumps not required	
	o Service water pumps not required	
	o Evaluate secondary plant status and shut down equipment as required	
	o Place main turbine and MBFP turbines on turning gear after shafts stop	
	This Step continued on the next page.	

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> o Reset FCU services and CCR ventilation as necessary: <ul style="list-style-type: none"> a. Place the following control switches in the position indicated: <ul style="list-style-type: none"> o FCU service water valve TCV-1104 - OPEN o FCU service water valve TCV-1105 - OPEN o FCU NORM OUT valves - OPEN o At CCR Panel PY2: <ul style="list-style-type: none"> 1) Place mode selector switch to 2 2) Place the follow switches to CUTOUT: <ul style="list-style-type: none"> o Unit-1 K-8 fan switch (OT2-3) o OT2-1 o OT2-2 b. Depress both reset buttons in racks E-7 and F-8 for each of the following: <ul style="list-style-type: none"> o FCU service water o FCU ventilation o CCR ventilation 	
23.	<u>Maintain Plant Conditions - STABLE:</u> <ul style="list-style-type: none"> o PRZR pressure o PRZR level o RCS temperatures o Intact SG levels 	

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. Verify SI System Flow NOT Required:

a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

b. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT).

a. Manually start SI system pumps as necessary. Go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

b. Control charging flow to maintain PRZR level. IF PRZR level can NOT be maintained, THEN manually start SI system pumps as necessary. Go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

25. Go To 2-POP-3.2 PLANT RECOVERY FROM TRIP, HOT STANDBY

-END-

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

ATTACHMENT 1
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG	22 DG		23 DG
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 SERVICE WATER PUMP	282 KW			
22 SERVICE WATER PUMP		282 KW OR 282 KW		
23 SERVICE WATER PUMP				282 KW
24 SERVICE WATER PUMP	282 KW			
25 SERVICE WATER PUMP		282 KW OR 282 KW		
26 SERVICE WATER PUMP				282 KW
PRZR CONTROL HEATERS				277 KW
21 PRZR BU HEATERS			554 KW	
22 PRZR BU HEATERS		485 KW		
23 PRZR BU HEATERS	485 KW			
21 AFW PUMP			384 KW	
23 AFW PUMP				384 KW
21 FAN COOLER UNIT	250 KW			
22 FAN COOLER UNIT	250 KW			
23 FAN COOLER UNIT		250 KW		
24 FAN COOLER UNIT			250 KW	
25 FAN COOLER UNIT				250 KW
21 SI PUMP	316 KW			
22 SI PUMP		316 KW	316 KW	
23 SI PUMP				345 KW
21 SPRAY PUMP	350 KW			
22 SPRAY PUMP				350 KW
21 RHR PUMP			303 KW	
22 RHR PUMP				303 KW
21 CHARGING PUMP	150 KW			
22 CHARGING PUMP			150 KW	
23 CHARGING PUMP				150 KW
21 RECIRC PUMP	299 KW			
22 RECIRC PUMP				299 KW
21 CCW PUMP	228 KW			
22 CCW PUMP		228 KW		
23 CCW PUMP				228 KW
21 LIGHTING TRANSFORMER		150 KW (N)		150 KW (E)
22 LIGHTING TRANSFORMER			225 KW	
23 LIGHTING TRANSFORMER	225 KW			
TURBINE AUX OIL PUMP				112 KW
STATION AIR COMPRESSOR	93 KW			

-END-

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.1	SI TERMINATION	REV. 1

ATTACHMENT 2 (Attachment page 1 of 1)
OBTAINING PICS ROD POSITION INDICATION

1. Obtain PICS Rod Position Indication by the following method:
 - o Obtain PICS Rod Indication from any screen:
 - a) Depress CANC on screen using mouse or depress Esc key on keyboard
 - b) Depress NSSS and BOP on screen using mouse
 - c) Depress ROD SUPERVISION on screen using mouse
 - d) Depress ALL ROD view or INDIVIDUAL BANK on screen using mouse
 - e) Check all rods less than 12 steps withdrawn

-END-

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.1	Title: SI TERMINATION	Revision Number: REV. 1
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ATTACHMENT 3
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE or DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-1.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs following SI termination, manually start SI system pumps as necessary AND go to 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



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Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-1.2, Revision: 0

POST LOCA COOLDOWN AND DEPRESSURIZATION

2

Approved By:

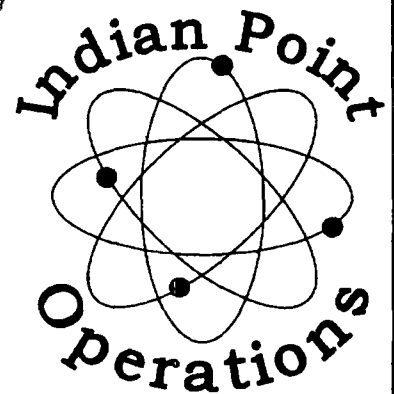
M. J. M. H.

Procedure Sponsor, RPO/ Designer

5/3/07
Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

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. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 17, when RCS pressure is greater than the shutoff head pressure of the RHR pumps.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of 480V equipment load ratings.</p>		
<p>⊛ 1. <u>Check Status Of 480V Busses:</u></p>	<p>a. All 480V busses - ENERGIZED BY OFFSITE POWER</p>	<p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p> <p><u>IF</u> necessary, <u>THEN</u> perform the following:</p> <p>1) Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o MCCs: <ul style="list-style-type: none"> o MCC 24A o MCC 27A o MCC 29A o Direct Support Facilities personnel to align lighting to PAB LIGHTING TRANSFORMER 23 ALTERNATE POWER SUPPLY to TSC bus per 2-SOP-27.1.5, 480 VOLT SYSTEM, as necessary. o Start one cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans.
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<ul style="list-style-type: none"> o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key.
		2) Verify adequate diesel capacity to run charging pumps. <u>IF</u> necessary, shed sufficient non-essential loads.
		Go to Step 2.
	<p>b. Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o All MCCs as necessary except MCC 28 and MCC 28A o All lighting as necessary o One cable tunnel exhaust fan o Verify radiation monitors R-43/R-44 in service and start PAB ventilation fans o Locally start one 480V switchgear room exhaust fan o IF necessary, defeat fan interlock using bypass key 	
2.	<u>Deenergize PRZR Heaters:</u>	
	<p>a. Place all PRZR heater switches in OFF position</p>	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* RCS pressure should be monitored. If RCS pressure decreases in an</p> <p>* uncontrolled manner to less than 320 psig (340 psig FOR ADVERSE</p> <p>* CONTAINMENT), the RHR pumps must be manually restarted to supply water to</p> <p>* the RCS.</p> <p>*****</p>											
③ 3.	<p><u>Check If RHR Pumps Should Be Stopped:</u></p> <table border="0"> <tr> <td>a. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST</td> <td>a. Go to Step 4.</td> </tr> <tr> <td>b. Check RCS pressure:</td> <td>b. Go to Step 4.</td> </tr> <tr> <td> 1) Pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)</td> <td></td> </tr> <tr> <td> 2) Pressure - STABLE OR INCREASING</td> <td></td> </tr> <tr> <td>c. Stop RHR pumps and place in AUTO</td> <td></td> </tr> </table>		a. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST	a. Go to Step 4.	b. Check RCS pressure:	b. Go to Step 4.	1) Pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)		2) Pressure - STABLE OR INCREASING		c. Stop RHR pumps and place in AUTO	
a. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST	a. Go to Step 4.											
b. Check RCS pressure:	b. Go to Step 4.											
1) Pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)												
2) Pressure - STABLE OR INCREASING												
c. Stop RHR pumps and place in AUTO												

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none">* o If RWST level decreases to less than 15 ft, charging pumps that are* started or running should be monitored for loss of suction which may* result in pump damage.* o Radiation levels and harsh environment conditions should be evaluated* prior to performing local actions.* o <p>*****</p>		
4.	<u>Establish Charging Flow:</u>	
a.	Charging pumps - AT LEAST ONE RUNNING	a. Perform the following: <ul style="list-style-type: none">1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:<ul style="list-style-type: none">o Locally energize <u>AND</u> close seal injection isolation valves:<ul style="list-style-type: none">o MOV-250A, MCC 26AA, A2o MOV-250C, MCC 26AA, B2o MOV-250B, MCC 26BB, L3o MOV-250D, MCC 26BB, M3- OR -o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):<ul style="list-style-type: none">o 241Ao 241Bo 241Co 241D2) Start charging pump(s) as necessary.
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. Align charging pump suction to RWST:</p> <ol style="list-style-type: none"> 1) Open charging pump suction valve from RWST: <ul style="list-style-type: none"> o LCV-112B 2) Close charging pump suction valve from VCT: <ul style="list-style-type: none"> o LCV-112C 3) Place RCS Makeup Control switch to STOP <p>c. Establish maximum flow:</p> <ol style="list-style-type: none"> 1) Start additional charging pump(s) 2) Verify speed controllers in MANUAL 3) Open HCV-142 as necessary and adjust charging pump speed controllers for maximum flow 	
⊕ 5.	<u>Check Intact SG Levels:</u>	
	<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control feed flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown <u>AND</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p>

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

Shutdown margin from graphs book should be monitored during RCS cooldown.

6. Initiate RCS Cooldown To Cold Shutdown:

- a. 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 SG(s):
 - 1) Check condenser - AVAILABLE
 - 2) Place steam dump controller switch to manual and adjust for zero output.
 - 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.
- c. Dump steam using intact SG(s) atmospheric steam dumps.

7. Check RCS Subcooling Based On Core Exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

Go to Step 16.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Check SI System Pump Status:</u> <ul style="list-style-type: none"> o SI pumps - ANY RUNNING - OR - o RHR pumps - ANY RUNNING IN SI MODE 	Go to Step 12.
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>The upper head region may void during RCS depressurization if RCPs are not running. This will result in a rapidly increasing PRZR level.</p> </div>		
9.	<u>Depressurize RCS To Refill PRZR:</u> <ul style="list-style-type: none"> a. Use normal PRZR spray 	<ul style="list-style-type: none"> a. Use one PRZR PORV. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray: <ul style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		6) Open auxiliary spray valve: o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow.
	b. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)	b. Continue with Step 10. OBSERVE CAUTION AND NOTE PRIOR TO STEP 10. <u>WHEN</u> level greater than 28% (47% FOR ADVERSE CONTAINMENT), <u>THEN</u> do Step 9c.
	c. Stop RCS depressurization	
	<div style="border: 1px dashed black; padding: 10px; text-align: center;"> <p>*****</p> <p><u>CAUTION</u></p> <p>*****</p> <p>* If RCP seal cooling had previously been lost, the affected RCP(s) should</p> <p>* <u>NOT</u> be started prior to a status evaluation.</p> <p>*****</p> </div>	
	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p> </div>	
10.	<u>Check If An RCP Should Be Started:</u>	
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>a. All RCPs - STOPPED</p> <p>b. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"><thead><tr><th>WR RCS PRESSURE (PSIG)</th><th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th></tr></thead><tbody><tr><td>0 - 400</td><td>52 (83)</td></tr><tr><td>401 - 800</td><td>36 (49)</td></tr><tr><td>801 - 1200</td><td>23 (30)</td></tr><tr><td>1201 - 2500</td><td>19 (26)</td></tr></tbody></table> <p>c. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)</p> <p>d. Try to start 24 RCP:</p> <ol style="list-style-type: none">1) Check containment conditions - <u>NOT</u> ADVERSE2) Check containment sump level - LESS THAN 42'10 1/2"3) Reset MCC 28 and MCC 28A4) Establish conditions for starting RCP(s) per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION5) Start 24 RCP	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. Perform the following:</p> <ol style="list-style-type: none">1) Stop all but 24 RCP.2) <u>IF</u> 24 RCP already stopped, <u>THEN ONLY</u> stop RCP(s) <u>NOT</u> required to provide PRZR spray.3) Go to Step 11. OBSERVE NOTE PRIOR TO Step 11. <p>b. Go to Step 16.</p> <p>c. Return to Step 9. OBSERVE NOTE PRIOR TO STEP 9.</p> <p>d. <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow <u>AND</u> go to Step 11. OBSERVE NOTE PRIOR TO STEP 11.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE

After stopping any SI pump, RCS pressure should be allowed to stabilize or increase before stopping another SI pump.

11. Check If One SI Pump Should Be Stopped:

a. Any SI pump - RUNNING

b. Determine required RCS subcooling from table:

a. IF RHR pump running in SI mode, THEN go to Step 16, IF NOT, THEN go to Step 12.

RCS SUBCOOLING °F (ADVERSE CONTAINMENT°F)						
CHARGING PUMP STATUS	ANY RCP RUNNING			NO RCP RUNNING		
	ONE SI PUMP RUNNING	TWO SI PUMPS RUNNING	THREE SI PUMPS RUNNING	ONE SI PUMP RUNNING	TWO SI PUMPS RUNNING	THREE SI PUMPS RUNNING
NONE RUNNING	DO NOT STOP SI PUMP	127 (146)	61 (81)	DO NOT STOP SI PUMP	138 (154)	69 (85)
ONE RUNNING	274 (286)	119 (137)	59 (76)	274 (286)	130 (146)	68 (83)
TWO RUNNING	247 (261)	111 (129)	58 (74)	250 (264)	122 (137)	66 (82)
THREE RUNNING	209 (228)	105 (123)	57 (73)	219 (235)	115 (131)	64 (80)

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. RCS subcooling based on core exit TCs - GREATER THAN REQUIRED SUBCOOLING	c. <u>IF</u> RCS hot leg temperatures greater than 345°F (335°F FOR ADVERSE CONTAINMENT), <u>THEN</u> go to Step 16. <u>IF</u> RCS hot leg temperatures less than 345°F (335°F FOR ADVERSE CONTAINMENT), <u>THEN</u> start one RHR pump if none running. <u>IF</u> at least one RHR pump can <u>NOT</u> be started, <u>THEN</u> go to Step 16.
	d. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)	d. Return to Step 9. OBSERVE NOTE PRIOR TO STEP 9.
	e. Stop one additional SI pump	
	f. Return to Step 11a	
12.	<u>Check If Charging Flow Should Be Controlled To Maintain PRZR Level:</u>	
	a. Check RHR pumps - NONE RUNNING IN SI MODE	a. Go to Step 16.
	b. Control charging flow to maintain PRZR level	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3' TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
<p style="text-align: center;">***** <u>CAUTION</u> *****</p> <p>If RCP seal cooling had previously been lost, the affected RCP(s) should <u>NOT</u> be started prior to a status evaluation.</p> <p style="text-align: center;">*****</p>												
<p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p>												
<p>⊙13. <u>Check RCP Status:</u></p> <p>a. 24 RCP - RUNNING</p>	<p>a. Start RCP(s) to provide normal PRZR spray as follows:</p> <p>1) <u>IF</u> RVLIS natural circulation range indication less than 100%, <u>THEN</u> perform the following:</p> <p>o Increase PRZR level to greater than 62% (81% FOR ADVERSE CONTAINMENT).</p> <p>o Increase RCS subcooling based on core exit TCs to greater than value obtained from table:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74 (105)</td> </tr> <tr> <td>401 - 800</td> <td>58 (71)</td> </tr> <tr> <td>801 - 1200</td> <td>45 (52)</td> </tr> <tr> <td>1201 - 2500</td> <td>41 (48)</td> </tr> </tbody> </table>		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	74 (105)	401 - 800	58 (71)	801 - 1200	45 (52)	1201 - 2500	41 (48)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	74 (105)											
401 - 800	58 (71)											
801 - 1200	45 (52)											
1201 - 2500	41 (48)											
<p>This Step continued on the next page.</p>												

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>o Use PRZR heaters, as necessary to saturate the pressurizer water.</p> <p>2) <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <p>a) Reset MCC 28 and MCC 28A.</p> <p>b) Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.</p> <p>c) Start 24 RCP.</p> <p>d) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 2 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	<p>b. Stop all RCP(s) NOT required to supply ONE PRZR spray path</p>	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <p style="text-align: center;">* If SI has been terminated, the SI accumulators should be isolated prior to depressurizing the RCS to less than 700 psig. *</p> <p style="text-align: center;">*****</p>			
	<p style="text-align: center;"><u>NOTE</u></p> <p style="text-align: center;">The upper head region may void during RCS depressurization if RCPs are not running. This will result in a rapidly increasing PRZR level.</p>			
14.	<p><u>Depressurize RCS To Minimize RCS Subcooling:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Use normal PRZR spray</p> </td> <td style="vertical-align: top;"> <p>a. Use one PRZR PORV. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B </td> </tr> </table>		<p>a. Use normal PRZR spray</p>	<p>a. Use one PRZR PORV. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B
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<p>This Step continued on the next page.</p>				

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number: 2-ES-1.2	Title: POST LOCA COOLDOWN AND DEPRESSURIZATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. Turn on PRZR heaters as necessary</p> <p>c. Depressurize RCS until either of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT) - OR - o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE: <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>62 (93)</td> </tr> <tr> <td>401 - 800</td> <td>46 (59)</td> </tr> <tr> <td>801 - 1200</td> <td>33 (40)</td> </tr> <tr> <td>1201 - 2500</td> <td>29 (36)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	62 (93)	401 - 800	46 (59)	801 - 1200	33 (40)	1201 - 2500	29 (36)	<p>6) Open auxiliary spray valve:</p> <ul style="list-style-type: none"> o 212 <p>7) Initiate spray slowly using HCV-142.</p> <p>8) Adjust charging pump speed to increase spray flow.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	62 (93)											
401 - 800	46 (59)											
801 - 1200	33 (40)											
1201 - 2500	29 (36)											
15.	<p><u>Verify Adequate Shutdown Margin:</u></p> <p>a. Sample RCS</p> <p>b. Shutdown margin from graphs book - ADEQUATE</p>	<p>b. Borate as necessary.</p>										

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
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Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft. go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) <p>d. Close all SI accumulator isolation valves</p>	<p>d. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <ul style="list-style-type: none"> o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves: <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	<p>e. Open all SI accumulator isolation valve breakers</p>	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	<u>Check If Diesel Generators Should Be Stopped:</u>	
	a. Verify 480V busses - ENERGIZED BY OFFSITE POWER	a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.
	b. Locally stop any unloaded diesel generator(s) and place in standby	
19.	<u>Check RCP Cooling - NORMAL:</u>	<u>IF</u> all seal cooling has <u>NOT</u> been lost, <u>THEN</u> establish normal cooling to RCPs. Refer to the following as necessary:
	a. RCP CCW system alarms - CLEARED	
	b. RCP seal injection flow - BETWEEN 6 GPM AND 10 GPM PER RCP	o 2-SOP-1.3, REACTOR COOLANT PUMP STARTUP <u>AND</u> SHUTDOWN.
		o 2-SOP-3.1, CHARGING, SEAL WATER, <u>AND</u> LETDOWN CONTROL.
20.	<u>Check If RCP Seal Return Flow Should Be Established:</u>	
	a. RCP thermal barrier ΔP - POSITIVE	a. Go to Step 21.
	b. CCW pumps - AT LEAST ONE RUNNING	b. Go to Step 21.
	c. Establish seal return flow:	
	1) Check No. 1 seal return valves - OPEN:	1) Manually open valves.
	o 261A	
	o 261B	
	o 261C	
	o 261D	
	2) Open seal return containment isolation valve:	
	o MOV-222	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛21.	<u>Check If RCPs Must Be Stopped:</u>	
	<ul style="list-style-type: none"> a. Check the following: <ul style="list-style-type: none"> o Number 1 seal differential pressure - LESS THAN 200 PSID - OR - o Number 1 seal return flow - LESS THAN 0.2 GPM b. Stop affected RCP(s) 	<ul style="list-style-type: none"> a. <u>IF</u> neither condition satisfied, <u>THEN</u> go to Step 22.
22.	<u>Check If Source Range Detectors Should Be Energized:</u>	
	<ul style="list-style-type: none"> a. Check intermediate range flux - LESS THAN 1E-10 AMPS b. Verify source range detectors - ENERGIZED c. Transfer nuclear recorders to source range scale 	<ul style="list-style-type: none"> a. Continue with Step 23. <u>WHEN</u> flux less than 1E-10 amps, <u>THEN</u> do Steps 22b and 22c. b. Manually energize source range detectors.
23.	<u>Shut Down Unnecessary Plant Equipment:</u>	
	<ul style="list-style-type: none"> o Circulating water pumps not required o Service water pumps not required o Evaluate secondary plant status and shut down equipment as required 	

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

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2-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.

24. Check If RHR System Can Be Placed In Service:

- | | |
|---|--------------------------|
| <p>a. Check both the following:</p> <ul style="list-style-type: none"> o RCS temperatures - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT) <p>b. Consult TSC to determine if RHR System should be placed in service</p> | <p>a. Go to Step 25.</p> |
|---|--------------------------|

25. Check Containment Hydrogen Concentration:

- | | |
|---|--|
| <p>a. Obtain a hydrogen concentration measurement:</p> <ul style="list-style-type: none"> o Dispatch chemistry personnel to obtain sample <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o Use H2-O2 analyzer on Accident Assessment Panel <p>b. Hydrogen concentration - LESS THAN 3.0% IN DRY AIR</p> | <p>b. Consult TSC for additional recovery actions.</p> |
|---|--|

26. Check RCS Temperatures - LESS THAN 200°F

Return to Step 3. OBSERVE CAUTION PRIOR TO STEP 3.

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
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IF EITHER condition listed below occurs, manually start SI system pumps as necessary:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
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ATTACHMENT 1
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG	22 DG		23 DG
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 SERVICE WATER PUMP	282 KW			
22 SERVICE WATER PUMP		282 KW OR 282 KW		
23 SERVICE WATER PUMP				282 KW
24 SERVICE WATER PUMP	282 KW			
25 SERVICE WATER PUMP		282 KW OR 282 KW		
26 SERVICE WATER PUMP				282 KW
PRZR CONTROL HEATERS				277 KW
21 PRZR BU HEATERS			554 KW	
22 PRZR BU HEATERS		485 KW		
23 PRZR BU HEATERS	485 KW			
21 AFW PUMP			384 KW	
23 AFW PUMP				384 KW
21 FAN COOLER UNIT	250 KW			
22 FAN COOLER UNIT	250 KW			
23 FAN COOLER UNIT		250 KW		
24 FAN COOLER UNIT			250 KW	
25 FAN COOLER UNIT				250 KW
21 SI PUMP	316 KW			
22 SI PUMP		316 KW	316 KW	
23 SI PUMP				345 KW
21 SPRAY PUMP	350 KW			
22 SPRAY PUMP				350 KW
21 RHR PUMP			303 KW	
22 RHR PUMP				303 KW
21 CHARGING PUMP	150 KW			
22 CHARGING PUMP			150 KW	
23 CHARGING PUMP				150 KW
21 RECIRC PUMP	299 KW			
22 RECIRC PUMP				299 KW
21 CCW PUMP	228 KW			
22 CCW PUMP		228 KW		
23 CCW PUMP				228 KW
21 LIGHTING TRANSFORMER		150 KW (N)		150 KW (E)
22 LIGHTING TRANSFORMER			225 KW	
23 LIGHTING TRANSFORMER	225 KW			
TURBINE AUX OIL PUMP				112 KW
STATION AIR COMPRESSOR	93 KW			

-END-

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. E-3 TRANSITION CRITERIA:

IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Number:	Title:	Revision Number:
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ATTACHMENT 2
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-1.2

1. SI TERMINATION CRITERIA:

IF ALL conditions listed below occur, go to 2-ES-1.1, SI TERMINATION:

- a. RCS subcooling based on core exit TCs - GREATER THAN 19°F (26°F FOR ADVERSE CONTAINMENT)
- b. Total feed flow to intact SGs - GREATER THAN 400 gpm
-OR-
Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)
- c. RCS pressure:
 - o STABLE OR INCREASING
 - o GREATER THAN 1660 PSIG (1690 PSIG FOR ADVERSE CONTAINMENT)
- d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

2. SI REINITIATION CRITERIA:

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

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

3. SECONDARY INTEGRITY CRITERIA:

IF any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, go to 2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

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IF any SG level increases in an uncontrolled manner or any SG has abnormal radiation, manually start SI system pumps as necessary and go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.



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Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 11-9-07

2-ES-1.3, Revision: 1

TRANSFER TO COLD LEG RECIRCULATION

2

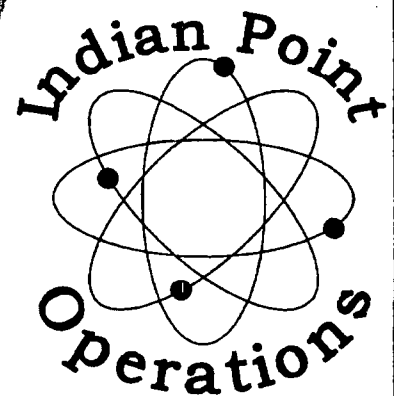
Approved By:

2 PARKS For JOHN DANIEL 11-9-07

Procedure Sponsor, RPO/ Designer

Date

Team P
Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

A. PURPOSE

This procedure provides the necessary instructions for transferring the safety injection system and containment spray system to the recirculation mode.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 18, on low RWST level.
- 2) 2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 8, on low RWST level.
- 3) Other procedures, whenever RWST level reaches the switchover setpoint.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o SI system recirculation flow to RCS must be maintained at all times. * o If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. * o Overriding breaker anti-pump/lockout may require placing control switches to TRIP or may require Containment Spray Reset * o Switchover to recirculation may cause high radiation in the PAB. * o Placing key switches to DEFEAT will prevent auto SI actuation. * o Foldout page contains criteria for transition to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1 whenever ALL trains of recirculation are affected by sump blockage. <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>Steps 1 through 40 should be performed without delay. FRPs should <u>NOT</u> be implemented prior to completion of these steps.</p>	
1.	<p><u>Determine If Transfer To Cold Leg Recirculation Is Required:</u></p> <ul style="list-style-type: none"> o Check BOTH RWST Low Low Level alarms - LIT o Containment Level - TRENDING UPWARDS (LR-3300/LR-3301) 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> VC level is GREATER THAN 46' 8 1/2" on LI-941, <u>THEN</u> GO To Step 2. b. Go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	<u>Reset SI if necessary:</u>	
	a. Check all CCW pumps - RUNNING	a. Place non-running CCW pumps CCR control switches in PULLOUT.
	b. Place controls for main AND bypass feedwater regulating valves to CLOSE	
	c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:	
	o Train A SIA-1	
	o Train B SIA-2	
	d. One at a time, depress Safety Injection reset buttons (Panel SB-2)	
	o Train A	
	o Train B	
	e. Verify Train A AND B - RESET	e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):
		o SIA-1
		o SIM-1
		o SIA-2
		o SIM-2
3.	<u>Establish Service Water Flow To CCW Heat Exchangers:</u>	
	a. Dispatch NPO to fully open CCW heat exchanger SW outlet valves:	
	o SWN-35	
	o SWN-35-1	

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Any pumps taking suction from RWST should be stopped if RWST level decreases to:</p> <ul style="list-style-type: none"> o 3.0 ft for SI, RHR and charging pumps. o 2.0 ft for containment spray pumps. <p>*****</p>	
4.	<u>Reduce 480V Bus Loads:</u>	
	<ul style="list-style-type: none"> a. Stop all charging pumps b. Turn off all PRZR heaters 	
5.	<u>One At A Time, Depress Containment Spray Reset Pushbuttons:</u>	
	<ul style="list-style-type: none"> o Spray SYS Reset Train A o Spray SYS Reset Train B 	
6.	<u>Place Safety Injection Recirc Switches 1 AND 3 To ON:</u>	
	<ul style="list-style-type: none"> a. Check 22 SI pump - STOPPED b. Check 21 containment spray pump - STOPPED c. Check RHR pumps - BOTH STOPPED 	<ul style="list-style-type: none"> a. <u>IF</u> three SI pumps running, <u>THEN</u> stop 22 SI pump. b. <u>IF</u> both pumps running, <u>THEN</u> place 21 containment spray pump in PULLOUT. c. Manually trip BOTH RHR pumps.

LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Align Service Water System As Follows:</u> a. Check service water system - ALIGNED FOR THREE HEADER OPERATION b. Verify following valves - CLOSED: o SWN-4 o SWN-5	a. Verify the following valves are closed: o Service water valve pit: o FCV-1111 o FCV-1112 o SWN-6 o SWN-7 o Zurn strainer pit: o SWN-4 o SWN-5 Go to Step 8. OBSERVE NOTE PRIOR TP STEP 8.

