

Constellation Energy

R.E. Ginna Nuclear Power Plant, LLC

November 17, 2004

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Emergency Operating Procedures
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

As requested, enclosed are Ginna Station Emergency Operating Procedures.

Very truly yours,

Thomas A. Marlow

TAM/jdw

xc: U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Ginna USNRC Senior Resident Inspector

Enclosure(s):

ATT Index	E-2, Rev 12	ES-0.1, Rev 23	FR-H.1, Rev 31
F Index	E-3, Rev 38	ES-0.3, Rev 10	FR-H.3, Rev 8
E Index	ECA-0.0, Rev 29	ES-1.1, Rev 27	FR-H.5, Rev 10
ECA Index	ECA-0.1, Rev 24	ES-1.2, Rev 27	FR-I.2, Rev 12
ES Index	ECA-0.2, Rev 16	ES-1.3, Rev 37	FR-I.3, Rev 20
FR Index	ECA-1.1, Rev 23	ES-3.1, Rev 16	FR-P.1, Rev 29
ATT-22.0, Rev 4	ECA-2.1, Rev 28	ES-3.2, Rev 17	FR-P.2, Rev 9
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PROCEDURE INDEX

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INPUT PARAMETERS: TYPE: PRATT

STATUS VALUE(S): EF, QU

5 YEARS ONLY:

PRATT EOP ATTACHMENTS

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ATT-1.0	ATTACHMENT AT POWER CCW ALIGNMENT	003	02/12/2003	02/12/2003	02/12/2008	EF
ATT-1.1	ATTACHMENT NORMAL CCW FLOW	000	05/18/2000	05/18/2000	05/18/2005	EF
ATT-2.1	ATTACHMENT MIN SW	005	02/01/2001	02/03/2003	02/03/2008	EF
ATT-2.2	ATTACHMENT SW ISOLATION	008	03/06/2002	03/27/2003	03/27/2008	EF
ATT-2.3	ATTACHMENT SW LOADS IN CNMT	004	03/06/2002	04/06/2004	04/06/2009	EF
ATT-2.4	ATTACHMENT NO SW PUMPS	002	05/30/2003	10/31/2001	10/31/2006	EF
ATT-2.5	ATTACHMENT SPLIT SW HEADERS	000	06/26/2002	06/26/2002	06/26/2007	EF
ATT-3.0	ATTACHMENT C/CVI	007	02/17/2004	02/17/2004	02/17/2009	EF
ATT-3.1	ATTACHMENT CNMT CLOSURE	005	02/17/2004	02/17/2004	02/17/2009	EF
ATT-4.0	ATTACHMENT CNMT RECIRC FANS	003	07/26/1994	03/27/2003	03/27/2008	EF
ATT-5.0	ATTACHMENT COND TO S/G	006	10/10/2003	04/06/2004	04/06/2009	EF
ATT-5.1	ATTACHMENT SAFW	008	05/30/2002	04/06/2004	04/06/2009	EF
ATT-5.2	ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP	004	10/07/2004	8/20/51/2	01/28/2009	EF
ATT-6.0	ATTACHMENT COND VACUUM	003	12/18/1996	02/03/2003	02/03/2008	EF
ATT-7.0	ATTACHMENT CR EVAC	006	03/06/2002	02/03/2003	02/03/2008	EF
ATT-8.0	ATTACHMENT DC LOADS	007	02/04/2004	02/04/2004	02/04/2009	EF
ATT-8.1	ATTACHMENT D/G STOP	005	03/08/2002	02/03/2003	02/03/2008	EF
ATT-8.2	ATTACHMENT GEN DEGAS	008	06/20/2002	05/28/2004	05/28/2009	EF
ATT-8.3	ATTACHMENT NONVITAL	004	03/06/2002	02/03/2003	02/03/2008	EF
ATT-8.4	ATTACHMENT S/U/V	005	03/06/2002	02/03/2003	02/03/2008	EF
ATT-8.5	ATTACHMENT LOSS OF OFFSITE POWER	001	08/26/2003	05/02/2002	05/02/2007	EF
ATT-9.0	ATTACHMENT LETDOWN	009	01/07/2004	03/06/2002	03/06/2007	EF
ATT-9.1	ATTACHMENT EXCESS L/D	006	07/28/2004	10/31/2001	10/31/2006	EF
ATT-10.0	ATTACHMENT FAULTED S/G	006	03/08/2002	03/27/2003	03/27/2008	EF
ATT-11.0	ATTACHMENT IA CONCERNS	004	09/01/2004	03/27/2003	03/27/2008	EF
ATT-11.1	ATTACHMENT IA SUPPLY	003	03/06/2002	03/27/2003	03/27/2008	EF
ATT-11.2	ATTACHMENT DIESEL AIR COMPRESSOR	004	11/18/2002	03/10/2003	03/10/2008	EF
ATT-12.0	ATTACHMENT N2 PORVS	005	02/12/2003	02/12/2003	02/12/2008	EF
ATT-13.0	ATTACHMENT NC	003	02/12/2003	02/12/2003	02/12/2008	EF
ATT-14.0	ATTACHMENT NORMAL RHR COOLING	003	03/06/2002	04/06/2004	04/06/2009	EF

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INPUT PARAMETERS: TYPE: PRATT

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PRATT EOP ATTACHMENTS

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ATT-14.1	ATTACHMENT RHR COOL	007	09/01/2004	01/08/2002	01/08/2007	EF
ATT-14.2	ATTACHMENT RHR ISOL	003	02/12/2003	02/12/2003	02/12/2008	EF
ATT-14.3	ATTACHMENT RHR NPSH	003	03/08/2002	01/28/2004	01/28/2009	EF
ATT-14.5	ATTACHMENT RHR SYSTEM	003	03/20/2003	02/03/2003	02/03/2008	EF
ATT-14.6	ATTACHMENT RHR PRESS REDUCTION	002	03/08/2002	01/28/2004	01/28/2009	EF
ATT-14.7	ATTACHMENT ADJUST RHR FLOW	000	02/17/2004	02/17/2004	02/17/2009	EF
ATT-15.0	ATTACHMENT RCP START	009	03/06/2002	03/17/2000	03/17/2005	EF
ATT-15.1	ATTACHMENT RCP DIAGNOSTICS	003	04/24/1997	02/03/2003	02/03/2008	EF
ATT-15.2	ATTACHMENT SEAL COOLING	005	03/08/2002	02/03/2003	02/03/2008	EF
ATT-16.0	ATTACHMENT RUPTURED SG	012	04/29/2004	01/11/2000	01/11/2005	EF
ATT-16.1	ATTACHMENT SGT	003	09/01/2004	09/08/2000	09/08/2005	EF
ATT-16.2	ATTACHMENT RCS BORON FOR SGT	003	11/26/2003	09/08/2000	09/08/2005	EF
ATT-17.0	ATTACHMENT SD-1	017	09/01/2004	02/29/2000	02/28/2005	EF
ATT-17.1	ATTACHMENT SD-2	007	09/01/2004	01/30/2001	01/30/2006	EF
ATT-18.0	ATTACHMENT SFP - RWST	005	03/08/2002	02/03/2003	02/03/2008	EF
ATT-20.0	ATTACHMENT VENT TIME	004	09/01/2004	02/03/2003	02/03/2008	EF
ATT-21.0	ATTACHMENT RCS ISOLATION	002	03/08/2002	02/03/2003	02/03/2008	EF
ATT-22.0	ATTACHMENT RESTORING FEED FLOW	004	11/17/2004	01/22/2002	01/22/2007	EF
ATT-23.0	ATTACHMENT TRANSFER 4160V LOADS	000	02/26/1999	01/28/2004	01/28/2009	EF
ATT-24.0	ATTACHMENT TRANSFER BATTERY TO TSC	000	09/08/2000	09/08/2000	09/08/2005	EF
ATT-26.0	ATTACHMENT RETURN TO NORMAL OPERATIONS	000	10/31/2001	10/31/2001	10/31/2006	EF

PRATT TOTAL: 51

GRAND TOTAL: 51

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INPUT PARAMETERS: TYPE: PRF

STATUS VALUE(S): EF, QU

5 YEARS ONLY:

PRF CRITICAL SAFETY FUNCTION STATUS PROC

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
F-0.1	SUBCRITICALITY CSFST	001	07/21/1989	02/25/2004	02/25/2009	EF
F-0.2	CORE COOLING CSFST	005	04/20/2004	04/20/2004	04/20/2009	EF
F-0.3	HEAT SINK CSFST	004	11/17/2004	02/25/2004	02/25/2009	EF
F-0.4	INTEGRITY CSFST	002	03/31/2000	02/25/2004	02/25/2009	EF
F-0.5	CONTAINMENT CSFST	002	01/12/1990	02/25/2004	02/25/2009	EF
F-0.6	INVENTORY CSFST	004	05/01/1998	03/27/2003	03/27/2008	EF

PRF TOTAL: 6

GRAND TOTAL: 6

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INPUT PARAMETERS: TYPE: PRE STATUS VALUE(S): EF, QU 5 YEARS ONLY:

PRE EMERGENCY PROCEDURE

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
E-0	REACTOR TRIP OR SAFETY INJECTION	037	11/17/2004	03/24/2003	03/24/2008	EF
E-1	LOSS OF REACTOR OR SECONDARY COOLANT	030	11/17/2004	03/24/2003	03/24/2008	EF
E-2	FAULTED STEAM GENERATOR ISOLATION	012	11/17/2004	03/24/2003	03/24/2008	EF
E-3	STEAM GENERATOR TUBE RUPTURE	038	11/17/2004	03/24/2003	03/24/2008	EF

PRE TOTAL: 4

GRAND TOTAL: 4

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INPUT PARAMETERS: TYPE: PRECA

STATUS VALUE(S): EF, QU

5 YEARS ONLY:

PRECA EMERGENCY CONTINGENCY ACTIONS PROC

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ECA-0.0	LOSS OF ALL AC POWER	029	11/17/2004	03/24/2003	03/24/2008	EF
ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	024	11/17/2004	03/24/2003	03/24/2008	EF
ECA-0.2	LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	016	11/17/2004	03/24/2003	03/24/2008	EF
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	023	11/17/2004	03/24/2003	03/24/2008	EF
ECA-1.2	LOCA OUTSIDE CONTAINMENT	006	05/30/2003	03/24/2003	03/24/2008	EF
ECA-2.1	UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	028	11/17/2004	03/24/2003	03/24/2008	EF
ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT SUBCOOLED RECOVERY DESIRED	027	11/17/2004	03/24/2003	03/24/2008	EF
ECA-3.2	SGTR WITH LOSS OF REACTOR COOLANT SATURATED RECOVERY DESIRED	028	11/17/2004	03/24/2003	03/24/2008	EF
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	031	11/17/2004	03/24/2003	03/24/2008	EF

PRECA TOTAL: 9

GRAND TOTAL: 9

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INPUT PARAMETERS: TYPE: PRES

STATUS VALUE(S): EF, QU

5 YEARS ONLY:

PRES EQUIPMENT SUB-PROCEDURE

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ES-0.0	REDIAGNOSIS	010	05/01/1998	03/24/2003	03/24/2008	EF
ES-0.1	REACTOR TRIP RESPONSE	023	11/17/2004	03/24/2003	03/24/2008	EF
ES-0.2	NATURAL CIRCULATION COOLDOWN	013	05/30/2003	03/24/2003	03/24/2008	EF
ES-0.3	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	010	11/17/2004	03/24/2003	03/24/2008	EF
ES-1.1	SI TERMINATION	027	11/17/2004	03/24/2003	03/24/2008	EF
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	027	11/17/2004	03/24/2003	03/24/2008	EF
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	037	11/17/2004	03/24/2003	03/24/2008	EF
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	016	11/17/2004	03/24/2003	03/24/2008	EF
ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	017	11/17/2004	03/24/2003	03/24/2008	EF
ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	017	11/17/2004	03/24/2003	03/24/2008	EF

PRES TOTAL: 10

GRAND TOTAL: 10

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INPUT PARAMETERS: TYPE: PRFR STATUS VALUE(S): EF, QU 5 YEARS ONLY:

PRFR FUNCTIONAL RESTORATION GUIDELINE PROC

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	021	11/17/2004	03/24/2003	03/24/2008	EF
FR-C.2	RESPONSE TO DEGRADED CORE COOLING	019	11/17/2004	03/24/2003	03/24/2008	EF
FR-C.3	RESPONSE TO SATURATED CORE COOLING	009	05/30/2003	03/24/2003	03/24/2008	EF
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	031	11/17/2004	03/24/2003	03/24/2008	EF
FR-H.2	RESPONSE TO STEAM GENERATOR OVERPRESSURE	006	10/10/2003	03/24/2003	03/24/2008	EF
FR-H.3	RESPONSE TO STEAM GENERATOR HIGH LEVEL	008	11/17/2004	03/24/2003	03/24/2008	EF
FR-H.4	RESPONSE TO LOSS OF NORMAL STEAM RELEASE CAPABILITIES	005	05/30/2003	03/24/2003	03/24/2008	EF
FR-H.5	RESPONSE TO STEAM GENERATOR LOW LEVEL	010	11/17/2004	03/24/2003	03/24/2008	EF
FR-I.1	RESPONSE TO HIGH PRESSURIZER LEVEL	017	01/07/2004	03/24/2003	03/24/2008	EF
FR-I.2	RESPONSE TO LOW PRESSURIZER LEVEL	012	11/17/2004	03/24/2003	03/24/2008	EF
FR-I.3	RESPONSE TO VOIDS IN REACTOR VESSEL	020	11/17/2004	03/24/2003	03/24/2008	EF
FR-P.1	RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	029	11/17/2004	03/24/2003	03/24/2008	EF
FR-P.2	RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	009	11/17/2004	03/24/2003	03/24/2008	EF
FR-S.1	RESPONSE TO REACTOR RESTART/ATWS	017	11/17/2004	03/24/2003	03/24/2008	EF
FR-S.2	RESPONSE TO LOSS OF CORE SHUTDOWN	009	05/30/2003	03/24/2003	03/24/2008	EF
FR-Z.1	RESPONSE TO HIGH CONTAINMENT PRESSURE	008	10/10/2003	03/24/2003	03/24/2008	EF
FR-Z.2	RESPONSE TO CONTAINMENT FLOODING	005	05/30/2003	03/24/2003	03/24/2008	EF
FR-Z.3	RESPONSE TO HIGH CONTAINMENT RADIATION LEVEL	005	05/30/2003	03/24/2003	03/24/2008	EF

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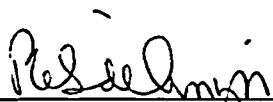
GRAND TOTAL: 18

EOP: ATT-22.0	TITLE: ATTACHMENT RESTORING FEED FLOW	REV: 4 PAGE 1 of 3
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

11-17-2004

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ATT-22.0	TITLE: ATTACHMENT RESTORING FEED FLOW	REV: 4 PAGE 2 of 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

FEED FLOW RATES SHOULD BE CONTROLLED TO PREVENT EXCESSIVE RCS COOLDOWN AND ASSOCIATED RCS PRESSURE AND INVENTORY REDUCTION.

NOTE:

- o This attachment provides the desired feed flow rate when restoring feed flow to a S/G during FR-H.1.
- o IF feedwater is restored via main feedwater or condensate the following may be used to indicate flow to the S/G:
 - o S/G feedwater flow meters (MCB)
 - o S/G feedwater flow recorders (MCB)
 - o S/G feedwater flow (PPCS Point ID F0466, F0467, F0476, F0477)
 - o S/G feedwater RTD temperature decrease (PPCS Point ID T2096, T2097)

1 Initiate Feed flow as follows:

a. Bleed and Feed initiated or required

b. Check RCS temp stable or decreasing

c. Establish less than or equal to 100 gpm feed flow to affected S/G. WHEN S/G level greater than 50 inches (100 inches adverse CNMT), THEN fill as desired to restore narrow range greater than 7% (25% adverse CNMT)

a. IF feedwater flow to affected S/G greater than 50 gpm OR affected SG level greater than 50 inches (100 inches adverse CNMT), THEN fill as desired to restore narrow range greater than 7% (25% adverse CNMT) and go to step 2 of this attachment.

IF NOT, THEN establish less than or equal to 100 gpm feed flow to affected S/G. WHEN S/G level greater than 50 inches (100 inches adverse CNMT), THEN fill as desired to restore narrow range greater than 7% (25% adverse CNMT) and go to step 2 of this attachment.

b. Fill ONE S/G at the highest possible flow rate and go to step 2 of this attachment.

EOP: ATT-22.0	TITLE: ATTACHMENT RESTORING FEED FLOW	REV: 4 PAGE 3 of 3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check RCS Loop Hot Legs - BOTH HOT LEG TEMPERATURES DECREASING	Return to step 1 of this attachment.
3	Verify affected S/G is not faulted or ruptured.	Return to step 1 of this attachment and attempt to establish the intact S/G as heat sink. Isolate feedwater and steam flow path to/from affected S/G. <u>IF</u> neither S/G is intact, <u>THEN</u> establish a heat sink using the best available S/G.
-END-		

EOP: F-0.3	TITLE: HEAT SINK	REV: 4 PAGE 1 of 2
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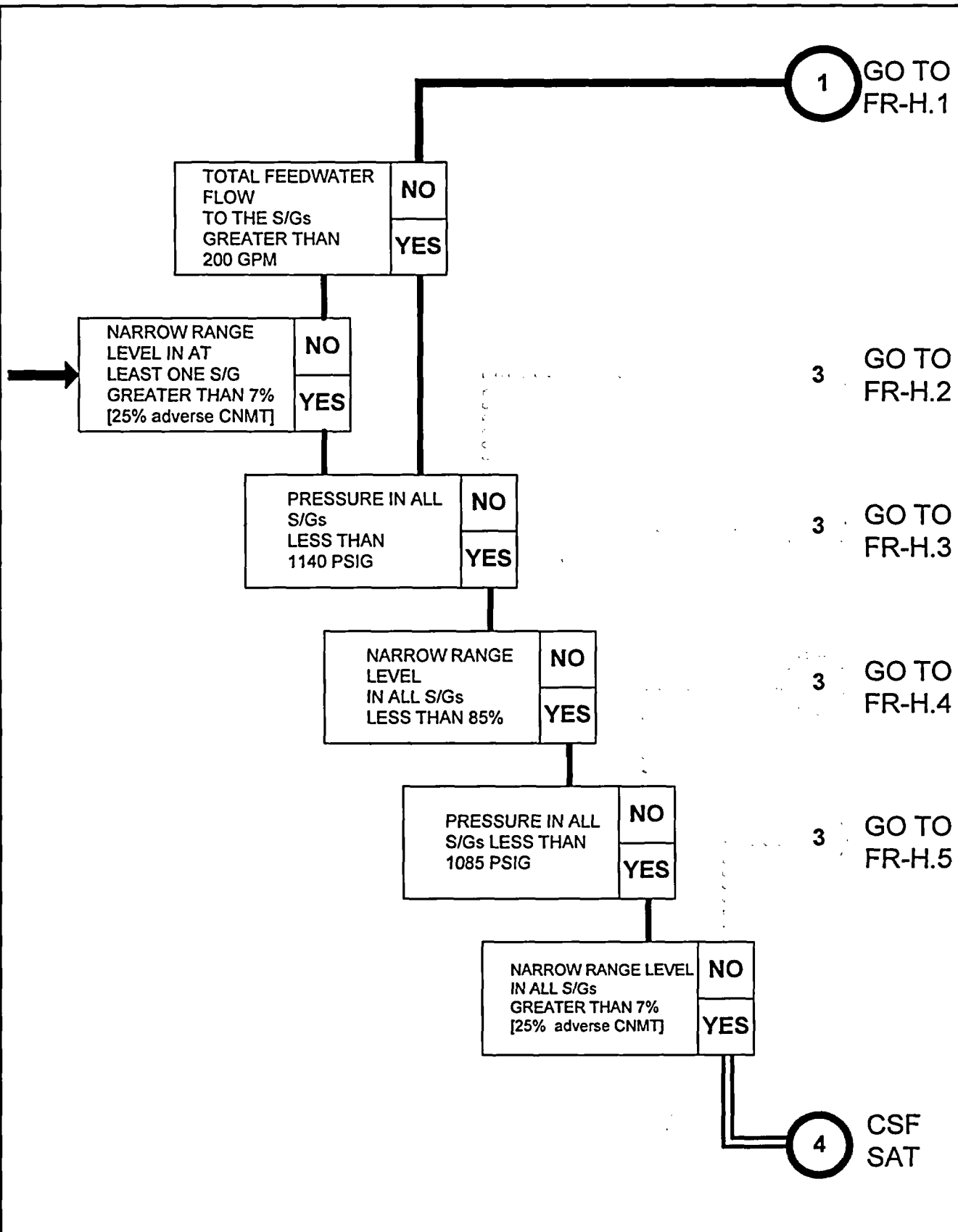
GINNA STATION
CONTROLLED COPY NUMBER 23

Reid Amgen
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

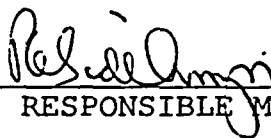
CATEGORY 1.0

REVIEWED BY: _____



EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 1 of 29
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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 2 of 29
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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 and to assess plant conditions, and identify the appropriate recovery procedure.