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>Diesel load may increase to 2300KW during recirculation switch sequence.</p>		
8.	<p><u>Place Safety Injection Recirc Switch 2 To ON:</u></p> <p>a. Check one service water pump - SUPPLYING NON-ESSENTIAL HEADER</p> <p>b. Check CCW Pumps - THREE RUNNING</p> <p>c. Stop 23 CCW pump</p> <p>d. Function complete light - LIT</p>	<p>a. Manually start one service water pump on NON-essential header in preferred order:</p> <p style="margin-left: 40px;">o 22, 23, 21 if 1-2-3 header NON-essential</p> <p style="text-align: center;">- OR -</p> <p style="margin-left: 40px;">o 25, 26, 24 if 4-5-6 header NON-essential</p> <p>b. Verify at least one CCW pump running (preferred order 22, 21, 23)</p> <p style="margin-left: 40px;">Go to Step 8d.</p> <p>d. Recheck required actions and manually initiate as necessary.</p> <p><u>IF</u> no CCW pumps can be started <u>THEN</u>, verify ACC pumps are running.</p>

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	<u>Place Safety Injection Recirc Switch 4 To ON</u>	
a.	Verify 21 recirculation pump - RUNNING	<p>a. <u>IF</u> 21 pump can <u>NOT</u> be started, <u>THEN</u> manually start 22 recirculation pump.</p> <p><u>IF</u> neither recirculation pump can be started, <u>THEN</u>:</p> <p>1) Perform ATTACHMENT 2.</p> <p>2) <u>WHEN</u> ATTACHMENT 2 is complete, <u>THEN</u> go to Step 11.</p>
b.	Recirculation pump header discharge valves - OPEN	<p>b. Verify at least one valve is STROKING open.</p> <p><u>IF</u> valve is stroking open, <u>THEN</u> go to Step 11.</p> <p><u>IF NOT</u>, <u>THEN</u>:</p> <p>1) Perform ATTACHMENT 2.</p> <p>2) <u>WHEN</u> ATTACHMENT 2 is complete, <u>THEN</u> go to Step 11.</p>
	<ul style="list-style-type: none"> o MOV-1802A o MOV-1802B 	
c.	Function complete light - LIT	c. Recheck required actions and manually initiate as necessary.

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.
 - 1) Indications of sump blockage may include:
 - a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
 - b) SI PUMP LOW PRESSURE alarm on panel SBF-1
 - c) Indication of errrratic or reduced flow
 - d) Abnormal sump level indication

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2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛10.	<p><u>Verify Recirculation Trains NOT Affected By Sump Blockage:</u></p> <p>a. Indications of sump blockage may include:</p> <ol style="list-style-type: none"> 1) LOW HEAD INJECTION LINE LOW FLOW alarm on panel SBF-1 2) SI PUMP SUCTION LOW PRESSURE alarm on panel SBF-1 3) Indication of erratic or reduced flow 4) Abnormal sump level indication 	<p><u>IF</u> both trains are affected such that at least one train of recirculation flow can not be established or maintained, <u>THEN</u> go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.</p>

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED															
11.	<p><u>Determine If Adequate Low Head Recirculation Flow Has Been Established:</u></p> <p>a. Determine required core cooling from table:</p> <table border="1"> <thead> <tr> <th>No. of 946A-D flow meters - INDICATING -</th> <th>Core flow rate with 1 Pump AND 1 RHR HX</th> <th>Core flow rate with 2 Pumps AND/OR 2 RHR HXs</th> </tr> </thead> <tbody> <tr> <td>4</td> <td> 2nd Highest indicator - GREATER THAN 470 gpm OR 2 Middle indicators - SUM GREATER THAN 780 gpm OR 3 Lowest indicators - SUM GREATER THAN 1020 gpm </td> <td> 2nd Highest indicator - GREATER THAN 620 gpm OR 2 Middle indicators - SUM GREATER THAN 910 gpm OR 3 Lowest indicators - SUM GREATER THAN 1110 gpm </td> </tr> <tr> <td>3</td> <td> 2nd Highest indicator - GREATER THAN 470 gpm OR 2 Lowest indicators - SUM GREATER THAN 780 gpm </td> <td> 2nd Highest indicator - GREATER THAN 620 gpm OR 2 Lowest indicators - SUM GREATER THAN 910 gpm </td> </tr> <tr> <td>2</td> <td>EACH GREATER THAN 470 gpm</td> <td>EACH GREATER THAN 620 gpm</td> </tr> <tr> <td>1 or None</td> <td colspan="2">Required core cooling - NOT MET</td> </tr> </tbody> </table> <p>b. Core cooling flow required by table - ESTABLISHED</p>	No. of 946A-D flow meters - INDICATING -	Core flow rate with 1 Pump AND 1 RHR HX	Core flow rate with 2 Pumps AND/OR 2 RHR HXs	4	2nd Highest indicator - GREATER THAN 470 gpm OR 2 Middle indicators - SUM GREATER THAN 780 gpm OR 3 Lowest indicators - SUM GREATER THAN 1020 gpm	2nd Highest indicator - GREATER THAN 620 gpm OR 2 Middle indicators - SUM GREATER THAN 910 gpm OR 3 Lowest indicators - SUM GREATER THAN 1110 gpm	3	2nd Highest indicator - GREATER THAN 470 gpm OR 2 Lowest indicators - SUM GREATER THAN 780 gpm	2nd Highest indicator - GREATER THAN 620 gpm OR 2 Lowest indicators - SUM GREATER THAN 910 gpm	2	EACH GREATER THAN 470 gpm	EACH GREATER THAN 620 gpm	1 or None	Required core cooling - NOT MET		<p>b. <u>IF</u> valves 746 <u>AND</u> 747 BOTH CLOSED, <u>THEN</u> go to Step 25.</p> <p><u>IF NOT, THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Start 22 recirc pump. 2) <u>IF</u> core flow rate required by table can <u>NOT</u> be established, <u>THEN</u>: <ol style="list-style-type: none"> a) <u>IF</u> BOTH recirc pumps running, <u>THEN</u> stop 22 recirc pump. b) Go to Step 25.
No. of 946A-D flow meters - INDICATING -	Core flow rate with 1 Pump AND 1 RHR HX	Core flow rate with 2 Pumps AND/OR 2 RHR HXs															
4	2nd Highest indicator - GREATER THAN 470 gpm OR 2 Middle indicators - SUM GREATER THAN 780 gpm OR 3 Lowest indicators - SUM GREATER THAN 1020 gpm	2nd Highest indicator - GREATER THAN 620 gpm OR 2 Middle indicators - SUM GREATER THAN 910 gpm OR 3 Lowest indicators - SUM GREATER THAN 1110 gpm															
3	2nd Highest indicator - GREATER THAN 470 gpm OR 2 Lowest indicators - SUM GREATER THAN 780 gpm	2nd Highest indicator - GREATER THAN 620 gpm OR 2 Lowest indicators - SUM GREATER THAN 910 gpm															
2	EACH GREATER THAN 470 gpm	EACH GREATER THAN 620 gpm															
1 or None	Required core cooling - NOT MET																

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.
 - 1) Indications of sump blockage may include:
 - a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
 - b) SI PUMP LOW PRESSURE alarm on panel SBF-1
 - c) Indication of erratic or reduced flow
 - d) Abnormal sump level indication

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	<u>Place Safety Injection Recirc Switch 7 To ON:</u>	
	a. Check SI pumps - ALL STOPPED	a. Manually stop pumps.
	b. Function complete light - LIT	b. Recheck required actions and manually initiate as necessary.
13.	<u>Place Safety Injection Recirc Switch 8 To ON:</u>	
	a. Check containment spray pump test line valve - CLOSED:	a. Manually close valve.
	o 1813	
14.	<u>Close SI Test Line Valves To RWST:</u>	
	a. Place interlock switches for SI valves to OFF:	
	o MOV-842	
	o MOV-843	
	b. Close valves:	
	o MOV-842	
	o MOV-843	
15.	<u>Check Recirculation Pumps - AT LEAST ONE RUNNING</u>	<u>IF</u> RHR pump is running for core recirculation, <u>THEN</u> :
		a. Dispatch NPO to energize the following MOVs:
		o MOV-882 on MCC 26B
		o MOV-1810 on MCC 26A
		b. Go to Step 19.
16.	<u>Check All 480V Busses - ENERGIZED</u>	Go to Step 18.

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number: 2-ES-1.3	Title: TRANSFER TO COLD LEG RECIRCULATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> ***** * A second train of recirculation should <u>NOT</u> be started if pump cavitation * due to Sump Blockage is expected. *****</p>		
17.	<p><u>Place Safety Injection Recirc Switch 5 To ON:</u></p> <p>a. Check at least two service water pumps - SUPPLYING NON-ESSENTIAL HEADER</p>	<p>a. Manually start one service water pump on NON-essential header in preferred order:</p> <ul style="list-style-type: none"> o 22, 23, 21 if 1-2-3 header non-essential <li style="text-align: center;">- OR - o 25, 26, 24 if 4-5-6 header non-essential <p><u>IF</u> second service water pump will <u>NOT</u> start, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) <u>IF</u> both recirculation pumps running, <u>THEN</u> stop ONE recirculation pump. 2) Close valve 804 to isolate spent fuel pit heat exchanger.
	<p>b. Check CCW pumps - AT LEAST TWO RUNNING</p>	<p>b. Manually start CCW pump as necessary (preferred order 22, 21, 23).</p> <p><u>IF</u> second CCW pump will <u>NOT</u> start <u>AND</u> BOTH recirc pumps are running, <u>THEN</u> stop ONE recirculation pump.</p>
	<p>c. Check recirculation pump - BOTH RUNNING</p>	<p>c. <u>IF</u> at least 2 CCW pumps <u>AND</u> at least 2 non-essential SW pumps are running, <u>THEN</u> start a second recirculation pump.</p>
	<p>d. Function complete light - LIT</p>	<p>d. Recheck required actions and manually initiate as necessary.</p>

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
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- d) Abnormal sump level indication

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2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	<u>Dispatch NPO To Perform The Following (on 98 ft. EL PAB):</u> <ul style="list-style-type: none"> a. Energize AND close RHR miniflow test line valves: <ul style="list-style-type: none"> o MOV-743 on MCC 26BB o MOV-1870 on MCC 26AA b. Energize the following MOVs: <ul style="list-style-type: none"> o MOV-882 on MCC 26B o MOV-744 on MCC 26A o MOV-1810 on MCC 26A 	
⊛19.	<u>Check CCW Pump Status:</u> <ul style="list-style-type: none"> a. Three CCW pumps - RUNNING b. Stop 23 CCW pump 	<ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Verify at least two CCW pumps running. 2) Go to Step 20.

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1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* <u>IF</u> Sump Blockage is a concern, <u>THEN</u> refilling the RWST should be</p> <p>* considered after ALL injection from RWST has stopped. TSC should be</p> <p>* consulted.</p> <p>*****</p>	
20.	<p><u>Check If Recirc Spray Is Required:</u></p> <p>a. Containment spray pumps - ANY RUNNING</p> <p>b. Check RWST level - LESS THAN 2.0 FT</p> <p>c. Stop containment spray pumps</p> <p>d. Close containment spray pump discharge valves:</p> <p>o 21 spray pump:</p> <p>o MOV-866A</p> <p>o MOV-866B</p> <p>o 22 spray pump:</p> <p>o MOV-866C</p> <p>o MOV-866D</p>	
		<p>a. Perform the following:</p> <p>1) <u>IF</u> containment pressure EVER greater than 24 psig, <u>THEN</u> go to Step 21.</p> <p>2) <u>IF NOT</u>, <u>THEN</u> go to Step 23.</p> <p>b. Return to Step 20a.</p>

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1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

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2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21.	<u>Verify One RHR Heat Exchanger Isolated As Follows:</u>	
	a. Check 822A AND 822B - OPEN	a. <u>IF</u> only 822B is open, <u>THEN</u> close 746. Go to Step 22.
		<u>IF</u> only 822A is open, <u>THEN</u> close 747. Go to Step 22.
	b. Close either 746 OR 747	
22.	<u>Open Spray Header Valve For In Service RHR Heat Exchanger:</u>	
	o MOV-889B (21 Hx with 747 open)	
	- OR -	
	o MOV-889A (22 Hx with 746 open)	

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1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23. Check Minimum Acceptable Flow To Core And Containment Spray:

- a. Determine required core cooling flow from table:

No. of 946A-D flow meters - INDICATING -	Core flow rate with 1 Pump AND 1 RHR HX	Core flow rate with 2 Pumps AND/OR 2 RHR HXs
4	2nd Highest indicator - GREATER THAN 410 gpm OR 2 Middle indicators - SUM GREATER THAN 710 gpm OR 3 Lowest indicators - SUM GREATER THAN 970 gpm	2nd Highest indicator - GREATER THAN 580 gpm OR 2 Middle indicators - SUM GREATER THAN 860 gpm OR 3 Lowest indicators - SUM GREATER THAN 1080 gpm
3	2nd Highest indicator - GREATER THAN 410 gpm OR 2 Lowest indicators - SUM GREATER THAN 710 gpm	2nd Highest indicator - GREATER THAN 580 gpm OR 2 Lowest indicators - SUM GREATER THAN 860 gpm
2	EACH GREATER THAN 410 gpm	EACH GREATER THAN 580 gpm
1 or None	Required core cooling - NOT MET	

- b. Core cooling flow required by table - ESTABLISHED

- b. Align system for high head recirculation as follows:

- 1) Close RHR spray header isolation valves:

- o MOV-889A
- o MOV-889B

- 2) Go to Step 25.

- c. Recirculation spray flow - GREATER THAN 960 GPM

- c. IF spray flow was previously established or required, THEN consult TSC.

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1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.
 - 1) Indications of sump blockage may include:
 - a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
 - b) SI PUMP LOW PRESSURE alarm on panel SBF-1
 - c) Indication of errratic or reduced flow
 - d) Abnormal sump level indication

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24.	<u>Go To Step 38</u>	
25.	<u>Dispatch NPO To Shut Down FSB Ventilation</u>	IF FSB ventilation can <u>NOT</u> be shut down, <u>THEN</u> notify TSC that FSB ventilation exhaust should be monitored for radioactive contamination.
26.	<u>Place Interlock Switches For SI Valves To OFF:</u>	
	o MOV-842	
	o MOV-843	

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* SI pumps should be stopped if RCS pressure is greater than their shutoff head pressure.</p> <p>*****</p>	
27.	<p><u>Place Safety Injection Recirc Switch 6 To ON:</u></p>	
	<p>a. Check RHR heat exchanger discharge valves - CLOSED:</p> <p>o MOV-746</p> <p>o MOV-747</p>	<p>a. Manually close valves.</p>
	<p>b. Check RHR heat exchanger No. 21 to SI pump suction header valves - OPEN:</p> <p>o MOV-888A</p> <p>o MOV-888B</p>	<p>b. Manually open valves.</p>
	<p>c. Check SI test line valves - CLOSED:</p> <p>o MOV-842</p> <p>o MOV-843</p>	<p>c. Manually close valves.</p>
	<p>d. Arm SI pump suction low pressure alarm by placing toggle switch to ON:</p> <p>o PT-947</p>	
	<p>e. Function complete light - LIT</p>	<p>e. Recheck required actions and manually initiate as necessary.</p>

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	<u>Check SI Suction Pressure - GREATER THAN 75 PSIG</u>	<p><u>IF</u> suction pressure is less than 75 psig, <u>THEN</u> perform the following:</p> <p>a. <u>IF</u> RHR pump running, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Recheck RHR alignment per ATTACHMENT 2. <p><u>WHEN</u> ATTACHMENT 2 is complete, <u>THEN</u> go to Step 29.</p> <p>b. <u>IF</u> 22 Recirculation pump running, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Stop 22 Recirculation pump. 2) Perform ATTACHMENT 2. <p><u>WHEN</u> ATTACHMENT 2 is complete, <u>THEN</u> go to Step 29.</p> <p>c. <u>IF</u> 21 Recirculation pump running, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Stop 21 Recirculation pump. 2) Start 22 Recirculation pump. 3) <u>IF</u> 22 Recirc pump can <u>NOT</u> be started, <u>THEN</u>: <p>a) Perform ATTACHMENT 2.</p> <p><u>WHEN</u> ATTACHMENT 2 is complete, <u>THEN</u> go to Step 29.</p> <p>d. <u>IF</u> SI pump suction pressure can <u>NOT</u> be established, <u>THEN</u> go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1</p>

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
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 - 1) Indications of sump blockage may include:
 - a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29.	<u>Check SI Pumps - AT LEAST 2 RUNNING</u>	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Verify Safety Injection recirc switch 7 is OFF b. Start two SI pumps: <ul style="list-style-type: none"> o 21 o 23 <p><u>IF</u> 21 <u>OR</u> 23 SI pump can <u>NOT</u> be started, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Place 21 containment spray pump control switch in PULLOUT. 2) Place 22 SI pump control switch in PULLOUT. 3) Place recirculation switch No. 1 to OFF. 4) Manually <u>OR</u> locally open 22 SI pump suction valves: <ul style="list-style-type: none"> o MOV-887A o MOV-887B 5) Start 22 SI pump. 6) <u>IF</u> 21 <u>AND</u> 22 SI pumps running, <u>THEN</u>: <ul style="list-style-type: none"> a) Verify MOV-851B open. b) Verify MOV-851A closed. 7) <u>IF</u> 22 <u>AND</u> 23 SI pumps running, <u>THEN</u>: <ul style="list-style-type: none"> a) Verify MOV-851A open. b) Verify MOV-851B closed.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30.	<u>Place Safety Injection Recirc Switch 8 To ON:</u>	
	<ul style="list-style-type: none"> a. Check containment spray pump test line valve - CLOSED: <ul style="list-style-type: none"> o 1813 	<ul style="list-style-type: none"> a. Manually close valve.
31.	<u>Check Recirculation Pumps - AT LEAST ONE RUNNING</u>	Perform the following: <ul style="list-style-type: none"> a. Dispatch NPO to energize the following MOVs: <ul style="list-style-type: none"> o MOV-882 on MCC 26B o MOV-1810 on MCC 26A b. Go to Step 35.
32.	<u>Check All 480V Busses - ENERGIZED</u>	Go to Step 34.
<div style="border: 1px dashed black; padding: 10px; text-align: center;"> <p><u>CAUTION</u></p> <p>Starting a second recirculation pump is <u>NOT</u> allowed due to potential pump damage from strong pump/weak pump interaction or from sump blockage cavitation.</p> </div>		
33.	<u>Align Safety Injection Recirc Switch 5 As Follows:</u>	
	<ul style="list-style-type: none"> a. Place non-running recirculation pump in trip pullout b. Place Safety Injection Recirc Switch 5 to ON 	
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Check at least two service water pumps - SUPPLYING NON-ESSENTIAL HEADER	<p>c. Manually start one service water pump on NON-essential header in preferred order:</p> <ul style="list-style-type: none"> o 22, 23, 21 if 1-2-3 header non-essential - OR - o 25, 26, 24 if 4-5-6 header non-essential <p><u>IF</u> second service water pump will <u>NOT</u> start, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) <u>IF</u> both recirculation pumps running, <u>THEN</u> stop ONE recirculation pump. 2) Close valve 804 to isolate spent fuel pit heat exchanger.
	d. Check CCW pumps - AT LEAST TWO RUNNING	<p>d. Manually start CCW pump as necessary (preferred order 22, 21, 23).</p> <p><u>IF</u> second CCW pump will <u>NOT</u> Start <u>AND</u> BOTH recirc pumps are running, <u>THEN</u> stop ONE recirculation pump.</p>
	e. Check recirculation pumps - ONLY ONE RUNNING	e. Ensure ONLY ONE recirculation pump is running.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
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- c) Indication of erratic or reduced flow
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34.	<u>Dispatch NPO To Perform The Following (on 98 ft. EL PAB):</u> <ul style="list-style-type: none"> a. Energize AND close RHR miniflow test line valves: <ul style="list-style-type: none"> o MOV-743 on MCC 26BB o MOV-1870 on MCC 26AA b. Energize the following MOVs: <ul style="list-style-type: none"> o MOV-882 on MCC 26B o MOV-744 on MCC 26A o MOV-1810 on MCC 26A 	
⊛35.	<u>Check CCW Pump Status:</u> <ul style="list-style-type: none"> a. Three CCW pumps - RUNNING b. Stop 23 CCW pump 	<ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Verify at least two CCW pumps running. 2) Go to Step 36.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

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- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

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- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p><u>CAUTION</u></p> <p>* <u>IF</u> Sump Blockage is a concern, <u>THEN</u> refilling the RWST should be</p> <p>* considered after ALL injection from RWST has stopped. TSC should be</p> <p>* consulted.</p> <p>*****</p>	
36.	<p><u>Check If Recirc Spray Is Required:</u></p> <p>a. Containment spray pumps - ANY RUNNING</p> <p>b. Check RWST level - LESS THAN 2.0 FT</p> <p>c. Stop containment spray pumps</p> <p>d. Close containment spray pump discharge valves:</p> <p>o 21 spray pump:</p> <p>o MOV-866A</p> <p>o MOV-866B</p> <p>o 22 spray pump:</p> <p>o MOV-866C</p> <p>o MOV-866D</p>	<p>a. Perform the following:</p> <p>1) <u>IF</u> containment pressure EVER greater than 24 psig, <u>THEN</u> go to Step 37.</p> <p>2) <u>IF NOT</u>, <u>THEN</u> go to Step 38.</p> <p>b. Return to Step 36a.</p>
37.	<p><u>Open One Spray Header Valve:</u></p> <p>o MOV-889B</p> <p>- OR -</p> <p>o MOV-889A</p>	

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38.	<u>Check Recirculation Switch Sequence Status:</u> a. Switch 1 function complete light - LIT	a. Perform the following: 1) <u>IF</u> 22 SI pump is stopped, <u>THEN</u> verify suction valves closed: o MOV-887A o MOV-887B 2) Verify discharge valves for <u>STOPPED</u> containment spray pump closed: o 21 spray pump: o MOV-866A o MOV-866B o 22 spray pump: o MOV-866C o MOV-866D b. Check RHR pumps - ALL STOPPED
		b. Go to Step 38d.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
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- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Switch 3 function complete light - LIT	<p>c. Check RHR pump suction and discharge valves - CLOSED:</p> <ul style="list-style-type: none"> o MOV-882 o MOV-744 <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify valve motor controls re-energized: <ul style="list-style-type: none"> o MOV-882 on MCC 26B o MOV-744 on MCC 26A 2) Manually close valves. <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> locally close valves.</p>
	d. Switch 8 function complete light - LIT	<p>d. Check SI pump suction valve from RWST - CLOSED:</p> <ul style="list-style-type: none"> o MOV-1810 <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify valve motor control re-energized: <ul style="list-style-type: none"> o MOV-1810 on MCC 26A 2) Manually close valve. <p><u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally close valve.</p>

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊕39.	<u>Check CCW System Temperature -</u> <u>LESS THAN 130°F</u>	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Verify CCW heat exchanger SW outlet valves FULLY open: <ul style="list-style-type: none"> o SWN-35 o SWN-35-1 b. Refer to 2-SOP-4.1.2 COMPONENT COOLING SYSTEM OPERATION to establish backup cooling to the following: <ul style="list-style-type: none"> o RHR pumps o SI pumps c. <u>IF</u> CCW system temperature increases greater than 145°F <u>AND</u> recirc flow has been established through both RHR heat exchangers, <u>THEN</u> shut one RHR heat exchanger discharge valve: <ul style="list-style-type: none"> o MOV-747 <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o MOV-746

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

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- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

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- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40.	<u>Verify Adequate Recirculation Flow:</u> a. Core exit TCs - STABLE OR DECREASING	a. Verify CCW heat exchanger SW outlet valves FULLY open: o SWN-35 o SWN-35-1 <u>IF</u> core exit TCs temperatures can <u>NOT</u> be stabilized, <u>THEN</u> align system for high head recirculation as follows: 1) Close RHR spray header isolation valves: o MOV-889A o MOV-889B 2) Return to Step 25.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

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- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of errrratic or reduced flow
- d) Abnormal sump level indication

Number: 2-ES-1.3	Title: TRANSFER TO COLD LEG RECIRCULATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>FRPs should be implemented as necessary.</p> </div>		
41.	<u>Check If Containment Spray Should Be Terminated:</u>	
	a. 889A OR 889B - OPEN b. Containment spray - IN SERVICE GREATER THAN 3.5 HOURS c. Close 889A AND 889B	a. Go to Step 42. b. <u>WHEN</u> condition is satisfied, <u>THEN</u> close 889A <u>AND</u> 889B. Go to Step 42.
42.	<u>Determine If Transfer To Hot Leg Recirculation Will Be Required:</u>	
	a. Check if entry for this procedure - FROM 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT	a. Perform the following: 1) Consult TSC to determine <u>IF</u> <u>AND</u> <u>WHEN</u> transfer to hot leg recirculation will be subsequently required. 2) Return to procedure and step in effect.
43.	<u>Return To Procedure And Step In Effect</u>	
-END-		

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
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Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

ATTACHMENT 1
480V EQUIPMENT LOAD RATING

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS		554 KW	
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP		384 KW	
23 AFW PUMP			384 KW
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT		250 KW	
25 FAN COOLER UNIT			250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW 316 KW	
23 SI PUMP			345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

-END-

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

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- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

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- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p align="center">ATTACHMENT 2 (Attachment page 1 of 4)</p> <p align="center"><u>COLD LEG RECIRCULATION USING RHR PUMPS</u></p>	
1.	<p><u>Check If FSB Ventilation -</u> <u>PREVIOUSLY SHUTDOWN</u></p>	<p>Dispatch NPO to shut down FSB ventilation.</p> <p>IF FSB ventilation can <u>NOT</u> be shut down, <u>THEN</u> notify TSC that FSB ventilation exhaust should be monitored for radioactive contamination.</p>

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
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- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

ATTACHMENT 2 (Attachment page 2 of 4)
COLD LEG RECIRCULATION USING RHR PUMPS

CAUTION

- * o IF either 885A OR 885B is de-energized, do NOT open the energized valve
- * UNTIL de-energized valve has been fully opened locally. Opening the
- * energized valve first may significantly increase local dose levels.
- * o Extremely high radiation fields may exist in the area of 885A AND 885B.
- * o Starting an RHR pump, will cause a significant increase in local dose
- * levels. Valving piping and pump areas should be evacuated prior to pump
- * start.

NOTE

Position of de-energized MOVs may be verified by Two is True indication
OR position prior to loss of power.

2. Establish Cold Leg Recirculation
Using RHR Pumps:

a) Check 885A AND 885B - BOTH
ENERGIZED

a) Dispatch NPO to locally open
the de-energized valve.

WHEN the de-energized valve is
open, THEN you should return
to this step.

Go to 2-ECA-1.1, LOSS OF
EMERGENCY COOLANT
RECIRCULATION.

b) Dispatch NPO to energize the
following MOV:

o MOV-882 at MCC 26B

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

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1) Indications of sump blockage may include:

- a) LOW HEAD INJECTON LINE LOW FLOW alarm on panel SBF-1
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- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<u>ATTACHMENT 2</u> <u>COLD LEG RECIRCULATION USING RHR PUMPS</u>	(Attachment page 3 of 4)
	c) Verify the following Safety Injection Recirc Switches are OFF: <ul style="list-style-type: none"> o Recirc Switch 3 o Recirc Switch 4 o Recirc Switch 5 d) Verify RHR Pumps - BOTH STOPPED: <ul style="list-style-type: none"> o 21 RHR Pump o 22 RHR Pump e) Stop BOTH Recirculation Pumps: <ul style="list-style-type: none"> o 21 Recirculation Pump o 22 Recirculation Pump f) Close 1802A AND 1802B g) Close RHR pump suction valve from RWST: <ul style="list-style-type: none"> o MOV-882 	
This Step continued on the next page.		

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p align="center">ATTACHMENT 2 (Attachment page 4 of 4) <u>COLD LEG RECIRCULATION USING RHR PUMPS</u></p>	
	<p>h) Establish recirculation flow path for RHR pumps:</p> <p>1) Verify RHR pump discharge valve is open:</p> <ul style="list-style-type: none"> o MOV-744 (normally de-energized open) <p>2) Verify RHR pump suction valves from containment sump are open:</p> <ul style="list-style-type: none"> o 1805 (normally open) o MOV-885A o MOV-885B <p>i) Start 22 RHR pump</p> <p>j) Return to Step in effect</p>	<p>h) <u>IF</u> a recirculation flow path can <u>NOT</u> be established, <u>THEN</u> go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.</p> <p>i) <u>IF</u> 22 RHR pump can <u>NOT</u> be started, <u>THEN</u> start 21 RHR pump.</p> <p><u>IF</u> 21 RHR pump can be <u>NOT</u> be started, <u>THEN</u> Go To 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.</p>

-END-

FOLDOUT PAGE FOR 2-ES-1.3

1. LOSS OF EMERGENCY COOLANT RECIRCULATION

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained, THEN go to 2-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
- b. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to Sump Blockage, THEN go to 2-ECA-1.3, LOSS OF EMERGENCY COOLANT RECIRCULATION CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTOR LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP LOW PRESSURE alarm on panel SBF-1
- c) Indication of erratic or reduced flow
- d) Abnormal sump level indication



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 11-9-07

2-ES-1.4, Revision: 1

TRANSFER TO HOT LEG RECIRCULATION

2

Approved By:

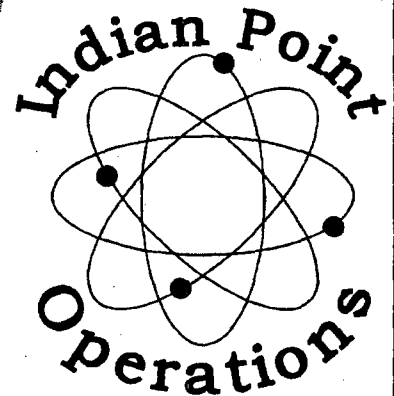
R. Parks For JOHN DIAZ 11-9-07

Procedure Sponsor, RPO/ Designee

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

A. PURPOSE

This procedure provides the necessary instructions for transferring the safety injection system to hot leg recirculation.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered:

- 1) From 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 24, when the specified time interval has elapsed, or
- 2) When a decision is made, based upon the recommendation of the TSC, that transfer to hot leg recirculation is required. Transfer to hot leg recirculation might be required eventually, after transferring to cold leg recirculation during the implementation of:
 - o 2-ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION;
 - o 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED;
 - o 2-ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	<u>Check Low-Head Recirculation - FLOW INDICATED</u>	<u>IF</u> any HHSI Pump is running, <u>THEN</u> go to step 15.
2.	<u>Check If FSB Ventilation - PREVIOUSLY SHUTDOWN</u>	Dispatch NPO to shut down FSB ventilation. <u>IF</u> FSB ventilation can <u>NOT</u> be shut down, <u>THEN</u> notify TSC that FSB ventilation exhaust should be monitored for radioactive contamination.
3.	<u>Close Cold Leg Injection Valve:</u> o MOV-856A - OR - o MOV-856E	
4.	<u>Open Hot Leg Injection Valve To Loop 23:</u> o MOV-856B	
5.	<u>Close Cold Leg Injection Valve:</u> o MOV-856C - OR - o MOV-856D	
6.	<u>Open Hot Leg Injection Valve To Loop 21:</u> o MOV-856F	

Number: 2-ES-1.4	Title: TRANSFER TO HOT LEG RECIRCULATION	Revision Number: REV. 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<u>Check Recirculation System Alignment:</u>	
	a. MOV-746 OR MOV-747 - CLOSED	a. Verify 746 <u>OR</u> 747 closed. <u>IF</u> neither valve can be closed, <u>THEN</u> close HCV-638 <u>OR</u> 640.
	b. Safety injection recirc switch 6 - OFF	b. Place safety injection recirc switch 6 to OFF.
8.	<u>Check System Alignment For Starting SI Pumps:</u>	
	a. Check recirculation pumps - ONLY ONE running	a. Place ONE recirculation pump in trip pullout.
	b. SI pump miniflow valves - PREVIOUSLY CLOSED	b. Manually close valves.
	o MOV-842	
	o MOV-843	
	c. SI pump suction valves from RHR Hx - OPEN:	c. Manually open valve(s).
	o MOV-888A	
	o MOV-888B	
	d. Arm SI pump suction low pressure alarm by placing toggle switch to ON:	
	o PT-947	
	e. Check recirculation switch No. 7 - OFF	e. Place switch in off.
9.	<u>Check SI Suction Pressure - GREATER THAN 75 PSIG</u>	Check SI valve alignment. <u>IF</u> adequate suction pressure can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.

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2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* EDG load should be maintained less than 1650 KW, but may be increased to</p> <p>* 2000 KW for a maximum of 2 hrs in any 24 hr period.</p> <p>*****</p>	
10.	<u>Start 23 SI Pump As Follows:</u>	
	<p>a. Verify adequate power:</p> <p>o Bus 6A - ENERGIZED BY OFFSITE POWER</p> <p style="text-align: center;">- OR -</p> <p>o Load on 23 diesel generator</p> <p style="text-align: center;">- LESS THAN 1300 KW</p>	<p>a. <u>IF</u> adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p>
	<p>b. Start 23 SI pump</p>	<p>b. Perform the following:</p> <p>1) Place 21 containment spray pump in PULLOUT.</p> <p>2) Place 22 SI pump in PULLOUT.</p> <p>3) Place Safety Injection Recirc Switch 1 to OFF.</p> <p>4) Open 22 SI pump suction valves:</p> <p>o MOV-887A</p> <p>o MOV-887B</p> <p>5) Verify:</p> <p>o MOV-851B open</p> <p style="text-align: center;">- AND -</p> <p>o MOV-851A closed</p> <p>6) Start 22 SI pump.</p>

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Verify 746 AND 747 - CLOSED</u>	<p><u>IF</u> either valve can <u>NOT</u> be closed, <u>THEN</u> close HCV-638 <u>AND</u> 640.</p> <p><u>IF</u> either HCV-638 <u>OR</u> 640 can <u>NOT</u> be closed, <u>THEN</u> go to step 21.</p>
12.	<u>Check SI Suction Pressure - GREATER THAN 75 PSIG</u>	<p>Check SI valve alignment.</p> <p><u>IF</u> adequate suction pressure can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p>

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED				
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">* EDG load should be maintained less than 1650 KW, but may be increased to * * 2000 KW for a maximum of 2 hrs in any 24 hr period. *</p> <p style="text-align: center;">*****</p>					
13.	<p><u>Start 21 SI Pump As Follows:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Verify adequate power:</p> <ul style="list-style-type: none"> o Bus 5A - ENERGIZED BY OFFSITE POWER - OR - o Load on 21 diesel generator - LESS THAN 1300 KW </td> <td style="vertical-align: top;"> <p>a. IF adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p>b. Start 21 SI pump</p> </td> <td style="vertical-align: top;"> <p>b. Perform the following:</p> <ul style="list-style-type: none"> 1) Place 21 containment spray pump in PULLOUT. 2) Place 22 SI pump in PULLOUT. 3) Place Safety Injection Recirc Switch 1 to OFF. 4) Open 22 SI pump suction valves: <ul style="list-style-type: none"> o MOV-887A o MOV-887B 5) Verify: <ul style="list-style-type: none"> o MOV-851A open - AND - o MOV-851B closed 6) Start 22 SI pump. </td> </tr> </table>		<p>a. Verify adequate power:</p> <ul style="list-style-type: none"> o Bus 5A - ENERGIZED BY OFFSITE POWER - OR - o Load on 21 diesel generator - LESS THAN 1300 KW 	<p>a. IF adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p>	<p>b. Start 21 SI pump</p>	<p>b. Perform the following:</p> <ul style="list-style-type: none"> 1) Place 21 containment spray pump in PULLOUT. 2) Place 22 SI pump in PULLOUT. 3) Place Safety Injection Recirc Switch 1 to OFF. 4) Open 22 SI pump suction valves: <ul style="list-style-type: none"> o MOV-887A o MOV-887B 5) Verify: <ul style="list-style-type: none"> o MOV-851A open - AND - o MOV-851B closed 6) Start 22 SI pump.
<p>a. Verify adequate power:</p> <ul style="list-style-type: none"> o Bus 5A - ENERGIZED BY OFFSITE POWER - OR - o Load on 21 diesel generator - LESS THAN 1300 KW 	<p>a. IF adequate power can <u>NOT</u> be established, <u>THEN</u> consult TSC prior to continuing.</p>					
<p>b. Start 21 SI pump</p>	<p>b. Perform the following:</p> <ul style="list-style-type: none"> 1) Place 21 containment spray pump in PULLOUT. 2) Place 22 SI pump in PULLOUT. 3) Place Safety Injection Recirc Switch 1 to OFF. 4) Open 22 SI pump suction valves: <ul style="list-style-type: none"> o MOV-887A o MOV-887B 5) Verify: <ul style="list-style-type: none"> o MOV-851A open - AND - o MOV-851B closed 6) Start 22 SI pump. 					
14.	<p><u>Go To Step 20</u></p>					

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Close Cold Leg Injection Valve:</u> o MOV-856A - OR - o MOV-856E	
16.	<u>Open Hot Leg Injection Valve To Loop 23:</u> o MOV-856B	
17.	<u>Close Cold Leg Injection Valve:</u> o MOV-856C - OR - o MOV-856D	
18.	<u>Open Hot Leg Injection Valve To Loop 21:</u> o MOV-856F	

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	<u>Check High-Head Recirculation Status:</u>	
	a. Check SI pumps - ANY RUNNING	a. <u>IF</u> SI pumps 21 and 23 were shutdown, <u>THEN</u> CONSULT with TSC.
	b. Check SI pumps - 21 AND 23 RUNNING	b. <u>IF</u> 21 <u>OR</u> 23 SI pump can <u>NOT</u> be started, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Place 21 containment spray pump control switch in PULLOUT. 2) Place 22 SI pump control switch in PULLOUT. 3) Place recirculation switch No. 1 to OFF. 4) Manually open 22 SI pump suction valves: <ul style="list-style-type: none"> o MOV-887A o MOV-887B 5) Start 22 SI pump. 6) <u>IF</u> 21 <u>AND</u> 22 SI pumps running, <u>THEN</u>: <ul style="list-style-type: none"> a) Verify MOV-851B open. b) Verify MOV-851A closed. 7) <u>IF</u> 22 <u>AND</u> 23 SI pumps running, <u>THEN</u>: <ul style="list-style-type: none"> a) Verify MOV-851A open. b) Verify MOV-851B closed.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	<u>Verify Adequate Recirculation Flow:</u>	
	a. Core exit TCs - STABLE OR DECREASING	a. Return to Step 1.
21.	<u>Align Seal Gas System:</u>	
	a. Verify following valves are closed:	
	o PCV-1090 outlet stop 1443	
	o PCV-1090 bypass stop 1444	
	b. Verify nitrogen supply is available - PI-1075 GREATER THAN 250 PSIG	
	c. Slowly open PCV-1090 outlet stop valve 1443	
	d. Verify PCV-1090 set to maintain 250 psig on PI-1089	
22.	<u>Close Containment Manual Isolation Valves:</u>	
	a. Consult SM to determine the necessary valves on ATTACHMENT 1 to be isolated	
	b. Dispatch NPO to isolate the necessary valves with Health Physics assistance	
23.	<u>Return To Procedure And Step In Effect</u>	

-END-

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 1 of 7)

Permission* Granted	Valve Operation	Location	Valving** Completed
A	Isolate Charging Line		
	a) Close MOV-205	4	_____
	b) Close MOV-226	4	_____
	c) Close MOV-227	4	_____
_____	d) Open SOV 3501 (IVSW)	2	_____
B	Isolate RCP 21 Seal Injection		
	a) Close MOV-4925	4	_____
	b) Close MOV-250A	4	_____
_____	c) Open SOV 3514 (IVSW)	2	_____
C	Isolate RCP 22 Seal Injection		
	a) Close MOV-4926	4	_____
	b) Close MOV-250B	4	_____
_____	c) Open SOV 3515 (IVSW)	2	_____
D	Isolate RCP 23 Seal Injection		
	a) Close MOV-4927	4	_____
	b) Close MOV-250C	4	_____
_____	c) Open SOV 3516 (IVSW)	2	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 2 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
E	Isolate RCP 24 Seal Injection		
	a) Close MOV-4928	4	_____
	b) Close MOV-250D	4	_____
	c) Open SOV 3517 (IVSW)	2	_____
F	Isolate RCP Seal Return		
	a) Close MOV-222	CCR	_____
G	Isolate RCP Component Cool. Wtr.		
	a) Close MOV-769 (Supply)	CCR	_____
	b) Close MOV-797 (Supply)	CCR	_____
	c) Close MOV-786 (Mtr Brg Return)	CCR	_____
	d) Close MOV-784 (Mtr Brg Return)	CCR	_____
	e) Close MOV-789 (Thermal Barrier)	CCR	_____
	f) Close FCV-625 (Thermal Barrier)	CCR	_____
H	Isolate Containment Spray Headers		
	a) Close MOV-869A	4	_____
	b) Close MOV-869B	4	_____
	c) Open SOV 3504 (IVSW-869B)	2	_____
	d) Open SOV 3511 (IVSW-869A)	2	_____
	e) Close 878A (Test Line Stop)	6	_____
I	Isolate Recirculation Sample Line		
	a) Close MOV-990A	4	_____
	b) Close MOV-990B	4	_____
	c) Open (N2 Gas) SOV 3505	2	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 3 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
J	Isolate RHR System		
	a) Close MOV-882	CCR	_____
	b) Close MOV-744	CCR	_____
	c) Close MOV-743	4	_____
	d) Close MOV-1870	4	_____
	e) Close MOV-958 (Sample Line)	4	_____
	f) Close MOV-959 (Sample Line)	4	_____
	g) Close 990D (Sample Line)	3	_____
	h) Open SOV 3500 (N2Gas 732)	2	_____
	i) Open SOV 3506 (N2Gas MOV-744)	2	_____
	j) Open SOV 3509 (N2Gas Sample Line)	2	_____
	k) Open SOV 3510 (N2Gas - Between Mov-743/1870)	2	_____
	l) Close 732 (RHR Suction)	1	_____
	m) Close 859A (SIS Test Line Stop)	1	_____
	n) Close 859C (SIS Test Line Stop)	1	_____
	o) Close MOV-885A (VC Sump To RHR)	CCR	_____
	p) Close MOV-885B (VC Sump To RHR)	CCR	_____
K	Isolate N2 to PRT/RCDT/SIS ACCUM/PORV		
	a) Close SOV 3418 and 3419 (PRT)	2	_____
	b) Close SOV 3416 and 3417 (RCDT)	2	_____
	c) Close PCV-863 (VC N2 Supply)	CCR	_____
	d) Close 5459 (RCDT N2 Supply)	1	_____
	e) Close 4136 (PRT N2 Supply)	1	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 4 of 7)

(Continued)

Permission*, Granted	Valve Operation	Location	Valving** Completed
L	Isolate Containment Pressure Instrumentation		
	a) Close 1814A	1	_____
	b) Close 1814B	1	_____
	c) Close 1814C	1	_____
M	Isolate PRZR Level Instrumentation DW Tester		
	a) Close 580A	1	_____
	b) Close 580B	1	_____
N	Isolate CCW To Recirc Pump Motors		
	a) Close 753G (Return)	1	_____
	b) Close 753H (Supply)	1	_____
O	Isolate Weld Channel to Racks in VC		
	a) Close PCV-1111-1 Rack 16 & 17	1	_____
	b) Close PCV-1111-2 Rack 14 & 18	1	_____
P	Isolate Station Air To VC		
	a) Close SA-24	1	_____
	b) Close SA-24-1	1	_____
Q	Isolate Service Water to FCU's		
	a) Close SWN-41-1A (21 Inlet Iso)	4	_____
	b) Close SWN-41-1B (21 Block)	4	_____
	c) Close SWN-41-2A (22 Inlet Iso)	4	_____
	d) Close SWN-41-2B (22 Block)	4	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 5 of 7)

Permission* Granted	Valve Operation	Location	Valving** Completed
Q	Isolate Service Water to FCU's (continued)		
	e) Close SWN-41-3A (23 Inlet Iso)	4	_____
	f) Close SWN-41-3B (23 Block)	4	_____
	g) Close SWN-41-4A (24 Inlet Iso)	4	_____
	h) Close SWN-41-4B (24 Block)	4	_____
	i) Close SWN-41-5A (25 Inlet Iso)	4	_____
	j) Close SWN-41-5B (25 Block)	4	_____
	k) Close SWN-43-1 (21 Hdr Drain)	1	_____
	l) Close SWN-43-2 (22 Hdr Drain)	1	_____
	m) Close SWN-43-3 (23 Hdr Drain)	1	_____
	n) Close SWN-43-4 (24 Hdr Drain)	1	_____
	o) Close SWN-43-5 (25 Hdr Drain)	1	_____
	p) Close SWN-44-1A (21 Out Isol)	4	_____
	q) Close SWN-44-1B (21 Block)	4	_____
	r) Close SWN-44-2A (22 Out Isol)	4	_____
	s) Close SWN-44-2B (22 Block)	4	_____
	t) Close SWN-44-3A (23 Out Isol)	4	_____
	u) Close SWN-44-3B (23 Block)	4	_____
	v) Close SWN-44-4A (24 Out Isol)	4	_____
	w) Close SWN-44-4B (24 Block)	4	_____
	x) Close SWN-44-5A (25 Out Isol)	4	_____
	y) Close SWN-44-5B (25 Block)	4	_____
	z) Close SWN-51-1A (21 Out Sample)	4	_____
	aa) Close SWN-51-2A (22 Out Sample)	4	_____
	ab) Close SWN-51-3A (23 Out Sample)	4	_____
	ac) Close SWN-51-4A (24 Out Sample)	4	_____
	ad) Close SWN-51-5A (25 Out Sample)	4	_____

- Location:
- 1 Piping Penetration Area
 - 2 IVSW Control Panel - PAB 98 ft. El.
 - 3 Gallery above Piping Penetration Area
 - 4 MCC 26 AA and BB - PAB 98 ft. El.
 - 5 PACS/PACV Panels - PAB 98 ft. El.
 - 6 Spray Pump Area - PAB 68 ft. El.
 - 7 Personnel Air Lock - Fan House 80 ft. El.
 - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 6 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
Q	Isolate Service Water to FCU's (continued)		
	ae) Close SWN-71-1A (21 Mtr Isol)	4	_____
	af) Close SWN-71-1B (21 Mtr Block)	4	_____
	ag) Close SWN-71-2A (22 Mtr Isol)	4	_____
	ah) Close SWN-71-2B (22 Mtr Block)	4	_____
	ai) Close SWN-71-3A (23 Mtr Isol)	4	_____
	aj) Close SWN-71-3B (23 Mtr Block)	4	_____
	ak) Close SWN-71-4A (24 Mtr Isol)	4	_____
	al) Close SWN-71-4B (24 Mtr Block)	4	_____
	am) Close SWN-71-5A (25 Mtr Isol)	4	_____
	an) Close SWN-71-5B (25 Mtr Block)	4	_____
R	Isolate Auxiliary Steam to VC		
	a) Close UH-43 (Steam Supply)	1	_____
	b) Close UH-44 (Condensate Return)	1	_____
S	Isolate Alternate Safe Shutdown Instrumentation		
	a) Close IIP-504 (Przr LI-3101-1)	1	_____
	b) Close IIP-505 (Przr LI-3101-1)	1	_____
	c) Close IIP-506 (Przr PI-3105-1)	1	_____
	d) Close IIP-507 (Przr PI-3105-1)	1	_____
	e) Close IIP-500 (22 SG LI-5002-1)	1	_____
	f) Close IIP-501 (22 SG LI-5002-1)	1	_____
	g) Close IIP-502 (21 SG LI-5001-1)	1	_____
	h) Close IIP-503 (21 SG LI-5001-1)	1	_____

Location:

- 1 Piping Penetration Area
- 2 IVSW Control Panel - PAB 98 ft. El.
- 3 Gallery above Piping Penetration Area
- 4 MCC 26 AA and BB - PAB 98 ft. El.
- 5 PACS/PACV Panels - PAB 98 ft. El.
- 6 Spray Pump Area - PAB 68 ft. El.
- 7 Personnel Air Lock - Fan House 80 ft. El.
- 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

Number:	Title:	Revision Number:
2-ES-1.4	TRANSFER TO HOT LEG RECIRCULATION	REV. 1

ATTACHMENT 1

(Attachment page 7 of 7)

(Continued)

Permission* Granted	Valve Operation	Location	Valving** Completed
T	Isolate Post Accident Air Sampling		
	a) Move SOV 5018 (VC Samp Ch 1)	5	_____
	b) Move SOV 5019 (VC Samp Ch 1)	5	_____
	c) Move SOV 5020 (VC Samp Ch 2)	5	_____
	d) Move SOV 5021 (VC Samp Ch 2)	5	_____
	e) Move SOV 5022 (VC Return Ch 1)	5	_____
	f) Move SOV 5023 (VC Return Ch 1)	5	_____
	g) Move SOV 5024 (VC Return Ch 2)	5	_____
	h) Move SOV 5025 (VC Return Ch 2)	5	_____
U	Isolate City Water To VC		
	a) Close MW-17	1	_____
	b) Close MW-17-1	1	_____
V	Isolate Post Accident Venting (Ventilation)		
	a) Close E-1 (VC IA Supply Stop)	5	_____
	b) Close E-2 (VC Isolation Stop)	5	_____
	c) Close E-3 (Vent Exhaust Isol)	5	_____
	d) Close E-5 (Vent Exhaust Isol)	5	_____
W	<u>IF</u> Personnel And Equipment Hatch Air Lock Doors <u>NOT</u> Operating. Isolate Equalizing Valves		
	a) Close 85A (80 ft Air Lock)	7	_____
	b) Close 85B (80 ft Air Lock)	7	_____
	c) Close 95A (95 ft Air Lock)	8	_____
	d) Close 95B (95 ft Air Lock)	8	_____

- Location:
- 1 Piping Penetration Area
 - 2 IVSW Control Panel - PAB 98 ft. El.
 - 3 Gallery above Piping Penetration Area
 - 4 MCC 26 AA and BB - PAB 98 ft. El.
 - 5 PACS/PACV Panels - PAB 98 ft. El.
 - 6 Spray Pump Area - PAB 68 ft. El.
 - 7 Personnel Air Lock - Fan House 80 ft. El.
 - 8 Equipment Hatch Air Lock - MO Bldg 95 ft. El.

* The SM should initial those lines which it is permissible to isolate.

** The NPO should initial each valve as he properly positions it. The CRS can previously position some MOVs. If he does so, he should initial the appropriate right hand column entry.

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Procedure Use Is:

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Control Copy: _____

Effective Date: 6/4/07

2-E-2, Revision: 0

FAULTED STEAM GENERATOR ISOLATION

2

Approved By:

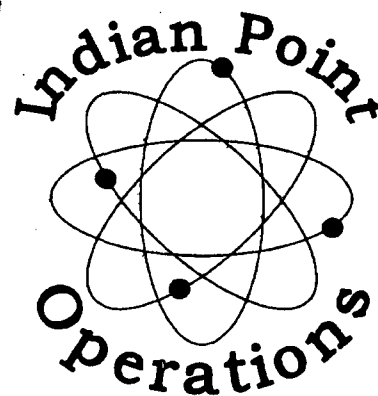
Procedure Sponsor, RPO/ Designee

6/4/2007

Date

Team P

Procedure Owner



EDITORIAL REVISION

Number:	Title:	Revision Number:
2-E-2	FAULTED STEAM GENERATOR ISOLATION	REV. 0

A. PURPOSE

This procedure provides actions to identify and isolate a faulted steam generator.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 13, with the following symptoms:
 - a. Any SG pressure decreasing in an uncontrolled manner.
 - b. Any SG completely depressurized.
- 2) 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 2, 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 11, and 2-ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 4, with the following symptoms and/or conditions:
 - a. Any SG pressure decreasing in an uncontrolled manner.
 - b. Any SG completely depressurized.
 - c. Faulted SG isolation not verified.
- 3) 2-FR-H.5, RESPONSE TO STEAM GENERATOR LOW LEVEL, Step 3, when the affected SG is identified as faulted.
- 4) Foldout page of other procedures whenever a faulted SG is identified.
- 5) 2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, foldout page, if any SG pressure increases.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

o Containment radiation levels greater than 1E5 R/hr.

- OR -

o Containment pressure greater than 4 psig.

Number: 2-E-2	Title: FAULTED STEAM GENERATOR ISOLATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o At least one SG must be maintained available for RCS cooldown. * o Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown. * o FRPs should <u>NOT</u> be implemented prior to completion of 2-E-0, REACTOR TRIP OR SAFETY INJECTION, ATTACHMENT 1, AUTOMATIC ACTION VERIFICATION. <p>*****</p>	
1.	<u>Check MSIVs - CLOSED</u>	Manually close valves.
2.	<u>Check If Any SG Secondary Pressure Boundary Is Intact:</u>	
	<ul style="list-style-type: none"> a. Check pressures in all SGs - ANY STABLE OR INCREASING 	<ul style="list-style-type: none"> a. <u>IF</u> all SG pressures decreasing in an uncontrolled manner, <u>THEN</u> go to 2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 1.
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * Radiation levels and harsh environment conditions should be evaluated prior to performing local actions. <p>*****</p>	
3.	<u>Identify Faulted SG(s):</u>	
	<ul style="list-style-type: none"> a. Check pressures in all SGs - <ul style="list-style-type: none"> o ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER - OR - o ANY SG COMPLETELY DEPRESSURIZED 	<ul style="list-style-type: none"> a. Search for initiating break: <ul style="list-style-type: none"> o Main steamlines o Main feedlines o Other secondary piping Go to Step 5.

Number: 2-E-2	Title: FAULTED STEAM GENERATOR ISOLATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* If the turbine-driven AFW pump is the only available source of feed flow, *</p> <p>* steam supply to the turbine-driven AFW pump must be maintained from one *</p> <p>* SG. *</p> <p>*****</p>	
4.	<p><u>Isolate Faulted SG(s):</u></p> <ul style="list-style-type: none"> o Isolate main feedline o Isolate AFW flow o Dispatch NPO to close steam supply header valves to turbine-driven AFW pump from faulted SG(s): <ul style="list-style-type: none"> o MS-41 (SG 22) o MS-42 (SG 23) o Verify SG atmospheric steam dumps - CLOSED o Verify SG blowdown isolation valves - CLOSED o Locally isolate the following lines from faulted SG(s): <ul style="list-style-type: none"> o Steam traps upstream of MSIVs o MSIV bypass valves 	<p>Manually close valves. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch NPO to attempt to locally close valves or associated block valves.</p>

Number:	Title:	Revision Number:
2-E-2	FAULTED STEAM GENERATOR ISOLATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	<u>Check CST Level - GREATER THAN 2 FT</u>	<p>Switch to city water supply:</p> <ul style="list-style-type: none"> a. Open city water header isolation valve: <ul style="list-style-type: none"> o FCV-1205A b. Open AFW pump suction valves as necessary: <ul style="list-style-type: none"> o PCV-1187 o PCV-1188 o PCV-1189
6.	<u>Check Secondary Radiation:</u> <ul style="list-style-type: none"> a. Request periodic activity samples of all SGs b. Check unisolated secondary radiation monitors: <ul style="list-style-type: none"> o Main steamline radiation recorder (R-28, R-29, R-30, and R-31) o Condenser air ejector radiation recorder (R-45) o SG blowdown radiation recorder (R-49) c. Secondary radiation - NORMAL 	<ul style="list-style-type: none"> c. Go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
7.	<u>Go To 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1</u>	

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Effective Date: 6/4/07

2-E-3, Revision: 0

STEAM GENERATOR TUBE RUPTURE

2

Approved By:

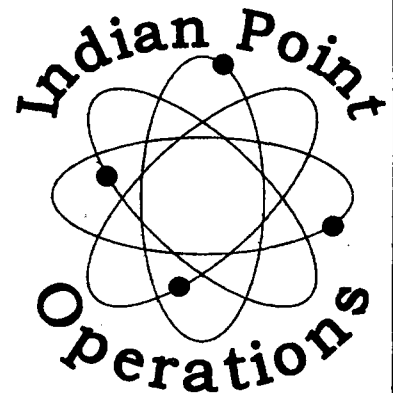
Mark J. Miller

Procedure Sponsor, RPO/ Designer

15/3/07

Date

Team P
Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

A. PURPOSE

This procedure provides actions to terminate leakage of reactor coolant into the secondary system following a steam generator tube rupture.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 14, when condenser air ejector radiation, SG blowdown radiation or steamline radiation is abnormal.
- 2) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 26,
2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 8,
2-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 6,
2-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 5, and
2-FR-H.3, RESPONSE TO STEAM GENERATOR HIGH LEVEL, Step 8, when secondary radiation is abnormal.
- 3) 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 21,
2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 3,
2-ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 5,
2-ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 5,
2-ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, Step 5,
2-ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, Step 5,
2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 12,
2-ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 5, and
2-ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, Step 6, when a SG narrow range level increases in an uncontrolled manner.
- 4) 2-ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, Step 3, 4, and 5 when pressurizer pressure control is restored.
- 5) Any foldout page that has E-3 transition criteria whenever any SG level increases in an uncontrolled manner or any SG has abnormal radiation.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than $1E5$ R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* FRPs should <u>NOT</u> be implemented prior to completion of 2-E-0, REACTOR TRIP * * OR SAFETY INJECTION, ATTACHMENT 1, AUTOMATIC ACTION VERIFICATION. *</p> <p>*****</p>		
④ 1.	<p><u>Check If RCPs Should Be Stopped:</u></p> <p>a. SI pumps - AT LEAST ONE RUNNING</p> <p>b. RCS subcooling based on core exit TCs - LESS THAN 23°F (30°F FOR ADVERSE CONTAINMENT)</p> <p>c. Stop all RCPs</p>	<p>a. Go to Step 2.</p> <p>b. Go to Step 2.</p>
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated * * prior to performing local actions. *</p> <p>*****</p>		
2.	<p><u>Identify Ruptured SG(s):</u></p> <p>o Unexpected increase in any SG level</p> <p style="text-align: center;">- OR -</p> <p>o High radiation from any SG steamline:</p> <p>o R-28 (SG 21)</p> <p>o R-29 (SG 22)</p> <p>o R-30 (SG 23)</p> <p>o R-31 (SG 24)</p> <p style="text-align: center;">- OR -</p> <p>o High radiation from any SG sample</p>	<p>Continue with Steps 7 through 12.</p> <p><u>WHEN</u> ruptured SG(s) identified, <u>THEN</u> do Steps 3 through 6. OBSERVE CAUTIONS PRIOR TO STEP 3.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none">* o If the turbine-driven AFW pump is the only available source of feed flow, steam supply to the turbine-driven AFW pump should be maintained from one SG.* o At least one SG must be maintained available for RCS cooldown. <p>*****</p>		
3.	<u>Isolate Flow From Ruptured SG(s):</u> <ul style="list-style-type: none">a. Adjust ruptured SG(s) atmospheric steam dump controller setpoint to 74%, 1030 psig.b. Check ruptured SG(s) atmospheric steam dump - CLOSEDb. <u>WHEN</u> ruptured SG pressure less than 1030 psig, <u>THEN</u> verify ruptured SG atmospheric steam dump closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in manual and close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally isolate open valve.	