B. ENTRY CONDITIONS/SYMPTOMS

1. The following are symptoms that require a reactor trip, if one has not occurred:
 - o Any plant parameter reaches a reactor trip setpoint and logic as listed in procedure P-1, REACTOR CONTROL AND PROTECTION SYSTEM.
 - o Operator discretion.
2. The following are symptoms of a reactor trip:
 - o Any First Out reactor trip annunciator lit.
 - o A rapid decrease in core neutron level as indicated by nuclear instrumentation.
 - o MRPI indicates all control and shutdown rods on bottom.
 - o Reactor trip breakers indicate open.
3. The following are symptoms that require a reactor trip and safety injection, if one has not occurred:
 - o Any plant parameter reaches the Safety Injection setpoint and logic listed in procedure P-1, REACTOR CONTROL AND PROTECTION SYSTEM.
 - o Operator discretion.
4. The following are symptoms of a reactor trip and safety injection:
 - o Any SI annunciator lit.
 - o Safeguards sequencing started.

EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 3 of 29
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	<p>Verify Reactor Trip:</p> <ul style="list-style-type: none"> o At least one train of reactor trip breakers - OPEN o Neutron flux - DECREASING o MRPI indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM 	<p>Manually trip reactor.</p> <p><u>IF</u> reactor trip breakers <u>NOT</u> open, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Open Bus 13 and Bus 15 normal feed breakers. b. Verify rod drive MG sets tripped. c. Close Bus 13 and Bus 15 normal feed breakers. d. Reset lighting breakers. <p><u>IF</u> the reactor will <u>NOT</u> trip <u>OR IF</u> power range NIS indicates greater than 5%, <u>THEN</u> go to FR-S.1, RESPONSE TO REACTOR RESTART/ATWS, Step 1</p>
2	<p>Verify Turbine Stop Valves - CLOSED</p>	<p>Manually trip turbine.</p> <p><u>IF</u> turbine trip can <u>NOT</u> be verified, <u>THEN</u> close both MSIVs.</p>
3	<p>Verify Both Trains Of AC Emergency Busses Energized To At Least 420 VOLTS:</p> <ul style="list-style-type: none"> • Bus 14 and Bus 18 • Bus 16 and Bus 17 	<p>Attempt to start any failed emergency D/G to restore power to all AC emergency busses.</p> <p><u>IF</u> Bus 14 <u>AND</u> Bus 16 are deenergized, <u>THEN</u> go to ECA-0.0, LOSS OF ALL AC POWER, Step 1.</p>

EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 4 of 29
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check if SI is Actuated:	
	a. Any SI Annunciator - LIT	a. <u>IF</u> any of the following conditions are met, <u>THEN</u> manually actuate SI and CI: <ul style="list-style-type: none"> o PRZR pressure less than 1750 psig -OR- o Steamline pressure less than 514 psig -OR- o CNMT pressure greater than 4 psig -OR- o SI sequencing started -OR- o Operator determines SI required <p><u>IF</u> SI is <u>NOT</u> required, <u>THEN</u> go to ES-0.1, REACTOR TRIP RESPONSE, Step 1.</p>
	b. SI sequencing - BOTH TRAINS STARTED.	b. Manually actuate SI and CI.

EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 5 of 29
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> o FOLDOUT page should be open and monitored periodically.</p> <p>o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p>		
5	Verify SI and RHR Pumps Running:	
	a. All SI pumps - RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) Ensure SI pump suction supply open from RWST. 2) Manually start pumps.
	b. Both RHR pumps - RUNNING	b. Manually start pumps.
6	Verify CNMT RECIRC Fans Running:	
	a. All fans - RUNNING	a. Manually start fans.
	b. Charcoal filter dampers green status lights - EXTINGUISHED	b. Dispatch personnel to relay room with relay rack key to locally open dampers by pushing in trip relay plungers. <ul style="list-style-type: none"> • AUX RELAY RACK RA-2 for fan A • AUX RELAY RACK RA-3 for fan C

EOP: E-0	TITLE: REACTOR TRIP OR SAFETY INJECTION	REV: 37 PAGE 6 of 29
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 7	<p>Verify CNMT Spray Not Required:</p> <ul style="list-style-type: none"> o Annunciator A-27, CNMT SPRAY - EXTINGUISHED o CNMT pressure - LESS THAN 28 PSIG 	<p>Verify CNMT spray initiated.</p> <p><u>IF</u> CNMT spray <u>NOT</u> initiated, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Depress manual CNMT spray pushbuttons (2 of 2). b. Ensure CNMT spray pumps running. <u>IF</u> no CNMT spray pump available, <u>THEN</u> go to Step 8. c. Ensure CNMT spray pump discharge valves open for operating pump(s). <ul style="list-style-type: none"> o CNMT spray pump A: <ul style="list-style-type: none"> • MOV-860A • MOV-860B o CNMT spray pump B: <ul style="list-style-type: none"> • MOV-860C • MOV-860D d. Verify NaOH flow (FI-930) <p><u>IF</u> NaOH flow <u>NOT</u> indicated, <u>THEN</u> place switches for NaOH tank outlet valves to OPEN.</p> <ul style="list-style-type: none"> • AOV-836A • AOV-836B

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check If Main Steamlines Should Be Isolated:	
	a. Any MSIV - OPEN	a. Go to Step 9.
	b. Check CNMT pressure - LESS THAN 18 PSIG	b. Ensure BOTH MSIVs closed and go to Step 9.
	c. Check if ANY main steamlines should be isolated:	c. Go to Step 9.
	o Low Tavg (545°F) AND high steam flow (0.4×10^6 lb/hr) from either S/G	
	-OR-	
	o High-High steam flow (3.6×10^6 lb/hr) from either S/G	
	d. Verify MSIV closed on the affected S/G(s)	d. Manually close valves.
9	Verify MFW Isolation:	
	a. MFW pumps - TRIPPED	a. Perform the following:.
		1) Manually close MFW pump discharge valves and trip MFW pumps.
		2) Continue with Step 9c. <u>WHEN</u> both MFPs are tripped, <u>THEN</u> perform Step 9b.
	b. Depress MANUAL pushbuttons for A and B S/G MFW regulating valve and bypass valve controllers <u>AND</u> adjust to 0% demand.	
	c. S/G blowdown and sample valves - CLOSED	c. Place S/G blowdown and sample valve isolation switch to CLOSE.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10 Verify Both MDAFW Pumps Running		<p>Manually start both MDAFW pumps.</p> <p><u>IF</u> less than 2 MDAFW pumps are running, <u>THEN</u> manually open TDAFW pump steam supply valves.</p> <ul style="list-style-type: none"> • MOV-3505A • MOV-3504A
11 Verify At Least Two SW Pumps - RUNNING		<p>Perform the following:</p> <ul style="list-style-type: none"> a. Ensure one SW pump running on each energized screenhouse AC emergency bus: <ul style="list-style-type: none"> • Bus 17 • Bus 18 b. <u>IF</u> offsite power <u>NOT</u> available, <u>THEN</u> ensure SW isolation. c. <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. 2) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify CI And CVI:	
a.	CI and CVI annunciators - LIT <ul style="list-style-type: none"> Annunciator A-26, CNMT ISOLATION Annunciator A-25, CNMT VENTILATION ISOLATION 	a. Depress manual CI pushbutton.
b.	Verify CI and CVI valve status lights - BRIGHT	b. Manually close affected CI and CVI valve(s). IF valve(s) can <u>NOT</u> be closed from the MCB, <u>THEN</u> dispatch A0 to locally close affected valve(s) IF valve(s) can <u>NOT</u> be locally closed, <u>THEN</u> close alternate isolation valve(s). (Refer to ATT-3.0, ATTACHMENT CI/CVI).
c.	CNMT RECIRC fan coolers SW outlet valve status lights - BRIGHT <ul style="list-style-type: none"> FCV-4561 FCV-4562 	c. Dispatch A0 to locally fail open valves.
d.	Letdown orifice valves - CLOSED <ul style="list-style-type: none"> AOV-200A AOV-200B AOV-202 	d. Place affected valve switch to CLOSE. IF valves can <u>NOT</u> be verified closed by MCB indication, <u>THEN</u> close alternate isolations. (Refer to ATT-3.0, ATTACHMENT CI/CVI)

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCP TRIP CRITERIA LISTED ON FOLDOUT PAGE SHOULD BE MONITORED PERIODICALLY.</p> <p>*****</p>		
13	Check CCW System Status:	
	<ul style="list-style-type: none"> a. Verify CCW pump - AT LEAST ONE RUNNING b. Place switch for excess letdown AOV-310 to CLOSE c. Place switch for CCW from excess letdown, AOV-745 to CLOSE 	<ul style="list-style-type: none"> a. <u>IF</u> offsite power available, <u>THEN</u> manually start one CCW pump.
14	Verify SI And RHR Pump Flow:	
	<ul style="list-style-type: none"> a. SI flow indicators - CHECK FOR FLOW b. RHR flow indicator - CHECK FOR FLOW 	<ul style="list-style-type: none"> a. <u>IF</u> RCS pressure less than 1400 psig, <u>THEN</u> manually start pumps and align valves. <u>IF NOT</u>, <u>THEN</u> go to Step 15. b. <u>IF</u> RCS pressure less than 140 psig, <u>THEN</u> manually start pumps and align valves. <u>IF NOT</u>, <u>THEN</u> go to Step 15.
15	Verify AFW Valve Alignment:	Manually align valves as necessary.
	<ul style="list-style-type: none"> a. AFW flow - INDICATED TO BOTH S/G(s) b. AFW flow from each MDAFW pump - LESS THAN 230 GPM 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*16 Monitor Heat Sink:</p>	
	<p>a. Check S/G narrow range level - GREATER THAN 7% [25% adverse CNMT] in any S/G</p>	<p>a. Perform the following:</p> <p>1) Verify total AFW flow - GREATER THAN 200 GPM</p> <p><u>IF</u> total AFW is less than 200 gpm, <u>THEN</u> manually start pumps and align valves to establish greater than 200 gpm AFW flow. <u>IF</u> AFW flow greater than 200 gpm can <u>NOT</u> be established, <u>THEN</u> go to FR-H.1. RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.</p> <p>2) Go to Step 17.</p>
	<p>b. Check S/G narrow range level - BOTH S/G LESS THAN 50%</p>	
	<p>c. Control feed flow to maintain S/G narrow range level between 7% [25% adverse CNMT] and 50%.</p>	<p>b. Secure AFW flow to any S/G with level above 50%.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Verify SI Pump And RHR Pump Emergency Alignment:	
a.	RHR pump discharge to Rx vessel deluge - OPEN • MOV-852A • MOV-852B	a. Ensure at least one valve open.
b.	Verify SI pump C - RUNNING	b. Manually start pump on available bus.
c.	Verify SI pump A - RUNNING	c. Perform the following: 1) Ensure SI pumps B and C running. IF either pump NOT running, THEN go to Step 17e. 2) Ensure SI pump C aligned to discharge line A: o MOV-871A open o MOV-871B closed 3) Go to Step 18.
d.	Verify SI pump B - RUNNING	d. Perform the following: 1) Ensure SI pumps A and C running. IF either pump NOT running, THEN go to Step 17e. 2) Ensure SI pump C aligned to discharge line B: o MOV-871B open o MOV-871A closed 3) Go to Step 18.
e.	Verify SI pump C discharge valves - OPEN • MOV-871A • MOV-871B	e. Manually open valves 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>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p>		
18	<p>Check CCW Flow to RCP Thermal Barriers:</p> <ul style="list-style-type: none"> o Annunciator A-7, RCP 1A CCW RETURN HI TEMP OR LO FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HI TEMP OR LO FLOW - EXTINGUISHED 	<p><u>IF</u> CCW to a RCP is lost, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Stop affected RCPs. b. Reset SI. c. Verify adequate power available to run one charging pump (75 kw). d. Start one charging pump at minimum speed for seal injection. e. Adjust HCV-142 to establish either of the following: <ul style="list-style-type: none"> o Labyrinth seal D/P to each RCP greater than 15 inches of water. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP seal injection flow to each RCP greater than 6 gpm. f. <u>IF</u> large imbalance in seal injection flow exists, <u>THEN</u> consider local adjustment of V-300A and V-300B.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check If TDAFW Pump Can Be Stopped: a. Both MDAFW pumps - RUNNING b. PULL STOP TDAFW pump steam supply valves • MOV-3504A • MOV-3505A	a. Go to Step 20.
*20	Monitor RCS Tavg - STABLE AT OR TRENDING TO 547°F	<p><u>IF</u> temperature less than 547°F and decreasing. <u>THEN</u> perform the following:</p> <p>a. Stop dumping steam.</p> <p>b. Ensure reheater steam supply valves are closed.</p> <p>c. <u>IF</u> cooldown continues, <u>THEN</u> control total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.</p> <p>d. <u>WHEN</u> S/G level greater than 7% [25% adverse CNMT] in one S/G, <u>THEN</u> limit feed flow to that required to maintain level in at least one S/G.</p> <p>e. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.</p> <p><u>IF</u> temperature greater than 547°F and increasing, <u>THEN</u> dump steam to stabilize and slowly decrease temperature to 547°F.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21 Check PRZR PORVs And Spray Valves:		
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 valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.</p> <ul style="list-style-type: none"> • MOV-516 for PCV-430 • MOV-515 for PCV-431C <p><u>IF</u> block valve can <u>NOT</u> be closed, <u>THEN</u> go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p>
b. Auxiliary spray valve (AOV-296) - CLOSED		<p>b. Manually close auxiliary spray valve. <u>IF</u> valve can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Decrease charging pump flow to minimum. 2) Ensure charging valve to loop B cold leg open (AOV-294).
c. Check PRZR pressure - LESS THAN 2260 PSIG		<p>c. Continue with Step 22. <u>WHEN</u> pressure less than 2260 psig, <u>THEN</u> do Step 21d.</p>
d. Normal PRZR spray valves - CLOSED	<ul style="list-style-type: none"> • PCV-431A • PCV-431B 	<p>d. Place controllers in MANUAL at 0% demand. <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> stop associated RCP(s).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Monitor RCP Trip Criteria:	
	a. RCP status - ANY RCP RUNNING	a. Go to Step 23.
	b. SI pumps - AT LEAST TWO RUNNING	b. Go to Step 23.
	c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT]	c. Go to Step 23.
	d. Stop both RCPs	
23	Check If S/G Secondary Side Is Intact:	
	o Pressure in both S/Gs - STABLE OR INCREASING	IF any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.
	o Pressure in both S/Gs - GREATER THAN 110 PSIG	
24	Check If S/G Tubes Are Intact:	
	o Air ejector radiation monitors (R-15 or R-15A) - NORMAL	Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	o S/G blowdown radiation monitor (R-19) - NORMAL	
	o Steamline radiation monitors (R-31 and R-32) - NORMAL	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Check If RCS Is Intact:	Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
a.	CNMT area radiation monitors - NORMAL	
	<ul style="list-style-type: none"> • R-2 • R-7 • R-29 • R-30 	
b.	CNMT pressure - LESS THAN 0.5 PSIG	
c.	CNMT sump B level - LESS THAN 8 INCHES	
d.	CNMT sump A level	
	<ul style="list-style-type: none"> o Level - STABLE o Annunciator C-19, CONTAINMENT SUMP A HI LEVEL - EXTINGUISHED 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Check If SI Should Be Terminated:	
a.	RCS pressure:	a. Do <u>NOT</u> stop SI pumps. Go to Step 27.
	o Pressure - GREATER THAN 1625 PSIG	
	o Pressure - STABLE OR INCREASING	
b.	RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	b. Do <u>NOT</u> stop SI pumps. Go to Step 27.
c.	Secondary heat sink:	c. <u>IF</u> neither condition met, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to Step 27.
	o Total feed flow to S/Gs - GREATER THAN 200 GPM	
	-OR-	
	o Narrow range level in at least one S/G - GREATER THAN 7%	
d.	PRZR level - GREATER THAN 10%	d. Do <u>NOT</u> stop SI pumps. Perform the following:
		1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray.
		2) Go to Step 27.
e.	Go to ES-1.1, SI TERMINATION, Step 1.	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).</p> <p>o The Critical Safety Function Red Path Summary is available in APPENDIX 1.</p>	
27	Initiate Monitoring of Critical Safety Function Status Trees	
*28	Monitor S/G Levels:	
	<p>a. Narrow range level - GREATER THAN 7%</p> <p>b. Control feed flow to maintain narrow range level between 17% and 50%</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% in at least one S/G.</p> <p>b. <u>IF</u> narrow range level in any S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to E-3. STEAM GENERATOR TUBE RUPTURE, Step 1.</p>
29	Check Secondary Radiation Levels - NORMAL	Go to E-3. STEAM GENERATOR TUBE RUPTURE, Step 1.
	<p>o Steamline radiation monitor (R-31 and R-32)</p> <p>o Dispatch AO to locally check steamline radiation</p> <p>o Request RP sample S/Gs for activity</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p>		
30	Reset SI	
31	Reset CI:	
	<p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED</p>	<p>b. Perform the following:</p> <p>1) Reset SI.</p> <p>2) Depress CI reset pushbutton.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Verify Adequate SW Flow:	
a.	At least three SW pumps - RUNNING	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than three pumps running. <u>THEN</u> ensure SW isolation.</p> <p><u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. 2) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. <p><u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p>
b.	Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
o	Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
o	Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressor(s) (75 kw each).
		<u>IF NOT</u> . <u>THEN</u> perform the following:
		o Start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped. (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS
		3) <u>WHEN</u> bus 15 is restored, <u>THEN</u> reset control room lighting.
b.	Check SW Pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to step 33d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 33 continued-from previous page)	
c.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressor(s) as power supply permits (75 kw each). <p>IF electric air compressor can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor. (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)</p>
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 34. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 33f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	<p>Check Auxiliary Building Radiation - NORMAL</p> <ul style="list-style-type: none"> • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • LTD line monitor (R-9) • CHG pump room (R-4) 	<p>Evaluate cause of abnormal conditions.</p> <p><u>IF</u> the cause is a loss of RCS inventory outside CNMT, <u>THEN</u> go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.</p>
35	<p>Check PRT Conditions</p> <ul style="list-style-type: none"> ◦ PRT level (LI-442) - LESS THAN 84% ◦ PRT temperature (TI-439) - LESS THAN 120°F ◦ PRT pressure (PI-440A) - LESS THAN 3 PSIG 	<p>Evaluate the following flowpaths for cause of abnormal conditions:</p> <ul style="list-style-type: none"> • RCP seal return relief • PRZR PORVs • PRZR safeties • Letdown line relief <p><u>IF</u> excess letdown previously in service, <u>THEN</u> close AOV-310, excess letdown isolation valve from loop A cold.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG, THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS. *****</p>		
*36	<p>Monitor If RHR Pumps Should Be Stopped:</p> <p>a. Check RCS pressure:</p> <p>1) Pressure - GREATER THAN 250 PSIG</p> <p>2) Pressure - STABLE OR INCREASING</p> <p>b. Stop both RHR pumps and place in AUTO</p>	<p>1) Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p> <p>2) Go to Step 37.</p>
37	<p>Check Normal Power Available To Charging Pumps:</p> <p>o Bus 14 normal feed breaker - CLOSED</p> <p>o Bus 16 normal feed breaker - CLOSED</p>	<p>Verify adequate emergency D/G capacity to run charging pumps (75 kw each).</p> <p><u>IF NOT. THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	<p>Check If Charging Flow Has Been Established:</p> <p>a. Charging pumps - ANY RUNNING</p> <p>b. Charging pump suction aligned to RWST:</p> <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED <p>c. Start charging pumps as necessary and adjust charging flow to restore PRZR level</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 open, demand at 0%. <p>b. Manually align valves.</p> <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (Charging Pump Room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Maintain PRZR Pressure Between 1800 PSIG And 2235 PSIG <ul style="list-style-type: none">o Reset PRZR heaterso Use normal PRZR spray	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40	<p>Check If Emergency D/Gs Should Be Stopped:</p> <p>a. Verify AC emergency busses energized by offsite power:</p> <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED <p>b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP)</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify non-safeguards bus tie breakers closed: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Ensure condenser steam dump mode control in MANUAL. 4) Restore power to MCCs: <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • F from Bus 15 • Z from Bus 15 5) Start HP seal oil backup pump. 6) Ensure D/G load within limits. 7) Refer to ATT-8.4, ATTACHMENT SI/UV for other equipment lost with loss of offsite power. 8) Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
41	Return to Step 20	
	-END-	

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E-0 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT CI/CVI (ATT-3.0)
- 4) ATTACHMENT SD-1 (ATT-17.0)
- 5) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 6) ATTACHMENT D/G STOP (ATT-8.1)
- 7) ATTACHMENT SI/UV (ATT-8.4)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 11) FOLDOUT

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FOLDOUT PAGE

1. RCP TRIP CRITERIA

IF BOTH conditions listed below occur, THEN trip both RCPs:

- a. SI pumps - AT LEAST TWO RUNNING
- b. RCS pressure minus maximum S/G pressure - LESS THAN 175 PSIG
[400 psig adverse CNMT]

2. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling
AND immediately depress associated VOLTAGE SHUTDOWN
pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

3. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23

Robert J. ...
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, and FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, when a PRZR PORV is stuck open and its block valve can not be closed.
- b. E-0, REACTOR TRIP OR SAFETY INJECTION, with any of the following symptoms: high containment radiation, high containment pressure, or high containment recirculation sump level.
- c. E-0, REACTOR TRIP OR SAFETY INJECTION, ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, and FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, when RCS pressure is less than the shutoff head pressure of the RHR pumps or is decreasing.
- d. ES-1.1, SI TERMINATION, and FR-I.2, RESPONSE TO LOW PRESSURIZER LEVEL, if SI has to be reinitiated.
- e. E-2, FAULTED STEAM GENERATOR ISOLATION, after identification and isolation of a faulted S/G.
- f. ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, after normal injection mode conditions are established.
- g. ECA-1.2, LOCA OUTSIDE CONTAINMENT, when a LOCA outside containment is isolated.
- h. FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, and FR-C.2, RESPONSE TO DEGRADED CORE COOLING, after core cooling has been reestablished.
- i. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, after secondary heat sink has been reestablished and all PRZR PORVs are closed.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

IF RWST LEVEL DECREASES TO LESS THAN 28%. THEN THE SI SYSTEM SHOULD BE
ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3. TRANSFER TO COLD LEG
RECIRCULATION, STEP 1.