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Check 22 AND 23 SGs - INTACT	c. Perform the following: 1) <u>IF</u> at least one motor-driven AFW pump running, <u>THEN</u> manually trip turbine-driven AFW pump. 2) <u>IF</u> turbine-driven AFW pump was <u>NOT</u> tripped, <u>THEN</u> : a) Locally isolate steam supply from ruptured SG(s) to turbine-driven AFW pump: o MS-41 (SG 22) o MS-42 (SG 23) 3) <u>IF</u> turbine-driven AFW pump was tripped, <u>THEN</u> : a) Locally isolate steam supply from ruptured SG to turbine-driven AFW pump: o MS-41 (SG 22) o MS-42 (SG 23) b) <u>WHEN</u> local isolation is complete, <u>THEN</u> restart turbine-driven AFW pump as necessary.
	d. Verify blowdown isolation valve(s) from ruptured SG(s) - CLOSED	d. Manually close valve(s).
	e. Dispatch NPO to: o Close steam traps upstream of ruptured SG(s) MSIV o Verify ruptured SG(s) MSIV bypass valve - CLOSED	
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	f. Close ruptured SG(s) MSIV(s)	<p>f. Perform the following:</p> <ol style="list-style-type: none"> 1) Close all remaining MSIVs. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> locally close per 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS. 2) Verify following valves closed: <ul style="list-style-type: none"> o Turbine stop valves. o Condenser steam dump valves. o Moisture separator reheater valves. o Dispatch NPO to close: <ul style="list-style-type: none"> o 21 MBFP stop valve MS-7 o 22 MBFP stop valve MS-7-1 o Air ejector stop valve MS-8 o Gland steam regulator stop valves 3) Use intact SG(s) atmospheric steam dump valve for steam dump. <p><u>IF</u> any ruptured SG can <u>NOT</u> be isolated from at least one intact SG, <u>THEN</u> go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>IF any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown.</p> <p>*****</p>	
4.	<p><u>Check Ruptured SG(s) Level:</u></p> <p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Stop feed flow to ruptured SG(s)</p>	<p>a. Maintain feed flow to ruptured SG until level greater than 10% (27% FOR ADVERSE CONTAINMENT).</p> <p>Continue with Step 5. OBSERVE CAUTION PRIOR TO STEP 5. <u>WHEN</u> ruptured SG level greater than 10% (27% FOR ADVERSE CONTAINMENT), <u>THEN</u> stop feed flow to ruptured SG(s).</p>
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>Isolation of the Ruptured SG(s) should be completed by closing the MSIV(s), the SG Atmospheric(s) and the Turbine-driven AFW Pump Steam Supply before continuing to Step 5.</p> <p>*****</p>	
5.	<p><u>Check Ruptured SG(s) Pressure - GREATER THAN 440 PSIG</u></p>	<p>Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- * o IF RCPs are NOT running, the following steps may cause a false 2-F-0.4, INTEGRITY STATUS TREE, indication for the ruptured loop. Disregard the ruptured loop T-cold indication until after performing Step 28.
- * o To prevent main steamline isolation, steam dump to condenser should NOT exceed 0.5 E6 lbs/hr per SG.
- * o After an operator-induced cooldown in Step 6 is begun, the continuous action for RCP Trip Criteria no longer applies.

6. Initiate RCS Cooldown:

- a. Determine required core exit temperature:

RUPTURED SG PRESSURE (PSIG)	CORE EXIT TEMPERATURE °F (ADVERSE CONTAINMENT °F)
Greater than OR Equal to	
1100	519 (513)
1050	513 (507)
1025	510 (504)
1000	507 (501)
975	504 (497)
950	500 (494)
900	494 (487)
850	487 (480)
800	479 (472)
750	471 (464)
700	463 (456)
650	454 (447)
600	445 (438)
550	435 (428)
500	424 (416)
440	409 (401)

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. Dump steam to condenser from intact SG(s) at maximum rate, NOT to exceed 0.5 E6 lbs/hr per intact SG:</p> <ol style="list-style-type: none"> 1) Check condenser - AVAILABLE 2) Place steam dump controller switch to manual and adjust for zero output. 3) Transfer condenser steam dump to pressure control mode and adjust manual switch as necessary. <p>c. Core exit TCs - LESS THAN REQUIRED TEMPERATURE</p> <p>d. Stop RCS cooldown</p> <p>e. Maintain core exit TCs - LESS THAN REQUIRED TEMPERATURE</p>	<p>b. Manually or locally dump steam at maximum rate from intact SG(s):</p> <ul style="list-style-type: none"> o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. o Use turbine-driven AFW pump. <p><u>IF</u> no intact SG available, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted SG. <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1. <p>c. Continue with Step 7. <u>WHEN</u> core exit TCs less than required temperature, <u>THEN</u> do Steps 6d and 6e.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊗ 7.	<u>Check Intact SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.
	b. Control feed flow to maintain narrow range level between 14% (27% FOR ADVERSE CONTAINMENT) and 50%	b. <u>IF</u> narrow range level in any intact SG continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown <u>AND</u> return to Step 1.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF any PRZR PORV opens because of high PRZR pressure, Step 8b should be repeated after pressure decreases to less than the PORV setpoint.</p> <p>*****</p>	
⊕ 8.	<u>Check PRZR PORVs And Block Valves:</u>	
	a. Power to block valves - AVAILABLE	a. Restore power to block valves by closing the following breakers as necessary: o MCC 26B/1H (MOV-535) o MCC 26A/1H (MOV-536)
	b. PORVs - CLOSED	b. IF PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs. IF any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. IF block valve can <u>NOT</u> be closed, <u>THEN</u> go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	c. Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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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, manual action may be required to restart safeguards equipment.</p> <p>o Overriding breaker anti-pump/lockout may require placing control switches to TRIP or may require Containment Spray Reset</p> <p>o Placing key switches to DEFEAT will prevent auto SI actuation.</p> <p>*****</p>	
9.	<u>Reset SI:</u>	
	<p>a. Check all CCW pumps - RUNNING</p> <p>b. Place controls for main AND bypass feedwater regulating valves to CLOSE</p> <p>c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:</p> <p>o Train A SIA-1</p> <p>o Train B SIA-2</p> <p>d. One at a time, depress Safety Injection reset buttons (Panel SB-2):</p> <p>o Train A</p> <p>o Train B</p> <p>e. Verify Train A AND B - RESET</p>	<p>a. Place non-running CCW pumps CCR control switches in PULLOUT.</p> <p>e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):</p> <p>o SIA-1</p> <p>o SIM-1</p> <p>o SIA-2</p> <p>o SIM-2</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<u>Reset Containment Isolation</u> <u>Phase A And Phase B:</u> <ol style="list-style-type: none"> a. Place IVSW switches to OPEN on SN panel: <ol style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel c. Verify personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel d. Place control switches for all remaining Phase A isolation valves to CLOSE on SN panel e. One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B f. Verify Train A AND B - RESET 	<ol style="list-style-type: none"> 1) Place key switches to BYPASS. 2) One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B <p>IF signal can NOT be reset, THEN reset relays CA1 AND CA2 on top of Safeguards Initiation Racks 1-2 AND 2-2.</p>
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	g. Check Phase B - ACTUATED	g. Go To Step 11.
	h. Containment pressure - LESS THAN 17 PSIG	h. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 10i through 10k. 2) Continue with Step 11.
	i. One At A Time, Depress Containment Spray Reset Pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	j. One at a time, depress Phase B reset buttons: o CI Phase B Train A o CI Phase B Train B	
	k. Verify Train A AND B - RESET	k. Verify Relays reset (Top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2): o S1 o S2 o CB1 o CB2
11.	<u>Establish Instrument Air To Containment:</u> a. Open PCV-1228	a. Verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset: o CA1 o CA2

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 320 psig (340 psig FOR ADVERSE CONTAINMENT), the RHR pumps must be manually restarted to supply water to the RCS.</p> <p>*****</p>	
⑫	<p><u>Check If RHR Pumps Should Be Stopped:</u></p> <p>a. RCS pressure - GREATER THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)</p> <p>b. Stop RHR pumps and place in AUTO</p> <p>a. Go to Step 13. OBSERVE NOTE PRIOR TO STEP 13.</p>	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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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 15 ft, charging pumps that are * started or running should be monitored for loss of suction which may * result in pump damage.</p> <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides 480V equipment load ratings.</p>	
13.	<p><u>Establish Charging Flow:</u></p> <p>a. Charging pumps - AT LEAST ONE RUNNING</p> <p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> go to Step 14.</p> <p>b. Align charging pump suction to RWST:</p> <p>1) Open charging pump suction valve from RWST: o LCV-112B</p> <p>2) Close charging pump suction valve from VCT: o LCV-112C</p> <p>3) Place RCS Makeup Control switch to STOP</p> <p>c. Establish maximum flow:</p> <p>1) Start additional charging pump(s)</p> <p>2) Verify speed controllers in MANUAL</p> <p>3) Open HCV-142 as necessary and adjust charging pump speed controllers for maximum flow</p>	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Check If RCS Cooldown Should Be Stopped:</u> a. Core exit TCs - LESS THAN REQUIRED TEMPERATURE FROM TABLE ON STEP 6a b. Stop RCS cooldown c. Maintain core exit TCs - LESS THAN REQUIRED TEMPERATURE FROM TABLE ON STEP 6a	a. Do <u>NOT</u> proceed until core exit TCs less than required temperature.
15.	<u>Check Ruptured SG(s) Pressure - STABLE OR INCREASING</u>	IF pressure continues to decrease to less than 250 psid above the pressure of the intact SG(s) used for cooldown, <u>THEN</u> go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
16.	<u>Check RCS Subcooling Based On Core Exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</u>	Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	72 (103)
401 - 800	56 (69)
801 - 1200	43 (50)
1201 - 2500	39 (46)

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
17.	<p><u>Depressurize RCS To Minimize Break Flow And Refill PRZR:</u></p> <p>a. Normal PRZR spray - AVAILABLE AND EFFECTIVE</p> <p>b. Spray PRZR with maximum available spray until <u>ANY</u> of the following conditions satisfied:</p> <p>o <u>BOTH</u> of the following:</p> <p>1) RCS pressure - LESS THAN RUPTURED SG PRESSURE</p> <p>2) PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)</p> <p>- OR -</p> <p>o PRZR level - GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)</p> <p>- OR -</p> <p>o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. Go to Step 18. OBSERVE CAUTIONS AND NOTE PRIOR TO STEP 18.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

c. Close spray valve(s):

1) Normal spray valves

1) Stop ANY RCP(s) required to stop spray flow.

2) Auxiliary spray valve

2) Isolate auxiliary spray line:

o Energize AND manually close charging line isolation valves:

o MOV-205 (At MCC 26AA)

- OR -

o MOV-226 (At MCC 26BB)
AND MOV-227 (At MCC 26AA)

d. Go to Step 20. OBSERVE
CAUTION PRIOR TO STEP 20

CAUTION

- o The PRT may rupture IF a PRZR PORV is used to depressurize the RCS. This may result in abnormal containment conditions.
- o Cycling of the PRZR PORV should be minimized.

NOTE

The upper head region may void during RCS depressurization IF RCPs are NOT running. This will result in a rapidly increasing PRZR level.

18. Depressurize RCS Using PRZR PORV To Minimize Break Flow And Refill PRZR:

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	a. PRZR PORV - AT LEAST ONE AVAILABLE	<p>a. Establish auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Secure all but one charging pump and reduce speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow. <p><u>IF</u> auxiliary spray established, <u>THEN</u> return to Step 17b.</p> <p><u>IF</u> auxiliary spray can <u>NOT</u> be established, <u>THEN</u> go to 2-ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, Step 1.</p>
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- b. Open one PRZR PORV until ANY of the following conditions satisfied:
- o BOTH of the following:
 - 1) RCS pressure - LESS THAN RUPTURED SG PRESSURE
 - 2) PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT).
 - OR -
 - o PRZR level - GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)
 - OR -
 - o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

c. Close PRZR PORV

c. Close PORV block valve.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	<u>Check RCS Pressure - INCREASING</u>	<p>Close PRZR PORV block valve.</p> <p><u>IF</u> pressure continues to decrease, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Monitor following conditions for indication of leakage from PRZR PORV: <ul style="list-style-type: none"> o PRT temperature. o PRT pressure. o PRT level. o PORV downstream temperature. o Acoustic monitors. b. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
<p style="text-align: center;">***** <u>CAUTION</u> *****</p> <p>SI MUST BE TERMINATED when termination criteria are satisfied to prevent overfilling the ruptured SG(s).</p> <p style="text-align: center;">*****</p>												
20.	<p><u>Check If SI Flow Should Be Terminated:</u></p> <p>a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p>b. Secondary heat sink:</p> <p>o Total feed flow to SG(s) - GREATER THAN 400 GPM AVAILABLE</p> <p style="text-align: center;">- OR -</p> <p>o Narrow range level in at least one intact SG - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>c. RCS pressure - STABLE OR INCREASING</p> <p>d. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>b. <u>IF</u> neither condition satisfied, <u>THEN</u> go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>d. Return to Step 5. OBSERVE CAUTION PRIOR TO STEP 5.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21.	<u>Stop SI Pumps And Place In Auto</u>	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

ATTACHMENT 1 provides a list of 480V equipment load ratings.

22. Establish Charging Flow:

a. Charging pumps - AT LEAST ONE
RUNNING

a. Perform the following:

1) IF CCW flow to RCP(s)
thermal barrier is lost,
THEN isolate seal injection
to affected RCP(s) before
starting charging pumps:

o Locally energize AND
close seal injection
isolation valves:

- o MOV-250A, MCC 26AA, A2
- o MOV-250C, MCC 26AA, B2
- o MOV-250B, MCC 26BB, L3
- o MOV-250D, MCC 26BB, M3

- OR -

o Locally close seal
injection needle valves
(51 ft. el. Piping
Penetration Area):

- o 241A
- o 241B
- o 241C
- o 241D

2) Start charging pump(s) as
necessary.

b. Establish charging flow as
necessary:

1) Verify speed controller in
MANUAL

2) Adjust charging pump speed

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
23.	<p><u>Verify SI System Flow Not Required:</u></p> <p>a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p>b. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. Manually start SI system pumps as necessary. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>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 system pumps as necessary. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24.	<u>Check If Letdown Can Be Established:</u> a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT) b. CCW pumps - ANY RUNNING	a. Continue with Step 25. <u>WHEN</u> level increases to greater than 28% (47% for ADVERSE CONTAINMENT), <u>THEN</u> do Steps 24b through 24d. b. Perform the following: 1) Check for adequate power to run one CCW pump: o Any 480V bus supplying CCW pump energized from offsite power. - OR - o Load on any running diesel generator less than 1775 KW. <u>IF NOT, THEN</u> go to Step 25. 2) Start one CCW pump. <u>IF</u> no CCW pump can be started, <u>THEN</u> go to Step 25.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Service water pumps - ANY RUNNING ON NON-ESSENTIAL HEADER</p> <p>d. Establish letdown:</p> <ol style="list-style-type: none"> 1) Close letdown orifice stops: <ul style="list-style-type: none"> o 200A o 200B o 200C 2) Open letdown line isolation valves 201 and 202 3) Place letdown flow control valves 200 A B C switch to REMOTE 4) Open letdown stop valve LCV 459 and return to AUTO 5) Place low pressure letdown backpressure controller PCV-135 in MANUAL and adjust to 75 percent open 6) Open letdown orifice stops to establish desired flow: <ul style="list-style-type: none"> o 200A, 75 gpm o 200B, 45 gpm o 200C, 75 gpm 7) Set PCV-135 to maintain pressure between 225 psig and 275 psig 8) Place PCV-135 in AUTO 	<p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Check for adequate power to run one service water pump on non-essential header: <ul style="list-style-type: none"> o Any 480V bus energized from offsite power. - OR - o Load on any running diesel generator less than 1725 KW. <p>IF NOT, THEN go to Step 24d.</p> 2) Start one service water pump on non-essential header. <p>d. Establish excess letdown:</p> <ol style="list-style-type: none"> 1) Establish CCW flow through excess letdown heat exchanger by opening CCW valves: <ul style="list-style-type: none"> o Inlet valves 791,798 o Outlet valves 793,796 2) Position excess letdown diversion valve 215 to NORMAL to direct flow to the VCT. 3) Verify seal water return containment isolation valve 222 open. 4) Verify excess letdown flow control valve HCV-123 closed. 5) Open excess letdown isolation stop valve 213. 6) Slowly open HCV-123 to warmup the excess letdown heat exchanger. 7) Establish desired excess letdown flow using HCV-123. 8) Maintain excess letdown heat exchanger outlet temperature less than 195°F.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25.	<u>Check VCT Makeup Control System:</u>	Adjust controls as necessary.
	a. Makeup set for greater than RCS boron concentration	
	b. Place RCS makeup control switch to START	
26.	<u>Check Charging Pump Suction - ALIGNED TO VCT</u>	Align suction to VCT:
		a. Open charging pump suction valve from VCT and return to AUTO:
		o LCV-112C
		b. Close charging pump suction valve from RWST and return to AUTO:
		o LCV-112B
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated</p> <p>* prior to performing local actions.</p> <p>*****</p>		
27.	<u>Check If SI Accumulators Should Be Isolated:</u>	
	a. RCS pressure - LESS THAN 1000 PSIG	a. Continue with Step 28. <u>WHEN</u> RCS pressure less than 1000 psig, <u>THEN</u> perform steps 27b, 27c, 27d and 27e.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

b. Check both the following:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

b. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

c. Locally restore power to isolation valves:

- o 894A (MCC 26A)
- o 894C (MCC 26A)
- o 894B (MCC 26B)
- o 894D (MCC 26B)

This Step continued on the next page.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	d. Close all SI accumulator isolation valves	<p>d. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o IF HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <p>o Accumulator 21:</p> <ul style="list-style-type: none"> o 891A o HCV-943 <p>o Accumulator 22:</p> <ul style="list-style-type: none"> o 891B o HCV-943 <p>o Accumulator 23:</p> <ul style="list-style-type: none"> o 891C o HCV-943 <p>o Accumulator 24:</p> <ul style="list-style-type: none"> o 891D o HCV-943
	e. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																								
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>RCS and ruptured SG(s) pressures must be maintained less than the ruptured SG(s) atmospheric steam dump setpoint.</p> <p>*****</p>																										
28.	<p><u>Control RCS Pressure And Charging Flow To Minimize RCS-To-Secondary Leakage:</u></p> <p>a. Perform appropriate action(s) from table:</p> <table border="1"> <thead> <tr> <th>RUPTURED SG(s) LEVEL</th> <th>INCREASING</th> <th>DECREASING</th> <th>OFFSCALE HIGH</th> </tr> </thead> <tbody> <tr> <td>PRZR LEVEL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 28b </td> <td>Increase RCS Makeup Flow</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal </td> </tr> <tr> <td>BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%</td> <td>Depressurize RCS Using Step 28b</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Depressurize RCS Using Step 28b o Decrease RCS Makeup Flow </td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)</td> <td>Decrease RCS Makeup Flow</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> </tbody> </table>		RUPTURED SG(s) LEVEL	INCREASING	DECREASING	OFFSCALE HIGH	PRZR LEVEL				LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 28b 	Increase RCS Makeup Flow	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal 	BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%	Depressurize RCS Using Step 28b	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Depressurize RCS Using Step 28b o Decrease RCS Makeup Flow 	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal
RUPTURED SG(s) LEVEL	INCREASING	DECREASING	OFFSCALE HIGH																							
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BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Depressurize RCS Using Step 28b o Decrease RCS Makeup Flow 	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal																							
GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal																							
This Step continued on the next page.																										

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Use normal PRZR spray per Step 28a	<p>b. <u>IF</u> letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow. <p><u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛29.	<u>Check If Containment Spray Should Be Stopped:</u>	
	a. Spray pumps - RUNNING	a. Go to Step 30.
	b. Containment pressure - LESS THAN 17 PSIG	b. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 29c through 29f. 2) Continue with Step 30. OBSERVE CAUTION PRIOR TO STEP 30.
	c. One at a time, depress containment spray reset pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	d. Containment area radiation - NORMAL o R-25, R-26 o R-41, R-42 o R-2, R-7	d. Perform the following: 1) <u>WHEN</u> containment spray has been in service for 3.5 hours, <u>THEN</u> do Steps 29e and 29f. 2) Go to Step 30. OBSERVE CAUTION PRIOR TO STEP 30.
	e. Stop containment spray pumps and place in AUTO	
	f. Close containment spray pump discharge valves: o MOV-866A o MOV-866B o MOV-866C o MOV-866D	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of 480V equipment load ratings.</p>		
<p>⊛30. <u>Check Status Of 480V Busses:</u></p>	<p>a. All 480V busses - ENERGIZED BY OFFSITE POWER</p>	<p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p> <p><u>IF</u> necessary, <u>THEN</u> manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o MCCs: <ul style="list-style-type: none"> o MCC 24A o MCC 27A o MCC 29A o Direct Support Facilities personnel to align lighting to PAB LIGHTING TRANSFORMER 23 ALTERNATE POWER SUPPLY TO TSC bus per 2-SOP-27.1.5, 480 VOLT SYSTEM, as necessary. o Start one cable tunnel exhaust fan. o <u>IF</u> load on 22 or 23 diesel generator less than 1875 KW, <u>THEN</u> verify radiation monitors R-43/R-44 in service and start PAB ventilation fans. o Locally start one 480V switchgear room exhaust fan. o <u>IF</u> necessary, defeat fan interlock using bypass key.
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		Go to Step 31.
	<p>b. Manually load the following equipment on the 480V busses:</p> <ul style="list-style-type: none"> o All MCCs as necessary except MCC 28 and MCC 28A o All lighting as necessary o One cable tunnel exhaust fan o Verify radiation monitors R-43/R-44 in service and start PAB ventilation fans o Locally start one 480V switchgear room exhaust fan o IF necessary, defeat fan interlock using bypass key 	
31.	<p><u>Check If Diesel Generators Should Be Stopped:</u></p> <ul style="list-style-type: none"> a. Verify 480V busses - ENERGIZED BY OFFSITE POWER b. Locally stop any unloaded diesel generator(s) and place in standby 	<p>a. Try to restore offsite power to 480V busses per 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6.</p>
32.	<p><u>Minimize Secondary System Contamination:</u></p> <ul style="list-style-type: none"> o Isolate boiler blowdown o Isolate condenser overboarding o Isolate makeup to CST 	
33.	<p><u>Turn On PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured SG(s) Pressure</u></p>	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34.	<u>Check RCP Cooling - NORMAL:</u> a. RCP CCW system alarms - CLEARED b. RCP seal injection flow - BETWEEN 6 GPM AND 10 GPM PER RCP	IF all seal cooling has <u>NOT</u> been lost, <u>THEN</u> establish normal cooling to RCPs. Refer to the following as necessary: o 2-SOP-1.3, REACTOR COOLANT PUMP STARTUP <u>AND</u> SHUTDOWN. o 2-SOP-3.1, CHARGING, SEAL WATER, <u>AND</u> LETDOWN CONTROL.
35.	<u>Check If RCP Seal Return Flow Should Be Established:</u> a. RCP thermal barrier ΔP - POSITIVE b. CCW pumps - AT LEAST ONE RUNNING c. Establish seal return flow: 1) Check No. 1 seal return valves - OPEN: o 261A o 261B o 261C o 261D 2) Open seal return containment isolation valve: o MOV-222	a. Go to Step 36. OBSERVE CAUTION AND NOTE PRIOR TO STEP 36. b. Go to Step 36. OBSERVE CAUTION AND NOTE PRIOR TO STEP 36. 1) Manually open valves.

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">* If RCP seal cooling had previously been lost, the affected RCP(s) should * * <u>NOT</u> be started prior to a status evaluation. *</p> <p style="text-align: center;">*****</p>											
	<p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p>											
③36.	<p><u>Check RCP Status:</u></p> <p>a. 24 RCP - RUNNING</p> <p>a. Start RCP(s) to provide normal PRZR spray as follows:</p> <p>1) <u>IF</u> RVLIS natural circulation range indication less than 100%, <u>THEN</u> perform the following:</p> <p>o Increase PRZR level to greater than 62% (81% FOR ADVERSE CONTAINMENT).</p> <p>o Increase RCS subcooling based on core exit TCs to greater than value obtained from table:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74 (105)</td> </tr> <tr> <td>401 - 800</td> <td>58 (71)</td> </tr> <tr> <td>801 - 1200</td> <td>45 (52)</td> </tr> <tr> <td>1201 - 2500</td> <td>41 (48)</td> </tr> </tbody> </table>		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	74 (105)	401 - 800	58 (71)	801 - 1200	45 (52)	1201 - 2500	41 (48)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	74 (105)											
401 - 800	58 (71)											
801 - 1200	45 (52)											
1201 - 2500	41 (48)											
<p>This Step continued on the next page.</p>												

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>o Use PRZR heaters, as necessary to saturate the pressurizer water.</p> <p>2) <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <p>a) Reset MCC 28 and MCC 28A.</p> <p>b) Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.</p> <p>c) Start 24 RCP.</p> <p>d) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 2 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	<p>b. Stop all RCP(s) NOT required to supply ONE PRZR spray path</p>	
37.	<p><u>Check If Source Range Detectors Should Be Energized:</u></p> <p>a. Check intermediate range flux - LESS THAN 1E-10 AMPS</p> <p>b. Verify source range detectors - ENERGIZED</p> <p>c. Transfer nuclear recorders to source range scale</p>	<p>a. Continue with Step 38. <u>WHEN</u> flux less than 1E-10 amps, <u>THEN</u> do Steps 37b and 37c.</p> <p>b. Manually energize source range detectors.</p>

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38.	<u>Shut Down Unnecessary Plant Equipment:</u> <ul style="list-style-type: none"> o Circulating water pumps not required o Service water pumps not required o Evaluate secondary plant status and shut down equipment as required <div style="border: 1px dashed black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>CAUTION</u></p> <p>An offsite dose evaluation should be completed prior to using 2-ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN or 2-ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP.</p> </div>	
39.	<u>Go To Appropriate Post-SGTR Cooldown Method:</u> <ul style="list-style-type: none"> o Go to 2-ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 1 <ul style="list-style-type: none"> - OR - o Go to 2-ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, Step 1 <ul style="list-style-type: none"> - OR - o Go to 2-ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, Step 1 	
	-END-	

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-E-3	STEAM GENERATOR TUBE RUPTURE	REV. 0

ATTACHMENT 1
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG	22 DG		23 DG
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 SERVICE WATER PUMP	282 KW			
22 SERVICE WATER PUMP		282 KW OR 282 KW		
23 SERVICE WATER PUMP				282 KW
24 SERVICE WATER PUMP	282 KW			
25 SERVICE WATER PUMP		282 KW OR 282 KW		
26 SERVICE WATER PUMP				282 KW
PRZR CONTROL HEATERS				277 KW
21 PRZR BU HEATERS			554 KW	
22 PRZR BU HEATERS		485 KW		
23 PRZR BU HEATERS	485 KW			
21 AFW PUMP			384 KW	
23 AFW PUMP				384 KW
21 FAN COOLER UNIT	250 KW			
22 FAN COOLER UNIT	250 KW			
23 FAN COOLER UNIT		250 KW		
24 FAN COOLER UNIT			250 KW	
25 FAN COOLER UNIT				250 KW
21 SI PUMP	316 KW			
22 SI PUMP		316 KW	316 KW	
23 SI PUMP				345 KW
21 SPRAY PUMP	350 KW			
22 SPRAY PUMP				350 KW
21 RHR PUMP			303 KW	
22 RHR PUMP				303 KW
21 CHARGING PUMP	150 KW			
22 CHARGING PUMP			150 KW	
23 CHARGING PUMP				150 KW
21 RECIRC PUMP	299 KW			
22 RECIRC PUMP				299 KW
21 CCW PUMP	228 KW			
22 CCW PUMP		228 KW		
23 CCW PUMP				228 KW
21 LIGHTING TRANSFORMER		150 KW (N)		150 KW (E)
22 LIGHTING TRANSFORMER			225 KW	
23 LIGHTING TRANSFORMER	225 KW			
TURBINE AUX OIL PUMP				112 KW
STATION AIR COMPRESSOR	93 KW			

-END-

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-E-3	Title: STEAM GENERATOR TUBE RUPTURE	Revision Number: REV. 0
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ATTACHMENT 2
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-E-3

1. SI REINITIATION CRITERIA:

Following SI Termination Step 20, IF EITHER condition listed below occurs, THEN manually start SI system pumps AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. COLD LEG RECIRCULATION CRITERION:

IF RWST level decreases to less than 9.24 ft, go to 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

5. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-3.1, Revision: 0

POST-SGTR COOLDOWN USING BACKFILL

2

Approved By:

Mark J. Miller

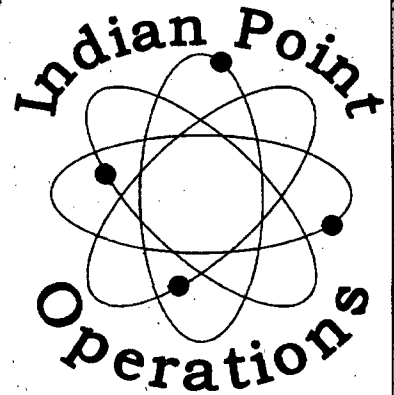
Procedure Sponsor, RPO/ Designee

5/3/2007

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	REV. 0

A. PURPOSE

This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a steam generator tube rupture. This recovery method depressurizes the ruptured SG(s) by draining it through the ruptured SG tube into the RCS.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 39, if plant staff selects backfill method.
- 2) 2-ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, Step 10, when blowdown is not available and plant staff selects backfill method.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-3.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Inadvertent criticality may occur following any natural circulation</p> <p>* cooldown if the first RCP started is in the ruptured loop.</p> <p>*****</p>	
1.	<p><u>Turn On PRZR Heaters As Necessary</u></p> <p><u>To Saturate PRZR Water At</u></p> <p><u>Ruptured SG(s) Pressure</u></p> <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* If RCP seal cooling had previously been lost, the affected RCP(s) should</p> <p>* <u>NOT</u> be started prior to a status evaluation.</p> <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p>	
⊛ 2.	<p><u>Check RCP Status:</u></p>	

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	a. 24 RCP - RUNNING	<p>a. Start RCP(s) to provide normal PRZR spray as follows:</p> <p>1) <u>IF</u> RVLIS natural circulation range indication less than 100%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 62% (81% FOR ADVERSE CONTAINMENT). o Increase RCS subcooling based on core exit TCs to greater than value obtained from table: <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74 (105)</td> </tr> <tr> <td>401 - 800</td> <td>58 (71)</td> </tr> <tr> <td>801 - 1200</td> <td>45 (52)</td> </tr> <tr> <td>1201 - 2500</td> <td>41 (48)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> o Use PRZR heaters, as necessary to saturate the pressurizer water. 	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	74 (105)	401 - 800	58 (71)	801 - 1200	45 (52)	1201 - 2500	41 (48)
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>2) <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <p>a) Reset MCC 28 and MCC 28A.</p> <p>b) Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.</p> <p>c) Start 24 RCP.</p> <p>d) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 1 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	b. Stop all RCP(s) NOT required to supply ONE PRZR spray path	

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3.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <p>a. Check both the following:</p> <p style="margin-left: 40px;">o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1" style="margin-left: 80px;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p style="margin-left: 40px;">o PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)</p> <p>b. Locally restore power to isolation valves:</p> <p style="margin-left: 40px;">o 894A (MCC 26A)</p> <p style="margin-left: 40px;">o 894C (MCC 26A)</p> <p style="margin-left: 40px;">o 894B (MCC 26B)</p> <p style="margin-left: 40px;">o 894D (MCC 26B)</p> <p style="margin-left: 40px;">a. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o IF HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p>IF an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	d. Open all SI accumulator isolation valve breakers	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Verify Adequate Shutdown Margin:</u>	
	a. Sample ruptured SG(s)	
	b. Sample RCS	
	c. Shutdown margin from graphs book - ADEQUATE	c. Borate as necessary.
⊗ 5.	<u>Check Intact SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.
	b. Control feed flow to maintain narrow range level between 14% (27% FOR ADVERSE CONTAINMENT) and 50%	b. <u>IF</u> narrow range level in any intact SG continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown <u>AND</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>Since ruptured SG(s) may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should <u>NOT</u> be delayed.</p>		
6.	<p><u>Initiate RCS Cooldown To Cold Shutdown:</u></p> <ul style="list-style-type: none"> a. 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 SG(s): <ul style="list-style-type: none"> 1) Check condenser - AVAILABLE 2) Place steam dump controller switch to manual and adjust for zero output. 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary. 	<ul style="list-style-type: none"> c. Manually or locally dump steam from intact SG(s): <ul style="list-style-type: none"> o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. <li style="text-align: center;">- OR - o Use turbine-driven AFW pump. <p><u>IF</u> no intact SG available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted SG. <li style="text-align: center;">- OR - o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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⊗ 7.	<u>Check Ruptured SG(s) Narrow Range Level - GREATER THAN 14% (27% FOR ADVERSE CONTAINMENT)</u>	<p>Refill ruptured SG to 73% (60% FOR ADVERSE CONTAINMENT) using feed flow. <u>IF</u> any of the following conditions occur, <u>THEN</u> stop feed flow to ruptured SG:</p> <ul style="list-style-type: none"> o Ruptured SG pressure decreases in an uncontrolled manner. - OR - o Ruptured SG pressure increases to 1000 psig. - OR - o Ruptured SG pressure decreases to 430 psig <u>AND</u> ruptured SG level greater than 10% (27% FOR ADVERSE CONTAINMENT).
⊗ 8.	<u>Control Charging And Letdown Flow To Maintain PRZR Level:</u>	
	a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)	a. Increase charging flow as necessary. Go to Step 9. OBSERVE NOTES PRIOR TO STEP 9.
	b. PRZR level - LESS THAN 71% (65% FOR ADVERSE CONTAINMENT)	b. Decrease charging flow as necessary. Go to Step 10.