- NOTE:
- o FOLDOUT page should be open AND monitored periodically.
 - o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.)
 - o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).
 - o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Monitor RCP Trip Criteria:

- | | |
|--|------------------|
| a. RCP status - ANY RCP RUNNING | a. Go to Step 2. |
| b. SI pumps - AT LEAST TWO RUNNING | b. Go to Step 2. |
| c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig
[400 psig adverse CNMT] | c. Go to Step 2. |
| d. Stop both RCPs | |

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> Pressure in both S/Gs - STABLE OR INCREASING Pressure in both S/Gs - GREATER THAN 110 PSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> Steamlines Feedlines <p><u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
<p><u>NOTE</u>: TDAFW pump flow control AOVs may drift open on loss of IA.</p>		
* 3	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> Narrow range level - GREATER THAN 7% [25% adverse CNMT] Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G. <u>IF</u> narrow range level in any S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
* 4	<p>Monitor If Secondary Radiation Levels Are Normal</p> <ul style="list-style-type: none"> Steamline radiation monitor (R-31 and R-32) Request RP sample S/Gs for activity 	<p><u>IF</u> steamline radiation monitors <u>NOT</u> available, <u>THEN</u> dispatch AO to locally check steamline radiation.</p> <p><u>IF</u> abnormal radiation levels detected in any S/G, <u>THEN</u> go to E-3, STEAM GENERATOR TUBE RUPTURE, 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>IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 5B).</p> <p>*****</p>		
<p>* 5 Monitor PRZR PORV Status:</p>		
a. Power to PORV block valves - AVAILABLE		<p>a. Restore power to block valves unless block valve was closed to isolate an open PORV:</p> <ul style="list-style-type: none"> • MOV-515. MCC D position 6C • MOV-516. MCC C position 6C
b. PORVs - CLOSED		<p>b. <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> dispatch AO to locally check breaker.</p> <ul style="list-style-type: none"> • MOV-515. MCC D position 6C • MOV-516. MCC C position 6C
c. Block valves - AT LEAST ONE OPEN		<p>c. Open one block valve unless it was closed to isolate an open PORV.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p>		
6	Reset SI	
7	Reset CI:	
	<p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED</p>	<p>b. Perform the following:</p> <p>1) Reset SI.</p> <p>2) Depress CI reset pushbutton.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Verify Adequate SW Flow:	
a.	Check at least two SW pumps - RUNNING	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure SW isolation. 2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following: <ol style="list-style-type: none"> a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 3) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.
b.	Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
o	Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
o	Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).
		<u>IF NOT, THEN</u> perform the following:
		o Start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).
		3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Check SW pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to step 9d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 9 continued from previous page)	
c.	Verify turbine building SW isolation valves - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch A0 to locally reset compressors as necessary.
d.	Verify adequate air compressors - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 10. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 9f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	<p>Check Normal Power Available To Charging Pumps:</p> <ul style="list-style-type: none"> o Bus 14 normal feed breaker - CLOSED o Bus 16 normal feed breaker - CLOSED 	<p>Verify adequate emergency D/G capacity to run charging pumps (75 kw each).</p> <p><u>IF NOT, THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high. <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 open. demand at 0%.
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. Manually align valves as necessary. <p><u>IF</u> LCV-112B can <u>NOT</u> be opened. <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Direct AO to locally open V-358. manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open. <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary and adjust charging flow to restore PRZR level	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If SI Should Be Terminated:	
a.	RCS pressure:	a. Do <u>NOT</u> stop SI pumps. Go to Step 13.
	o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT]	
	o Pressure - STABLE OR INCREASING	
b.	RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	b. Do <u>NOT</u> stop SI pumps. Go to Step 13.
c.	Secondary heat sink:	c. <u>IF</u> neither condition satisfied, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to Step 13.
	o Total feed flow to intact S/Gs - GREATER THAN 200 GPM	
	-OR-	
	o Narrow range level in at least one intact S/G - GREATER THAN 7% [25% adverse CNMT]	
d.	PRZR level - GREATER THAN 10% [30% adverse CNMT]	d. Do <u>NOT</u> stop SI pumps. Perform the following:
		1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray.
		2) Go to Step 13.
e.	Go to ES-1.1, SI TERMINATION, Step 1.	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*13	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - RUNNING	a. Go to Step 14.
b.	Check the following:	b. Continue with Step 14. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 13c through f.
	o CNMT pressure - LESS THAN 4 PSIG	
	o Sodium hydroxide tank level - LESS THAN 55%	
c.	Reset CNMT spray	
d.	Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE.
		• AOV-836A • AOV-836B
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves	
	• MOV-860A • MOV-860B • MOV-860C • MOV-860D	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	<p>Check If Emergency D/Gs Should Be Stopped:</p> <p>a. Verify AC emergency busses energized by offsite power:</p> <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED <p>b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP)</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers as necessary: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Ensure condenser steam dump mode control in MANUAL. 4) Restore power to MCCs: <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 5) Start HP seal oil backup pump. 6) Ensure D/G load within limits. 7) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting breaker. 8) Refer to ATT-8.4, ATTACHMENT SI/UV for other equipment lost with loss of offsite power. 9) Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check If RHR Should Be Throttled: a. Check RWST level - LESS THAN 70% b. Perform ATT-14.7, ATTACHMENT ADJUST RHR FLOW to locally adjust HCV-624 and HCV-625.	 a. Continue with Step 18. <u>WHEN</u> RWST level less than 70%. <u>THEN</u> perform step 17b. b. Manually adjust RHR Hx outlet valves equally to reduce flow to less than 1500 gpm per operating pump • RHR Hx A, HCV-625 • RHR Hx B, HCV-624

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	<p>Verify CNMT Sump Recirculation Capability:</p> <p>a. Check RHR and CCW systems:</p> <ol style="list-style-type: none"> 1) At least one recirculation flowpath, including required power supplies, from Sump B and back to RCS available per ATT-14.5, ATTACHMENT RHR SYSTEM 2) At least one CCW pump available. 3) At least one CCW Hx available. <p>b. Check SW pumps - AT LEAST 2 PUMPS AVAILABLE</p> <p>c. Dispatch AO to check AUX BLDG sub-basement for RHR system leakage (AUX BLDG sub-basement key may be required)</p>	<p>a. <u>IF</u> at least one flowpath of cold leg recirculation capability can <u>NOT</u> be verified, <u>THEN</u> go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.</p> <p>b. Attempt to restore at least 2 SW pumps to operable.</p> <p><u>IF</u> only 1 SW pump available, <u>THEN</u> refer to ATT-2.1, ATTACHMENT MIN SW for additional guidance.</p> <p><u>IF</u> no SW pumps are available, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. 2) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 3) Go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION. <p>c. <u>IF</u> any RHR pump seal leakage indicated, <u>THEN</u> leakage should be evaluated and isolated if necessary.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19 Evaluate Plant Status:		
a. Check auxiliary building radiation - NORMAL	<ul style="list-style-type: none"> • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • LTDN line monitor (R-9) • CHG pump room (R-4) 	a. Notify RP and refer to appropriate AR-RMS procedure. <u>IF</u> the cause is a loss of RCS inventory outside CNMT, <u>THEN</u> go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.
b. Direct RP to obtain following samples:	<ul style="list-style-type: none"> • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron • CNMT Sump pH 	
c. Verify adequate Rx head cooling:	<ol style="list-style-type: none"> 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING 	<ol style="list-style-type: none"> 1) Manually start one fan as power supply permits (45 kw) 2) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 19 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	<p>Check If RCS Cooldown And Depressurization Is Required:</p> <p>a. RCS pressure - GREATER THAN 250 psig [465 psig adverse CNMT]</p> <p>b. Go to ES-1.2. POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1</p>	<p>a. <u>IF</u> RHR pump flow greater than 475 gpm, <u>THEN</u> go to Step 21.</p>

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 20 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: IF D/Gs supplying emergency AC busses. THEN non-essential loads may be shed as necessary to allow start of additional SW pumps.

21 Establish Adequate SW Flow:

a. Verify at least two SW pumps -
RUNNING

a. Start additional SW pumps as power supply permits (257 kw each). IF only 1 SW pump operable. THEN perform the following:

1) Ensure ATT-2.1. ATTACHMENT MIN SW is in progress.

2) Go to Step 22.

IF no SW pumps are available. THEN perform the following:

1) Pull stop any D/G that is NOT supplied by alternate cooling. AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.

2) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.

3) Go to ECA-1.1. LOSS OF EMERGENCY COOLANT RECIRCULATION.

b. Verify AUX BLDG SW isolation valves - OPEN

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

b. Manually align valves.

c. Dispatch AO to check BOTH CCW Hx - IN SERVICE

c. Locally place BOTH CCW Hxs in service

This Step continued on the next page.

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 21 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 21 continued from previous page)

- d. Determine required SW flow to CCW HXs per table:

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

- e. Direct AO to adjust SW flow to required value

- o IF on normal SW discharge:

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

-OR-

- o IF on alternate SW discharge:

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

- e. IF the required SW flow can NOT be obtained, THEN perform the following:

- 1) Isolate SW to screenhouse and air conditioning headers.

- MOV-4609/MOV-4780 - AT LEAST ONE CLOSED
- MOV-4663/MOV-4733 - AT LEAST ONE CLOSED

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

- 3) Direct AO to locally isolate SW return from SFP Hxs:

- SFP Hx A (V-4622) (for alternate SW discharge use V-4622A)
- SFP Hx B (V-8689)

- 4) Verify SW portions of ATT-17.0, ATTACHMENT SD-1 are complete.

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 22 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Establish CCW flow to RHR Hxs:	
a.	Check both CCW pumps - RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) Start CCW pumps as power supply permits (122 kw each) 2) <u>IF</u> both CCW pumps are running, <u>THEN</u> go to step 22b. 3) <u>IF</u> only one CCW pump is running, <u>THEN</u> perform the following: <ul style="list-style-type: none"> a) Direct AO to isolate CCW to boric acid evaporator <ul style="list-style-type: none"> o Close V-760A b) Manually open CCW MOV to only one operable RHR Loop <ul style="list-style-type: none"> o Open MOV-738A
		-OR-
		o Open MOV-738B
		c) Go to step 23.
b.	Manually open CCW valves to RHR Hxs <ul style="list-style-type: none"> • MOV-738A • MOV-738B 	b. Dispatch AO to locally open valves.

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 1 of 1
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E-1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 4) ATTACHMENT D/G STOP (ATT-8.1)
- 5) ATTACHMENT SD-1 (ATT-17.0)
- 6) ATTACHMENT SI/UV (ATT-8.4)
- 7) ATTACHMENT MIN SW (ATT-2.1)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 11) ATTACHMENT RHR SYSTEM (ATT-14.5)
- 12) ATTACHMENT ADJUST RHR FLOW (ATT-14.7)
- 13) FOLDOUT

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 1 of 2
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FOLDOUT PAGE

1. RCP TRIP CRITERIA

IF BOTH conditions listed below occur, THEN trip both RCPs:

- a. SI pumps - AT LEAST TWO RUNNING
- b. RCS pressure minus maximum S/G pressure - LESS THAN 175 PSIG [400 psig adverse CNMT]

2. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

3. SI REINITIATION CRITERIA

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

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

4. SI TERMINATION CRITERIA

IF ALL conditions listed below occur, THEN go to ES-1.1, SI TERMINATION, Step 1:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0° F USING FIGURE MIN SUBCOOLING
- b. Total feed flow to intact S/Gs - GREATER THAN 200 GPM
- OR -
- Narrow range level in at least one intact S/G - GREATER THAN 7% [25% adverse CNMT]
- c. RCS pressure:
 - o GREATER THAN 1625 PSIG [1825 psig adverse CNMT]
 - o STABLE OR INCREASING
- d. PRZR level - GREATER THAN 10% [30% adverse CNMT]

5. SECONDARY INTEGRITY CRITERIA

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

6. E-3 TRANSITION CRITERIA

IF any S/G level increased in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

EOP: E-1	TITLE: LOSS OF REACTOR OR SECONDARY COOLANT	REV: 30 PAGE 2 of 2
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7. COLD LEG RECIRCULATION SWITCHOVER CRITERION

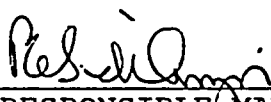
IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

8. AFW SUPPLY SWITCHOVER CRITERION

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

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 1 of 8
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GINNA STATION
CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 2 of 8
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A. PURPOSE - This procedure provides actions to identify and isolate a faulted steam generator.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. E-0, REACTOR TRIP OR SAFETY INJECTION, with the following symptoms:

- 1) Any S/G pressure decreasing in an uncontrolled manner.
- 2) Any S/G completely depressurized.

b. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, E-3, STEAM GENERATOR TUBE RUPTURE, ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, and ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, with the following symptoms and/or conditions:

- 1) Any S/G pressure decreasing in an uncontrolled manner.
- 2) Any S/G complete depressurized.
- 3) Faulted S/G isolation not verified.

c. FR-H.5, RESPONSE TO STEAM GENERATOR LOW LEVEL, when the affected S/G is identified as faulted.

d. Other procedures whenever a faulted S/G is identified.

e. ECA-2.1 Foldout Page if any S/G pressure increases.

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 3 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o AT LEAST ONE S/G SHALL BE MAINTAINED AVAILABLE FOR RCS COOLDOWN.</p> <p>o ANY FAULTED S/G OR SECONDARY BREAK SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p> <p><u>NOTE:</u> o Critical Safety Function Status Trees should be monitored.</p> <p>o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10⁺⁰⁵ R/hr.</p> <p>o Foldout page should be open and monitored periodically.</p>		
1 Check MSIV Of Faulted S/G(s) - CLOSED	<p>Manually close valve.</p> <p><u>IF</u> valve will <u>NOT</u> close from MCB. <u>THEN</u> dispatch AO with locked valve key to locally closed faulted S/G(s) MSIV as follows:</p> <p>o S/G A</p> <ul style="list-style-type: none"> close IA to MSIV, V-5408A open vent valves V-5471 <u>AND</u> V-5473 <p>o S/G B</p> <ul style="list-style-type: none"> close IA to MSIV, V-5409B open vent valves V-5472 <u>AND</u> V-5474 	

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 4 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Check If Any S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Check pressure in S/G A - STABLE OR INCREASING <p>-OR-</p> <ul style="list-style-type: none"> o Check pressure in S/G B - STABLE OR INCREASING 	<p><u>IF</u> both S/G pressures decreasing in an uncontrolled manner, <u>THEN</u> go to ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, Step 1.</p>
3	<p>Check Faulted S/G Status:</p> <ul style="list-style-type: none"> o Faulted S/G pressure - DECREASING IN AN UNCONTROLLED MANNER <p>-OR-</p> <ul style="list-style-type: none"> o Faulted S/G - COMPLETELY DEPRESSURIZED 	<p><u>IF</u> both S/G pressures stable or increasing, <u>THEN</u> search for initiating break and go to Step 6.</p> <ul style="list-style-type: none"> • Main steamlines • Main feedlines • S/G blowdown system • Sample system

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 5 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Isolate Feed Flow To Faulted S/G:</p> <ul style="list-style-type: none"> o Close faulted S/G MDAFW pump discharge valve <ul style="list-style-type: none"> • S/G A. MOV-4007 • S/G B. MOV-4008 o Pull stop faulted S/G MDAFW pump o Close faulted S/G TDAFW flow control valve <ul style="list-style-type: none"> • S/G A. AOV-4297 • S/G B. AOV-4298 o Verify faulted S/G MFW regulating valve and bypass valve - CLOSED <ul style="list-style-type: none"> • S/G A. HCV-466 and HCV-480 • S/G B. HCV-476 and HCV-481 o Verify MDAFW pump crosstie valves - BOTH CLOSED <ul style="list-style-type: none"> • MOV-4000A • MOV-4000B o Close faulted S/G SAFW pump discharge valve <ul style="list-style-type: none"> • S/G A. MOV-9701A • S/G B. MOV-9701B 	<p>Manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths as necessary.</p>

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 6 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** CAUTION *****		
IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G. *****		
5	Isolate Steam Flow From Faulted S/G:	Manually close valves.
	o Verify faulted S/G ARV - CLOSED	<u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths as necessary.
	• S/G A, AOV-3411	
	• S/G B, AOV-3410	
	o Close faulted S/G TDAFW pump steam supply valve and place in PULL STOP	
	• S/G A, MOV-3505A	
	• S/G B, MOV-3504A	
	o Verify faulted S/G blowdown and sample valves - CLOSED	
	• S/G A, AOV-5738 and AOV-5735	
	• S/G B, AOV-5737 and AOV-5736	
	o Dispatch AO to complete faulted S/G isolation (Refer to ATT-10.0, ATTACHMENT FAULTED S/G)	

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 7 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** CAUTION *****		
IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).		

NOTE: TDAFW pump flow control AOVs may drift open on loss of IA.		
* 6 Monitor Intact S/G Levels:		
a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]		a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.
b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%		b. IF narrow range level in any S/G continues to increase in an uncontrolled manner, THEN go to E-3. STEAM GENERATOR TUBE RUPTURE, Step 1.
7 Check Secondary Radiation Levels - NORMAL		IF steamline radiation monitors NOT available, THEN dispatch AO to locally check steamline radiation.
o Steamline radiation monitor (R-31 and R-32)		IF abnormal radiation levels detected in any S/G, THEN go to E-3. STEAM GENERATOR TUBE RUPTURE, Step 1.
o Air ejector radiation monitor (R-15)		
o S/G blowdown radiation monitor (R-19)		
o Request RP sample S/Gs for activity		

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 8 of 8
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8 Adjust Steam Dump To Minimize
RCS Heatup:

- a. Determine allowable intact S/G pressure using maximum hot leg temperature (Refer to FIG-7.0. FIGURE INTACT S/G PRESSURE)
- b. Check condenser steam dump available:
 - o Verify intact S/G MSIV - OPEN
 - o Annunciator G-15. STEAM DUMP ARMED- LIT
- c. Verify steam dump mode selector switch in MANUAL
- d. Adjust condenser steam dump controller in AUTO to pressure determined from FIG-7.0. FIGURE INTACT S/G PRESSURE

b. Perform the following:

- 1) Adjust intact S/G ARV to pressure determined from FIG-7.0. FIGURE INTACT S/G PRESSURE.
- 2) Go to E-1. LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

9 Go To E-1, LOSS OF REACTOR OR
SECONDARY COOLANT, Step 1

-END-

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 1 of 1
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E-2 APPENDIX LIST

TITLE

- 1) FIGURE INTACT S/G PRESSURE (FIG-7.0)
- 2) ATTACHMENT FAULTED S/G (ATT-10.0)
- 3) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 4) FOLDOUT

EOP: E-2	TITLE: FAULTED STEAM GENERATOR ISOLATION	REV: 12 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA -

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 1 of 42
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GINNA STATION
CONTROLLED COPY NUMBER 23

Richard M. Min
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 2 of 42
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A. PURPOSE - This procedure provides actions to terminate leakage of reactor coolant into the secondary system following a steam generator tube rupture (SGTR), this procedure should also be used for a SGTR in one S/G and a fault in the other S/G.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, when condenser air ejector radiation or blowdown radiation is abnormal, or
- b. E-0, REACTOR TRIP OR SAFETY INJECTION, E-1, LOSS OF REACTOR OR SECONDARY COOLANT, E-2, FAULTED STEAM GENERATOR ISOLATION, and FR-H.3, RESPONSE TO STEAM GENERATOR HIGH LEVEL, when secondary radiation is abnormal, or
- c. E-0, REACTOR TRIP OR SAFETY INJECTION, E-1, LOSS OF REACTOR OR SECONDARY COOLANT, E-2, FAULTED STEAM GENERATOR ISOLATION, ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION, ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, when an intact S/G narrow range level increases in an uncontrolled manner.
- d. ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, when pressurizer pressure control is restored.
- e. Any FOLDOUT page that has E-3 transition criteria whenever either S/G level increases in an uncontrolled manner or either S/G has abnormal radiation.