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<p style="text-align: center;"><u>NOTE</u></p> <ul style="list-style-type: none"> o The upper head region may void during RCS depressurization if RCPs are <u>NOT</u> running. This will result in a rapidly increasing PRZR level. o RCS depressurization may be stopped when RCS pressure decreases to less than 370 psig (280 psig FOR ADVERSE CONTAINMENT) to maintain adequate RCP number 1 seal differential pressure. o RCS depressurization rate should be controlled to maintain PRZR level stable. 		
<p>⊛ 9. <u>Depressurize RCS To Backfill From Ruptured SG(s):</u></p>	<p>a. Use normal PRZR spray</p>	<p>a. <u>IF</u> letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212
<p>This Step continued on the next page.</p>		

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Number: 2-ES-3.1	Title: POST-SGTR COOLDOWN USING BACKFILL	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. Turn on PRZR heaters as necessary</p> <p>c. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p>d. Maintain PRZR level - STABLE</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>7) Initiate spray slowly using HCV-142.</p> <p>8) Adjust charging pump speed to increase spray flow.</p> <p><u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

FOLDOUT PAGE FOR 2-ES-3.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.

10. Check If RHR System Can Be Placed In Service:

- a. Check both the following:
 - o RCS temperature - LESS THAN 350°F
 - o RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT)
- a. Go to Step 11.
- b. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM

⑪. Check If RCPs Must Be Stopped:

- a. Check the following:
 - o Number 1 seal differential pressure - LESS THAN 200 PSID
 - OR -
 - o Number 1 seal return flow - LESS THAN 0.2 GPM
- a. IF neither condition satisfied, THEN go to Step 12.
- b. Stop affected RCP(s)

12. Check RCS Temperatures - LESS THAN 200°F

Return to Step 4.

FOLDOUT PAGE FOR 2-ES-3.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.1	Title: POST-SGTR COOLDOWN USING BACKFILL	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	<u>Evaluate Long Term Plant Status:</u> a. Maintain cold shutdown conditions b. Consult TSC	
	-END-	

FOLDOUT PAGE FOR 2-ES-3.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

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RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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IF CST level decreases to less than 2 ft, switch to city water supply.

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Number:	Title:	Revision Number:
2-ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	REV. 0

ATTACHMENT 1
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-3.1

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.



Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-3.2, Revision: 0

POST-SGTR COOLDOWN USING BLOWDOWN

2

Approved By:

Mandy Melt

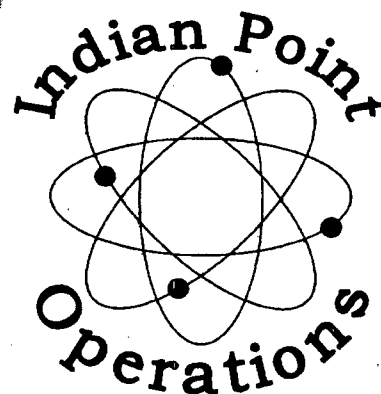
Procedure Sponsor, RPO/ Designee

15/3/2007

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	REV. 0

A. PURPOSE

This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a steam generator tube rupture. This recovery method depressurizes the ruptured SG(s) by draining it using SG blowdown.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 39, if plant staff selects the blowdown method.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

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- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

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3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <p>* An offsite dose evaluation should be completed prior to using this</p> <p>* procedure.</p> <p style="text-align: center;">*****</p>	
1.	<p><u>Turn On PRZR Heaters As Necessary</u></p> <p><u>To Saturate PRZR Water At</u></p> <p><u>Ruptured SG(s) Pressure</u></p>	
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <p>* If RCP seal cooling had previously been lost, the affected RCP(s) should</p> <p>* <u>NOT</u> be started prior to a status evaluation.</p> <p style="text-align: center;">*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p>	
⊛ 2.	<p><u>Check RCP Status:</u></p>	

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

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

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Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	a. 24 RCP - RUNNING	<p>a. Start RCP(s) to provide normal PRZR spray as follows:</p> <p>1) IF RVLIS natural circulation range indication less than 100%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 62% (81% FOR ADVERSE CONTAINMENT). o Increase RCS subcooling based on core exit TCs to greater than value obtained from table: <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>74 (105)</td> </tr> <tr> <td>401 - 800</td> <td>58 (71)</td> </tr> <tr> <td>801 - 1200</td> <td>45 (52)</td> </tr> <tr> <td>1201 - 2500</td> <td>41 (48)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> o Use PRZR heaters, as necessary to saturate the pressurizer water. 	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	74 (105)	401 - 800	58 (71)	801 - 1200	45 (52)	1201 - 2500	41 (48)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	74 (105)											
401 - 800	58 (71)											
801 - 1200	45 (52)											
1201 - 2500	41 (48)											

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>2) <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <p>a) Reset MCC 28 and MCC 28A.</p> <p>b) Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.</p> <p>c) Start 24 RCP.</p> <p>d) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 1 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	b. Stop all RCP(s) NOT required to supply ONE PRZR spray path	

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated</p> <p>* prior to performing local actions.</p> <p>*****</p>											
3.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>a. Check both the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT) </div> <div style="width: 45%;"> <p>a. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> </div> </div> <p>b. Locally restore power to isolation valves:</p> <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
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<p>This Step continued on the next page.</p>												

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

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IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Verify Adequate Shutdown Margin:</u>	
	a. Sample ruptured SG(s)	
	b. Sample RCS	
	c. Shutdown margin from graphs book - ADEQUATE	c. Borate as necessary.
⊛ 5.	<u>Check Intact SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.
	b. Control feed flow to maintain narrow range level between 14% (27% FOR ADVERSE CONTAINMENT) and 50%	b. <u>IF</u> narrow range level in any intact SG continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown <u>AND</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>Since ruptured SG(s) may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should <u>NOT</u> be delayed.</p>		
6.	<p><u>Initiate RCS Cooldown To 350°F:</u></p> <p>a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Dump steam to condenser from intact SG(s):</p> <ol style="list-style-type: none"> 1) Check condenser - AVAILABLE 2) Place steam dump controller switch to manual and adjust for zero output. 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary. 	<p>b. Manually or locally dump steam from intact SG(s):</p> <ol style="list-style-type: none"> o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. - OR - o Use turbine-driven AFW pump. <u>IF</u> no intact SG available, <u>THEN</u> perform the following: o Use faulted SG. - OR - o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																								
<p style="text-align: center;">***** * <u>CAUTION</u> * * RCS and ruptured SG(s) pressures must be maintained less than the * * ruptured SG(s) atmospheric steam dump setpoint. * * *****</p>																										
<p>7. <u>Control RCS Pressure And Charging Flow To Minimize RCS-To-Secondary Leakage:</u></p> <p>a. Perform appropriate action(s) from table:</p>																										
<table border="1"> <thead> <tr> <th>RUPTURED SG(s) LEVEL</th> <th>INCREASING</th> <th>DECREASING</th> <th>OFFSCALE HIGH</th> </tr> </thead> <tbody> <tr> <td>PRZR LEVEL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 7b </td> <td>Increase RCS Makeup Flow</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal </td> </tr> <tr> <td>BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%</td> <td>Depressurize RCS Using Step 7b</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Depressurize RCS Using Step 7b o Decrease RCS Makeup Flow </td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)</td> <td>Decrease RCS Makeup Flow</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> </tbody> </table>	RUPTURED SG(s) LEVEL	INCREASING	DECREASING	OFFSCALE HIGH	PRZR LEVEL				LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 7b 	Increase RCS Makeup Flow	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal 	BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%	Depressurize RCS Using Step 7b	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Depressurize RCS Using Step 7b o Decrease RCS Makeup Flow 	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal		
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<p>This Step continued on the next page.</p>																										

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Use normal PRZR spray per Step 7a	<p>b. <u>IF</u> letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow. <p><u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.</p>		
8.	<p><u>Check If RCS Cooldown Should Be Stopped:</u></p> <p>a. RCS temperatures - LESS THAN 350°F</p> <p>b. Stop RCS cooldown</p> <p>c. Maintain RCS Temperatures - LESS THAN 350°F</p>	<p>a. Return to Step 4.</p>
⊛ 9.	<p><u>Check Ruptured SG(s) Narrow Range Level - GREATER THAN 14% (27% FOR ADVERSE CONTAINMENT)</u></p>	<p>Refill ruptured SG to 73% (60% FOR ADVERSE CONTAINMENT) using feed flow. <u>IF</u> any of the following conditions occur, <u>THEN</u> stop feed flow to ruptured SG:</p> <p>o Ruptured SG pressure decreases in an uncontrolled manner.</p> <p style="text-align: center;">- OR -</p> <p>o Ruptured SG pressure increases to 1000 psig.</p> <p style="text-align: center;">- OR -</p> <p>o Ruptured SG pressure decreases to 430 psig <u>AND</u> ruptured SG level greater than 10% (27% FOR ADVERSE CONTAINMENT).</p>

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<div> <p align="center"><u>NOTE</u></p> <p>Blowdown from ruptured SG(s) may be stopped when RCS pressure decreases to less than 370 psig (280 psig FOR ADVERSE CONTAINMENT) to maintain adequate RCP number 1 seal differential pressure.</p> </div>		
10.	<u>Establish Blowdown From Ruptured SG(s):</u> a. Refer to 2-SOP-7.2, SECONDARY BOILER BLOWDOWN PURIFICATION SYSTEM, as necessary	Go to alternate post-SGTR cooldown procedure, 2-ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 1, or 2-ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, Step 1.
⊛11.	<u>Control Charging And Letdown Flow To Maintain PRZR Level:</u> a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT) b. PRZR level - LESS THAN 71% (65% FOR ADVERSE CONTAINMENT)	a. Increase charging flow as necessary. Go to Step 12. OBSERVE NOTE PRIOR TO STEP 12. b. Decrease charging flow as necessary. Go to Step 13.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

The upper head region may void during RCS depressurization if RCPs are NOT running. This will result in a rapidly increasing PRZR level.

⊗12. Depressurize RCS To Minimize
RCS-To-Secondary Leakage:

a. Use normal PRZR spray

a. IF letdown is in service, THEN
use auxiliary spray:

- 1) Maintain RCP seal injection
6 gpm to 10 gpm.
- 2) Reduce charging pump speed
to minimum flow.
- 3) Close charging line flow
control valve:
 - o HCV-142
- 4) Close the charging stop
valves:
 - o 204A - Loop 22
 - o 204B - Loop 21
- 5) Close the pressurizer spray
valves:
 - o PCV-455A
 - o PCV-455B
- 6) Open auxiliary spray valve:
 - o 212
- 7) Initiate spray slowly using
HCV-142.
- 8) Adjust charging pump speed
to increase spray flow.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. Turn on PRZR heaters as necessary</p> <p>c. Maintain RCS pressure at ruptured SG(s) pressure</p> <p>d. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>IF auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
⑩13.	<p><u>Check If RCPs Must Be Stopped:</u></p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o Number 1 seal differential pressure - LESS THAN 200 PSID - OR - o Number 1 seal return flow - LESS THAN 0.2 GPM <p>b. Stop affected RCP(s)</p>	<p>a. IF neither condition satisfied, <u>THEN</u> go to Step 14.</p>										

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Check If RHR System Can Be Placed In Service:</u> a. Check both the following: o RCS temperature - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT) b. Place RHR System in service per 2-SOP-4.2.1, RESIDUAL HEAT REMOVAL SYSTEM	a. Return to Step 9.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.2	Title: POST-SGTR COOLDOWN USING BLOWDOWN	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Continue RCS Cooldown To Cold Shutdown:</u> a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Use RHR System c. Dump steam to condenser from intact SG(s)	c. Manually or locally dump steam from intact SG(s): o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. - OR - o Use turbine-driven AFW pump. <u>IF</u> no intact SG available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following: o Use faulted SG. - OR - o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
16.	<u>Check RCS Temperatures - LESS THAN 200°F</u>	Return to Step 9.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	REV. 0

ATTACHMENT 1
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-3.2

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.



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Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ES-3.3, Revision: 0

POST-SGTR COOLDOWN USING STEAM DUMP

2

Approved By:

Mark J. Mill

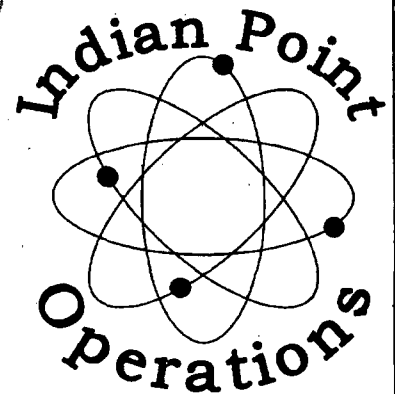
Procedure Sponsor, RPO/ Designee

5/3/2007

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

A. PURPOSE

This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a steam generator tube rupture. This recovery method depressurizes the ruptured SG(s) by dumping steam.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-3; STEAM GENERATOR TUBE RUPTURE, Step 39, if plant staff selects steam dump method.
- 2) 2-ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, Step 10, when blowdown is not available and plant staff selects steam dump method.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o Steam should <u>NOT</u> be released from any ruptured SG if water may exist in its steamline.</p> <p>o An offsite dose evaluation should be completed prior to using this procedure.</p> <p>*****</p>	
1.	<p><u>Turn On PRZR Heaters As Necessary</u> <u>To Saturate PRZR Water At</u> <u>Ruptured SG(s) Pressure</u></p> <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>If RCP seal cooling had previously been lost, the affected RCP(s) should <u>NOT</u> be started prior to a status evaluation.</p> <p>*****</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p> </div>	
⊛ 2.	<p><u>Check RCP Status:</u></p>	
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

a. 24 RCP - RUNNING

a. Start RCP(s) to provide normal PRZR spray as follows:

1) IF RVLIS natural circulation range indication less than 100%, THEN perform the following:

o Increase PRZR level to greater than 62% (81% FOR ADVERSE CONTAINMENT).

o Increase RCS subcooling based on core exit TCs to greater than value obtained from table:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	74 (105)
401 - 800	58 (71)
801 - 1200	45 (52)
1201 - 2500	41 (48)

o Use PRZR heaters, as necessary to saturate the pressurizer water.

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>2) <u>IF</u> containment sump level less than 42'10 1/2" <u>AND</u> containment conditions <u>NOT</u> adverse, <u>THEN</u>:</p> <p>a) Reset MCC 28 and MCC 28A.</p> <p>b) Establish conditions for starting an RCP per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION.</p> <p>c) Start 24 RCP.</p> <p>d) <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> refer to ATTACHMENT 1 to verify natural circulation.</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	b. Stop all RCP(s) NOT required to supply ONE PRZR spray path	

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

Radiation levels and harsh environment conditions should be evaluated prior to performing local actions.

3. Check If SI Accumulators Should Be Isolated:

a. Check both the following:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

a. Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)

b. Locally restore power to isolation valves:

- o 894A (MCC 26A)
- o 894C (MCC 26A)
- o 894B (MCC 26B)
- o 894D (MCC 26B)

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <p>1) Close nitrogen supply valve to accumulators: HCV-863.</p> <p>o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves:</p> <ul style="list-style-type: none"> o 1809 o 1811A o 1811B <p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
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RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Verify Adequate Shutdown Margin:</u>	
	a. Sample ruptured SG(s)	
	b. Sample RCS	
	c. Shutdown margin from graphs book - ADEQUATE	c. Borate as necessary.
⊗ 5.	<u>Check Intact SG Levels:</u>	
	a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)	a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.
	b. Control feed flow to maintain narrow range level between 14% (27% FOR ADVERSE CONTAINMENT) and 50%	b. <u>IF</u> narrow range level in any intact SG continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown <u>AND</u> go to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

Since ruptured SG(s) may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should NOT be delayed.

6. Initiate RCS Cooldown To 350°F:

- a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR
- b. Dump steam to condenser from intact SG(s):
 - 1) Check condenser - AVAILABLE
 - 2) Place steam dump controller switch to manual and adjust for zero output.
 - 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.
- b. Manually or locally dump steam from intact SG(s):
 - o Use SG atmospheric steam dump:
 - o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION AND COMPENSATORY ACTIONS for local operation as necessary.
 - OR -
 - o Use turbine-driven AFW pump.
 - IF no intact SG available, THEN perform the following:
 - o Use faulted SG.
 - OR -
 - o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																								
<p style="text-align: center;">***** * <u>CAUTION</u> * * * RCS and ruptured SG(s) pressures must be maintained less than the * ruptured SG(s) atmospheric steam dump setpoint. * *****</p>																										
7.	<u>Control RCS Pressure And Charging Flow To Minimize RCS-To-Secondary Leakage:</u> a. Perform appropriate action(s) from table:																									
	<table border="1"> <thead> <tr> <th>RUPTURED SG(s) LEVEL</th> <th>INCREASING</th> <th>DECREASING</th> <th>OFFSCALE HIGH</th> </tr> </thead> <tbody> <tr> <td>PRZR LEVEL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 7b </td> <td>Increase RCS Makeup Flow</td> <td> <ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal </td> </tr> <tr> <td>BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%</td> <td>Depressurize RCS Using Step 7b</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)</td> <td> <ul style="list-style-type: none"> o Depressurize RCS Using Step 7b o Decrease RCS Makeup Flow </td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> <tr> <td>GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)</td> <td>Decrease RCS Makeup Flow</td> <td>Turn On PRZR Heaters</td> <td>Maintain RCS And Ruptured SG(s) Pressures Equal</td> </tr> </tbody> </table>		RUPTURED SG(s) LEVEL	INCREASING	DECREASING	OFFSCALE HIGH	PRZR LEVEL				LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 7b 	Increase RCS Makeup Flow	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal 	BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%	Depressurize RCS Using Step 7b	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Depressurize RCS Using Step 7b o Decrease RCS Makeup Flow 	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal	GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal
RUPTURED SG(s) LEVEL	INCREASING	DECREASING	OFFSCALE HIGH																							
PRZR LEVEL																										
LESS THAN 28% (47% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Depressurize RCS Using Step 7b 	Increase RCS Makeup Flow	<ul style="list-style-type: none"> o Increase RCS Makeup Flow o Maintain RCS And Ruptured SG(s) Pressures Equal 																							
BETWEEN 28% (47% FOR ADVERSE CONTAINMENT) AND 50%	Depressurize RCS Using Step 7b	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal																							
BETWEEN 50% And 71% (65% FOR ADVERSE CONTAINMENT)	<ul style="list-style-type: none"> o Depressurize RCS Using Step 7b o Decrease RCS Makeup Flow 	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal																							
GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZR Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal																							
This Step continued on the next page.																										

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Use normal PRZR spray per Step 7a	<p>b. <u>IF</u> letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow. <p><u>IF</u> auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>2-POP-3.3, PLANT COOLDOWN - HOT TO COLD SHUTDOWN, should be referred to for plant alignment during cooldown.</p>		
8.	<p><u>Check If RCS Cooldown Should Be Stopped:</u></p> <ul style="list-style-type: none"> a. RCS temperatures - LESS THAN 350°F b. Stop RCS cooldown c. Maintain RCS temperatures - LESS THAN 350°F 	<ul style="list-style-type: none"> a. Return to Step 4.
⊕ 9.	<p><u>Check Ruptured SG(s) Narrow Range Level - GREATER THAN 14% (27% FOR ADVERSE CONTAINMENT)</u></p>	<p>Refill ruptured SG to 73% (60% FOR ADVERSE CONTAINMENT) using feed flow. <u>IF</u> any of the following conditions occur, <u>THEN</u> stop feed flow to ruptured SG:</p> <ul style="list-style-type: none"> o Ruptured SG pressure decreases in an uncontrolled manner. <li style="text-align: center;">- OR - o Ruptured SG pressure increases to 1000 psig. <li style="text-align: center;">- OR - o Ruptured SG pressure decreases to 430 psig <u>AND</u> ruptured SG level greater than 10% (27% FOR ADVERSE CONTAINMENT).

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** * <u>CAUTION</u> * * Ruptured SG(s) pressure may decrease rapidly when steam is released. * *****</p>		
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>Steam releases from ruptured SG(s) may be stopped when RCS pressure decreases to less than 370 psig (280 psig FOR ADVERSE CONTAINMENT) to maintain adequate RCP number 1 seal differential pressure.</p> </div>		
10.	<u>Dump Steam To Condenser From Ruptured SG(s):</u> o Locally operate MSIV bypass valves as necessary	Dump steam using ruptured SG(s) atmospheric steam dump.
⊛11.	<u>Control Charging And Letdown Flow To Maintain PRZR Level:</u> a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT) b. PRZR level - LESS THAN 71% (65% FOR ADVERSE CONTAINMENT)	a. Increase charging flow as necessary. Go to Step 12. OBSERVE NOTE PRIOR TO STEP 12. b. Decrease charging flow as necessary. Go to Step 13.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV.. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>The upper head region may void during RCS depressurization if RCPs are <u>NOT</u> running. This will result in a rapidly increasing PRZR level.</p>		
<p>⊛12. <u>Depressurize RCS To Minimize RCS-To-Secondary Leakage:</u></p>	<p>a. Use normal PRZR spray</p>	<p>a. <u>IF</u> letdown is in service, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow.
<p>This Step continued on the next page.</p>		

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number: 2-ES-3.3	Title: POST-SGTR COOLDOWN USING STEAM DUMP	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. Turn on PRZR heaters as necessary</p> <p>c. Maintain RCS pressure at ruptured SG(s) pressure</p> <p>d. Maintain RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>IF auxiliary spray can <u>NOT</u> be used, <u>THEN</u> use one PRZR PORV.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
⊛13.	<p><u>Check If RCPs Must Be Stopped:</u></p> <p>a. Check the following:</p> <p>o Number 1 seal differential pressure - LESS THAN 200 PSID</p> <p>- OR -</p> <p>o Number 1 seal return flow - LESS THAN 0.2 GPM</p> <p>b. Stop affected RCP(s)</p>	<p>a. IF neither condition satisfied, <u>THEN</u> go to Step 14.</p>										

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Check If RHR System Can Be Placed In Service:</u> a. Check both the following: <ul style="list-style-type: none"> o RCS temperature - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT) b. Place RHR System in service per 2-SOP-4.2.1. RESIDUAL HEAT REMOVAL SYSTEM	a. Return to Step 9.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Continue RCS Cooldown To Cold Shutdown:</u> a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Use RHR System c. Dump steam to condenser from intact SG(s)	c. Manually or locally dump steam from intact SG(s): o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. - OR - o Use turbine-driven AFW pump. IF no intact SG available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following: o Use faulted SG. - OR - o Go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
16.	<u>Check RCS Temperatures - LESS THAN 200°F</u>	Return to Step 9.

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	<u>Evaluate Long Term Plant Status:</u> a. Maintain cold shutdown conditions b. Consult TSC	
	-END-	

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

Number:	Title:	Revision Number:
2-ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	REV. 0

ATTACHMENT 1
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

1. The following conditions support or indicate natural circulation flow:

- o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- o SG pressures - STABLE OR DECREASING
- o RCS hot leg temperatures - STABLE OR DECREASING
- o Core exit TCs - STABLE OR DECREASING
- o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

-END-

FOLDOUT PAGE FOR 2-ES-3.3

1. SI REINITIATION CRITERIA:

IF EITHER condition listed below occurs, manually start SI system pumps as necessary AND go to 2-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o PRZR level - CANNOT BE MAINTAINED GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)
- o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE

RCS PRESSURE - PSIG	0-400	401-800	801-1200	1200-2500
RCS SUBCOOLING °F (ADVERSE)	52 (83)	36 (49)	23 (30)	19 (26)

2. SECONDARY INTEGRITY CRITERIA:

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

3. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

4. MULTIPLE TUBE RUPTURE CRITERIA:

IF any intact SG level increases in an uncontrolled manner or any intact SG has abnormal radiation, stabilize the plant AND return to 2-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date:

4/28/08

2-ECA-0.0, Revision: 2

LOSS OF ALL AC POWER

2

Approved By:

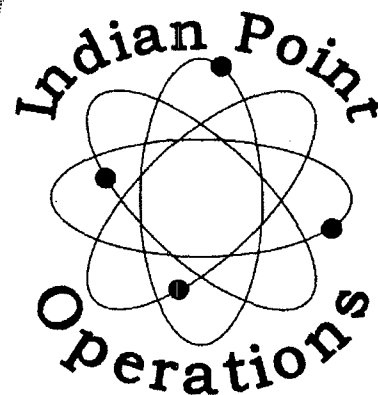
Procedure Sponsor, RPO/ Designee

Date

4/28/08

Team P

Procedure Owner



PARTIAL REVISION

Number: 2-ECA-0.0	Title: LOSS OF ALL AC POWER	Revision Number: REV. 2
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A. PURPOSE

This procedure provides actions to respond to a loss of all AC power.

B. SYMPTOMS OR ENTRY CONDITIONS

- 1) The symptom of a loss of all AC power is the indication that all 480V busses are de-energized.
- 2) This procedure is entered from 2-E-0, REACTOR TRIP OR SAFETY INJECTION, Step 3, on the indication that all 480V busses are de-energized.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

Number: 2-ECA-0.0	Title: LOSS OF ALL AC POWER	Revision Number: REV. 2
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <ul style="list-style-type: none"> o Steps 1 and 2 are IMMEDIATE ACTION steps. o CSF Status Trees should be monitored for information only. FRPs should <u>NOT</u> be implemented. </div>		
1.	<u>Verify Reactor Trip:</u> <ul style="list-style-type: none"> o Reactor trip breakers - OPEN o Neutron flux - DECREASING o Rod bottom lights - LIT o Rod position indicators - AT ZERO 	Manually trip reactor.
2.	<u>Verify Turbine Trip:</u> a. All turbine stop valves - CLOSED	a. Manually trip turbine. <u>IF</u> turbine will <u>NOT</u> trip, <u>THEN</u> close MSIVs. <u>IF</u> MSIVs can <u>NOT</u> be closed, <u>THEN</u> manually run back turbine.

Number: 2-ECA-0.0	Title: LOSS OF ALL AC POWER	Revision Number: REV. 2
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<u>Check If RCS Is Isolated:</u>	
	a. PRZR PORVs - CLOSED	a. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs.
	b. Letdown isolation valves - CLOSED	b. Manually close valve.
	o LCV-459	
	o 200A	
	o 200B	
	o 200C	
	c. Excess letdown isolation valve - CLOSED	c. Manually close valve.
	o 213	
4.	<u>Verify AFW Flow - GREATER THAN 400 GPM:</u>	
	a. Turbine-driven AFW pump - RUNNING	a. Manually open steam supply regulator valve:
		o PCV-1139
	b. Manually align turbine-driven AFW pump FCVs as necessary	
	c. Adjust steam supply speed control valve as necessary:	
	o HCV-1118	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p><u>IF</u> 480V bus can <u>NOT</u> be energized from diesel generator(s), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a) Locally trip running diesel generator(s). b) Contact Con Ed D0 to determine if 138KV or 13.8KV power readily available. c) <u>IF</u> outside power is <u>NOT</u> readily available, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1. Start Appendix R DG per: <ul style="list-style-type: none"> o 2-SOP-27.6, UNIT 2 APPENDIX R DIESEL GENERATOR OPERATION 2. Dispatch NPO to black start a GT per: <ul style="list-style-type: none"> o 2-SOP-27.5.3, BLACK START OF GAS TURBINE 1, 2, <u>OR</u> 3. 3. Go to Step 6. OBSERVE CAUTIONS PRIOR TO STEP 6. d) <u>IF</u> outside power is readily available, <u>THEN</u> attempt to manually energize 480V bus using the following: <ul style="list-style-type: none"> o 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 <u>AND/OR</u> 6. o 2-AOP-480V-1, LOSS OF 480V BUS.
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> b. Check 480V busses - AT LEAST ONE ENERGIZED: <ul style="list-style-type: none"> o 2A <u>AND</u> 3A - OR - o 5A - OR - o 6A c. Start one service water pump on the essential header to support running diesel generator d. Return to procedure and step in effect and implement FRPs 	<ul style="list-style-type: none"> b. Go to Step 6. OBSERVE CAUTIONS PRIOR TO STEP 6.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o When power is restored to any 480V bus, recovery actions should * continue starting with Step 24. * o If an SI signal exists or if an SI signal is actuated during this * procedure, it should be reset (refer to Step 18b) to permit manual * loading of equipment on a 480V bus. * o If a diesel generator is started, a service water pump should be * started on the essential header to provide diesel generator cooling. * o If a partial train (bus 2A or bus 3A) is energized, safeguards * equipment on the energized bus including RCP seal cooling should <u>NOT</u> be * placed in PULLOUT or isolated. <p>*****</p>	
6.	<p><u>Place Following Equipment</u></p> <p><u>Switches In PULLOUT Position:</u></p> <ul style="list-style-type: none"> o Containment spray pumps o SI pumps o FCUs o Motor-driven AFW pumps o Turning gear oil pump o Bearing oil pump o Turbine auxiliary oil pump o CCW pumps o RHR pumps 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated</p> <p>* prior to performing local actions.</p> <p>*****</p>	
⊕ 7.	<p><u>Dispatch Personnel To Locally</u></p> <p><u>Restore AC Power:</u></p> <p>a. Emergency diesel generator(s)</p> <p>per:</p> <ul style="list-style-type: none"> o 2-SOP-27.3.1.1, 21 EMERGENCY DIESEL GENERATOR MANUAL OPERATION o 2-SOP-27.3.1.2, 22 EMERGENCY DIESEL GENERATOR MANUAL OPERATION o 2-SOP-27.3.1.3, 23 EMERGENCY DIESEL GENERATOR MANUAL OPERATION 	
<p>This Step continued on the next page.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Check 13.8KV feeder 13W92 - ENERGIZED	<p>b. <u>IF</u> 13.8KV feeder 13W92 can <u>NOT</u> be energized, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Contact Con Ed DO to determine if IP3 13.8KV feeder 13W93 is available. 2) <u>IF</u> IP3 13.8KV 13W93 is available, <u>THEN</u> attempt to restore power to 6.9KV via 52GT/BT per: <ul style="list-style-type: none"> o 2-SOP-ESP-001. LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS 3) <u>IF</u> 13.8KV feeder 13W93 is <u>NOT</u> available <u>OR</u> 52GT/BT can <u>NOT</u> be closed, <u>THEN</u> start Appendix R DG per: <ul style="list-style-type: none"> o 2-SOP-27.6, UNIT 2 APPENDIX R DIESEL GENERATOR OPERATION 4) <u>IF</u> Appendix R DG can <u>NOT</u> be started, <u>THEN</u> perform the following as required: <ol style="list-style-type: none"> a) Restore power to ASSS via IP3 Appendix R DG per: <ul style="list-style-type: none"> o 2-AOI-27.1.9.2, PROVIDING APPENDIX R POWER FROM UNIT 3 b) Black start a GT per 2-SOP-27.5.3, BLACK START OF GAS TURBINE 1, 2, <u>OR</u> 3 c) Contact Con Ed DO for available power alignment.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		5) Continue with Step 8. <u>WHEN</u> power source is available, <u>THEN</u> do Step 7c.
	<p>c. Attempt to restore power to busses per the following while continuing with Step 8:</p> <ul style="list-style-type: none"> o 2-SOP-27.1.3, OPERATION OF 13.8KV SYSTEM o 2-SOP-27.1.4, 6900 VOLT SYSTEM. o 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 AND/OR 6. o 2-AOP-13.8KV-1, LOSS OF POWER TO ANY 13.8KV BUS o 2-AOP-480V-1, LOSS OF 480V BUS. <p>8. <u>Dispatch Personnel To Locally Close Valves To Isolate RCP Seals And Place Valve Switches In CLOSED Position:</u></p> <ul style="list-style-type: none"> o RCP seal return isolation valve outside containment: <ul style="list-style-type: none"> o MOV-222 o RCP seal injection isolation valves outside containment: <ul style="list-style-type: none"> o MOV-250A o MOV-250B o MOV-250C o MOV-250D o RCP thermal barrier CCW return isolation valve outside containment: <ul style="list-style-type: none"> o MOV-789 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	<u>Check If CST Is Isolated From Hotwell:</u>	
	<ul style="list-style-type: none"> a. Verify condenser hotwell isolation valves - CLOSED: <ul style="list-style-type: none"> o LCV-1128 o LCV-1128A o LCV-1129 o CD-6 o CT-8 b. Place condenser hotwell isolation valve controllers in MANUAL: <ul style="list-style-type: none"> o LCV-1128 o LCV-1128A o LCV-1129 	<ul style="list-style-type: none"> a. <u>IF</u> valve(s) open or position not known, <u>THEN</u> dispatch personnel to locally close valve(s). <u>IF</u> valve(s) can <u>NOT</u> be closed, <u>THEN</u> locally close associated isolation valve(s): <ul style="list-style-type: none"> o CT-7 for LCV-1128 and LCV-1128A. o CD-5 for LCV-1129.
10.	<u>Check SG Status:</u>	
	<ul style="list-style-type: none"> a. MSIVs - CLOSED b. Main FW regulating and bypass valves - CLOSED c. Blowdown isolation valves - CLOSED 	<p>Manually close valves. <u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> locally close valves.</p> <p>Locally close MSIVs as necessary per 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* A faulted or ruptured SG that is isolated should remain isolated. Steam * * supply to the turbine-driven AFW pump must be maintained from at least * * one SG. *</p> <p>*****</p>	
11.	<p><u>Check If Any SG Is Faulted:</u></p> <p>a. Check pressures in all SGs - a. Go to Step 12.</p> <p> o ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER</p> <p> - OR -</p> <p> o ANY SG COMPLETELY DEPRESSURIZED</p> <p>b. Isolate faulted SG(s): b. Manually close valves. <u>IF</u> o Isolate AFW flow valves can <u>NOT</u> be closed, <u>THEN</u> o Dispatch NPO to close steam dispatch NPO to attempt to supply header valves to locally close valves or turbine-driven AFW pump from associated block valves. faulted SG(s):</p> <p> o MS-41 (SG 22) o MS-42 (SG 23)</p> <p> o Verify SG atmospheric steam dumps - CLOSED</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	<p><u>Check If SG Tubes Are Intact:</u></p> <ul style="list-style-type: none"> o Main steamline radiation recorder (R-28, R-29, R-30 and R-31) - NORMAL o Condenser air ejector radiation recorder (R-45)- NORMAL o SG blowdown radiation recorder (R-49) - NORMAL o NO SG LEVEL INCREASING IN AN UNCONTROLLED MANNER 	<p>Try to identify ruptured SG(s). Continue with Step 13. OBSERVE CAUTION PRIOR TO STEP 13. <u>WHEN</u> ruptured SG(s) identified, <u>THEN</u> isolate ruptured SG(s):</p> <ul style="list-style-type: none"> o Isolate AFW flow. o Dispatch NPO to close steam supply header valves to turbine-driven AFW pump from ruptured SG(s): <ul style="list-style-type: none"> o MS-41 (SG 22) o MS-42 (SG 23) o Adjust ruptured SG(s) atmospheric steam dump controller setpoint to 74%, 1030 psig. <p><u>WHEN</u> ruptured SG pressure less than 1030 psig, <u>THEN</u> verify ruptured SG atmospheric steam dump closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in manual and close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally isolate open valve.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* City water for AFW pumps will be necessary if CST level decreases to less * * than 2 ft. *</p> <p>*****</p>			
⑬.	<p><u>Check Intact SG Levels:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p> </td> <td style="vertical-align: top;"> <p>a. Maintain maximum AFW flow until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> isolate ruptured SG(s):</p> <ul style="list-style-type: none"> o Isolate AFW flow. o Dispatch NPO to close steam supply header valves to turbine-driven AFW pump from ruptured SG(s): <ul style="list-style-type: none"> o MS-41 (SG 22) o MS-42 (SG 23) o Adjust ruptured SG(s) atmospheric steam dump controller setpoint to 74%, 1030 psig. <p><u>WHEN</u> ruptured SG pressure less than 1030 psig, <u>THEN</u> verify ruptured SG atmospheric steam dump closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in manual and close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally isolate open valve.</p> </td> </tr> </table>		<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain maximum AFW flow until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> isolate ruptured SG(s):</p> <ul style="list-style-type: none"> o Isolate AFW flow. o Dispatch NPO to close steam supply header valves to turbine-driven AFW pump from ruptured SG(s): <ul style="list-style-type: none"> o MS-41 (SG 22) o MS-42 (SG 23) o Adjust ruptured SG(s) atmospheric steam dump controller setpoint to 74%, 1030 psig. <p><u>WHEN</u> ruptured SG pressure less than 1030 psig, <u>THEN</u> verify ruptured SG atmospheric steam dump closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in manual and close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally isolate open valve.</p>
<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain maximum AFW flow until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase in an uncontrolled manner, <u>THEN</u> isolate ruptured SG(s):</p> <ul style="list-style-type: none"> o Isolate AFW flow. o Dispatch NPO to close steam supply header valves to turbine-driven AFW pump from ruptured SG(s): <ul style="list-style-type: none"> o MS-41 (SG 22) o MS-42 (SG 23) o Adjust ruptured SG(s) atmospheric steam dump controller setpoint to 74%, 1030 psig. <p><u>WHEN</u> ruptured SG pressure less than 1030 psig, <u>THEN</u> verify ruptured SG atmospheric steam dump closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in manual and close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> locally isolate open valve.</p>			

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>Check DC Bus Loads:</u> a. Monitor DC power supply: o Consult TSC and shed selected DC loads if necessary to extend battery life	
15.	<u>Check CST Level - GREATER THAN 2 FT</u>	Switch to city water supply: a. Open city water header isolation valve: o FCV-1205A b. Open AFW pump suction valves as necessary: o PCV-1187 o PCV-1188 o PCV-1189

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- * o SG pressures should NOT be decreased to less than 110 psig to prevent injection of accumulator nitrogen into the RCS.
- * o SG narrow range level should be maintained greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one intact SG. If level can NOT be maintained, SG depressurization should be stopped until level is restored in at least one SG.

NOTE

- o The SGs should be depressurized at a rate sufficient to maintain a cooldown rate in the RCS cold legs less than 100°F per hour. This will minimize RCS inventory loss while cooling the RCP seals in a controlled manner.
- o PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurization of SGs. Depressurization should NOT be stopped to prevent these occurrences.

16. Depressurize Intact SGs To 210 psig:

- | | |
|--|--|
| <p>a. Check SG narrow range levels - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG</p> | <p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Maintain maximum AFW flow until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG. 2) Continue with Step 17. <u>WHEN</u> narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG, <u>THEN</u> do Steps 16b through 16e. |
|--|--|

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> b. Manually dump steam using SG atmospheric steam dumps to maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR c. Check RCS cold leg temperatures - GREATER THAN 325°F d. Check SG pressures - LESS THAN 210 PSIG e. Manually control SG atmospheric steam dumps to maintain SG pressures at 210 psig 	<ul style="list-style-type: none"> b. Locally dump steam using SG atmospheric steam dumps: <ul style="list-style-type: none"> o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. c. Perform the following: <ul style="list-style-type: none"> 1) Control SG atmospheric steam dumps to stop SG depressurization. 2) Go to Step 17. d. Continue with Step 17. <u>WHEN</u> SG pressures decrease to less than 210 psig, <u>THEN</u> do Step 16e. e. Locally control SG atmospheric steam dumps to maintain SG pressures at 210 psig: <ul style="list-style-type: none"> o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary.
17.	<u>Check Reactor Subcritical:</u> <ul style="list-style-type: none"> o Intermediate range channels - ZERO OR NEGATIVE STARTUP RATE o Source range channels - ZERO OR NEGATIVE STARTUP RATE 	Control SG atmospheric steam dumps to stop SG depressurization and allow RCS to heat up.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Placing key switches to DEFEAT will prevent auto SI actuation.</p> <p>*****</p>				
<p style="text-align: center;"><u>NOTE</u></p> <p>Depressurization of SGs will result in SI actuation. SI should be reset to permit manual loading of equipment on 480V bus.</p>				
18.	<p><u>Check SI Signal Status:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. SI - HAS BEEN ACTUATED</p> <p>b. Reset SI:</p> <p>1) Check all CCW pumps - RUNNING</p> <p>2) Place controls for main AND bypass feedwater regulating valves to CLOSE</p> <p>3) Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:</p> <p style="padding-left: 20px;">o Train A SIA-1</p> <p style="padding-left: 40px;">- AND -</p> <p style="padding-left: 20px;">o Train B SIA-2</p> <p>4) One at a time, depress Safety Injection reset buttons (Panel SB-2):</p> <p style="padding-left: 20px;">o Train A</p> <p style="padding-left: 20px;">o Train B</p> <p>5) Verify Train A AND B - RESET</p> </td> <td style="vertical-align: top;"> <p>a. Go to Step 22. <u>WHEN</u> SI is actuated, <u>THEN</u> do Steps 18b, 19, 20 and 21.</p> <p>1) Place non-running CCW pumps CCR control switches in PULLOUT.</p> <p>5) Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):</p> <p style="padding-left: 20px;">o SIA-1</p> <p style="padding-left: 20px;">o SIM-1</p> <p style="padding-left: 20px;">o SIA-2</p> <p style="padding-left: 20px;">o SIM-2</p> </td> </tr> </table>		<p>a. SI - HAS BEEN ACTUATED</p> <p>b. Reset SI:</p> <p>1) Check all CCW pumps - RUNNING</p> <p>2) Place controls for main AND bypass feedwater regulating valves to CLOSE</p> <p>3) Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:</p> <p style="padding-left: 20px;">o Train A SIA-1</p> <p style="padding-left: 40px;">- AND -</p> <p style="padding-left: 20px;">o Train B SIA-2</p> <p>4) One at a time, depress Safety Injection reset buttons (Panel SB-2):</p> <p style="padding-left: 20px;">o Train A</p> <p style="padding-left: 20px;">o Train B</p> <p>5) Verify Train A AND B - RESET</p>	<p>a. Go to Step 22. <u>WHEN</u> SI is actuated, <u>THEN</u> do Steps 18b, 19, 20 and 21.</p> <p>1) Place non-running CCW pumps CCR control switches in PULLOUT.</p> <p>5) Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):</p> <p style="padding-left: 20px;">o SIA-1</p> <p style="padding-left: 20px;">o SIM-1</p> <p style="padding-left: 20px;">o SIA-2</p> <p style="padding-left: 20px;">o SIM-2</p>
<p>a. SI - HAS BEEN ACTUATED</p> <p>b. Reset SI:</p> <p>1) Check all CCW pumps - RUNNING</p> <p>2) Place controls for main AND bypass feedwater regulating valves to CLOSE</p> <p>3) Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:</p> <p style="padding-left: 20px;">o Train A SIA-1</p> <p style="padding-left: 40px;">- AND -</p> <p style="padding-left: 20px;">o Train B SIA-2</p> <p>4) One at a time, depress Safety Injection reset buttons (Panel SB-2):</p> <p style="padding-left: 20px;">o Train A</p> <p style="padding-left: 20px;">o Train B</p> <p>5) Verify Train A AND B - RESET</p>	<p>a. Go to Step 22. <u>WHEN</u> SI is actuated, <u>THEN</u> do Steps 18b, 19, 20 and 21.</p> <p>1) Place non-running CCW pumps CCR control switches in PULLOUT.</p> <p>5) Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1):</p> <p style="padding-left: 20px;">o SIA-1</p> <p style="padding-left: 20px;">o SIM-1</p> <p style="padding-left: 20px;">o SIA-2</p> <p style="padding-left: 20px;">o SIM-2</p>			

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

ATTACHMENT 1 provides a list of Phase A valves.

19. Verify Containment Isolation

Phase A:

a. Phase A - ACTUATED

a. Manually actuate phase A.

o Train A master relay CA1
(above rack E)

o Train B master relay CA2
(above rack F)

b. Phase A valves - CLOSED

b. Manually close valves. IF
valves can NOT be manually
closed, THEN locally close
valves.

c. IVSW valves - OPEN:

c. Manually open valves.

o 1410
o 1413
o SOV-3518
o SOV-3519

d. WCP valves - OPEN:

d. Manually open valves.

o PCV 1238
o PCV 1239
o PCV 1240
o PCV 1241

e. Place personnel AND equipment
hatch solenoid control
switches to INCIDENT on SM
panel

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	<p><u>Verify Containment Ventilation Isolation:</u></p> <p>a. Containment purge valves - CLOSED:</p> <ul style="list-style-type: none"> o FCV-1170 o FCV-1171 o FCV-1172 o FCV-1173 <p>b. Containment pressure relief valves - CLOSED:</p> <ul style="list-style-type: none"> o PCV-1190 o PCV-1191 o PCV-1192 	<p>a. Manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator and HP personnel to close outside valves by isolating instrument air:</p> <ul style="list-style-type: none"> o FCV-1171, IA-780 o FCV-1173, IA-779 <p>b. Manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator <u>AND</u> HP personnel to close outside valves by isolating instrument air:</p> <ul style="list-style-type: none"> o PCV-1191, IA-777 o PCV-1192, IA-778 <p><u>IF</u> containment pressure relief can <u>NOT</u> be isolated, <u>THEN</u> locally close the following valves (Fan House 88 ft. el):</p> <ul style="list-style-type: none"> o UH-1013, Pressure Relief Fan Inlet Stop o UH-1014, Pressure Relief Fan Outlet stop

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

ATTACHMENT 1 provides a list of Phase B valves.

21. Check Containment Pressure - HAS
REMAINED LESS THAN 24 PSIG

Perform the following:

- a. Verify containment spray
signal actuated. IF NOT, THEN
manually actuate.

- b. Verify containment isolation
Phase B valves closed.

IF NOT, THEN manually close
valves.

IF valves can NOT be manually
closed, THEN locally close
valves.

- c. Verify IVSW isolation valves
open:

- o 7864
- o 7865
- o 7866
- o 7867

- d. One at a time, depress
Containment Spray Reset
Pushbuttons:

- o Spray SYS Reset Train A
- o Spray SYS Reset Train B

22. Check Core Exit TCs - LESS THAN
1200°F

IF Core Exit temperatures greater
than 1200°F and increasing, THEN
go to SACRG-1, SEVERE ACCIDENT
CONTROL ROOM GUIDELINE INITIAL
RESPONSE, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23.	<p><u>Check If AC Power Is Restored:</u></p> <p>a. Check 480V busses - AT LEAST ONE ENERGIZED</p> <p>o 2A <u>AND</u> 3A</p> <p>- OR -</p> <p>o 5A</p> <p>- OR -</p> <p>o 6A</p>	<p>a. Continue to control RCS conditions and monitor plant status:</p> <p>1) Check status of local actions:</p> <p>o AC power restoration.</p> <p>o RCP seal isolation.</p> <p>o DC power supply.</p> <p>2) Check status of auxiliary boration systems:</p> <p>o BAST temperature greater than 155°F.</p> <p><u>IF</u> temperature less than 155°F, request TSC to provide emergency power supply for boric acid heat trace to prevent crystallization.</p> <p>3) Check status of spent fuel cooling:</p> <p>o Spent fuel pit level greater than low level alarm.</p> <p><u>IF</u> level less than low level alarm, <u>THEN</u> dispatch NPO to makeup to the spent fuel pit as necessary.</p> <p>4) Open doors on all control room cabinets.</p> <p>5) Dispatch NPO to open AFW pump room roll-up door.</p> <p>6) Return to Step 11. OBSERVE CAUTION PRIOR TO STEP 11.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24.	<u>Stabilize SG Pressures:</u> a. Manually control SG atmospheric steam dumps	a. Locally control SG atmospheric steam dumps: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary.
* * * * * <div style="border: 1px solid black; padding: 5px; text-align: center;"> <u>CAUTION</u> * The loads placed on the energized 480V bus should <u>NOT</u> exceed the capacity of the power source. * * * * * * </div>		
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <u>NOTE</u> ATTACHMENT 2 provides a list of 480V equipment load ratings. </div>		
25.	<u>Verify Service Water System Operation:</u> a. Verify at least one pump - RUNNING ON ESSENTIAL HEADER b. Service water valves from diesel generator - OPEN	a. Manually start pump. b. Locally open valves as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26.	<u>Verify Following Equipment Loaded On Energized 480V Bus:</u> <ul style="list-style-type: none"> o Bus 5A: <ul style="list-style-type: none"> a. MCCs: <ul style="list-style-type: none"> o MCC 26A o MCC 29A b. 21 Battery Charger in service c. 21 Static Inverter on alternate power supply per 2-SOP-27.1.6, INSTRUMENT BUS, DC DISTRIBUTION SYSTEM AND PA SYSTEM INVERTER d. 23 Static Inverter on alternate power supply per 2-SOP-27.1.6 o Bus 2A: <ul style="list-style-type: none"> a. MCCs: <ul style="list-style-type: none"> o MCC 24 o MCC 24A b. 22 Battery Charger in service c. 22 Static Inverter on alternate power supply per 2-SOP-27.1.6 d. PA System Inverter on alternate power supply per 2-SOP-27.1.6 	Manually load equipment as necessary.
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> o Bus 3A: <ul style="list-style-type: none"> a. MCCs: <ul style="list-style-type: none"> o MCC 26C o MCC 211 b. 23 Battery Charger in service o Bus 6A: <ul style="list-style-type: none"> a. MCCs: <ul style="list-style-type: none"> o MCC 26B o MCC 27A b. 24 Battery Charger in service c. 24 Static Inverter on alternate power supply per 2-SOP-27.1.6 	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

If RCP seal cooling was previously isolated, further cooling of the RCP seals will be established by natural circulation cooldown as directed in subsequent procedures.

27. Select Recovery Procedure:

- | | |
|---|--|
| <p>a. Check RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> | <p>a. Go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.</p> |
|---|--|

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

- | | |
|--|--|
| <p>b. Check PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)</p> <p>c. Check if SI equipment - ACTUATED WITH RESULTANT INJECTION FLOW UPON AC POWER RESTORATION</p> <p>d. Go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1</p> | <p>b. Go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.</p> <p>c. Go to 2-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 1.</p> |
|--|--|

-END-

Number:	Title:	Revision Number:
2-ECA-0.0	LOSS OF ALL AC POWER	REV. 2

ATTACHMENT 1
CONTAINMENT ISOLATION VALVES

(Attachment page 1 of 1)

1. The following valves will close on Phase A isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
CCW from excess letdown Hx	796, 793
CCW to excess letdown Hx	798, 791
Vent header from RCDT	1786, 1787
Gas analyzer PRT	548, 549
Gas analyzer RCDT	1788, 1789
Letdown from regenerative HX	201, 202
Letdown orifice control stop valves	200A, 200B, 200C
Make-up to PRT	519, 552
Containment sump pumps to WDS - hold-up tank	1723, 1728
Instrument air to containment	PCV-1228
RCDT to WDS - hold-up tank	1702, 1705
SG blowdown and sampling system	PCV-1214, 1214A
	PCV-1215, 1215A
	PCV-1216, 1216A
	PCV-1217, 1217A
Radiation monitor return to containment	PCV-1234, 1235
	PCV-1236, 1237
Accumulator samples	956G, 956H
Sample - pressurizer steam	956A, 956B
Sample - pressurizer liquid	956C, 956D
Sample - RCS loops	21, 22, 23
	MOV-956E, 956F
SJAE to containment	1229, 1230
Hi-Rad sample system return to containment sump	MOV-4399, 5132
Recirculation pump discharge sample line	MOV-990A, 990B
Accumulator N2 Supply Line Stop	863

2. The following valves will close on Phase B isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
Component cooling to RCS pumps	MOV-769, 797
Component cooling from RCS thermal barrier return	MOV-789, FCV-625
Component cooling from RCS motor bearing return	MOV-786, 784
Seal water return containment isolation valve	MOV-222

-END-

Number:	Title:	Revision Number:
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ATTACHMENT 2
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS		554 KW	
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP		384 KW	
23 AFW PUMP			384 KW
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT		250 KW	
25 FAN COOLER UNIT			250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW 316 KW	
23 SI PUMP			345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

-END-



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ECA-0.1, Revision: 0

LOSS OF ALL AC POWER RECOVERY

WITHOUT SI REQUIRED

2

Approved By:

Mark J. Muth

Procedure Sponsor, RPO/ Designee

15/2/2007

Date

Team P
Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

A. PURPOSE

This procedure provides actions to use normal operational systems to stabilize plant conditions following restoration of 480V power.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from 2-ECA-0.0, LOSS OF ALL AC POWER, Step 27, when 480V power is restored and SI is not required.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- * o IF an SI signal is actuated prior to performing Step 9 of this procedure, it should be reset per Attachment 1 SI RESET to permit manual loading of equipment on a 480V bus.
- * o Radiation levels and harsh environment conditions should be evaluated prior to performing local actions.

NOTE

CSF Status Trees should be monitored for information only. FRPs should NOT be implemented prior to completion of Step 9.

1. Check RCP Seal Isolation Status:

- | | |
|--|--|
| <p>a. RCP seal injection isolation valves outside containment - CLOSED:</p> <ul style="list-style-type: none"> o MOV-250A o MOV-250B o MOV-250C o MOV-250D | <p>a. <u>IF</u> valves open or position not known, <u>THEN</u> check charging pump status:</p> <ul style="list-style-type: none"> 1) <u>IF</u> pump running, <u>THEN</u> go to Step 2. 2) <u>IF</u> pump <u>NOT</u> running, <u>THEN</u> manually close valves before starting charging pump. <p><u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> locally close valves.</p> |
| <p>b. RCP thermal barrier CCW return isolation valve outside containment - CLOSED:</p> <ul style="list-style-type: none"> o MOV-789 | <p>b. <u>IF</u> valve open or position not known, <u>THEN</u> check CCW pump status:</p> <ul style="list-style-type: none"> 1) <u>IF</u> pump running, <u>THEN</u> go to Step 2. 2) <u>IF</u> pump <u>NOT</u> running, <u>THEN</u> manually close valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> manually close CCW return flow control valve outside containment: <ul style="list-style-type: none"> o FCV-625 |

Number:	Title:	Revision Number:
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	<u>Check Containment Isolation</u> <u>Phase A - NOT ACTUATED</u>	<p>Perform the following:</p> <p>a. Reset containment isolation Phase A:</p> <ol style="list-style-type: none"> 1) Place IVSW switches to OPEN on SN panel <ul style="list-style-type: none"> o 1410 o 1413 o SOV 3518 o SOV 3519 2) Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel 3) Place personnel and equipment hatch solenoid control switches to INCIDENT on SM panel. 4) Place control switches for all Phase A isolation valves to CLOSE on SN panel. 5) One at a time, depress Phase A reset buttons: <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B
This Step continued on the next page.		