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 3 of 42
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: o FOLDOUT page should be open AND monitored periodically.

- o Critical Safety Function Status Trees should be monitored (Refer to Appendix 1 for Red Path Summary).
- o Personnel should be available for sampling during this procedure.
- o Conditions should be evaluated for Site Contingency Reporting (EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).
- o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Monitor RCP Trip Criteria:

- | | |
|---|------------------|
| a. RCP status - ANY RCP RUNNING | a. Go to Step 2. |
| b. SI pumps - AT LEAST TWO RUNNING | b. Go to Step 2. |
| c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT] | c. Go to Step 2. |
| d. Stop both RCPs | |

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 4 of 42
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> IF OFFSITE POWER IS LOST AFTER SI RESET. THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER) *****</p>		
2	Identify Ruptured S/G(s): <ul style="list-style-type: none"> o Unexpected increase in either S/G narrow range level -OR- o High radiation indication on main steamline radiation monitor <ul style="list-style-type: none"> • R-31 for S/G A • R-32 for S/G B -OR- o AO reports local indication of high steamline radiation -OR- o RP reports high radiation from S/G activity sample 	Perform the following: <ul style="list-style-type: none"> a. Reset SI b. Continue with Steps 10 through 16. <u>WHEN</u> ruptured S/G(s) identified. <u>THEN</u> do Steps 3 through 9.

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 5 of 42
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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 THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>o AT LEAST ONE S/G SHALL BE MAINTAINED AVAILABLE FOR RCS COOLDOWN.</p> <p>*****</p>		
3	Isolate Flow From Ruptured S/G(s):	
a.	Adjust ruptured S/G ARV controller to 1050 psig in AUTO	
b.	Check ruptured S/G ARV - CLOSED	<p>b. <u>WHEN</u> ruptured S/G pressure less than 1050 psig, <u>THEN</u> verify S/G ARV closed. <u>IF NOT</u> closed, <u>THEN</u> place controller in MANUAL and close S/G ARV.</p> <p><u>IF</u> S/G ARV can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate.</p>
c.	Close ruptured S/G TDAFW pump steam supply valve and place in PULL STOP	<p>c. Dispatch AO with locked valve key to locally isolate steam from ruptured S/G to TDAFW pump.</p>
	<ul style="list-style-type: none"> • S/G A, MOV-3505A • S/G B, MOV-3504A 	<ul style="list-style-type: none"> • S/G A, V-3505 • S/G B, V-3504
d.	Verify ruptured S/G blowdown valve - CLOSED	<p>d. Place S/G blowdown and sample valve isolation switch to CLOSE.</p> <p><u>IF</u> blowdown can <u>NOT</u> be isolated manually, <u>THEN</u> dispatch AO to locally isolate blowdown.</p>
	<ul style="list-style-type: none"> • S/G A, AOV-5738 • S/G B, AOV-5737 	<ul style="list-style-type: none"> • S/G A, V-5701 • S/G B, V-5702

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 6 of 42
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Complete Ruptured S/G Isolation: a. Close ruptured S/G MSIV - RUPTURED S/G MSIV CLOSED	a. Perform the following: 1) Close intact S/G MSIV. 2) Place intact S/G ARV controller at 1005 psig in AUTO. 3) Adjust condenser steam dump controller to 1050 psig in AUTO. 4) Place condenser steam dump mode selector switch to MANUAL. 5) Adjust reheat steam supply controller cam to close reheat steam supply valves. 6) Ensure turbine stop valves - CLOSED. 7) Dispatch A0 to complete ruptured S/G isolation (Refer to ATT-16.0. ATTACHMENT RUPTURED S/G. parts A and B). 8) Go to step 5.
	b. Dispatch A0 to complete ruptured S/G isolation (Refer to ATT-16.0. ATTACHMENT RUPTURED S/G part A)	

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 7 of 42
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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 RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
5	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 7% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 7% [25% adverse CNMT].</p> <p>2) Continue with Step 6. <u>WHEN</u> ruptured S/G level greater than 7% [25% adverse CNMT], <u>THEN</u> do Steps 5b through e.</p>
b.	Close MDAFW pump discharge valve to ruptured S/G	b. Dispatch AO to locally close valve.
	<ul style="list-style-type: none"> • S/G A. MOV-4007 • S/G B. MOV-4008 	
c.	Pull stop MDAFW pump for ruptured S/G	
d.	Close TDAFW pump flow control valve to ruptured S/G	d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.
	<ul style="list-style-type: none"> • S/G A. AOV-4297 • S/G B. AOV-4298 	<ul style="list-style-type: none"> • S/G A. V-4005 • S/G B. V-4006
e.	Verify MDAFW pump crosstie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> • MOV-4000A • MOV-4000B 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Verify Ruptured S/G Isolated:	
	a. Check ruptured MSIV - CLOSED	a. Direct AO to immediately isolate air ejector/gland steam supply and flange heating steam. (Refer to ATT-16.0, ATTACHMENT RUPTURED S/G, part A).
	b. Check TDAFW pump steam supply from ruptured S/G - ISOLATED	b. Continue efforts to isolate steam supply from ruptured S/G: • S/G A, MOV-3505A <u>OR</u> V-3505 • S/G B, MOV-3504A <u>OR</u> V-3504
	c. Ruptured S/G pressure - GREATER THAN 300 PSIG	c. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
7	Establish Condenser Steam Dump Pressure Control:	
	a. Verify condenser available: o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT	a. Adjust S/G ARV controllers to maintain intact S/G pressure in AUTO and go to Step 8.
	b. Adjust condenser steam dump controller HC-484 to maintain intact S/G pressure and verify in AUTO	
	c. Place steam dump mode selector switch to MANUAL	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p> <p>8 Reset SI</p>		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

RUPTURED S/G LEVEL SHALL BE MAINTAINED GREATER THAN 7% [25% ADVERSE CNMT] DURING THE RCS COOLDOWN, UNLESS THE RUPTURED S/G IS ALSO FAULTED.

NOTE: Following initiation of controlled cooldown or depressurization, RCP trip criteria is no longer applicable.

9 Initiate RCS Cooldown:

- a. Determine required core exit temperature from below table

RUPTURED SG PRESSURE	REQUIRED CORE EXIT TEMPERATURE (°F)
1100 PSIG	525 [517 adverse CNMT]
1000 PSIG	512 [504 adverse CNMT]
900 PSIG	499 [490 adverse CNMT]
800 PSIG	484 [475 adverse CNMT]
700 PSIG	468 [457 adverse CNMT]
600 PSIG	449 [437 adverse CNMT]
500 PSIG	428 [413 adverse CNMT]
400 PSIG	402 [384 adverse CNMT]
300 PSIG	369 [344 adverse CNMT]

- b. IF ruptured S/G MSIV closed, THEN initiate dumping steam to condenser from intact S/G at maximum rate

- b. Manually or locally initiate steam dump from intact S/G at maximum rate using S/G ARV.

IF no intact S/G available, THEN perform the following:

- o Use faulted S/G.

-OR-

- o IF a ruptured S/G must be used, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

- c. Core exit T/Cs - LESS THAN REQUIRED TEMPERATURE

- c. Continue with Step 10. WHEN core exit T/Cs less than required, THEN do Step 9d.

- d. Stop RCS cooldown and stabilize core exit T/Cs less than required temperature

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

10 Monitor Intact S/G Level:

a. Narrow range level - GREATER
THAN 7% [25% adverse CNMT]

a. Maintain total feed flow greater
than 200 gpm until narrow range
level greater than 7% [25%
adverse CNMT] in at least one
S/G.

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

b. IF narrow range level in the
intact S/G continues to increase
in an uncontrolled manner, THEN
go to ECA-3.1, SGTR WITH LOSS OF
REACTOR COOLANT - SUBCOOLED
RECOVERY DESIRED, Step 1.

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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, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 11B).</p> <p>*****</p>		
11	Monitor PRZR PORVs And Block Valves:	
a.	Power to PORV block valves - AVAILABLE	a. Restore power to block valves unless block valve was closed to isolate an open PORV: <ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
b.	PORVs - CLOSED	b. <u>IF</u> PRZR pressure less than 2335 psig. <u>THEN</u> manually close PORVs. <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 ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>
c.	Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Reset CI: a. Depress CI reset pushbutton b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Verify Adequate SW Flow:	
a.	Check at least two SW pumps - RUNNING	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running, <u>THEN</u>:</p> <ol style="list-style-type: none"> 1) Ensure SW isolation. 2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following: <ol style="list-style-type: none"> a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 3) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.
b.	Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized	a. Perform the following:
	o Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
	o Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).
		<u>IF NOT, THEN</u> perform the following:
		o Start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS)
b.	Check SW pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to step 15d.
c.	Verify turbine building SW isolation valves - OPEN	c. Manually align valves.
	• MOV-4613 and MOV-4670	
	• MOV-4614 and MOV-4664	
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 15 continued-from previous page)	
d.	Verify adequate air compressors - RUNNING	d. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch A0 to locally reset compressors as necessary.
e.	Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	e. Perform the following: 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 16. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 15f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

CAUTION		
RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.		

16	Check If RHR Pumps Should Be Stopped:	
a.	Check RCS pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	a. Go to Step 17.
b.	Stop RHR pumps and place both in AUTO	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Establish Charging Flow:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high. <u>THEN</u> dispatch AO to locally close seal injection needle valves to affected RCP. <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 demand at 0%.
b.	Align charging pump suction to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	<p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened. <u>THEN</u> dispatch AO to locally open V-358. manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358. manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open. <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary and establish 75 gpm total charging flow <ul style="list-style-type: none"> • Charging line flow • Seal injection 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If RCS Cooldown Should Be Stopped: a. Core exit T/Cs - LESS THAN REQUIRED TEMPERATURE b. Stop RCS cooldown c. Stabilize core exit T/Cs - LESS THAN REQUIRED TEMPERATURE	a. Do <u>NOT</u> proceed until core exit T/Cs less than required temperature.
19	Check Ruptured S/G Pressure - STABLE OR INCREASING	<u>IF</u> pressure continues to decrease to less than 250 psi above the pressure of the intact S/G, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
20	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 20°F USING FIG-1.0, FIGURE MIN SUBCOOLING	Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1 .

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> SI ACCUMs may inject during RCS depressurization.</p>	
21	<p>Depressurize RCS To Minimize Break Flow And Refill PRZR:</p>	
	<p>a. Check the following:</p> <ul style="list-style-type: none"> o Ruptured S/G level - LESS THAN 90% [80% adverse CNMT] o Any RCP - RUNNING o IA to CNMT - AVAILABLE 	<p>a. Go to Step 22.</p>
	<p>b. Spray PRZR with maximum available spray until ANY of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 75% [65% adverse CNMT] -OR- o RCS pressure - LESS THAN SATURATION USING FIG-1.0. FIGURE MIN SUBCOOLING -OR- o <u>BOTH</u> of the following: <ul style="list-style-type: none"> 1) RCS pressure - LESS THAN RUPTURED S/G PRESSURE 2) PRZR level - GREATER THAN 10% [30% adverse CNMT] 	
	<p>c. Close normal PRZR spray valves:</p> <ul style="list-style-type: none"> 1) Adjust normal spray valve controller to 0% DEMAND 2) Verify PRZR spray valves - CLOSED <ul style="list-style-type: none"> • PCV-431A • PCV-431B 	<p>c. Stop associated RCP(s).</p>
	<p>d. Verify auxiliary spray valve (AOV-296) - CLOSED</p>	<p>d. Decrease charging speed to minimum and ensure charging valve to loop B cold leg open (AOV-294).</p>
	<p>e. Go to Step 24</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> *****</p> <ul style="list-style-type: none"> o THE PRT MAY RUPTURE IF A PRZR PORV IS USED TO DEPRESSURIZE THE RCS. THIS MAY RESULT IN ABNORMAL CNMT CONDITIONS. o CYCLING OF THE PRZR PORV SHOULD BE MINIMIZED. o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS MAY RESULT IN A RAPIDLY INCREASING PRZR LEVEL. <p style="text-align: center;">*****</p> <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p style="padding-left: 40px;">o When using a PRZR PORV select one with an operable block valve.</p>		
22	<p>Depressurize RCS Using PRZR PORV To Minimize Break Flow And Refill PRZR:</p> <ul style="list-style-type: none"> a. Verify IA to CNMT - AVAILABLE b. PRZR PORVs - AT LEAST ONE AVAILABLE 	<ul style="list-style-type: none"> a. Refer to ATT-12.0, ATTACHMENT N2 PORVS to operate PORVs. b. <u>IF</u> auxiliary spray available, <u>THEN</u> return to Step 21b. <p style="padding-left: 40px;"><u>IF</u> auxiliary spray can <u>NOT</u> be established, <u>THEN</u> go to ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, Step 1.</p>
<p>This Step continued on the next page.</p>		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 22 continued-from previous page)

c. Open one PRZR PORV until ANY of the following conditions satisfied:

- o PRZR level - GREATER THAN 75% [65% adverse CNMT]

-OR-

- o RCS pressure - LESS THAN SATURATION USING FIG-1.0. FIGURE MIN SUBCOOLING

-OR-

- o BOTH of the following:

- 1) RCS pressure - LESS THAN RUPTURED S/G PRESSURE
- 2) PRZR level - GREATER THAN 10% [30% adverse CNMT]

d. Close PRZR PORVs

c. IF auxiliary spray available, THEN return to step 21b.

- 1) IF auxiliary spray can NOT be established, THEN go to ECA-3.3. SGTR WITHOUT PRESSURIZER PRESSURE CONTROL. Step 1.

d. IF either PRZR PORV can NOT be closed, THEN close associated block valve.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23 Check RCS Pressure - INCREASING		<p>Close block valve for the PRZR PORV that was opened.</p> <p><u>IF</u> pressure continues to decrease, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Monitor the following conditions for indication of leakage from PRZR PORV: <ul style="list-style-type: none"> o PORV outlet temp (TI-438) <u>NOT</u> decreasing. o PRT pressure, level or temperature continue to increase. b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

SI MUST BE TERMINATED WHEN TERMINATION CRITERIA ARE SATISFIED TO PREVENT OVERFILLING OF THE RUPTURED S/G.

24 Check If SI Flow Should Be Terminated:

- | | |
|--|---|
| <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p> <p>b. Secondary heat sink:</p> <p>o Total feed flow to S/G(s) - GREATER THAN 200 GPM AVAILABLE</p> <p style="text-align: center;">-OR-</p> <p>o Narrow range level in at least one intact S/G - GREATER THAN 7% [25% adverse CNMT]</p> <p>c. RCS pressure - STABLE OR INCREASING</p> <p>d. PRZR level - GREATER THAN 10% [30% adverse CNMT]</p> | <p>a. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>b. <u>IF</u> neither condition satisfied. <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>d. Do <u>NOT</u> stop SI pumps. Return to Step 6.</p> |
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Stop SI Pumps And Place In AUTO	
26	Establish Required Charging Line Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high. <u>THEN</u> dispatch AO to locally isolate seal injection to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open. 3) Start one charging pump.
	b. Establish 20 gpm charging line flow	
27	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
	b. PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. <p><u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	<p>Check If SI ACCUMs Should Be Isolated:</p> <ul style="list-style-type: none"> a. Check the following: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 10% [30% adverse CNMT] b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C c. Close SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841 • MOV-865 d. Locally reopen breakers for MOV-841 and MOV-865 	<ul style="list-style-type: none"> a. Manually operate SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1. c. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. <p>IF an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least three SW pumps - RUNNING	<p>a. Manually start pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.</p> <p>3) Go to Step 36.</p>
b.	Verify AUX BLDG SW isolation valves - AT LEAST ONE SET OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 	
This Step continued on the next page.		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 29 continued-from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 29 of 42
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG 	a. Continue with Step 36. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 30 through 35.
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
d.	Charging pump - ANY RUNNING	d. Continue with Step 36. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 31 through 35.

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 38 PAGE 30 of 42
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 32.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 32.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Verify PRZR Level - GREATER THAN 20% [40% adverse CNMT]	Continue with Step 34. <u>WHEN</u> PRZR level increases to greater than 20% [40% adverse CNMT]. <u>THEN</u> do Step 33.
33	Establish Normal Letdown: <ul style="list-style-type: none"> a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • Letdown isolation valve AOV-371 • Loop B cold leg to REGEN Hx AOV-427 c. Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> • TCV-130 • PCV-135 d. Reset both trains of XY relays for AOV-371 and AOV-427 e. Open AOV-371 and AOV-427 f. Open letdown orifice valves as necessary g. Place PCV-135 in AUTO at 250 psig h. Place TCV-130 in AUTO at the normal setpoint i. Adjust charging pump speed and HCV-142 as necessary 	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p>

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Check Charging Pump Suction Aligned To VCT:	
a.	VCT level - GREATER THAN 20%	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <p>1) Ensure charging pump suction aligned to RWST</p> <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed <p>2) Continue with Step 36. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 35b.</p>
b.	Verify charging pumps aligned to VCT	b. Manually align valves as necessary.
	<ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED 	

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

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

***36 Control RCS Pressure And
Charging Flow To Minimize
RCS-To-Secondary Leakage:**

- a. Perform appropriate action(s)
from table:

PRZR LEVEL	RUPTURED S/G NARROW RANGE LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 20% [40% ADVERSE CNMT]	<ul style="list-style-type: none"> o Increase charging flow o Depressurize RCS using Step 36b 	Increase charging flow	<ul style="list-style-type: none"> o Increase charging flow o Maintain RCS and ruptured S/G pressure equal
BETWEEN 20% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 36b	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	<ul style="list-style-type: none"> o Depressurize RCS using Step 36b o Decrease charging flow 	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
GREATER THAN 75% [65% ADVERSE CNMT]	o Decrease charging flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal

- b. Control pressure using normal PRZR spray, if available, to obtain desired results for Step 36a

- b. IF letdown is in service, THEN use auxiliary spray (AOV-296). IF NOT, THEN use one PRZR PORV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - ANY RUNNING	a. Go to Step 38.
b.	Verify CNMT pressure - LESS THAN 4 PSIG	b. Continue with Step 38. <u>WHEN</u> CNMT pressure less than 4 psig. <u>THEN</u> do Steps 37c through f.
c.	Reset CNMT spray	
d.	Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE. • AOV-836A • AOV-836B
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves • MOV-860A • MOV-860B • MOV-860C • MOV-860D	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1. ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1. RESTORATION OF OFFSITE POWER).
39	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (LC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Check status of local actions to complete ruptured S/G isolation (Refer to ATT-16.0. ATTACHMENT RUPTURED S/G) 	<ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing. <u>THEN</u> direct RP to sample hotwells for activity.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

40 Energize PRZR Heaters As
Necessary To Saturate PRZR
Water At Ruptured S/G Pressure

41 Check RCP Cooling:

Establish normal cooling to RCPs
(Refer to ATT-15.2, ATTACHMENT SEAL
COOLING).

a. Check CCW to RCPs:

- o Annunciator A-7, RCP 1A CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED
- o Annunciator A-15, RCP 1B CCW
RETURN HIGH TEMP OR LOW FLOW
- EXTINGUISHED

b. Check RCP seal injection:

- o Labyrinth seal D/Ps - GREATER
THAN 15 INCHES OF WATER

-OR-

- o RCP seal injection flow to
each RCP - GREATER THAN 6 GPM

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION. *****</p>		
42	Check RCP Status	
	a. Both RCPs - STOPPED b. Ensure conditions for starting an RCP. <ul style="list-style-type: none"> o Bus 11A or 11B energized. o Refer to ATT-15.0, ATTACHMENT RCP START. 	a. Stop all but one RCP and go to step 43. b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC). <u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam. 2) Go to step 43.
<p>This Step continued on the next page.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 42 continued-from previous page)	
c.	Check RVLIS level (no RCPs) - ≥ 95%	<p>c. <u>IF</u> RVLIS level (no RCPs) less than 95%. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT]. o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water <p><u>IF</u> conditions <u>NOT</u> met. <u>THEN</u> continue with step 43. <u>WHEN</u> conditions met, <u>THEN</u> do step 42d.</p>
d.	Start one RCP	<p>d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

43 Check If Source Range
Detectors Should Be Energized:

a. Source range channels -
DEENERGIZED

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

c. Check the following:

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

-OR-

o Greater than 20 minutes since
reactor trip

d. Verify source range detectors -
ENERGIZED

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

a. Go to Step 43e.

b. Perform the following:

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

2) Continue with Step 44. WHEN
flux is LESS THAN 10-10 amps
on any operable channel, THEN
do Steps 43c through e.

c. Continue with Step 44. WHEN
either condition met, THEN do
Steps 43d and e.

d. Manually energize source range
detectors by depressing P-6
permissive defeat pushbuttons (2
of 2).