Number:	Title:	Revision Number:
2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>6) Verify Train A and B reset.</p> <p><u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u>:</p> <p>a) Place key switches to BYPASS.</p> <p>b) One at a time, depress Phase A reset buttons:</p> <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B <p><u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.</p> <p>b. <u>IF</u> Phase B actuated, <u>THEN</u> perform the following:</p> <p>1) Reset Containment Spray.</p> <p>2) Depress Phase B reset buttons.</p> <p>c. Establish instrument air to containment by opening isolation valve PCV-1228.</p> <p><u>IF</u> valve will <u>NOT</u> open, <u>THEN</u> verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset:</p> <ul style="list-style-type: none"> o CA1 o CA2

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* The loads placed on the energized 480V bus should <u>NOT</u> exceed the capacity of the power source. *</p> <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 2 provides a list of 480V equipment load ratings.</p>	
3.	<p><u>Manually Load Following Equipment On 480V Bus:</u></p>	
	<p>a. Check instrument air - AVAILABLE</p> <p>b. Start one CCW pump</p>	<p>a. Start one instrument air compressor.</p> <p>b. <u>IF</u> one CCW pump can <u>NOT</u> be started, <u>THEN</u> refer to 2-SOP-4.1.2 COMPONENT COOLING SYSTEM OPERATION to establish backup cooling to the following:</p> <ul style="list-style-type: none"> o Charging pumps o RHR pumps o SI pumps
	<p>c. Check valve alignment and start charging pump:</p> <p>1) Check valve alignment:</p> <ul style="list-style-type: none"> o Charging pump suction valve from VCT - OPEN: o LCV-112C o VCT makeup control system - SET FOR AUTOMATIC CONTROL AND GREATER THAN RCS BORON CONCENTRATION <p>2) Start one charging pump</p>	<p>1) Manually align valve as necessary. <u>IF</u> VCT <u>NOT</u> available, <u>THEN</u> establish suction from RWST:</p> <ul style="list-style-type: none"> o Open suction valve from RWST: o LCV-112B o Close suction valve from VCT: o LCV-112C
	<p>d. Start containment fan coolers as necessary</p> <p>e. Start one service water pump on non-essential header</p>	

Number: 2-ECA-0.1	Title: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
4.	<u>Establish 55 gpm Charging Flow:</u>											
	a. Verify speed controller in MANUAL											
	b. Adjust charging pump speed to establish 55 gpm flow											
⊗ 5.	<u>Verify SI System Flow Not Required:</u>											
	a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:	a. Go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.										
	<table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
	b. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)	b. Control charging flow to maintain PRZR level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.										
6.	<u>Check PRZR Level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)</u>	Control charging flow as necessary.										

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o City water for AFW pumps will be necessary if CST level decreases to less than 2 ft. * o If narrow range level decreases to less than 10% (27% FOR ADVERSE CONTAINMENT) and AFW flow is less than 400 gpm, the motor-driven AFW pumps should be manually loaded on 480V bus to supply water to the SGs. <p>*****</p>	
	<p style="text-align: center;"><u>NOTE</u></p> <p>If motor-driven AFW pump operation is <u>NOT</u> required, pump switches should be maintained in PULLOUT to prevent automatic start.</p>	
⊛ 7.	<u>Check Intact SG Levels:</u>	
	<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain AFW flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p><u>IF</u> AFW flow <u>NOT</u> greater than 400 gpm, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Open AFW flow control valves as necessary. 2) Start motor-driven AFW pumps as necessary.

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2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<p><u>Establish SG Pressure Control:</u></p> <ul style="list-style-type: none"> a. Set each SG atmospheric steam dump controller to maintain existing SG pressure b. Place each SG atmospheric steam dump controller in automatic mode c. Locally return SG atmospheric steam dumps to remote control if necessary per 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION AND COMPENSATORY ACTIONS 	
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* If an SI signal is actuated during this procedure after the SI pump switches have been placed in AUTO, procedure 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, should be performed.</p> <p>*****</p>	
9.	<p><u>Place Following Pump Switches In AUTO:</u></p> <ul style="list-style-type: none"> o SI pump o RHR pump o Containment spray pump 	

Number:	Title:	Revision Number:
2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

FRPs may now be implemented as necessary.

10. Check If Letdown Can Be Established:

- | | |
|--|--|
| <p>a. PRZR level - GREATER THAN 28% (47% FOR ADVERSE CONTAINMENT)</p> <p>b. CCW pumps - ANY RUNNING</p> <p>c. Establish letdown:</p> <p>1) Close letdown orifice stops:</p> <ul style="list-style-type: none"> o 200A o 200B o 200C <p>2) Open letdown line isolation valves 201 and 202</p> <p>3) Place letdown flow control valves 200 A B C switch to REMOTE</p> <p>4) Open letdown stop valve LCV 459 and return to AUTO</p> <p>5) Place low pressure letdown backpressure controller PCV-135 in MANUAL and adjust to 75 percent open</p> <p>6) Open letdown orifice stops to establish desired flow:</p> <ul style="list-style-type: none"> o 200A, 75 gpm o 200B, 45 gpm o 200C, 75 gpm <p>7) Set PCV-135 to maintain pressure between 225 psig and 275 psig</p> <p>8) Place PCV-135 in AUTO</p> | <p>a. Continue with Step 11. <u>WHEN</u> level increases to greater than 28% (47% FOR ADVERSE CONTAINMENT), <u>THEN</u> do Steps 10b and 10c.</p> <p>b. Go to Step 11.</p> <p>c. Establish excess letdown:</p> <p>1) Establish CCW flow through excess letdown heat exchanger by opening CCW valves:</p> <ul style="list-style-type: none"> o Inlet valves 791,798 o Outlet valves 793,796 <p>2) Position excess letdown diversion valve 215 to NORMAL to direct flow to the VCT.</p> <p>3) Verify seal water return containment isolation valve 222 open.</p> <p>4) Verify excess letdown flow control valve HCV-123 closed.</p> <p>5) Open excess letdown isolation stop valve 213.</p> <p>6) Slowly open HCV-123 to warmup the excess letdown heat exchanger.</p> <p>7) Establish desired excess letdown flow using HCV-123.</p> <p>8) Maintain excess letdown heat exchanger outlet temperature less than 195°F.</p> |
|--|--|

Number: 2-ECA-0.1	Title: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Control Charging And Letdown Flow To Maintain PRZR Level Between 28% (47% FOR ADVERSE CONTAINMENT) And 50%</u>	
12.	<u>Establish PRZR Pressure Control:</u>	
	a. Check letdown - IN SERVICE	a. Use PRZR heaters and one PRZR PORV to maintain RCS pressure. Go to Step 13.
	b. Check differential temperature between PRZR and auxiliary spray (TI-126)- LESS THAN 320°F	b. Use PRZR heaters and one PRZR PORV to maintain RCS pressure. Go to Step 13.
	c. Use PRZR heaters and use auxiliary spray:	
	o Refer to 2-SOP-1.4, PRESSURIZER PRESSURE CONTROL	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
13.	<u>Verify Natural Circulation:</u> o RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE: <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> o SG pressures - STABLE OR DECREASING o RCS hot leg temperatures - STABLE OR DECREASING o Core exit TCs - STABLE OR DECREASING o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	Increase dumping steam from intact SG(s).
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
14.	<u>Check If Source Range Detectors Should Be Energized:</u> a. Check intermediate range flux - LESS THAN 1E-10 AMPS b. Verify source range detectors - ENERGIZED c. Transfer nuclear recorders to source range scale	a. Continue with Step 15. <u>WHEN</u> flux less than 1E-10 amps, <u>THEN</u> do Steps 14b and 14c. b. Manually energize source range detectors.										

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
15.	<u>Verify Adequate Shutdown Margin:</u>											
	a. Sample RCS											
	b. Shutdown margin from graphs book - ADEQUATE	b. Borate as necessary.										
16.	<u>Maintain Plant Conditions - STABLE:</u>											
	o RCS pressure											
	o PRZR level											
	o RCS temperature											
	o Intact SG levels											
⊛17.	<u>Verify SI System Flow Not Required:</u>											
	a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:	a. Go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.										
	<table border="1"><thead><tr><th>WR RCS PRESSURE (PSIG)</th><th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th></tr></thead><tbody><tr><td>0 - 400</td><td>52 (83)</td></tr><tr><td>401 - 800</td><td>36 (49)</td></tr><tr><td>801 - 1200</td><td>23 (30)</td></tr><tr><td>1201 - 2500</td><td>19 (26)</td></tr></tbody></table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
	b. PRZR level - GREATER THAN 14% (33% FOR ADVERSE CONTAINMENT)	b. Control charging flow to maintain PRZR Level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to 2-ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.										

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2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	<u>Try To Restore Offsite Power To All AC Busses:</u> <ul style="list-style-type: none"> o 2-SOP-27.1.3, OPERATION OF 13.8KV SYSTEM o 2-SOP-27.1.4, 6900 VOLT SYSTEM o 2-AOP-138KV-1, LOSS OF POWER TO 6.9KV BUS 5 AND/OR 6 o 2-AOP-480V-1, LOSS OF NORMAL POWER TO ANY 480V BUS 	Maintain plant conditions stable using 480V power.
19.	<u>Go To 2-ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1</u>	

-END-

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2-ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">ATTACHMENT 1 (Attachment page 1 of 1)</p> <p style="text-align: center;"><u>SI RESET</u></p> <p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <p style="text-align: center;">* Placing key switches to DEFEAT will prevent auto SI actuation. *</p> <p style="text-align: center;">*****</p>	
1.	<p><u>Reset SI:</u></p> <p>a) Check all CCW pumps - RUNNING a) Place non-running CCW pumps CCR control switches in PULLOUT.</p> <p>b) Place controls for main AND bypass feedwater regulating valves to CLOSE</p> <p>c) Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position:</p> <p> o Train A SIA-1</p> <p> - AND -</p> <p> o Train B SIA-2</p> <p>d) One at a time, depress Safety Injection reset buttons (Panel SB-2):</p> <p> o Train A</p> <p> o Train B</p> <p>e) Verify Train A AND B - RESET e) Verify Relays reset (Top of Safeguards Initiation Racks 1-1 AND 2-1):</p> <p> o SIA-1</p> <p> o SIM-1</p> <p> o SIA-2</p> <p> o SIM-2</p> <p style="text-align: center;">-END-</p>	

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ATTACHMENT 2
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG	22 DG		23 DG
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 SERVICE WATER PUMP	282 KW			
22 SERVICE WATER PUMP		282 KW OR 282 KW		
23 SERVICE WATER PUMP				282 KW
24 SERVICE WATER PUMP	282 KW			
25 SERVICE WATER PUMP		282 KW OR 282 KW		
26 SERVICE WATER PUMP				282 KW
PRZR CONTROL HEATERS				277 KW
21 PRZR BU HEATERS			554 KW	
22 PRZR BU HEATERS		485 KW		
23 PRZR BU HEATERS	485 KW			
21 AFW PUMP			384 KW	
23 AFW PUMP				384 KW
21 FAN COOLER UNIT	250 KW			
22 FAN COOLER UNIT	250 KW			
23 FAN COOLER UNIT		250 KW		
24 FAN COOLER UNIT			250 KW	
25 FAN COOLER UNIT				250 KW
21 SI PUMP	316 KW			
22 SI PUMP		316 KW	316 KW	
23 SI PUMP				345 KW
21 SPRAY PUMP	350 KW			
22 SPRAY PUMP				350 KW
21 RHR PUMP			303 KW	
22 RHR PUMP				303 KW
21 CHARGING PUMP	150 KW			
22 CHARGING PUMP			150 KW	
23 CHARGING PUMP				150 KW
21 RECIRC PUMP	299 KW			
22 RECIRC PUMP				299 KW
21 CCW PUMP	228 KW			
22 CCW PUMP		228 KW		
23 CCW PUMP				228 KW
21 LIGHTING TRANSFORMER		150 KW (N)		150 KW (E)
22 LIGHTING TRANSFORMER			225 KW	
23 LIGHTING TRANSFORMER	225 KW			
TURBINE AUX OIL PUMP				112 KW
STATION AIR COMPRESSOR	93 KW			

-END-



Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ECA-0.2, Revision: 0

LOSS OF ALL AC POWER RECOVERY

WITH SI REQUIRED

2

Approved By:

Mark J. Bille

Procedure Sponsor, RPO/ Designee

15/12/2007

Date

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ECA-0.2	LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV. 0

A. PURPOSE

This procedure provides actions to use engineered safeguards systems to recover plant conditions following restoration of 480V power.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-ECA-0.0, LOSS OF ALL AC POWER, Step 27, when 480V power is restored and SI is required.
- 2) 2-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 5 and 17, if SI is required or any time after performing Step 9 if SI is actuated.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

- o Containment radiation levels greater than 1E5 R/hr.

- OR -

- o Containment pressure greater than 4 psig.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">***** <u>CAUTION</u> ***** * Placing key switches to DEFEAT will prevent auto SI actuation. * *****</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>CSF Status Trees should be monitored for information only. FRPs should <u>NOT</u> be implemented prior to completion of Step 11.</p> </div>	
1.	<u>Check SI Signal Status - RESET</u>	Reset SI: a. Check all CCW pumps running. <u>IF NOT, THEN</u> place non-running CCW pumps CCR control switches in PULLOUT. b. Place controls for main <u>AND</u> bypass feedwater regulating valves to CLOSE. c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position: o Train A SIA-1 - AND - o Train B SIA-2 d. One at a time, depress Safety Injection reset buttons (Panel SB-2): o Train A o Train B e. Verify Train A <u>AND</u> B reset. <u>IF NOT, THEN</u> verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1): o SIA-1 o SIM-1 o SIA-2 o SIM-2

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	<u>Check RCP Thermal Barrier CCW Isolation Status:</u> a. CCW pumps - ALL STOPPED b. CCW return isolation valve outside containment - CLOSED: o MOV-789	a. Go to Step 3. b. Manually isolate CCW to RCP thermal barriers: o Close CCW return isolation valve outside containment: o MOV-789 - OR - o Close CCW return flow control valve outside containment: o FCV-625
3.	<u>Check RWST Level - GREATER THAN 9.24 FT</u>	Establish cold leg recirculation: a. Perform 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1 b. Go to Step 5. OBSERVE CAUTION PRIOR TO STEP 5.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>Manually Align Valves To Establish SI Injection Mode:</u> <ol style="list-style-type: none"> a. Verify SI pump suction valve from RWST - OPEN: <ol style="list-style-type: none"> o MOV-1810 b. Align SI System valves: <ol style="list-style-type: none"> 1) Open RHR Hx CCW outlet valves: <ol style="list-style-type: none"> o MOV-822A o MOV-822B 2) Open RHR Hx outlet valves: <ol style="list-style-type: none"> o MOV-746 o MOV-747 	<ol style="list-style-type: none"> a. Manually open valve.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <ul style="list-style-type: none"> * o The loads placed on the energized 480V bus should <u>NOT</u> exceed the * capacity of the power source. * o Radiation levels and harsh environment conditions should be evaluated * prior to performing local actions. * ***** 	
	<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 2 provides a list of 480V equipment load ratings.</p>	
5.	<p><u>Manually Load Following Equipment</u> <u>On 480V Bus:</u></p> <ul style="list-style-type: none"> a. CCW pump <ul style="list-style-type: none"> a. <u>IF</u> one CCW pump can <u>NOT</u> be started, <u>THEN</u> refer to 2-SOP-4.1.2 COMPONENT COOLING SYSTEM OPERATION to establish backup cooling to the following: <ul style="list-style-type: none"> o Charging pumps o RHR pumps o SI pumps b. RHR pump c. SI pump 	
<p>This Step continued on the next page.</p>		

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2-ECA-0.2	LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	d. Containment Fan Coolers:	
	1) Start fan coolers	
	2) NORM OUT valves - OPEN	2) Manually open valve(s). <u>IF</u> any normal outlet valve on any fan cooler can <u>NOT</u> be opened, <u>THEN</u> perform the following: a) Notify TSC which containment fan cooler(s) are <u>NOT</u> available. b) Go to Step 5d3).
	3) TCV-1104 and TCV-1105 - BOTH OPEN	3) Manually open valve(s).
	e. Service water pump on essential header	
	f. 21 Instrument air compressor	

Number: 2-ECA-0.2	Title: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <ul style="list-style-type: none"> * o City water for AFW pumps will be necessary if CST level decreases to less than 2 ft. * o If SG narrow range level decreases to less than 10% (27% FOR ADVERSE CONTAINMENT) and AFW flow is less than 400 gpm, the motor-driven AFW pumps should be manually loaded on 480V bus to supply water to the SGs. <p style="text-align: center;">*****</p>			
	<p style="text-align: center;"><u>NOTE</u></p> <p>If motor-driven AFW pump operation is <u>NOT</u> required, pump switches should be maintained in PULLOUT to prevent automatic start.</p>			
⑥	<p><u>6. Check Intact SG Levels:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p> </td> <td style="vertical-align: top;"> <p>a. Maintain AFW flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p><u>IF</u> AFW flow <u>NOT</u> greater than 400 gpm, <u>THEN</u>:</p> <p>1) Open AFW flow control valves as necessary.</p> <p>2) Start motor-driven AFW pumps as necessary.</p> </td> </tr> </table>		<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain AFW flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p><u>IF</u> AFW flow <u>NOT</u> greater than 400 gpm, <u>THEN</u>:</p> <p>1) Open AFW flow control valves as necessary.</p> <p>2) Start motor-driven AFW pumps as necessary.</p>
<p>a. Narrow range level - GREATER THAN 10% (27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control AFW flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain AFW flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p><u>IF</u> AFW flow <u>NOT</u> greater than 400 gpm, <u>THEN</u>:</p> <p>1) Open AFW flow control valves as necessary.</p> <p>2) Start motor-driven AFW pumps as necessary.</p>			

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of Phase A valves.</p>		
7.	<u>Verify Containment Isolation Phase A:</u>	
	<p>a. Phase A - ACTUATED</p> <ul style="list-style-type: none"> o Train A master relay CA1 (above rack E) o Train B master relay CA2 (above rack F) <p>b. Phase A valves - CLOSED</p> <p>c. IVSW valves - OPEN:</p> <ul style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 <p>d. WCP valves - OPEN:</p> <ul style="list-style-type: none"> o PCV 1238 o PCV 1239 o PCV 1240 o PCV 1241 <p>e. Place personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel</p> <p>f. Dispatch NPO to periodically check:</p> <ul style="list-style-type: none"> 1) IVSW tank: <ul style="list-style-type: none"> o Level - GREATER THAN 92% o Pressure - GREATER THAN 57 PSIG 2) WCP header pressures - GREATER THAN 52 PSIG 	<p>a. Manually actuate phase A.</p> <p>b. Manually close valves. <u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> locally close valves.</p> <p>c. Manually open valves.</p> <p>d. Manually open valves.</p> <p>1) Direct NPO to fill or pressurize tank as necessary.</p> <p>2) Direct NPO to verify station air backup <u>OR</u> N2 backup are aligned as necessary.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Verify Containment Ventilation Isolation:</u>	
	a. Containment purge valves - CLOSED:	a. Manually close valves.
	o FCV-1170	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.
	o FCV-1171	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator and HP personnel to close outside valves by isolating instrument air:
	o FCV-1172	o FCV-1171, IA-780
	o FCV-1173	o FCV-1173, IA-779
	b. Containment pressure relief valves - CLOSED:	b. Manually close valves.
	o PCV-1190	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> close valves from fan room.
	o PCV-1191	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch operator <u>AND</u> HP personnel to close outside valves by isolating instrument air:
	o PCV-1192	o PCV-1191, IA-777
		o PCV-1192, IA-778
		<u>IF</u> containment pressure relief can <u>NOT</u> be isolated, <u>THEN</u> locally close the following valves (Fan House 88 ft. el):
		o UH-1013, Pressure Relief Fan Inlet Stop
		o UH-1014, Pressure Relief Fan Outlet stop

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>ATTACHMENT 1 provides a list of Phase B valves.</p>		
9.	<p><u>Verify Containment Spray Not Required:</u></p> <p>a. Containment Pressure - HAS REMAINED LESS THAN 24 PSIG</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify containment spray valves in proper emergency alignment: <ul style="list-style-type: none"> o Spray pump discharge valves open: <ul style="list-style-type: none"> o MOV-866A o MOV-866B o MOV-866C o MOV-866D <p><u>IF NOT, THEN</u> manually align valves as necessary.</p> <p><u>IF</u> valves can <u>NOT</u> be manually aligned, <u>THEN</u> locally align valves.</p> 2) Manually load containment spray pump on 480V bus. 3) Verify containment isolation Phase B valves closed. <p><u>IF NOT, THEN</u> manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> locally close valves.</p> 4) Verify IVSW isolation valves open: <ul style="list-style-type: none"> o 7864 o 7865 o 7866 o 7867 5) Go to Step 11.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<u>Place Containment Spray Pump Switches In AUTO</u>	
11.	<u>Check RCP Seal Isolation Status:</u> a. RCP seal injection isolation valves outside containment - CLOSED: o MOV-250A o MOV-250B o MOV-250C o MOV-250D	a. Locally close valves before starting charging pumps.
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><u>NOTE</u></p> <p>FRPs may now be implemented as necessary.</p> </div>		
12.	<u>Go To 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1</u>	

-END-

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ATTACHMENT 1
CONTAINMENT ISOLATION VALVES

(Attachment page 1 of 1)

1. The following valves will close on Phase A isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
CCW from excess letdown Hx	796, 793
CCW to excess letdown Hx	798, 791
Vent header from RCDT	1786, 1787
Gas analyzer PRT	548, 549
Gas analyzer RCDT	1788, 1789
Letdown from regenerative HX	201, 202
Letdown orifice control stop valves	200A, 200B, 200C
Make-up to PRT	519, 552
Containment sump pumps to WDS - hold-up tank	1723, 1728
Instrument air to containment	PCV-1228
RCDT to WDS - hold-up tank	1702, 1705
SG blowdown and sampling system	PCV-1214, 1214A
	PCV-1215, 1215A
	PCV-1216, 1216A
	PCV-1217, 1217A
Radiation monitor return to containment	PCV-1234, 1235
	PCV-1236, 1237
Accumulator samples	956G, 956H
Sample - pressurizer steam	956A, 956B
Sample - pressurizer liquid	956C, 956D
Sample - RCS loops	21, 22, 23
	MOV-956E, 956F
SJAE to containment	1229, 1230
Hi-Rad sample system return to containment sump	MOV-4399, 5132
Recirculation pump discharge sample line	MOV-990A, 990B
Accumulator N2 Supply Line Stop	863

2. The following valves will close on Phase B isolation:

<u>VALVE NAME</u>	<u>VALVE NUMBER(s)</u>
Component cooling to RCS pumps	MOV-769, 797
Component cooling from RCS thermal barrier return	MOV-789, FCV-625
Component cooling from RCS motor bearing return	MOV-786, 784
Seal water return containment isolation valve	MOV-222

-END-

Number:	Title:	Revision Number:
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ATTACHMENT 2
480V EQUIPMENT LOAD RATINGS

(Attachment page 1 of 1)

1. Use the following table to determine 480V equipment load ratings:

EQUIPMENT	21 DG BUS 5A	22 DG BUS 2A BUS 3A	23 DG BUS 6A
21 SERVICE WATER PUMP	282 KW		
22 SERVICE WATER PUMP		282 KW OR 282 KW	
23 SERVICE WATER PUMP			282 KW
24 SERVICE WATER PUMP	282 KW		
25 SERVICE WATER PUMP		282 KW OR 282 KW	
26 SERVICE WATER PUMP			282 KW
PRZR CONTROL HEATERS			277 KW
21 PRZR BU HEATERS		554 KW	
22 PRZR BU HEATERS		485 KW	
23 PRZR BU HEATERS	485 KW		
21 AFW PUMP		384 KW	
23 AFW PUMP			384 KW
21 FAN COOLER UNIT	250 KW		
22 FAN COOLER UNIT	250 KW		
23 FAN COOLER UNIT		250 KW	
24 FAN COOLER UNIT		250 KW	
25 FAN COOLER UNIT			250 KW
21 SI PUMP	316 KW		
22 SI PUMP		316 KW	
23 SI PUMP		316 KW	345 KW
21 SPRAY PUMP	350 KW		
22 SPRAY PUMP			350 KW
21 RHR PUMP		303 KW	
22 RHR PUMP			303 KW
21 CHARGING PUMP	150 KW		
22 CHARGING PUMP		150 KW	
23 CHARGING PUMP			150 KW
21 RECIRC PUMP	299 KW		
22 RECIRC PUMP			299 KW
21 CCW PUMP	228 KW		
22 CCW PUMP		228 KW	
23 CCW PUMP			228 KW
21 LIGHTING TRANSFORMER		150 KW (N)	150 KW (E)
22 LIGHTING TRANSFORMER		225 KW	
23 LIGHTING TRANSFORMER	225 KW		
TURBINE AUX OIL PUMP			112 KW
STATION AIR COMPRESSOR	93 KW		

-END-



Entergy

Nuclear Northeast



Procedure Use Is:

☒ Continuous

☐ Reference

☐ Information

Control Copy: _____

Effective Date: 6/4/07

2-ECA-1.1, Revision: 0

LOSS OF EMERGENCY COOLANT RECIRCULATION

2

Approved By:

Matt Webb

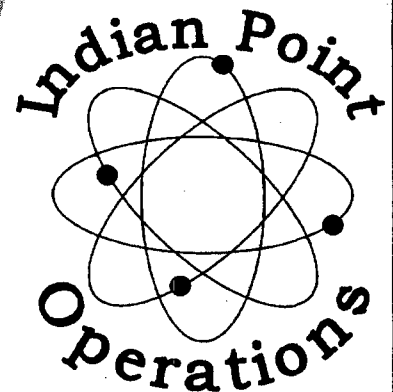
Procedure Sponsor, RPO/ Designee

Date

15/2/2007

Team P

Procedure Owner



PARTIAL REVISION

Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

A. PURPOSE

This procedure provides actions to restore emergency coolant recirculation capability, to delay depletion of the RWST by adding makeup and reducing outflow, and to depressurize the RCS to minimize break flow.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

- 1) 2-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 16, when cold leg recirculation capability cannot be verified.
- 2) 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 9, when containment water level is insufficient to establish recirculation flow.
- 3) 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, ATTACHMENT 2, COLD LEG RECIRCULATION USING RHR PUMPS, Step 2, when at least one flow path from the sump cannot be established or maintained.
- 4) 2-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 28, when adequate recirculation flow cannot be maintained.
- 5) 2-ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 6, when a LOCA outside containment cannot be isolated.

C. ADVERSE CONTAINMENT CONDITIONS

EOP values for adverse containment should be used if either of the following conditions exist:

o Containment radiation levels greater than 1E5 R/hr.

- OR -

o Containment pressure greater than 4 psig.

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTION LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP SUCTION LOW PRESS alarm on panel SBF-1
- c) Indications of erratic or reduced flow
- d) Abnormal sump level indication

Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If emergency coolant recirculation capability is restored during this * procedure, further recovery actions should continue by returning to * procedure and step in effect. * o Foldout page contains criteria to transition to 2-ECA-1.3, LOSS OF * EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1, * whenever all trains of recirculation are affected by sump blockage. * o <u>IF</u> sump suction or RWST suction is lost to any pump(s), the pump(s) * should be stopped: * o RWST level less than 3.0 ft for SI, RHR and charging pumps. * o RWST level less than 2.0 ft for containment spray pumps. <p>*****</p>	
① 1.	<u>VERIFY Recirculation Trains NOT Affected By Sump Blockage</u> a. Indications of sump blockage may include: <ol style="list-style-type: none"> 1) LOW HEAD INJECTION LINE LOW FLOW alarm on panel SBF-1 2) SI PUMP SUCTION LOW PRESS alarm on panel SBF-1 3) Indications of erratic or reduced flow 4) Abnormal sump level indication 	<u>IF</u> both trains are affected such that at least one train of recirculation flow can <u>NOT</u> be established or maintained, <u>THEN</u> GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	<u>Check Emergency Coolant Recirculation Equipment - AVAILABLE</u> <ul style="list-style-type: none"> o Recirculation pump and flow path - OR - o RHR pump and recirculation flow path - OR - o SI pump and recirculation flow path using: <ul style="list-style-type: none"> o Recirculation pump - OR - o RHR pump 	Try to restore any recirculation flowpath on at least one train.
3.	<u>Verify Containment Fan Coolers - IN SERVICE:</u> <ul style="list-style-type: none"> a. Five fan coolers - RUNNING b. NORM OUT valves - OPEN 	<ul style="list-style-type: none"> a. Manually start fan cooler(s). b. Manually open valve(s). IF any normal outlet valve on any fan cooler can <u>NOT</u> be opened, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Notify TSC which containment fan cooler(s) are <u>NOT</u> available. 2) Go to Step 3c. c. Manually open valve(s).
	<ul style="list-style-type: none"> c. TCV-1104 and TCV-1105 - BOTH OPEN 	

FOLDOUT PAGE FOR 2-ECA-1.1

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																																				
* 4.	<u>Check RWST Level - GREATER THAN 3.0 FT</u>	Go to step 26.																																				
5.	<u>Determine Containment Spray Requirements:</u> a. Determine number of spray pumps required from table:																																					
	<table border="1"> <thead> <tr> <th>RWST LEVEL</th> <th>CONTAINMENT PRESSURE</th> <th>FAN COOLERS RUNNING IN EMERGENCY MODE</th> <th>SPRAY PUMPS REQUIRED</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Greater than 9.24 ft</td> <td>Greater than 47 psig</td> <td>-</td> <td>2</td> </tr> <tr> <td rowspan="3">Between 2 psig and 47 psig</td> <td>0, 1</td> <td>2</td> </tr> <tr> <td>2, 3, 4</td> <td>1</td> </tr> <tr> <td>5</td> <td>0</td> </tr> <tr> <td>Less than 2 psig</td> <td>-</td> <td>0</td> </tr> <tr> <td rowspan="5">Between 9.24 ft and 2 ft</td> <td>Greater than 47 psig</td> <td>-</td> <td>2</td> </tr> <tr> <td rowspan="3">Between 2 psig and 47 psig</td> <td>0</td> <td>2</td> </tr> <tr> <td>1, 2, 3</td> <td>1</td> </tr> <tr> <td>4, 5</td> <td>0</td> </tr> <tr> <td>Less than 2 psig</td> <td>-</td> <td>0</td> </tr> <tr> <td>Less than 2 ft</td> <td>-</td> <td>-</td> <td>0</td> </tr> </tbody> </table>	RWST LEVEL	CONTAINMENT PRESSURE	FAN COOLERS RUNNING IN EMERGENCY MODE	SPRAY PUMPS REQUIRED	Greater than 9.24 ft	Greater than 47 psig	-	2	Between 2 psig and 47 psig	0, 1	2	2, 3, 4	1	5	0	Less than 2 psig	-	0	Between 9.24 ft and 2 ft	Greater than 47 psig	-	2	Between 2 psig and 47 psig	0	2	1, 2, 3	1	4, 5	0	Less than 2 psig	-	0	Less than 2 ft	-	-	0	
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		4, 5	0																																			
	Less than 2 psig	-	0																																			
Less than 2 ft	-	-	0																																			
	b. Spray pumps running - EQUAL TO NUMBER REQUIRED	b. Manually operate spray pumps and associated discharge valves as necessary.																																				