IF source ranges can NOT be
restored, THEN refer to
ER-NIS.1, SR MALFUNCTION and go
to Step 44.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
44	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump <p>c. Verify adequate Rx head cooling:</p> <ol style="list-style-type: none"> 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING <p>d. Verify ATT-17.0, ATTACHMENT SD-1 - COMPLETE</p>	<p>a. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2.</p> <p>1) Manually start one fan as power supply permits (45 kw)</p> <p>2) Perform the following:</p> <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw)

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
45	<p>Consult TSC To Determine Appropriate Post-SGTR Cooldown Procedure:</p> <ul style="list-style-type: none"> o Go to ES-3.1. POST-SGTR COOLDOWN USING BACKFILL, Step 1 <li style="text-align: center;">-OR- o Go to ES-3.2. POST-SGTR COOLDOWN USING BLOWDOWN, Step 1 <li style="text-align: center;">-OR- o Go to ES-3.3. POST-SGTR COOLDOWN USING STEAM DUMP, Step 1 <p style="text-align: right;">-END-</p>	

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E-3 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 4) ATTACHMENT D/G STOP (ATT-8.1)
- 5) ATTACHMENT N2 PORVS (ATT-12.0)
- 6) ATTACHMENT NC (ATT-13.0)
- 7) ATTACHMENT SEAL COOLING (ATT-15.2)
- 8) ATTACHMENT RCP START (ATT-15.0)
- 9) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 10) ATTACHMENT SD-1 (ATT-17.0)
- 11) ATTACHMENT SD-2 (ATT-17.1)
- 12) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 13) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 14) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 15) FOLDOUT

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

Following SI termination, IF either condition listed below occurs, THEN start SI pumps manually as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT].

3. SECONDARY INTEGRITY CRITERIA

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

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

5. AFW SUPPLY SWITCHOVER CRITERION

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

6. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 1 of 25
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GINNA STATION
CONTROLLED COPY NUMBER 23

Robert L. Smith
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 2 of 25
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A. PURPOSE - This procedure provides actions to respond to a loss of all AC power.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure may be entered directly or from:
 - a. E-0, REACTOR TRIP OR SAFETY INJECTION, on the indication that both Bus 14 and Bus 16 are deenergized.
2. SYMPTOMS - Which indicate a loss of all AC power are:
 - a. Neither 480 volt AC emergency bus 14 nor 16 available.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> DUE TO POTENTIALLY EXTREME ENVIRONMENTAL CONDITIONS, CAUTION SHOULD BE USED WHEN ENTERING THE INTERMEDIATE BLDG FOR LOCAL ACTIONS. *****</p> <p><u>NOTE:</u> o CSFSTs should be monitored for information only. FR procedures should not be implemented.</p> <p> o Local actions may require portable lighting and communication devices.</p>		
1	Verify Reactor Trip: <ul style="list-style-type: none"> o At least one train of reactor trip breakers - OPEN o Neutron flux - DECREASING o MRPI indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM 	Manually trip reactor. <u>IF</u> reactor trip breakers <u>NOT</u> open, <u>THEN</u> perform the following: <ul style="list-style-type: none"> a. Open Bus 13 and Bus 15 normal feed breakers. b. Verify rod drive MG sets tripped. c. Close Bus 13 and Bus 15 normal feed breakers. d. Reset lighting breakers.
2	Verify Turbine Stop Valves - CLOSED	Manually trip turbine. <u>IF</u> turbine trip can <u>NOT</u> be verified, <u>THEN</u> close both MSIVs.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: FOLDOUT page should be open and monitored periodically.

- * 3 Adjust S/G ARVs To Control
Tavg At Approximately 547°F

4 Stop Both RCPs

NOTE: Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

5 Check If RCS Is Isolated:

a. PRZR PORVs - CLOSED

a. IF PRZR pressure less than 2335 psig, THEN manually close PORVs.

b. Verify RCS isolation valves closed:

1) Place letdown orifice valve switches to CLOSE

- AOV-200A
- AOV-200B
- AOV-202

2) Place letdown isolation valve switches to CLOSE

- AOV-371
- AOV-427

3) Place excess letdown isolation valve switch to CLOSE (AOV-310)

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Verify Adequate TDAFW Flow:	
a.	Verify TDAFW pump - RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify governor valve, V-3652, latched. <u>IF</u> governor valve tripped, <u>THEN</u> dispatch AO to locally reset valve. 2) Manually or locally open at least one TDAFW pump steam supply valve. <ul style="list-style-type: none"> • MOV-3505A • MOV-3504A
b.	Verify TDAFW pump flow - GREATER THAN 200 GPM	<p>b. Verify proper TDAFW valve alignment:</p> <ol style="list-style-type: none"> 1) TDAFW pump discharge valve (MOV-3996) open. 2) Intact S/G TDAFW pump flow control valves open. <p><u>IF NOT</u>, <u>THEN</u> manually align valves as necessary.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).

- o AO should increase surveillance of TDAFW pump until AC power is restored.

7 Try To Restore Power to Any Train Of AC Emergency Busses:

a. Verify emergency D/G aligned for unit operation

- o Mode switch in UNIT
- o Voltage control selector in AUTO

b. Check emergency D/Gs - BOTH D/G RUNNING

a. Manually align switches on rear of MCB.

b. WHEN non-running D/G available for starting. THEN perform the following:

- 1) Depress D/G FIELD RESET pushbutton
- 2) Depress D/G RESET pushbutton
- 3) Start D/G
- 4) IF D/G starts. THEN go to Step 7c.
- 5) IF D/G will NOT start. THEN dispatch AO to locally start emergency D/Gs.

IF no emergency D/G available. THEN perform the following:

- a) Direct AO to attempt to restore emergency D/G (Refer to ER-D/G.1, RESTORING D/G)

b) Go to Step 8.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 7 continued from previous page)	
c.	Check D/G voltage and frequency	
	1) Voltage - APPROXIMATELY 480v	1) Adjust voltage control to restore voltage to approximately 480v
	2) Frequency - APPROXIMATELY 60 Hz	2) Adjust governor to restore frequency to approximately 60 Hz
d.	Verify adequate D/G cooling	d. Manually energize busses and start SW Pumps.
	o Bus 17 and/or Bus 18 - ENERGIZED	<u>IF</u> adequate cooling can <u>NOT</u> be supplied to a running D/G. <u>THEN</u> perform the following:
	o One SW Pump running for each running D/G	
		1) Pull stop the D/G <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.
		2) Align alternate cooling (Refer to ER-D/G.2. ALTERNATE COOLING FOR EMERGENCY D/Gs).
e.	Verify at least one train of AC emergency busses - ENERGIZED	e. Manually energize AC emergency busses.
	• Bus 14 and Bus 18	<u>IF</u> Bus 14 <u>AND</u> Bus 16 are deenergized. <u>THEN</u> go to Step 8.
	• Bus 16 and Bus 17	
f.	Return to procedure and step in effect	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o WHEN POWER IS RESTORED TO BUS 14 AND/OR BUS 16, RECOVERY ACTIONS SHOULD CONTINUE STARTING WITH STEP 27.
- o IF AN SI SIGNAL EXISTS OR IF AN SI SIGNAL IS ACTUATED DURING THIS PROCEDURE, IT SHOULD BE RESET TO PERMIT MANUAL LOADING OF EQUIPMENT ON AN AC EMERGENCY BUS.

8 Establish The Following Equipment Alignment:

a. Pull stop AC emergency bus loads

- RHR pumps
- CNMT RECIRC fans
- CNMT spray pumps
- SI pumps
- CCW pumps
- Charging pumps
- MDAFW pumps

b. Evaluate non-vital loads (Refer to ATT-8.3, ATTACHMENT NONVITAL)

c. Place non-running SW pump switches to STOP, then return to AUTO

d. Place switch for MOV-313, RCP seal return isolation valve, to CLOSE

e. Momentarily place to CLOSE RCP CCW return valves

- MOV-759A
- MOV-759B

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 9 of 25
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Temporary power may be provided to Bus 16 by performing procedure ER-ELEC.4 and to Bus 13 by performing procedure ER-ELEC.5 at the Shift Supervisor's discretion.

9 Try To Restore Offsite Power:

a. Consult RG&E Energy Control Center to determine if either normal offsite power supply - AVAILABLE

o 12B transformer via breaker 76702

-OR-

o 12A transformer via breaker 75112

b. Reset SI, if necessary

c. Restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER)

a. IF normal offsite power supply NOT readily available, THEN perform the following:

1) Restore IA system using the Diesel Air Compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).

2) Evaluate Main transformer backfeed for long term concerns (Refer to ER-ELEC.3, EMERGENCY OFFSITE BACKFEED VIA MAIN & UNIT TRANSFORMER).

3) Go to Step 10.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	<p>Initiate Local Actions To Isolate RCS And To Provide Cooling To Vital Areas And Equipment</p> <p>a. Open all Reactor Protection and Control System rack doors in the Control Room.</p> <p>b. Direct Security personnel to open the following vital area doors to increase cooling:</p> <ul style="list-style-type: none">• Control Room Door S51• Intermediate Bldg Door S37 (AFW pump area)• Intermediate Bldg Door F36 (Automatic fire door, Rod Drive MG set area)• Intermediate Bldg Door S44 (Steam Header area) <p>c. Dispatch A0 To Locally Isolate RCP Seals and BASTs (Refer to ATT-21.0, ATTACHMENT RCS ISOLATION)</p> <p>d. Dispatch A0 to align backup cooling water to TDAFW Pump (Refer to ATT-5.2, ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP)</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Isolate Makeup And Reject From Hotwell To CST By Placing Hotwell Level Controller (LC-107) In Manual AT 50%	<p><u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> dispatch AO to locally isolate makeup and reject lines.</p> <ul style="list-style-type: none"> • Makeup isolation V-4058 • Reject isolation V-4055
12	Isolate S/G:	<u>IF</u> valves can <u>NOT</u> be manually closed, <u>THEN</u> dispatch AO to locally isolate the affected flow path.
	a. Manually close both MSIVs	
	b. Depress MANUAL pushbuttons <u>AND</u> manually close MFW flow control valves	
	<ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves 	
	c. Place MCB master switch for S/G blowdown and sample valves to CLOSE	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>A FAULTED OR RUPTURED S/G THAT IS ISOLATED SHOULD REMAIN ISOLATED. STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM AT LEAST ONE S/G.</p> <p>*****</p>		
13	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 110 PSIG 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> isolate faulted S/G unless needed for RCS cooldown: <ul style="list-style-type: none"> 1) Close faulted S/G MDAFW pump discharge valve. <ul style="list-style-type: none"> • S/G A, MOV-4007 • S/G B, MOV-4008 2) Close faulted S/G TDAFW flow control valve. <ul style="list-style-type: none"> • S/G A, AOV-4297 • S/G B, AOV-4298 3) Verify faulted S/G ARV controller in MANUAL with output at 0%. <ul style="list-style-type: none"> • S/G A, AOV-3411 • S/G B, AOV-3410 4) Pull stop faulted S/G TDAFW pump steam supply valve. <ul style="list-style-type: none"> • S/G A, MOV-3505A • S/G B, MOV-3504A <p><u>IF</u> valve(s) can <u>NOT</u> be closed manually, <u>THEN</u> dispatch AO to locally close valve(s) to isolate flow.</p> b. Dispatch AO to complete faulted S/G isolation (Refer to ATT-10.0, ATTACHMENT FAULTED S/G).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	<p>Check If S/G Tubes Are Intact:</p> <ul style="list-style-type: none"> o Dispatch RP tech or AO to locally check steamline radiation - NORMAL 	<p>Try to identify ruptured S/G. Continue with Step 15. <u>WHEN</u> ruptured S/G identified, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Isolate ruptured S/G unless needed for RCS cooldown: <ul style="list-style-type: none"> 1) Close ruptured S/G MDAFW pump discharge valve. <ul style="list-style-type: none"> • S/G A, MOV-4007 • S/G B, MOV-4008 2) Pull stop ruptured S/G MDAFW pump. 3) Close ruptured S/G TDAFW flow control valve. <ul style="list-style-type: none"> • S/G A, AOV-4297 • S/G B, AOV-4298 4) Adjust ruptured S/G ARV controller to 1050 psig in AUTO. <u>WHEN</u> S/G pressure less than 1050 psig, <u>THEN</u> ensure ruptured S/G ARV closed. <ul style="list-style-type: none"> • S/G A, AOV-3411 • S/G B, AOV-3410 5) Pull stop ruptured S/G TDAFW pump steam supply valve. <ul style="list-style-type: none"> • S/G A, MOV-3505A • S/G B, MOV-3504A <p><u>IF</u> valve(s) can <u>NOT</u> be closed manually, <u>THEN</u> dispatch AO to locally close valve(s) to isolate flow.</p> <ul style="list-style-type: none"> b. Dispatch AO to complete ruptured S/G isolation (Refer to ATT-16.0, ATTACHMENT RUPTURED S/G).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF CST LEVEL DECREASES TO LESS THAN 5 FEET. THEN ALTERNATE WATER SOURCES FOR AFW PUMPS. USING FIRE OR CITY WATER. WILL BE NECESSARY (REFER TO ER-AFW.1. ALTERNATE WATER SUPPLY TO AFW PUMPS).</p> <p>*****</p> <p><u>NOTE:</u> TDAFW pump AOV flow control AOVs may drift open on loss of IA.</p>		
*15 Monitor Intact S/G Levels:		
	<p>a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]</p> <p>b. Control AFW flow by throttling TDAFW flow control valves</p> <ul style="list-style-type: none"> • S/G A. AOV-4297 • S/G B. AOV-4298 <p>c. Control AFW flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Maintain maximum AFW flow until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.</p> <p>b. Control AFW flow by throttling TDAFP discharge MOV-3996.</p> <p>IF MOV-3996 can <u>NOT</u> be controlled, <u>THEN</u> dispatch AO to locally control AFW flow by throttling TDAFW flow control valves.</p> <ul style="list-style-type: none"> • S/G A. AOV-4297 • S/G B. AOV-4298 <p>IF valves can <u>NOT</u> be throttled, <u>THEN</u> control AFW flow by starting and stopping TDAFW pump.</p> <p>c. IF narrow range level in any intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> return to Step 14.</p>

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 15 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> IF the loss of power is expected to continue beyond 4 hours, THEN degassing of main generator should commence as soon as personnel become available (Refer to ATT-8.2, ATTACHMENT GEN DEGAS).</p>	
	<p>16 Check DC Bus Loads:</p>	
	<p>a. Place control switches for MFW pump AC oil pumps to OFF (allows timer to stop DC oil pumps)</p>	
	<p>b. Stop all large non-essential DC loads</p>	
	<p>1) Evaluate DC loads (Refer to ATT-8.0, ATTACHMENT DC LOADS).</p>	
	<p>2) WHEN turbine is stopped, THEN perform the following:</p>	
	<p>a) Locally close Turbine backup seal oil reg outlet valve V-5475J.</p>	
	<p>b) Stop Turbine DC lube oil pump (within 1 hour).</p>	
	<p>c. Check DC bus voltage - GREATER THAN 105 VOLTS DC</p>	
	<ul style="list-style-type: none"> • Bus A • Bus B 	
	<p>d. Direct electricians to locally monitor DC power supply</p>	
	<p>c. <u>IF</u> either DC bus less than 105 volts DC, <u>THEN</u> refer to ER-ELEC.2, RECOVERY FROM LOSS OF A or B DC BUS.</p>	

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 16 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Verify Source Range Detector(s) - ENERGIZED <ul style="list-style-type: none"> • N-31 • N-32 	Dispatch personnel with relay rack key to turn off 125 VDC power switches in REACTOR PROTECTION racks RLTR-1 and RLTR-2 to deenergize source range block relays.
***** <u>CAUTION</u> WHEN POWER IS RESTORED TO BUS 14 AND/OR BUS 16, RECOVERY ACTIONS SHOULD CONTINUE STARTING WITH STEP 27. *****		
18	Check CST Level - GREATER THAN 5 FEET	Initiate makeup to CSTs using fire or city water as a source. (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o S/G PRESSURES SHOULD BE MAINTAINED GREATER THAN 200 PSIG TO PREVENT INJECTION OF SI ACCUM NITROGEN INTO THE RCS.
- o S/G NARROW RANGE LEVEL SHOULD BE MAINTAINED GREATER THAN 7% [25% ADVERSE CNMT] IN AT LEAST ONE INTACT S/G. IF LEVEL CANNOT BE MAINTAINED, S/G DEPRESSURIZATION SHOULD BE STOPPED UNTIL LEVEL IS RESTORED IN AT LEAST ONE S/G.

- NOTE:
- o The S/Gs should be depressurized at maximum rate to minimize RCS inventory loss.
 - o PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurization of S/Gs. Depressurization should not be stopped to prevent these occurrences.
 - o S/G ARV nitrogen pressure should be monitored and nitrogen supply bottles changed as necessary.

19 Initiate Depressurization Of Intact S/Gs To 300 PSIG:

- | | |
|---|---|
| <p>a. Check S/G narrow range levels - GREATER THAN 17% [25% adverse CNMT] IN AT LEAST ONE S/G</p> | <p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Maintain maximum AFW flow until narrow range level greater than 17% [25% adverse CNMT] in at least one S/G. 2) Continue with Step 20. <u>WHEN</u> narrow range level greater than 17% [25% adverse CNMT] in at least one S/G, <u>THEN</u> do Steps 19b and 20. |
| <p>b. Manually dump steam from intact S/Gs at maximum rate using S/G ARVs</p> | <p>b. Locally dump steam from intact S/Gs at maximum rate using S/G ARV.</p> |

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> o Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p> <p>o <u>IF</u> Instrument Bus D deenergized, <u>THEN</u> NIS SUR meters will <u>NOT</u> be available.</p>	
<p>*20 Monitor Reactor For Subcriticality:</p>		
a.	Verify Subcriticality using the following indications:	a. <u>IF</u> unable to verify subcriticality using NIS. <u>THEN</u> perform the following:
1)	Check source range(s), N-31 <u>AND</u> N-32	o Control S/G ARVs to stop S/G depressurization and allow RCS to heat up.
	o Indicator - ON SCALE	
	o Power - STABLE OR DECREASING	o Direct RP to sample RCS and PRZR for boron concentration.
2)	Check intermediate range, N-35	o Request plant staff assistance in evaluating core reactivity status
	o Indicator - ON SCALE	
	o Power - STABLE OR DECREASING	
3)	Check power range, N-41 and N-43	
	o Indicators - LESS THAN 5%	
	o Power - STABLE OR DECREASING	

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 19 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Depressurization-of S/Gs will result in-a SI actuation. SI should be reset to permit manual loading of equipment on emergency busses.</p>		
21 Check SI Signal Status:		
a. Any SI annunciator - LIT		a. Go to Step 25. <u>WHEN</u> SI actuated, <u>THEN</u> do Steps 21b, 22, 23 and 24.
b. Reset SI		
22 Verify CI And CVI:		
a. CI and CVI annunciators - LIT		a. Depress manual CI pushbutton.
<ul style="list-style-type: none"> Annunciator A-26. CNMT ISOLATION Annunciator A-25. CONTAINMENT VENTILATION ISOLATION 		
b. Verify CI and CVI valve status lights - BRIGHT		b. Manually close CI and CVI valves. <u>IF</u> valves can <u>NOT</u> be verified closed by MCB indication, <u>THEN</u> dispatch AO to locally close valves (Refer to ATT-3.0, ATTACHMENT CI/CVI).
c. CNMT RECIRC fan coolers SW outlet valve status lights - BRIGHT		c. Dispatch AO to locally fail open valves.
<ul style="list-style-type: none"> AOV-4561 AOV-4562 		
d. Verify RHR Pump Suction from CNMT Sump B valves - CLOSED		d. <u>IF</u> sump recirculation <u>NOT</u> in progress, <u>THEN</u> manually close valves.
<ul style="list-style-type: none"> MOV-850A MOV-850B 		<u>IF</u> valves can <u>NOT</u> be verified closed by MCB indication, <u>THEN</u> dispatch AO to locally close valves.