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Radiation levels and harsh environment conditions should be evaluated prior to performing local actions.</p> <p>*****</p>			
6.	<p><u>Add Makeup To RWST As Necessary:</u></p> <p>a. Align makeup to RWST per 2-SOP-10.1.1, SAFETY INJECTION ACCUMULATORS AND REFUELING WATER STORAGE TANK OPERATIONS</p> <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>City water for AFW pumps will be necessary if CST level decreases to less than 2 ft.</p> <p>*****</p>			
⊗ 7.	<p><u>Check Intact SG Levels:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Narrow range level - GREATER THAN 10%(27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control feed flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p> </td> <td style="vertical-align: top;"> <p>a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase, <u>THEN</u> stop feed flow to that SG.</p> </td> </tr> </table>		<p>a. Narrow range level - GREATER THAN 10%(27% FOR ADVERSE CONTAINMENT)</p> <p>b. Control feed flow to maintain narrow range level between 10% (27% FOR ADVERSE CONTAINMENT) and 50%</p>	<p>a. Maintain total feed flow greater than 400 gpm until narrow range level greater than 10% (27% FOR ADVERSE CONTAINMENT) in at least one SG.</p> <p>b. <u>IF</u> narrow range level in any SG continues to increase, <u>THEN</u> stop feed flow to that SG.</p>
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FOLDOUT PAGE FOR 2-ECA-1.1

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

Shutdown margin from graphs book should be monitored during RCS cooldown.

8. Initiate RCS Cooldown To Cold Shutdown:

- a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR
- b. Dump steam to condenser from intact SG(s):
 - 1) Check condenser - AVAILABLE
 - 2) Place steam dump controller switch to manual and adjust for zero output.
 - 3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.
- b. Manually or locally dump steam from intact SG(s):
 - o Use SG atmospheric steam dump:
 - o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION AND COMPENSATORY ACTIONS for local operation as necessary.
 - OR -
 - o Use turbine-driven AFW pump.

IF no intact SG available,
THEN use faulted SG.

9. Check SI System pump Status:

Go to Step 19.

- o SI pumps - ANY RUNNING
- OR -
- o RHR pumps - ANY RUNNING IN SI MODE

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o If offsite power is lost after SI reset, manual action may be required * to restart safeguards equipment. * o Overriding breaker anti-pump/lockout may require placing control * switches to TRIP or may require Containment Spray Reset * o Placing key switches to DEFEAT will prevent auto SI actuation. <p>*****</p>	
10.	<p><u>Reset SI If Necessary:</u></p> <ul style="list-style-type: none"> a. Check all CCW pumps - RUNNING a. Place non-running CCW pumps CCR control switches in PULLOUT. b. Place controls for main AND bypass feedwater regulating valves to CLOSE c. Verify Automatic Safeguards Actuation key switches on Panel SB-2 in DEFEAT position: <ul style="list-style-type: none"> o Train A SIA-1 o Train B SIA-2 d. One at a time, depress Safety Injection reset buttons (Panel SB-2) <ul style="list-style-type: none"> o Train A o Train B e. Verify Train A AND B - RESET e. Verify Relays reset (Top of Safeguards Initiation Racks 1-1 <u>AND</u> 2-1): <ul style="list-style-type: none"> o SIA-1 o SIM-1 o SIA-2 o SIM-2 	

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>Establish One Train Of SI System Flow:</u>	
	a. SI pump - ONLY ONE RUNNING	a. Start or stop SI pumps to establish only one pump running.
	b. RCS pressure - LESS THAN 320 PSIG (340 PSIG FOR ADVERSE CONTAINMENT)	b. Stop RHR pumps. Go to Step 12.
	c. RHR pump - ONLY ONE RUNNING	c. Start or stop RHR pumps to establish only one pump running.
12.	<u>Verify No Backflow From RWST To Containment Sump:</u>	
	a. Containment sump valves - ANY OPEN: o MOV-885A o MOV-885B	a. <u>IF</u> both containment sump valves closed, <u>THEN</u> go to Step 13. OBSERVE CAUTION AND NOTE PRIOR TO STEP 13.
	b. Valve from RWST to RHR pump - CLOSED o MOV-882	b. Manually close valve.

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">* If RCP seal cooling had previously been lost, the affected RCP(s) should * * <u>NOT</u> be started prior to a status evaluation. *</p> <p style="text-align: center;">*****</p>												
<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>RCPs should be run in the following order to provide normal PRZR spray: RCP 24, RCP 23. Running 23 RCP may require starting additional RCPs to provide adequate spray flow.</p> </div>												
13.	<p><u>Check If An RCP Should Be Started:</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>a. All RCPs - STOPPED</p> <p>b. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> </div> <div style="width: 45%;"> <p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Stop all but 24 RCP. 2) <u>IF</u> 24 RCP already stopped, <u>THEN ONLY</u> stop RCP(s) <u>NOT</u> required to provide PRZR spray. 3) Go to Step 14. <p>b. Go to Step 19.</p> </div> </div>		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)
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<p>This Step continued on the next page.</p>												

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1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Try to start 24 RCP:</p> <ol style="list-style-type: none"> 1) Check containment conditions - <u>NOT</u> ADVERSE 2) Check containment sump level - LESS THAN 42'10 1/2" 3) Reset MCC 28 and MCC 28A 4) Establish conditions for starting RCP(s) per 2-SOP-1.3, REACTOR COOLANT PUMP OPERATION 5) Start 24 RCP 	<p>c. <u>IF</u> 24 RCP can <u>NOT</u> be started, <u>THEN</u> start RCP(s) as required to provide PRZR spray flow <u>AND</u> go to Step 14.</p>

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Reset Containment Isolation</u> <u>Phase A And Phase B:</u> <ol style="list-style-type: none"> a. Place IVSW switches to OPEN on SN panel: <ol style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. Place CNTMT RAD MON WCPS VALVES control switch to OPEN on SN panel c. Verify personnel AND equipment hatch solenoid control switches to INCIDENT on SM panel d. Place control switches for all remaining Phase A isolation valves to CLOSE on SN panel e. One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B f. Verify Train A AND B - RESET 	f. <u>IF</u> signal does <u>NOT</u> reset, <u>THEN</u> : <ol style="list-style-type: none"> 1) Place key switches to BYPASS. 2) One at a time, depress Phase A reset buttons: <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B <p><u>IF</u> signal can <u>NOT</u> be reset, <u>THEN</u> reset relays CA1 <u>AND</u> CA2 on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2.</p>
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTION LINE LOW FLOW alarm on panel SBF-1
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- c) Indications of erratic or reduced flow
- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	g. Check Phase B - ACTUATED	g. Go To Step 16.
	h. Containment pressure - LESS THAN 17 PSIG	h. Perform the following: 1) <u>WHEN</u> containment pressure less than 17 psig, <u>THEN</u> do Steps 15i through 15k. 2) Continue with Step 16.
	i. One At A Time, Depress Containment Spray Reset Pushbuttons: o Spray SYS Reset Train A o Spray SYS Reset Train B	
	j. One at a time, depress Phase B reset buttons: o CI Phase B Train A o CI Phase B Train B	
	k. Verify Train A AND B - RESET	k. Verify Relays reset (Top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2): o S1 o S2 o CB1 o CB2
16.	<u>Establish Instrument Air To Containment:</u> a. Open PCV-1228	a. Verify relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 are reset: o CA1 o CA2

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	<u>Stop SI System Pumps And Place In AUTO:</u> <ul style="list-style-type: none"> o RHR pumps o SI pumps 	

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED				
	<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">*****</p> <p>* If RWST level decreases to less than 15 ft, charging pumps that are</p> <p>* started or running should be monitored for loss of suction which may</p> <p>* result in pump damage.</p> <p style="text-align: center;">*****</p>					
18.	<p><u>Establish Charging Flow:</u></p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Charging pumps - AT LEAST ONE RUNNING</p> </td> <td style="vertical-align: top;"> <p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p style="margin-left: 20px;">o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p style="margin-left: 40px;">o MOV-250A, MCC 26AA, A2</p> <p style="margin-left: 40px;">o MOV-250C, MCC 26AA, B2</p> <p style="margin-left: 40px;">o MOV-250B, MCC 26BB, L3</p> <p style="margin-left: 40px;">o MOV-250D, MCC 26BB, M3</p> <p style="margin-left: 40px;">- OR -</p> <p style="margin-left: 40px;">o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):</p> <p style="margin-left: 40px;">o 241A</p> <p style="margin-left: 40px;">o 241B</p> <p style="margin-left: 40px;">o 241C</p> <p style="margin-left: 40px;">o 241D</p> <p>2) Start one charging pump.</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p>b. Check RWST - LESS THAN 15 FT</p> </td> <td style="vertical-align: top;"> <p>b. <u>IF</u> RWST level decreases to less than 15 ft, <u>THEN</u> do Step 18c. Continue with Step 18d.</p> </td> </tr> </table>		<p>a. Charging pumps - AT LEAST ONE RUNNING</p>	<p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p style="margin-left: 20px;">o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p style="margin-left: 40px;">o MOV-250A, MCC 26AA, A2</p> <p style="margin-left: 40px;">o MOV-250C, MCC 26AA, B2</p> <p style="margin-left: 40px;">o MOV-250B, MCC 26BB, L3</p> <p style="margin-left: 40px;">o MOV-250D, MCC 26BB, M3</p> <p style="margin-left: 40px;">- OR -</p> <p style="margin-left: 40px;">o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):</p> <p style="margin-left: 40px;">o 241A</p> <p style="margin-left: 40px;">o 241B</p> <p style="margin-left: 40px;">o 241C</p> <p style="margin-left: 40px;">o 241D</p> <p>2) Start one charging pump.</p>	<p>b. Check RWST - LESS THAN 15 FT</p>	<p>b. <u>IF</u> RWST level decreases to less than 15 ft, <u>THEN</u> do Step 18c. Continue with Step 18d.</p>
<p>a. Charging pumps - AT LEAST ONE RUNNING</p>	<p>a. Perform the following:</p> <p>1) <u>IF</u> CCW flow to RCP(s) thermal barrier is lost, <u>THEN</u> isolate seal injection to affected RCP(s) before starting charging pumps:</p> <p style="margin-left: 20px;">o Locally energize <u>AND</u> close seal injection isolation valves:</p> <p style="margin-left: 40px;">o MOV-250A, MCC 26AA, A2</p> <p style="margin-left: 40px;">o MOV-250C, MCC 26AA, B2</p> <p style="margin-left: 40px;">o MOV-250B, MCC 26BB, L3</p> <p style="margin-left: 40px;">o MOV-250D, MCC 26BB, M3</p> <p style="margin-left: 40px;">- OR -</p> <p style="margin-left: 40px;">o Locally close seal injection needle valves (51 ft. el, Piping Penetration Area):</p> <p style="margin-left: 40px;">o 241A</p> <p style="margin-left: 40px;">o 241B</p> <p style="margin-left: 40px;">o 241C</p> <p style="margin-left: 40px;">o 241D</p> <p>2) Start one charging pump.</p>					
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<p>This Step continued on the next page.</p>						

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. Try to add makeup to RCS from alternate source:</p> <ol style="list-style-type: none"> 1) Realign makeup to VCT per 2-SOP-10.1.1, SAFETY INJECTION ACCUMULATORS AND REFUELING WATER STORAGE TANK OPERATIONS 2) Manually set blender controls to supply water to charging pump suction. <p>d. Establish 55 gpm charging flow:</p> <ol style="list-style-type: none"> 1) Verify speed controller in MANUAL 2) Adjust charging pump speed to establish 55 gpm flow 	

FOLDOUT PAGE FOR 2-ECA-1.1

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛19.	<u>Verify Adequate RCS Makeup Flow:</u>	
	<p>a. Check RVLIS indication:</p> <ul style="list-style-type: none"> o Natural circulation range - GREATER THAN 60% IF NO RCP RUNNING - OR - o RCP running range - GREATER THAN 22% IF ONE RCP RUNNING - OR - o RCP running range - GREATER THAN 29% IF TWO RCPs RUNNING - OR - o RCP running range - GREATER THAN 41% IF THREE RCPs RUNNING - OR - o RCP running range - GREATER THAN 60% IF FOUR RCPs RUNNING <p>b. Core exit TCs - STABLE OR DECREASING</p>	<p>a. Increase RCS makeup flow to maintain RVLIS indication as necessary.</p> <p>b. Increase RCS makeup flow to maintain TCs stable or decreasing.</p>

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

The upper head region may void during RCS depressurization if RCPs are not running. This will result in a rapidly increasing PRZR level.

20. Depressurize RCS To Decrease RCS Subcooling:

- a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE: a. Go to Step 21.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	62 (93)
401 - 800	46 (59)
801 - 1200	33 (40)
1201 - 2500	29 (36)

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ECA-1.1

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. Use normal PRZR spray	<p>b. Use one PRZR PORV. <u>IF</u> RCS can <u>NOT</u> be depressurized using any PRZR PORV, <u>THEN</u> use auxiliary spray:</p> <ol style="list-style-type: none"> 1) Maintain RCP seal injection 6 gpm to 10 gpm. 2) Reduce charging pump speed to minimum flow. 3) Close charging line flow control valve: <ul style="list-style-type: none"> o HCV-142 4) Close the charging stop valves: <ul style="list-style-type: none"> o 204A - Loop 22 o 204B - Loop 21 5) Close the pressurizer spray valves: <ul style="list-style-type: none"> o PCV-455A o PCV-455B 6) Open auxiliary spray valve: <ul style="list-style-type: none"> o 212 7) Initiate spray slowly using HCV-142. 8) Adjust charging pump speed to increase spray flow.
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																				
	<p>c. Depressurize RCS until either of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 71% (65% FOR ADVERSE CONTAINMENT) - OR - o RCS subcooling based on core exit TCs: <p><u>BETWEEN</u> VALUE OBTAINED FROM FIRST TABLE</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p><u>AND</u> VALUE OBTAINED FROM SECOND TABLE</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>62 (93)</td> </tr> <tr> <td>401 - 800</td> <td>46 (59)</td> </tr> <tr> <td>801 - 1200</td> <td>33 (40)</td> </tr> <tr> <td>1201 - 2500</td> <td>29 (36)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	62 (93)	401 - 800	46 (59)	801 - 1200	33 (40)	1201 - 2500	29 (36)	<p>c. If RCS subcooling less than value obtained from table below, <u>THEN</u> increase RCS makeup flow as necessary to restore subcooling:</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)																					
0 - 400	52 (83)																					
401 - 800	36 (49)																					
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0 - 400	62 (93)																					
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	d. Stop RCS depressurization																					

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21.	<u>Check If RHR System Should Be Placed In Service:</u>	
	a. Check both the following: <ul style="list-style-type: none"> o RCS temperatures - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT) 	a. Go to Step 22.
	b. Consult TSC to determine if RHR System should be placed in service	
22.	<u>Check If SI Accumulators Should Be Isolated:</u>	
	a. At least two RCS hot leg temperatures - LESS THAN 350°F	a. Continue with Step 23. <u>WHEN</u> at least two RCS hot leg temperatures less than 350°F, <u>THEN</u> do steps 22b through 22d
	b. Locally restore power to isolation valves: <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) 	

This Step continued on the next page.

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	c. Close all SI accumulator isolation valves	<p>c. Vent any unisolated accumulators:</p> <ul style="list-style-type: none"> 1) Close nitrogen supply valve to accumulators: HCV-863. <ul style="list-style-type: none"> o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves: <ul style="list-style-type: none"> o 1809 o 1811A o 1811B 2) Open the following valves as necessary: <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	d. Open all SI accumulator isolation valve breakers	

FOLDOUT PAGE FOR 2-ECA-1.1

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
⊛23.	<u>Check If RCPs Must Be Stopped:</u>	
	a. Check the following: <ul style="list-style-type: none"> o Number 1 seal differential pressure - LESS THAN 200 PSID - OR - o Number 1 seal return flow - LESS THAN 0.2 GPM 	a. <u>IF</u> neither condition satisfied, <u>THEN</u> go to Step 24.
	b. Stop affected RCP(s)	
24.	<u>Check RCS Temperature - GREATER THAN 200°F</u>	Go to Step 35.
25.	<u>Check RWST Level - LESS THAN 3.0 FT</u>	Return to Step 1.
26.	<u>Stop Pumps Taking Suction From RWST And Place Switches In PULLOUT Position:</u>	
	<ul style="list-style-type: none"> o RHR pumps o SI pumps o Charging pumps 	
27.	<u>Check RWST Level:</u>	
	a. RWST Level - LESS THAN 2.0 FT	a. Continue with Step 28. <u>WHEN</u> RWST level less than 2.0 ft, <u>THEN</u> stop containment spray pumps.
	b. Stop containment spray pumps	

FOLDOUT PAGE FOR 2-ECA-1.1

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Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Radiation levels and harsh environment conditions should be evaluated *</p> <p>* prior to performing local actions. *</p> <p>*****</p>	
28.	<p><u>Try To Add Makeup To RCS From</u></p> <p><u>Alternate Source:</u></p> <p>a. Realign makeup to VCT per 2-SOP-10.1.1. SAFETY INJECTION ACCUMULATORS AND REFUELING WATER STORAGE TANK OPERATIONS</p> <p>b. Set blender controls to manually supply water to charging pump suction</p> <p>c. Start charging pumps</p> <p>d. Establish charging flow by adjusting charging pump speed controller as necessary</p>	

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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- d) Abnormal sump level indication

Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* To prevent main steamline isolation, steam dump to condenser should <u>NOT</u></p> <p>* exceed 0.5 E6 lbs/hr per SG.</p> <p>*****</p>	
29.	<p><u>Check If All Intact SGs Should Be Depressurized To 710 psig:</u></p>	
	<p>a. Check SG pressures - GREATER THAN 710 PSIG</p> <p>b. Dump steam to condenser at maximum rate, <u>NOT</u> to exceed 0.5 E6 lbs/hr per intact SG:</p> <p>1) Check condenser - AVAILABLE</p> <p>2) Place steam dump controller switch to manual and adjust for zero output.</p> <p>3) Transfer condenser steam dump to pressure control mode and adjust manual setpoint as necessary.</p> <p>c. Check SG pressures - LESS THAN 710 PSIG</p> <p>d. Stop SG depressurization</p>	<p>a. Go to Step 30.</p> <p>b. Manually or locally dump steam at maximum rate from intact SG(s):</p> <p>o Use SG atmospheric steam dump:</p> <p>o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary.</p> <p>o Use turbine-driven AFW pump.</p> <p>c. Return to Step 29b.</p>

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

1) Indications of sump blockage may include:

- a) LOW HEAD INJECTION LINE LOW FLOW alarm on panel SBF-1
- b) SI PUMP SUCTION LOW PRESS alarm on panel SBF-1
- c) Indications of erratic or reduced flow
- d) Abnormal sump level indication

Number: 2-ECA-1.1	Title: LOSS OF EMERGENCY COOLANT RECIRCULATION	Revision Number: REV. 0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30.	<p><u>Depressurize All Intact SGs To Inject SI Accumulators As Necessary:</u></p> <p>a. Dump steam to condenser as necessary to maintain appropriate RVLIS indication:</p> <ul style="list-style-type: none"> o Natural circulation range - AT 60% IF NO RCP RUNNING - OR - o RCP running range - AT 22% IF ONE RCP RUNNING - OR - o RCP running range - AT 29% IF TWO RCPs RUNNING - OR - o RCP running range - AT 41% IF THREE RCPs RUNNING - OR - o RCP running range - AT 60% IF FOUR RCPs RUNNING <p>b. Check SG pressures - LESS THAN 110 PSIG</p> <p>c. Stop SG depressurization</p>	<p>a. Manually or locally dump steam from intact SG(s) as necessary to maintain appropriate RVLIS indication:</p> <ul style="list-style-type: none"> o Use SG atmospheric steam dump: o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. o Use turbine-driven AFW pump. <p>b. Return to Step 30a.</p>

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

- a. IF at any time recirculation flow from Containment to RCS can NOT be established OR maintained due to sump blockage, THEN GO To 2-ECA-1.3, LOSS OF EMERGENCY RECIRCULATION COOLANT CAUSED BY SUMP BLOCKAGE, Step 1.

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31.	<p><u>Check If SI Accumulators Should Be Isolated:</u></p> <ul style="list-style-type: none"> a. At least two RCS hot leg temperatures - LESS THAN 350°F b. Locally restore power to isolation valves: <ul style="list-style-type: none"> o 894A (MCC 26A) o 894C (MCC 26A) o 894B (MCC 26B) o 894D (MCC 26B) c. Close all SI accumulator isolation valves 	<ul style="list-style-type: none"> a. Continue with Step 32. <u>WHEN</u> at least two RCS hot leg temperatures less than 350°F, <u>THEN</u> do Steps 31b through 31d. c. Vent any unisolated accumulators: <ul style="list-style-type: none"> 1) Close nitrogen supply valve to accumulators: HCV-863. o <u>IF</u> HCV-863 will <u>NOT</u> close <u>THEN</u> locally close the following nitrogen valves: <ul style="list-style-type: none"> o 1809 o 1811A o 1811B
This Step continued on the next page.		

FOLDOUT PAGE FOR 2-ECA-1.1

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>2) Open the following valves as necessary:</p> <ul style="list-style-type: none"> o Accumulator 21: <ul style="list-style-type: none"> o 891A o HCV-943 o Accumulator 22: <ul style="list-style-type: none"> o 891B o HCV-943 o Accumulator 23: <ul style="list-style-type: none"> o 891C o HCV-943 o Accumulator 24: <ul style="list-style-type: none"> o 891D o HCV-943 <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult the TSC to determine contingency actions.</p>
	<p>d. Open all SI accumulator isolation valve breakers</p> <p>⊛32. <u>Check If RCPs Must Be Stopped:</u></p> <ul style="list-style-type: none"> a. Check the following: <ul style="list-style-type: none"> o Number 1 seal differential pressure - LESS THAN 200 PSID - OR - o Number 1 seal return flow - LESS THAN 0.2 GPM b. Stop affected RCP(s) 	<p>a. <u>IF</u> neither condition satisfied, <u>THEN</u> go to Step 33.</p>

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33.	<u>Depressurize All Intact SGs To Atmospheric Pressure:</u> <ol style="list-style-type: none"> Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR Dump steam to condenser 	<ol style="list-style-type: none"> Manually or locally dump steam from intact SG(s): <ol style="list-style-type: none"> Use SG atmospheric steam dump: Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary. Use turbine-driven AFW pump.
34.	<u>Check If RHR System Should Be Placed In Service:</u> <ol style="list-style-type: none"> Check both the following: <ol style="list-style-type: none"> RCS temperature - LESS THAN 350°F RCS pressure - LESS THAN 370 PSIG (280 PSIG FOR ADVERSE CONTAINMENT) Consult TSC to determine if RHR System should be placed in service 	<ol style="list-style-type: none"> Return to Step 33.

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35.	<u>Maintain RCS Heat Removal:</u>	
	a. Use RHR System if in service	
	b. Dump steam to condenser from intact SGs	b. Manually or locally dump steam from intact SG(s):
		o Use SG atmospheric steam dump:
		o Refer to 2-SOP-ESP-001, LOCAL EQUIPMENT OPERATION <u>AND</u> COMPENSATORY ACTIONS for local operation as necessary.
		- OR -
		o Use turbine-driven AFW pump.
		<u>IF</u> no intact SG available and RHR system <u>NOT</u> in service, <u>THEN</u> use faulted SG.
36.	<u>Check Containment Hydrogen Concentration:</u>	
	a. Obtain a hydrogen concentration measurement:	
	o Dispatch chemistry personnel to obtain sample	
	- OR -	
	o Use H2-O2 analyzer on Accident Assessment Panel	
	b. Hydrogen concentration - LESS THAN 3.0% IN DRY AIR	b. Consult TSC for additional recovery actions.
37.	<u>Consult TSC</u>	
	-END-	

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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Number:	Title:	Revision Number:
2-ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	REV. 0

FIGURE ECA11-1

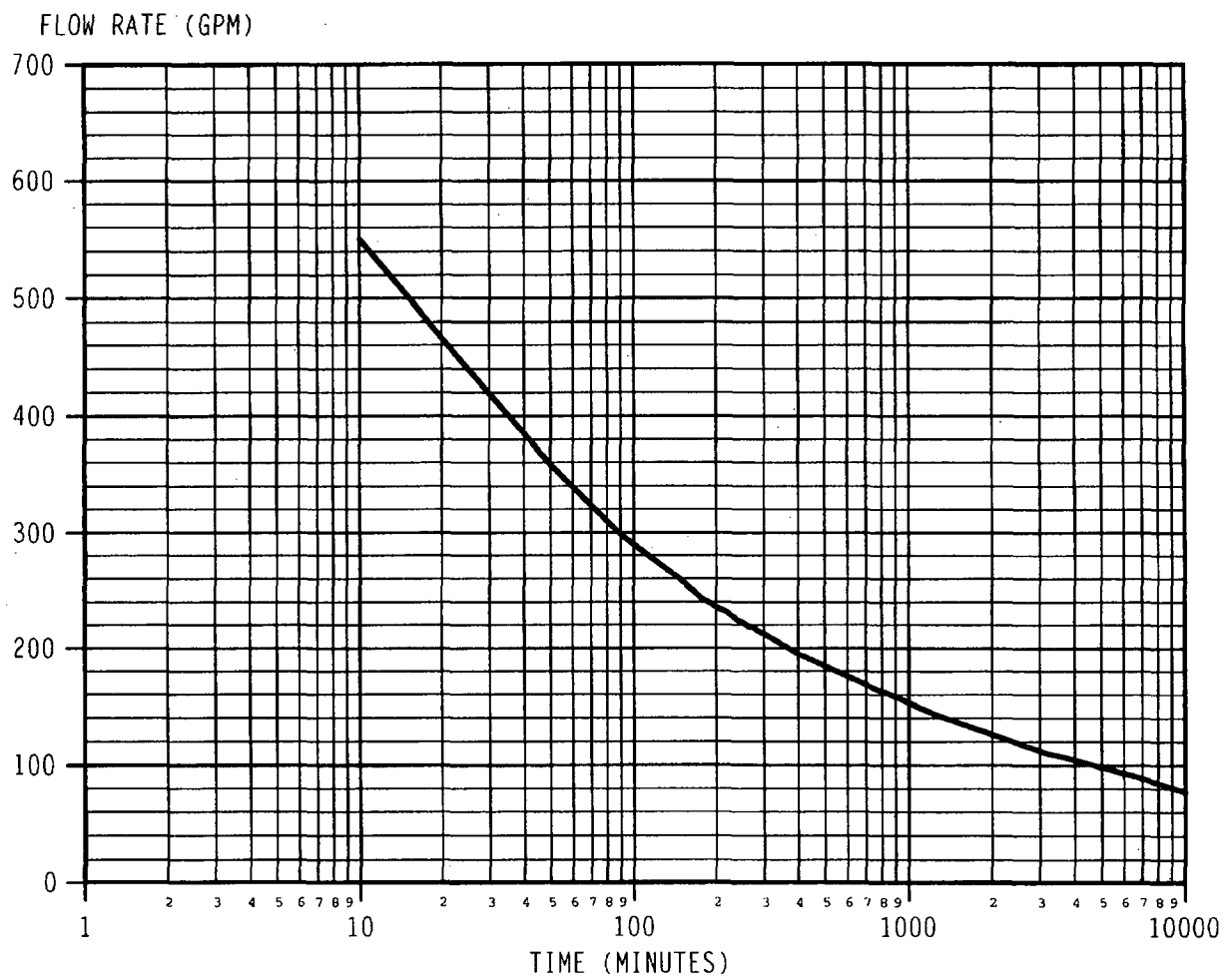


FIGURE ECA11-1, MINIMUM SI FLOW RATE VERSUS TIME AFTER TRIP
-END-

FOLDOUT PAGE FOR 2-ECA-1.1

1. LOSS OF EMERGENCY COOLANT RECIRCULATION:

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