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 20 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check If S/G Depressurization Should Be Stopped:	
a.	Check RCS cold leg temperatures - GREATER THAN 315°F	a. Perform the following: 1) Control S/G ARVs to stop S/G depressurization. 2) Go to Step 24.
b.	Check S/G pressures - LESS THAN 300 PSIG	b. Continue with Step 24. <u>WHEN</u> S/G pressure decreases to less than 300 psig. <u>THEN</u> do Step 23c and d.
c.	Check IA supply: o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING	c. Control S/G ARVs in manual to maintain S/G pressures at 300 psig <u>IF</u> manual control is <u>NOT</u> available, <u>THEN</u> locally control S/G ARVs to maintain S/G pressures at 300 psig.
d.	Control S/G ARVs to maintain S/G pressures at 300 psig IN AUTO	d. Control S/G ARVs in manual to maintain S/G pressures at 300 psig <u>IF</u> manual control is <u>NOT</u> available, <u>THEN</u> locally control S/G ARVs to maintain S/G pressures at 300 psig.

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 21 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	<p>Check CNMT Pressure - HAS REMAINED LESS THAN 28 PSIG</p> <ul style="list-style-type: none"> o Annunciator A-27, CNMT SPRAY - EXTINGUISHED o CNMT pressure indicators - LESS THAN 28 PSIG 	<p><u>IF</u> CNMT pressure is less than 28 psi, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Reset CNMT spray. b. Place CNMT spray pump discharge valve switches to CLOSE to deenergize open contactor. <p><u>IF NOT</u>, <u>THEN</u> continue with step 25. <u>WHEN</u> CNMT pressure less than 28 psig, <u>THEN</u> reset CNMT spray and place CNMT spray pump discharge valve switches to CLOSE.</p>
25	<p>Check Core Exit T/Cs - LESS THAN 1200°F</p>	<p><u>IF</u> core exit temperatures greater than 1200°F and increasing, <u>THEN</u> go to SACRG-1, SEVERE ACCIDENT CONTROL ROOM GUIDELINE INITIAL RESPONSE, step 1.</p>
26	<p>Check If AC Emergency Power Is Restored - BUSSES 14 AND/OR 16 ENERGIZED</p>	<p>Continue to control RCS conditions and monitor plant status:</p> <ul style="list-style-type: none"> a. Check status of desired actions: <ul style="list-style-type: none"> o AC power restoration o ARV nitrogen pressure o Diesel air compressor to IA system o RCP seal isolation o DC power supply b. Return to Step 13.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: SW isolation may occur when power is restored to AC emergency busses.

28 Verify SW System Operation:

a. Check Bus 17 and Bus 18 - AT
LEAST ONE ENERGIZED

a. Perform the following:

1) Pull stop any D/G that is NOT supplied by alternate cooling. AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.

2) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

3) Go to Step 29.

b. Verify two SW pumps - RUNNING

b. IF normal power available. THEN establish two SW pumps running.

IF normal power NOT available. THEN establish one SW pump running for each operating D/G.

IF NO SW pumps running. THEN perform the following:

1) Pull stop any D/G that is NOT supplied by alternate cooling. AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.

2) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

IF only one SW pump running. THEN perform the following:

1) Manually perform SW isolation.

2) Refer to AP-SW.2, LOSS OF SERVICE WATER.

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 24 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE LOADS PLACED ON THE ENERGIZED AC EMERGENCY BUS SHOULD NOT EXCEED THE CAPACITY OF THE POWER SOURCE.</p> <p>*****</p>		
29	<p>Verify Following Equipment Loaded On Available AC Emergency Busses:</p> <ul style="list-style-type: none"> o 480 volt MCCs - ENERGIZED <ul style="list-style-type: none"> • MCC C from Bus 14 • MCC D from Bus 16 o Verify instrument busses - ENERGIZED <ul style="list-style-type: none"> • Bus A from MCC C (A battery) • Bus B from MCC C • Bus C from MCC D (B battery) o Dispatch personnel to verify proper operation of battery chargers 	<p>Manually load equipment as power supply permits.</p>

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 25 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30 Select Recovery Procedure:		
a.	Check RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
b.	Check PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
c.	Check SI and RHR Pumps - NONE RUNNING	c. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
d.	Go to ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 1	
-END-		

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 1 of 1
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ECA-0.0 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) ATTACHMENT DC LOADS (ATT-8.0)
- 3) ATTACHMENT FAULTED S/G (ATT-10.0)
- 4) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 5) ATTACHMENT CI/CVI (ATT-3.0)
- 6) ATTACHMENT NONVITAL (ATT-8.3)
- 7) ATTACHMENT GEN DEGAS (ATT-8.2)
- 8) ATTACHMENT RCS ISOLATION (ATT-21.0)
- 9) ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP (ATT-5.2)
- 10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 11) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 12) FOLDOUT

EOP: ECA-0.0	TITLE: LOSS OF ALL AC POWER	REV: 29 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA -

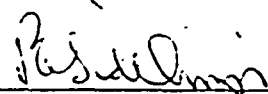
IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

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GINNA STATION

CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

11-17-2004

EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 2 of 21
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- A. PURPOSE - This procedure provides actions to use normal operational systems to stabilize plant conditions following restoration of AC emergency power.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. ECA-0.0, LOSS OF ALL AC POWER, when AC emergency power is restored and SI is not required.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 3 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

IF AN SI SIGNAL IS ACTUATED PRIOR TO PERFORMING STEP 10 OF THIS PROCEDURE, THEN SI SHOULD BE RESET TO PERMIT MANUAL LOADING OF EQUIPMENT ON AN AC EMERGENCY BUS.

- NOTE:
- o CSFSTs should be monitored for information only. FR procedures should not be implemented prior to completion of Step 10.
 - o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.
 - o FOLDOUT page should be open and monitored periodically.

1 Check RCP Seal Isolation Status:

- | | |
|--|--|
| <p>a. RCP seal injection needle valves
- CLOSED</p> <ul style="list-style-type: none"> • V-300A • V-300B <p>b. RCP CCW return valves CLOSED</p> <ul style="list-style-type: none"> • MOV-759A • MOV-759B | <p>a. Dispatch AO to locally close valves before starting charging pump.</p> <p>b. <u>IF</u> valves open or position not known, <u>THEN</u> check CCW pump status:</p> <p>1) <u>IF</u> pump running, <u>THEN</u> go to Step 2.</p> <p>2) <u>IF</u> pump <u>NOT</u> running, <u>THEN</u> manually close valves.</p> <p><u>IF</u> valve(s) can <u>NOT</u> be closed, <u>THEN</u> place switches for RCP thermal barrier CCW outlet valves to CLOSE.</p> <ul style="list-style-type: none"> • AOV-754A • AOV-754B |
|--|--|

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 4 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check CI Annunciator A-26, CONTAINMENT ISOLATION - EXTINGUISHED	Perform the following: a. Depress CI reset pushbutton b. Verify annunciator A-26. CONTAINMENT ISOLATION. extinguished.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 5 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	3 Establish IA to CNMT:	
	<p>a. Verify non-safeguards busses energized from offsite power</p> <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED <p>b. Check SW pumps - AT LEAST TWO PUMPS RUNNING</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie <p>b. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> no SW pumps are available, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. 2) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS. <p><u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Restore IA using service air compressor <u>OR</u> diesel air compressor (Refer to ATT-11.2. ATTACHMENT DIESEL AIR COMPRESSOR). 2) Go to Step 3d.
	<p>c. Verify turbine building SW isolation valves - OPEN</p> <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	<p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
This Step continued on the next page.		

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 6 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 3 continued from previous page)	
	d. Start adequate air compressor(s) (75 kw each)	d. <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
	e. Check IA supply:	e. Perform the following:
	o Pressure - GREATER THAN 60 PSIG	1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).
	o Pressure - STABLE OR INCREASING	2) Continue with Step 4. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 3f and g.
	f. Reset both trains of XY relays for IA to CHMT (AOV-5392) if necessary	
	g. Verify IA to CHMT AOV-5392 - OPEN	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 7 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE LOADS PLACED ON THE ENERGIZED AC EMERGENCY BUS SHOULD NOT EXCEED THE CAPACITY OF THE POWER SOURCE.</p> <p>*****</p>		
4	Manually Load Following Equipment On AC Emergency Busses:	
	a. Start one CCW pump (122 kw)	
	b. Energize MCCs as power supply permits	
	<ul style="list-style-type: none"> • MCC A from Bus 13 • MCC B from Bus 15 • MCC E from Bus 15 • MCC F from Bus 15 	
	c. Verify instrument bus D - ENERGIZED	c. Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
	d. <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting	
	e. Start at least one CNMT RECIRC fan	
	f. Restore Rx head cooling as power supply permits:	
	1) Start one Rx compartment cooling fan (23 kw each)	1) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits. (23 kw)
	2) Start both control rod shroud fans (45 kw each)	2) Manually start at least one fan (45 kw)
	g. Dispatch AO to establish normal shutdown alignment (refer to ATT-17.0, ATTACHMENT SD-1)	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 8 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) Ensure seal injection needle valves to both RCPs isolated: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. Manually align valves as necessary. <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from RWST (charging pump room).
	Start charging pumps (75 kw each) as necessary and adjust charging flow to restore PRZR level	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 9 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 6 Monitor SI Initiation Criteria:		
a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING		a. Go to ECA-0.2. LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED. Step 1.
b. PRZR level - GREATER THAN 10% [30% adverse CNMT]		b. Control charging flow to maintain PRZR level. IF PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to ECA-0.2. LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED. Step 1.
7 Check PRZR Level - GREATER THAN 20% [40% FOR ADVERSE CONTAINMENT]		Control charging flow as necessary.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 10 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).
- o IF S/G NR LEVEL DECREASES TO LESS THAN 7% [25% ADVERSE CNMT] AND FEED FLOW IS LESS THAN 200 GPM, THEN THE MDAFW PUMPS SHOULD BE MANUALLY LOADED ON AC EMERGENCY BUS TO SUPPLY WATER TO THE S/G(S).

NOTE:

- o If MDAFW pump operation is not required, pump switches should be maintained in PULL-STOP to prevent automatic start.
- o TDAFW pump flow control AOVs may drift open on loss of IA.

* 8 Monitor Intact S/G Levels:

<p>a. Narrow range level - GREATER THAN 1% [25% adverse CNMT]</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.</p> <p><u>IF</u> feed flow less than 200 gpm. <u>THEN</u> perform the following:</p> <p>1) Verify MDAFW pump discharge valves open.</p> <ul style="list-style-type: none">• MOV-4007• MOV-4008 <p>2) Manually start MDAFW pumps as necessary (223 kw each).</p>
<p>b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 52%</p>	

EOP: ECA-0.1	TIME: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 11 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	<p>Establish S/G Pressure Control:</p> <ul style="list-style-type: none"> a. Adjust S/G ARV controllers to maintain existing S/G pressure b. Verify S/G ARV controllers in AUTO c. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2 <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF AN SI SIGNAL IS ACTUATED AFTER THE SI PUMP SWITCHES ARE PLACED IN AUTO, THEN ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, SHOULD BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u> Safeguards pump switches should be placed in AUTO only if associated bus is energized.</p>	
10	<p>Place Following Pump Switches In AUTO:</p> <ul style="list-style-type: none"> • SI pumps • RHR pumps • CHMT spray pumps 	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 12 of 21
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: FR procedures may now be implemented as necessary.

11 Verify Adequate SW Flow To
CCW Hx:

a. Verify at least two SW pumps -
RUNNING

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

1) IF NO SW pumps running, THEN
perform the following:

a) Pull stop any D/G that is
NOT supplied by alternate
cooling, AND immediately
depress associated VOLTAGE
SHUTDOWN pushbutton.

b) Refer to ATT-2.4.
ATTACHMENT NO SW PUMPS.

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

3) Go to Step 17.

b. Verify AUX BLDG SW isolation
valves - OPEN

- MOV-4615 and MOV-4/34
- MOV-4616 and MOV-4/35

b. Manually align valves. IF
valves must be locally operated.
THEN continue with Step 17.
WHEN SW restored to AUX BLDG.
THEN do Steps 11c through 16.

This Step continued on the next page.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 13 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 11 continued from previous page)

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

c. Perform the following:

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

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

2) Direct AO to adjust SW flow
to required value

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 14 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	<p>Check If Normal CVCS Operation Can Be Established</p> <p>a. Verify IA restored:</p> <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG <p>b. Charging pump - ANY RUNNING</p>	<p>a. Continue with Step 17. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12 through 16.</p> <p>b. Continue with Step 17. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 13 through 16.</p>
13	<p>Verify PRZR Level - GREATER THAN 20% [40% adverse CNMT]</p>	<p>Continue with Step 17. <u>WHEN</u> PRZR level increases to greater than 20% [40% adverse CNMT], <u>THEN</u> do Steps 14 through 16.</p>

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 15 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Establish Normal Letdown:	Consult TSC to determine if excess letdown should be placed in service.
a.	Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM	
b.	Place the following switches to CLOSE: <ul style="list-style-type: none"> Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) AOV-371, letdown isolation valve AOV-427, loop B cold leg to REGEN Hx 	
c.	Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> TCV-130 PCV-135 	
d.	Reset both trains of XY relays for AOV-371 and AOV-427 if necessary	
e.	Open AOV-371 and AOV-427	
f.	Open letdown orifice valves as necessary	
g.	Place PCV-135 in AUTO at 20% setpoint	
h.	Place TCV-130 in AUTO at the normal setpoint	
i.	Adjust charging pump speed and HCV-142 as necessary	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 16 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check VCT Makeup System:	
a.	Verify the following:	a. <u>IF</u> VCT auto makeup can <u>NOT</u> be established, <u>THEN</u> manually control VCT level (Refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION).
	1) Boric acid and RMW flow control valves - SET FOR REQUIRED CSD CONCENTRATION (Refer to FIG-2.0, FIGURE SDM)	
	2) At least one BA and RMW pump in AUTO	
	3) RMW mode selector switch in AUTO	
	4) RMW control armed - RED LIGHT LIT	
b.	Check VCT level	b. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20% or	1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u> , <u>THEN</u> dispatch AO to reset MCC C and MCC D UV lockouts as necessary.
	o Level STABLE OR INCREASING	2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.
		3) Increase boric acid flow as necessary.
		<u>IF</u> VCT level can <u>NOT</u> be restored, <u>THEN</u> go to Step 17.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 17 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check Charging Pump Suction Aligned To VCT:	
a.	VCT level - GREATER THAN 20%	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%. <u>THEN</u> perform the following:</p> <p>1) Ensure charging pump suction aligned to RWST:</p> <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed <p>2) Continue with Step 17. <u>WHEN</u> VCT level greater than 40%. <u>THEN</u> do Step 16b.</p>
b.	Verify charging pumps aligned to VCT	b. Manually align valves as necessary.
	<ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED 	
17	Control PRZR Level:	
a.	Check letdown - IN SERVICE	a. Stop and start charging pumps as necessary to control PRZR level.
b.	Maintain PRZR level between 20% [40% adverse CHMT] and 50%	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves. o When using a PRZR PORV select one with an operable block valve. 		
18	Establish PRZR Pressure Control:	
	a. Check letdown - IN SERVICE	<p>a. Perform the following:</p> <ul style="list-style-type: none"> 1) Use PRZR heaters and one PRZR PORV to maintain RCS pressure. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> Refer to ATT-12.0, ATTACHMENT N2 PORVS to operate PORV. 2) Go to Step 19.
	b. Use PRZR heaters and auxiliary spray valve (AOV-296) to maintain RCS pressure	
19	Verify Natural Circulation:	Increase dumping steam from intact S/Gs.
	<ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o S/G pressures - STABLE OR DECREASING o RCS hot leg temperatures - STABLE OR DECREASING o Core exit T/Cs - STABLE OR DECREASING o RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR S/G PRESSURE 	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 19 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

20 Check If Source Range
Detectors Should Be Energized:

- | | |
|---|---|
| <p>a. Source range channels -
DEENERGIZED</p> | <p>a. Go to Step 20e.</p> |
| <p>b. Check intermediate range flux -
EITHER CHANNEL LESS THAN
10⁻¹⁰ AMPS</p> | <p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range
channel is decreasing <u>THEN</u>
initiate boration. 2) Continue with Step 21. <u>WHEN</u>
flux is LESS THAN 10⁻¹⁰ amps
on any operable channel. <u>THEN</u>
do Steps 20c through e. |
| <p>c. Check the following:</p> <ul style="list-style-type: none"> o Both intermediate range
channels - LESS THAN
10⁻¹⁰ AMPS <li style="text-align: center;">OR o Greater than 20 minutes since
reactor trip | <p>c. Continue with Step 21. <u>WHEN</u>
either condition met. <u>THEN</u> do
Steps 20d and e.</p> |
| <p>d. Verify source range detectors:
ENERGIZED</p> | <p>d. Manually energize source range
detectors by depressing P-6
permissive defeat pushbuttons (2
of 2).</p> <p><u>IF</u> source ranges can <u>NOT</u> be
restored. <u>THEN</u> refer to
ER-NIS.1, SR MALFUNCTION and go
to Step 21.</p> |
| <p>e. Transfer Rk-45 recorder to one
source range and one
intermediate range channel</p> | |

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 20 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Verify Adequate Shutdown Margin:	
	a. Direct RP to sample RCS and PRZR liquid for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM	b. Borate as necessary.
22	Maintain Stable Plant Conditions	
	a. RCS pressure - STABLE	a. Control PRZR heaters and auxiliary spray if available.
	b. RCS temperature - STABLE	b. Control dumping steam as necessary.
	c. PRZR level - BETWEEN 20% [40% adverse CNMT] and 50%	c. Control charging as necessary.
	d. Intact S/G level - BETWEEN 17% [25% adverse CNMT] and 52%	d. Control S/G feed flow as necessary.
*23	Monitor SI Initiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 21 of 21
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Try To Restore Offsite Power To All AC Busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER)	Maintain plant condition stable using AC emergency power.
25	Implement Plant Recovery Procedures:	
	a. Review plant systems for realignment to normal conditions (Refer to ATT-26.0. ATTACHMENT RETURN TO NORMAL OPERATIONS)	
	b. Consult plant staff to determine if RCS cooldown is necessary	b. <u>IF</u> cooldown <u>NOT</u> required. <u>THEN</u> go to 0-3, HOT SHUTDOWN WITH XENON PRESENT.
	c. At least one RCF - OPERABLE	c. Go to ES-0.2, NATURAL CIRCULATION COOLDOWN.
	d. Go to 0-2.2. PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD SHUTDOWN	
	END	

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 1 of 1
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ECA-0.1 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) FIGURE SDM (FIG-2.0)
- 3) ATTACHMENT SD-1 (ATT-17.0)
- 4) ATTACHMENT SD-2 (ATT-17.1)
- 5) ATTACHMENT N2 PORVS (ATT-12.0)
- 6) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 7) ATTACHMENT RETURN TO NORMAL OPERATIONS (ATT-26.0)
- 8) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 9) FOLDOUT

EOP: ECA-0.1	TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	REV: 24 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 1 of 9
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GINNA STATION
CONTROLLED COPY NUMBER 23

Paul W. Amgen
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 2 of 9
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A. PURPOSE - This procedure provides actions to use engineered safeguards systems to recover plant conditions following restoration of AC emergency power.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. ECA-0.0, LOSS OF ALL AC POWER, when AC emergency power is restored and SI is required.
- b. ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, if SI is required.

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 3 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o CSFSTs should be monitored for information only. FR procedures should not be implemented prior to completion of Step 10. o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. o FOLDOUT page should be open and monitored periodically. 		
1	Reset SI	
2	Check RCP CCW Isolation Status:	
	<ul style="list-style-type: none"> a. CCW pumps - BOTH PUMPS OFF b. RCP CCW return valves - CLOSED <ul style="list-style-type: none"> • MOV-759A • MOV-759B 	<ul style="list-style-type: none"> a. Go to Step 3. b. Manually close valves as necessary: <ul style="list-style-type: none"> o RCP CCW thermal barrier outlet valves <ul style="list-style-type: none"> • AOV-754A • AOV-754B <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP CCW supply valves <ul style="list-style-type: none"> • MOV-749A • MOV-749B

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 4 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Check RWST Level - GREATER THAN 28%	Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
<p><u>NOTE:</u> SI actuation to establish safeguards valve alignment is not recommended.</p>		
4	Manually Align SI And RHR Pumps To Establish SI Injection:	
a.	SI pump suction valves from RWST - OPEN	a. Ensure at least one SI pump suction valve from RWST open.
	<ul style="list-style-type: none"> • MOV-825A • MOV-825B 	<ul style="list-style-type: none"> • MOV-825A • MOV-825B
b.	Verify SI pump C discharge valves - OPEN	b. Manually open valves as necessary.
	<ul style="list-style-type: none"> • MOV-871A • MOV-871B 	
c.	RHR pump discharge to Rx vessel deluge - OPEN	c. Ensure at least one deluge valve open.
	<ul style="list-style-type: none"> • MOV-852A • MOV-852B 	<ul style="list-style-type: none"> • MOV-852A • MOV-852B

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 5 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE LOADS PLACED ON THE ENERGIZED AC EMERGENCY BUS SHOULD NOT EXCEED THE CAPACITY OF THE POWER SOURCE.</p> <p>*****</p>		
5	Manually Load Following Safeguards Equipment On AC Emergency Bus:	
	<p>a. Start all SI pumps</p> <p>b. Check RCS pressure</p> <p>o Pressure GREATER THAN 250 psig (not psig adverse CNMT)</p> <p>o Pressure STABLE OR INCREASING</p> <p>c. Place RHR pump switches in AUTO</p> <p>d. Start all available CNMT RECIPRO fans</p>	<p>a. Perform the following:</p> <p>1) Start available SI pumps.</p> <p>2) <u>IF</u> SI pump A or B <u>NOT</u> available, <u>THEN</u> verify SI pump C aligned as follows:</p> <p>o <u>IF</u> SI pump A <u>NOT</u> available, <u>THEN</u> ensure MOV-871B closed.</p> <p>o <u>IF</u> SI pump B <u>NOT</u> available, <u>THEN</u> ensure MOV-871A closed.</p> <p>b. Manually start both RHR pumps and go to Step 5d.</p>

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 6 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		

<u>CAUTION</u>				
<ul style="list-style-type: none">o IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).o IF S/G NR LEVEL DECREASES TO LESS THAN 7% [25% ADVERSE CNMT] AND FEED FLOW IS LESS THAN 200 GPM, THEN THE MDAFW PUMPS SHOULD BE MANUALLY LOADED ON AC EMERGENCY BUS TO SUPPLY WATER TO THE S/G(S).				

<u>NOTE:</u> <ul style="list-style-type: none">o If MDAFW pump operation is not required, pump switches should be maintained in PULL-STOP to prevent automatic start.o TDAFW pump flow control AOVs may drift open on loss of IA.				
* 6 Monitor Intact S/G Levels:				
<table border="0"><tr><td style="vertical-align: top;"><ul style="list-style-type: none">a. Narrow range level - GREATER THAN 1% [25% adverse CNMT]</td><td style="vertical-align: top;"><ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.</td></tr></table>			<ul style="list-style-type: none">a. Narrow range level - GREATER THAN 1% [25% adverse CNMT]	<ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.
<ul style="list-style-type: none">a. Narrow range level - GREATER THAN 1% [25% adverse CNMT]	<ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.			
<p style="margin-left: 400px;"><u>IF</u> feed flow less than 200 gpm. <u>THEN</u> perform the following:</p>				
<p style="margin-left: 400px;">1) Verify MDAFW pump discharge valve to intact S/G(s) open.</p>				
<p style="margin-left: 400px;"><ul style="list-style-type: none">• S/G A, MOV-4007• S/G B, MOV-4008</p>				
<p style="margin-left: 400px;">2) Manually start MDAFW pumps as necessary (223 kw).</p>				
<ul style="list-style-type: none">b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50%				

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 7 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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7 Verify CI And CVI:

a. CI and CVI annunciators - LIT

- Annunciator A-26, CNMT ISOLATION
- Annunciator A-25, CONTAINMENT VENTILATION ISOLATION

b. Verify CI and CVI valve status lights - BRIGHT

c. CNMT RECIRC fan coolers SW outlet valve status lights - BRIGHT

- AOV-4561
- AOV-4562

a. Depress manual CI pushbutton.

b. Manually close CI and CVI valves. IF valves can NOT be verified closed by MCB indication, THEN dispatch AO to locally close valves (Refer to ATT-3.0, ATTACHMENT CI/CVI).

c. Dispatch AO to locally fail open valves.

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 8 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Verify CNMT Spray Not Required: o Annunciator A-27. CNMT SPRAY - EXTINGUISHED o CNMT pressure - LESS THAN 28 PSIG	 <u>IF</u> CNMT pressure is less than 28 psig. <u>THEN</u> perform the following: a. Reset CNMT spray. b. Place CNMT spray pump discharge valve switches to CLOSE to deenergize open contactor. <u>IF NOT</u> . <u>THEN</u> perform the following: a. Depress manual CNMT spray pushbuttons (2 of 2). b. Ensure CNMT spray pump discharge valves open. o CNMT spray pump A: <ul style="list-style-type: none">• MOV-860A• MOV-860B o CNMT spray pump B: <ul style="list-style-type: none">• MOV-860C• MOV-860D c. Verify NaOH tank flow (FI-930). <u>IF</u> NaOH flow <u>NOT</u> indicated. <u>THEN</u> place switches for NaOH tank outlet valves to OPEN. <ul style="list-style-type: none">• AOV-836A• AOV-836B d. Start both CNMT spray pumps.. e. Go to step 10.

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 9 of 9
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Place CNMT Spray Pumps In AUTO	
10	Check RCP Seal Injection Needle Valves - CLOSED	Locally close valves before starting charging pump.
	<ul style="list-style-type: none">• V-300A• V-300B	
	<u>NOTE:</u> FR procedures may now be implemented as necessary.	
11	Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1	
	-END-	

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 1 of 1
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ECA-0.2 APPENDIX LIST

TITLE

- 1) ATTACHMENT CI/CVI (ATT-3.0)
- 2) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 3) FOLDOUT

EOP: ECA-0.2	TITLE: LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	REV: 16 PAGE 1 of 1
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FOLDOUT PAGE

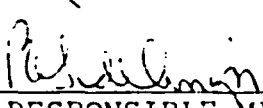
1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 1 of 34
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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP:	TITLE:	REV: 23
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	PAGE 2 of 34

- 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. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when cold leg recirculation capability cannot be verified.
 - b. ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, when recirculation cannot be established or maintained OR when RWST level is < 15% and recirculation has not been established.
 - c. ECA-1.2, LOCA OUTSIDE CONTAINMENT, when a LOCA outside containment cannot be isolated.

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 3 of 34
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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 EMERGENCY COOLANT RECIRCULATION IS ESTABLISHED DURING THIS PROCEDURE, FURTHER RECOVERY ACTIONS SHOULD CONTINUE BY RETURNING TO ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.</p> <p>o IF SUCTION SOURCE IS LOST TO ANY SI OR CNMT SPRAY PUMP, THE PUMP SHOULD BE STOPPED.</p> <p>*****</p> <p><u>NOTE:</u> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p>o FOLDOUT page should be open and monitored periodically.</p> <p>★ 1 Verify CNMT Sump Recirculation Capability:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Check CNMT Sump B level - AT LEAST 113 INCHES</p> </td> <td style="vertical-align: top;"> <p>a. <u>IF</u> Sump B level less than 113 inches due to a loss of RCS inventory outside CNMT, <u>THEN</u> go to Step 2.</p> </td> </tr> </table>			<p>a. Check CNMT Sump B level - AT LEAST 113 INCHES</p>	<p>a. <u>IF</u> Sump B level less than 113 inches due to a loss of RCS inventory outside CNMT, <u>THEN</u> go to Step 2.</p>
<p>a. Check CNMT Sump B level - AT LEAST 113 INCHES</p>	<p>a. <u>IF</u> Sump B level less than 113 inches due to a loss of RCS inventory outside CNMT, <u>THEN</u> go to Step 2.</p>			
<p>This Step continued on the next page.</p>				

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 4 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 1 continued from previous page)	
b.	Check RHR system:	b. Perform the following:
	<ul style="list-style-type: none"> o RHR pumps - OPERABLE o RHR suction valves from sump B - OPERABLE <ul style="list-style-type: none"> • MOV-850A • MOV-850B o RHR pump discharge to Rx vessel deluge valves - OPERABLE <ul style="list-style-type: none"> • MOV-852A • MOV-852B o CCW pumps - OPERABLE o CCW to RHR Hx - OPERABLE <ul style="list-style-type: none"> • MOV-738A • MOV-738B 	<ul style="list-style-type: none"> 1) Manually or locally try to restore at least one flowpath (Refer to ATT-14.5, ATTACHMENT RHR SYSTEM to identify minimum components for one flowpath). 2) Continue with step 2. <u>WHEN</u> at least one flowpath is restored, <u>THEN</u> do steps 1c, d and e.
c.	Check at least two SW pumps - RUNNING	c. Manually start SW pumps as power supply permits (257 kw each).
d.	Check RWST level - GREATER THAN 28%	d. Go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION. Step 2 <u>AND</u> continue with step 2 of this procedure until such time as Emergency Coolant Recirculation is established.
e.	Return to procedure and step in effect.	

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 5 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Verify CNMT RECIRC Fans Running:	
	a. All fans - RUNNING	a. Manually start fans.
	b. Charcoal filter dampers green status lights - EXTINGUISHED	b. Dispatch personnel with relay rack key to locally open dampers using trip relay pushbuttons in relay room racks.
		<ul style="list-style-type: none"> • AUX RELAY RACK RA-2 for fan A • AUX RELAY RACK RA-3 for fan C
* 3	Monitor RWST Level - GREATER THAN 15%	Go to Step 27.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4 Determine CNMT Spray Requirements:

- a. Determine number of CNMT spray pumps required from table:

RWST LEVEL	CNMT PRESSURE	CNMT RECIRC FANS RUNNING	CNMT SPRAY PUMPS REQUIRED
GREATER THAN 28%	GREATER THAN 60 PSIG	-	2
	BETWEEN 28 PSIG AND 60 PSIG	0 OR 1	2
		2 OR 3	1
		ALL	0
	LESS THAN 28 PSIG	-	0
BETWEEN 15% AND 28%	GREATER THAN 60 PSIG	-	2
	BETWEEN 28 PSIG AND 60 PSIG	0, 1, 2, OR 3	1
		ALL	0
	LESS THAN 28 PSIG	-	0
LESS THAN 15%	-	-	0

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 4 continued from previous page)	
b.	CNMT spray pumps running - EQUAL TO MINIMUM NUMBER REQUIRED	<p>b. Manually operate CNMT spray pumps as necessary.</p> <p><u>IF</u> CNMT spray pump(s) must be stopped, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Reset CNMT spray. 2) Place CNMT spray pump in PULL STOP. 3) <u>IF</u> CNMT pressure less than 28 psig, <u>THEN</u> close discharge valves for idle CNMT spray pump(s). <ul style="list-style-type: none"> o Pump A <ul style="list-style-type: none"> • MOV-860A • MOV-860B o Pump B <ul style="list-style-type: none"> • MOV-860C • MOV-860D

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 8 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
5	<p>Add Makeup To RWST As Necessary</p> <ul style="list-style-type: none">o Refer to ATT-18.0. ATTACHMENT SFP-RWST (~ 400 gpm can be expected) <p>-OR-</p> <ul style="list-style-type: none">o Refer to S-3.2D. TRANSFERRING WATER FROM CVCS HUT(S) TO RWST OR SFP (~ 60 gpm can be expected) <p>-OR-</p> <ul style="list-style-type: none">o Refer to S-9J. BLENDING TO RWST (~ 50 gpm can be expected) <p>.....</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF CST LEVEL DECREASES TO LESS THAN 5 FEET. THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1. ALTERNATE WATER SUPPLY TO AFW PUMPS).</p> <p>.....</p> <p><u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA.</p> <p>.....</p> <p>* 6 Monitor Intact S/G Levels:</p> <table border="0"><tr><td style="vertical-align: top;"><ul style="list-style-type: none">a. Narrow range level GREATER THAN 1% [25% adverse CNMT]b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50%</td><td style="vertical-align: top;"><ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G..b. <u>IF</u> narrow range level in any S/G continues to increase. <u>THEN</u> stop feed flow to that S/G.</td></tr></table>	<ul style="list-style-type: none">a. Narrow range level GREATER THAN 1% [25% adverse CNMT]b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50%	<ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G..b. <u>IF</u> narrow range level in any S/G continues to increase. <u>THEN</u> stop feed flow to that S/G.	
<ul style="list-style-type: none">a. Narrow range level GREATER THAN 1% [25% adverse CNMT]b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50%	<ul style="list-style-type: none">a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G..b. <u>IF</u> narrow range level in any S/G continues to increase. <u>THEN</u> stop feed flow to that S/G.			

EOP:	TITLE:	REV: 23
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	PAGE 9 of 34

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Shutdown margin should be monitored during RCS cooldown (Refer to FIG-2.0, FIGURE SDM).</p>	
7	<p>Initiate RCS Cooldown To Cold Shutdown:</p>	
	<p>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p>	
	<p>b. Dump steam to condenser from intact S/G(s)</p>	<p>b. Manually or locally dump steam from intact S/G(s):</p> <ul style="list-style-type: none"> o Use S/G ARVs <p>-OR-</p> <ul style="list-style-type: none"> o Open TDAFW pump steam supply valves. <p>-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to perform the following: <ul style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam supply root valve. V-3578. 3) Open 1A and 1B priming air ejector isolation valves. <ul style="list-style-type: none"> • V-3580 • V-3581 <p><u>IF</u> no intact S/G available, <u>THEN</u> use faulted S/G.</p>

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 10 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check ECCS Pump Status:	Go to step 19.
	o SI Pumps - ANY RUNNING	
	-OR-	
	o RHR Pumps - ANY RUNNING IN INJECTION MODE	

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

9	Reset SI If Necessary	
10	Establish One Train Of SI Flow	
	a. SI pumps - LESS THAN THREE RUNNING	a. Stop one SI pump.
	b. RCS pressure - LESS THAN 250 psig [465 psig adverse CNMT]	b. Stop RHR pumps and go to Step 11.
	c. RHR pump - ONLY ONE RUNNING	c. <u>IF</u> two RHR pumps running. <u>THEN</u> stop one RHR pump.
		<u>IF</u> no RHR pumps running. <u>THEN</u> start one RHR pump.

EOP:	TITLE:	REV: 23
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	PAGE 11 of 34

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	<p>Verify No Backflow From RWST To Sump:</p> <p>a. Any RHR suction valve from sump B - OPEN</p> <ul style="list-style-type: none"> • MOV-850A • MOV-850B <p>b. RWST outlet valve to RHR pump suction (MOV-856) - CLOSED</p>	<p>a. <u>IF</u> both RHR suction valves from sump B closed, <u>THEN</u> go to Step 12.</p> <p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) Place MOV-856 key switch to ON 2) Manually close valve <p><u>IF</u> valve can <u>NOT</u> be closed manually, <u>THEN</u> direct AO to locally close valve.</p>
12	<p>Reset CI:</p> <p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-20, CNMT ISOLATION - EXTINGUISHED</p>	<p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) Reset SI. 2) Depress CI reset pushbutton.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>13 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure SW isolation. 2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following: <ol style="list-style-type: none"> a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS. 3) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.

EOP:	TITLE:	REV: 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
	o Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
	o Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).
		<u>IF NOT</u> , <u>THEN</u> perform the following:
		o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).
		3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Check SW pumps AT LEAST TWO PUMPS RUNNING	: Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to Step 14d.

This Step continued on the next page.

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 14 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 14 continued from previous page)	
c.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressor can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure GREATER THAN 60 PSIG o Pressure STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 15. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 14f and g.
f.	Reset both trains of XY relays for IA to CHMT A01 5397	
g.	Verify IA : CHMT A01 5397 OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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15 Establish Required Charging
Line Flow:

a. Charging pumps - ANY RUNNING

a. Perform the following:

- 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO to locally close seal injection needle valves to affected RCP:

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

2) Ensure HCV-142 demand at 0%.

3) Start one charging pump.

b. Establish 20 gpm total charging
flow

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 16 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>		
16	Check If An RCP Should Be Started:	
	a. All RCPs - STOPPED	a. Stop all but one RCP and go to step 17.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	b. Go to Step 17.
	c. Try to start an RCP:	
	1) Establish conditions for starting an RCP	
	o Bus 11A or 11B energized	
	o Refer to ATT-15.0. ATTACHMENT RCP START	
	2) Start one RCP.	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*17	<p>Monitor SI Termination Criteria:</p> <p>a. Check RVLIS indication:</p> <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] <p>-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% <p>b. RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p>	<p>a. Go to step 19.</p> <p>b. Limit RCS injection flow (SI, RHR and charging) to that required to remove decay heat:</p> <ul style="list-style-type: none"> o Determine required injection flow using FIG-6.0. FIGURE MIN RCS INJECTION o Stop SI and/or RHR pumps as necessary to establish and maintain minimum required injection flow. o IF required injection flow is less than 100 gpm. <u>THEN</u> establish charging at required flow and go to Step 18. <p>IF required injection flow is greater than 100 gpm. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Establish minimum charging flow for RCP seal injection. 2) Establish sufficient SI pumps and adjust charging flow to satisfy minimum required injection flow. 3) Consult TSC to determine if SI pump discharge valves should be locally throttled. (Locked valve key required.) 4) Go to Step 19.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Stop SI And RHR Pumps And Place In Auto	
*19	Verify Adequate RCS Makeup Flow:	
	<ul style="list-style-type: none"> a. Check RVLIS indication: <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84% 	<ul style="list-style-type: none"> a. Increase RCS injection flow as necessary to maintain RVLIS indication stable.
	<ul style="list-style-type: none"> b. Core exit T/Cs - STABLE OR DECREASING 	<ul style="list-style-type: none"> b. Increase RCS injection flow to maintain core exit T/Cs stable or decreasing.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	<p>Check If Emergency D/Gs Should Be Stopped:</p> <p>a. Verify AC emergency busses energized by offsite power:</p> <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED <p>b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1. ATTACHMENT D/G STOP)</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers as necessary: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Ensure condenser steam dump mode control in MANUAL. 4) Restore power to MCCs: <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 5) Start HP seal oil backup pump. 6) Ensure D/G load within limits. 7) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting breaker. 8) Refer to ATT-8.4. ATTACHMENT SI/UV for other equipment lost with loss of offsite power. 9) Try to restore offsite power. (Refer to ER-ELEC.1. RESTORATION OF OFFSITE POWER)

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</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> <p>*****</p> <p><u>NOTE:</u> If normal RCP support conditions can NOT be satisfied, then any running RCP(s) should be stopped.</p>		
21	Depressurize RCS To Decrease RCS Subcooling:	
	<p>a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 10°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p> <p>b. Normal PRZR spray -AVAILABLE</p> <p>c. Depressurize RCS until either of the following conditions satisfied:</p> <p>o RCS subcooling based on core exit T/Cs LESS THAN 10°F USING FIG 1.0. FIGURE MIN SUBCOOLING</p> <p style="text-align: center;">or</p> <p>o PRZR level GREATER THAN 10% [65% adverse CMT]</p> <p>d. <u>WHEN</u> either condition met. <u>THEN</u> stop RCS depressurization.</p> <p>e. Check RCS subcooling GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p>	<p>a. Go to Step 22.</p> <p>b. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0. ATTACHMENT N2 PORVS.</p> <p><u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p>e. Increase RCS makeup flow as necessary to restore subcooling.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 23.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 23.
c.	Place letdown pressure controller (PCV-135) in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371. letdown isolation valve • AOV-427. loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371. 3) Place AOV-427 switch to OPEN. 4) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 23.
f.	Place RCS overpressure protection system in service (Refer to O-1. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using ATT-14.1. ATTACHMENT RHR COOL	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Check If SI ACCUMs Should Be Isolated:

a. Both RCS hot leg temperatures - LESS THAN 400°F

a. Continue with Step 24. WHEN both RCS hot leg temperatures less than 400°F. THEN do Steps 23b, c and d.

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

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

c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

c. Vent any unisolated ACCUMs:

1) Open vent valves for unisolated SI ACCUMs.

- ACCUM A. AOV-834A
- ACCUM B. AOV-834B

2) Open HCV-945.

IF an accumulator can NOT be isolated or vented. THEN consult TSC for contingency actions.

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*24	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 25.
	b. Check the following:	b. Stop affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF	
25	Check Core Exit T/Cs - GREATER THAN 200°F	Go to Step 40.
26	Check RWST Level - LESS THAN 15%	Return to Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Minimize RWST Outflow:	
a.	Any SI pump(s) - RUNNING	a. <u>IF</u> charging pump suction aligned to RWST, <u>THEN</u> perform the following:
		1) Verify SI pump suction aligned to RWST. MOV-825A or MOV-825B open.
		2) Start one SI pump and verify flow.
		3) Stop running charging pumps.
		4) Go to Step 27d.
b.	Stop all but one SI pump	
c.	Check charging pump suction from RWST (AOV-112B) - CLOSED	c. Stop all charging pumps
d.	Stop both RHR pumps	
e.	Pull Stop both CNMT spray pumps	
f.	Check CNMT pressure - LESS THAN 28 PSIG	f. Go to Step 28.
g.	Reset CNMT spray	
h.	Close discharge valves for idle CNMT spray pump	
	o Pump A	
	• MOV-860A	
	• MOV-860B	
	o Pump B	
	• MOV-860C	
	• MOV-860D	
i.	Determine required injection flow using FIG-6.0. FIGURE MIN RCS INJECTION	
j.	Consult TSC to determine if SI pump discharge valve should be locally throttled (locked valve key required)	

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 25 of 34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*28	Check SI pump flow - STABLE	<u>IF</u> SI flow zero or erratic, <u>THEN</u> stop running SI pump.
29	Try To Add Makeup To RCS From VCT:	
	a. Check VCT level - GREATER THAN 5%	a. Stop charging pumps taking suction from VCT and continue with Step 30. <u>WHEN</u> VCT level greater than 5%, <u>THEN</u> do Steps 29b and c.
	b. Verify charging pumps aligned to VCT	b. Manually align valves as necessary.
	o LCV-112C - OPEN	
	o LCV-112B - CLOSED	
	c. Establish two charging pumps running	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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30 Establish Maximum VCT Makeup:

- | | |
|--|---|
| <p>a. Check RMW control armed - RED LIGHT LIT</p> <p>b. Check VCT level - LESS THAN 20%</p> <p>c. Check VCT makeup system - OPERATING IN AUTO</p> <p>d. Increase VCT makeup flow</p> <ol style="list-style-type: none"> 1) Start both RMW pumps 2) Start both boric acid pumps 3) Adjust RMW controller (HC-111) to maximum flow from table | <p>a. Place RMW mode switch in AUTO and place RMW control switch to START.</p> <p>b. Continue with Step 31. <u>WHEN</u> VCT level less than 20%. <u>THEN</u> do Steps 30c, d and e.</p> <p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Open makeup system valves. <ul style="list-style-type: none"> • AOV-110B • AOV-110C • AOV-111 2) Start BA transfer pumps and RMW pumps. 3) Open boric acid flow control valve (AOV-110A). |
|--|---|

BACT CONC (PPM)	MAX RMW FLOW (GPM)
8750 (5%)	40
10500 (6%)	50
12250 (7%)	60
14000 (8%)	70
15750 (9%)	80
17500 (10%)	90

- 4) Adjust boric acid flow controller (HC 110A) to MANUAL to 9.5 gpm
- e. Adjust charging pump speed to stabilize VCT level

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	<p>Add Makeup To RWST As Necessary</p> <ul style="list-style-type: none"> o Refer to ATT-18.0, ATTACHMENT SFP-RWST (~ 400 gpm can be expected) -OR- o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST OR SFP (~ 60 gpm can be expected) -OR- o Refer to S-9J, BLENDING TO RWST (~ 50 gpm can be expected) 	
32	<p>Try To Add Makeup To RCS From Alternate Source:</p> <ul style="list-style-type: none"> a. Evaluate Use Of RCDT Pumps (Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING) b. Consult TSC to determine other means of makeup 	
33	<p>Verify SI ACCUM Isolation Valves - OPEN</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 	<p><u>IF</u> valves were closed to prevent SI ACCUM nitrogen injection, <u>THEN</u> go to Step 37.</p> <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Dispatch A0 to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C b. Open SI ACCUM discharge valves.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Depressurize All Intact S/Gs To 785 PSIG:	
a.	Check S/G pressures - GREATER THAN 785 PSIG	a. Go to Step 35.
b.	Dump steam to condenser at maximum rate	b. Manually or locally dump steam at maximum rate from intact S/G(s): <ul style="list-style-type: none"> o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch A0 to perform the following: <ol style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581
c.	Check S/G pressures - LESS THAN 785 PSIG	c. Return to Step 34b.
d.	Stop S/G depressurization	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> The intent of the next step is to depressurize S/Gs more slowly, but at a rate that will maintain required RVLIS level.</p>	
35	<p>Depressurize Intact S/Gs To 200 PSIG Slowly To Inject SI ACCUMs:</p>	
	<p>a. Dump steam to condenser as necessary to maintain appropriate RVLIS indication:</p> <ul style="list-style-type: none"> o Level (no RCPs) - BETWEEN 77% AND 82% [82% AND 85% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - BETWEEN 84% AND 90% 	<p>a. Manually or locally dump steam from intact S/G(s) to maintain appropriate RVLIS indication:</p> <ul style="list-style-type: none"> o Use S/G ARVs <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Open steam supply valves to TDAFW pump <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to perform the following: <ul style="list-style-type: none"> 1) Open affected S/G MSIV bypass valve. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581
	<p>b. Check S/G pressures - LESS THAN 200 PSIG</p>	<p>b. Return to Step 35a.</p>
	<p>c. Stop S/G depressurization</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Both RCS hot leg temperatures - LESS THAN 400°F</p> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Continue with Step 37. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 36b, c and d.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC for contingency actions.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*37	Monitor RCP Operation:	
	<ul style="list-style-type: none"> a. RCPs - ANY RUNNING b. Check the following: <ul style="list-style-type: none"> o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0, FIGURE RCP SEAL LEAKOFF 	<ul style="list-style-type: none"> a. Go to Step 38. b. Stop affected RCP(s).
38	Depressurize All Intact S/Gs To Atmospheric Pressure:	
	<ul style="list-style-type: none"> a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR. b. Dump steam to condenser 	<ul style="list-style-type: none"> b. Manually or locally dump steam from intact S/G(s): <ul style="list-style-type: none"> o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: <ul style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581

EOP:	TITLE:	REV: 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 38.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 38.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Return to Step 38.
f.	Place RCS overpressure protection system in service (Refer to O. 1. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using ATT-14.1. ATTACHMENT RHR COOL	

EOP: ECA-1.1	TIME: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 33 of 34
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

40 Maintain RCS Heat Removal:

- a. Use RHR system if in service
- b. Dump steam to condenser from intact S/Gs

- b. Manually or locally dump steam from intact S/G(s):

- o Use S/G ARVs

-OR-

- o Open steam supply valves to TDAFW pump

-OR-

- o Dispatch AO to perform the following:

1) Open S/G MSIV bypass valves.

2) Open priming air ejector steam isolation valves

- V-3580
- V-3581

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

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 34 of 34
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in the next step.

41 Check CNMT Hydrogen
Concentration:

- a. Direct RP to start CNMT hydrogen monitors as necessary
- b. Hydrogen concentration - LESS THAN 0.5%
- b. Consult TSC to determine if hydrogen recombiners should be placed in service.

42 Consult TSC

-END-

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ECA-1.1 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) FIGURE SDM (FIG-2.0)
- 3) FIGURE MIN RCS INJECTION (FIG-6.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT RHR COOL (ATT-14.1)
- 6) ATTACHMENT SFP-RWST (ATT-18.0)
- 7) ATTACHMENT RCP START (ATT-15.0)
- 8) ATTACHMENT SD-1 (ATT-17.0)
- 9) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 10) ATTACHMENT RHR SYSTEM (ATT-14.5)
- 11) ATTACHMENT N2 PORVS (ATT 12.0)
- 12) ATTACHMENT NO SW PUMPS (ATT 2.4)
- 13) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 14) ATTACHMENT SI/UV (ATT 8.4)
- 15) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 16) FOLDOUT

EOP: ECA-1.1	TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION	REV: 23 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA


IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

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GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-2.1	TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	REV: 28 PAGE 2 of 36
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- A. PURPOSE - This procedure provides actions to mitigate and minimize a loss of secondary coolant from both steam generators.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-2, FAULTED STEAM GENERATOR ISOLATION, when an uncontrolled depressurization of both steam generators occurs.

EOP: ECA-2.1	TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	REV: 28 PAGE 3 of 36
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>*****</p> <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open AND monitored periodically. o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION). o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. 		
1	<p>Check Secondary Pressure Boundary:</p> <ul style="list-style-type: none"> o MSIVs - CLOSED o MFW flow control valves - CLOSED <ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves o MFW pump discharge valves - CLOSED o S/G blowdown and sample valves - CLOSED o TDAFW pump steam supply valves - PULL STOP o TDAFW pump flow control valves - CLOSED o S/G ARVs - CLOSED o Dispatch AO to locally isolate S/Gs (Refer to ATT-10.0, ATTACHMENT FAULTED S/G) 	<p>Manually close valves one loop at a time.</p> <p>IF valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths, as necessary, one loop at a time.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

A MINIMUM FEED FLOW OF 50 GPM MUST BE MAINTAINED TO EACH S/G WITH A NARROW RANGE LEVEL LESS THAN 7% [25% ADVERSE CNMT].

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to FIG-2.0, FIGURE SDM).

2 Control Feed Flow To Minimize
RCS Cooldown:

- | | |
|--|---|
| a. Check cooldown rate in RCS cold legs - LESS THAN 100°F/HR | a. Decrease feed flow to 50 gpm to each S/G and go to Step 2c. |
| b. Check narrow range level in both S/Gs - LESS THAN 50% | b. Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| c. Check RCS hot leg temperatures - STABLE OR DECREASING | c. Control feed flow or dump steam to stabilize RCS hot leg temperatures. |

* 3 Monitor RCP Trip Criteria:

- | | |
|---|------------------|
| a. RCP status - ANY RCP RUNNING | a. Go to Step 4. |
| b. SI pumps - AT LEAST TWO RUNNING | b. Go to Step 4. |
| c. RCS pressure minus maximum S/G pressure - LESS THAN 1/5 psig [400 psig adverse CNMT] | c. Go to Step 4. |
| d. Stop both RCPs | |

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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, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 4B).</p> <p>*****</p>		
* 4	Monitor PRZR PORVs And Block Valves:	
	a. Power to PORV block valves - AVAILABLE	a. Restore power to block valves unless block valve was closed to isolate an open PORV:
		<ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
	b. PORVs - CLOSED	b. <u>IF</u> PRZR pressure less than 2335 psig. <u>THEN</u> manually close PORVs.
		<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> dispatch AO to locally check breaker.</p> <ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
	c. Block valves - AT LEAST ONE OPEN	c. Open one block valve unless it was closed to isolate an open PORV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	<p>Check Secondary Radiation Levels - NORMAL</p> <ul style="list-style-type: none"> o Steamline radiation monitor (R-31 and R-32) o Dispatch AO to locally check steamline radiation o Request RP sample S/Gs for activity 	<p>Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p>
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET. THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p>		
6	Reset SI	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
* 7	Monitor If RHR Pumps Should Be Stopped:	
	a. RHR pumps - ANY RUNNING IN INJECTION MODE	a. Go to Step 8.
	b. Check RCS Pressure:	
	1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	1) Go to E-1. LOSS OF REACTOR OR SECONDARY COOLANT. Step 1.
	2) Pressure - STABLE OR INCREASING	2) Go to Step 8.
	c. Stop RHR pumps and place in AUTO	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 8	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - RUNNING	a. Go to Step 9.
b.	Check the following:	b. Continue with Step 9. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 8c through f.
	o CNMT pressure - LESS THAN 4 PSIG	
	o Sodium hydroxide tank level - LESS THAN 55%	
c.	Reset CNMT spray	
d.	Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE. • AOV-836A • AOV-836B
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves	
	• MOV-860A • MOV-860B • MOV-860C • MOV-860D	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Check RWST Level - GREATER THAN 28%	Go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION. Step 1.
10	Reset CI: a. Depress CI reset pushbutton b. Verify annunciator A-26. CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.
11	Verify Adequate SW Flow: a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following: 1) Ensure SW isolation. 2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following: a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS. 3) <u>IF only one SW pump running.</u> <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.
	b. Dispatch A0 to establish normal shutdown alignment (Refer to ATT-17.0. ATTACHMENT SD-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
	o Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
	o Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).
		<u>IF NOT</u> , <u>THEN</u> perform the following:
		o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).
		3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Check SW pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to Step 12d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 12 continued from previous page)	
	c. Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
	d. Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2. ATTACHMENT DIESEL AIR COMPRESSOR).
	e. Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1. LOSS OF INSTRUMENT AIR).. 2) Continue with Step 13. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12f and g.
	f. Reset both trains of XY relays for IA to CNMT AOV-5392	
	g. Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If SI ACCUMs Should Be Isolated:	
	<ul style="list-style-type: none"> a. Both RCS hot leg temperatures - LESS THAN 400°F b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C c. Close SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841 • MOV-865 d. Locally reopen breakers for MOV-841 and MOV-865 	<ul style="list-style-type: none"> a. Go to Step 14. c. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC for contingency actions.</p>
14	Check Normal Power Available To Charging Pumps:	
	<ul style="list-style-type: none"> o Bus 14 normal feed breaker CLOSED o Bus 16 normal feed breaker CLOSED 	<p>Verify adequate emergency D/G capacity to run charging pumps (75 kw each).</p> <p><u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer ATT-4.0, ATTACHMENT CNMT RECIRC ...).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
b.	Align charging pump suction to RWST:	<p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary and adjust charging flow to restore FRZF level	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*16	Monitor SI Termination Criteria:	
a.	SI pumps - ANY RUNNING	a. Go to Step 18.
b.	Check RCS pressure:	b. DO <u>NOT</u> stop SI pumps. Perform the following:
	o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT]	1) Energize PRZR heaters and operate PRZR spray as necessary to stabilize RCS pressure greater than 1625 psig [1825 psig adverse CNMT]
	o Pressure - STABLE OR INCREASING	2) Return to Step 2.
c.	RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	c. DO <u>NOT</u> stop SI pumps. Return to Step 2.
d.	PRZR level - GREATER THAN 10% [30% adverse CNMT]	d. Do <u>NOT</u> stop SI pumps. Perform the following:
		1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray.
		2) Return to Step 16a.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> o Following SI termination, RCP trip criteria is no longer applicable.</p> <p> o Foldout Page E-2 transition criteria does not apply while performing steps 17 and 18.</p>		
17	Stop SI and RHR Pumps And Place In Auto	
18	Monitor SI Reinitiation Criteria:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 10% [30% adverse CNMT]</p>	<p>a. Manually start SI pumps as necessary and return to Step 2.</p> <p>b. Control charging flow to maintain PRZR level.</p> <p>IF PRZR level can <u>NOT</u> be maintained. <u>THEN</u> manually start SI pumps as necessary and return to Step 2.</p>
19	Check RCS Hot Leg Temperatures - STABLE OR DECREASING	Control feed flow or dump steam to stabilize RCS hot leg temperatures.
20	Check Narrow Range Level In Both S/Gs - LESS THAN 50%	Control feed flow to maintain narrow range level less than 50% in both S/Gs.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 27.</p>
b.	Verify AUX BLDG SW isolation valves - OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> • MOV-4615 and MOV-4/34 • MOV-4616 and MOV-4/35 	
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 21 continued from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored:	a. Continue with Step 27. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 22 through 26.
	o IA to CNMT (AOV-5392) - OPEN	
	o IA pressure - GREATER THAN 60 PSIG	
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following:
		1) Verify MCC A energized.
		2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following:
		1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s).
		• RCP A, MOV-749A and MOV-759A
		• RCP B, MOV-749B and MOV-759B
		2) Manually start one CCW pump.
d.	Charging pump: AN: RUNNING	d. Continue with Step 27. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 23 through 26.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Verify PRZR Level - GREATER THAN 20% [40% adverse CNMT]	Continue with Step 25. <u>WHEN</u> PRZR level increases to greater than 20% [40% adverse CNMT], <u>THEN</u> do Step 24.
24	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> Verify charging line flow to REGEN Hx - GREATER THAN 20 GPM Place the following switches to CLOSE: <ul style="list-style-type: none"> Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) AOV-371, letdown isolation valve AOV-427, loop B cold leg to REGEN Hx Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> TCV-130 PCV-135 Reset both trains of XY relays for AOV-371 and AOV-427 Open AOV-371 and AOV-427 Open letdown orifice valves as necessary Place PCV-135 in AUTO at 250 psig Place TCV-130 in AUTO at the normal setpoint Adjust charging pump speed and HCV-142 as necessary 	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> Place excess letdown divert valve, AOV-312, to NORMAL. Ensure CCW from excess letdown open. (AOV-745). Open excess letdown isolation valve AOV-310. Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	25 Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Adjust RMW flow control valve in AUTO to 40 gpm	
	c. Verify the following:	c. Adjust controls as necessary.
	1) RMW mode selector switch in AUTO	
	2) RMW control armed - RED LIGHT LIT	
	d. Check VCT level:	d. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20%	
	-OR-	
	o Level - STABLE OR INCREASING	
		1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT.</u> <u>THEN</u> reset MCC C and MCC D UV lockouts as necessary.
		2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.
		3) Increase boric acid flow as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	<p>Check Charging Pump Suction Aligned To VCT:</p> <p>a. VCT level - GREATER THAN 20%</p> <p>b. Verify charging pumps aligned to VCT:</p> <ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED 	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%. <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed 2) Continue with Step 27. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 26b. <p>b. Manually align valves as necessary.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	<p>Check RCP Cooling:</p> <p>a. Check CCW to RCPs:</p> <ul style="list-style-type: none"> o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED <p>b. Check RCP seal injection:</p> <ul style="list-style-type: none"> o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP seal injection flow to each RCP - GREATER THAN 6 GPM 	<p>Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 29.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down. <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A. AOV-270A • RCP B. AOV-270B <p>IF both RCP seal discharge valves are shut, <u>THEN</u> go to Step 29.</p>
f.	Verify RCP #1 seal leakoff flow GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1. RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves. o When using PRZR PORV, select one with an operable block valve. 	
29	Energize Heaters And Operate Normal Spray As Necessary To Maintain RCS Pressure Stable	<p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p> <p><u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump 5) Ensure D/G load within limits. 6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 7) Refer to ATT-8.4, ATTACHMENT SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>		
31	Check RCP Status	
a.	Both RCPs - STOPPED	a. Go to Step 32.
b.	Check RVLIS level (no RCPs) - ≥ 95%	b. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following: <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT] o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0. FIGURE MIN SUBCOOLING o Energize PRZR heaters as necessary to saturate PRZR water <u>IF</u> conditions <u>NOT</u> met, <u>THEN</u> continue with Step 32. <u>WHEN</u> conditions met, <u>THEN</u> do Steps 31c and d.
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 31 continued from previous page)	
	c. Establish conditions for starting an RCP:	c. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:
	o Ensure Bus 11A or 11B energized.	1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).
	o Refer to ATT-15.0, ATTACHMENT RCP START.	<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase feed flow or dumping steam.
		2) Go to Step 32.
	d. Start one RCP.	d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).
		<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase feed flow or dumping steam.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>	
32	Check If Source Range Detectors Should Be Energized:	
a.	Source range channels - DEENERGIZED	a. Go to Step 32e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS	b. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing <u>THEN</u> initiate boration. 2) Continue with Step 33. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel. <u>THEN</u> do Steps 32c, d and e.
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with step 33. <u>WHEN</u> either condition met. <u>THEN</u> do Steps 32d and e.
d.	Verify source range detectors ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2). <p><u>IF</u> source ranges can <u>NOT</u> be restored. <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 33.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel.	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1. ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1. RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2.
	b. Perform the following:	
	o Open generator disconnects	
	• 1G13A71	
	• 9X13A73	
	o Place voltage regulator to OFF	
	o Open turbine drain valves	
	o Rotate reheater steam supply controller cam to close valves	
	o Place reheater dump valve switches to HAND	
	o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following:
		o Dispatch AO to reset UV relays at MCC C and MCC D.
		o Manually start one fan as power supply permits (23 kw)
	d. Verify ATT 17.1. ATTACHMENT SD-2 - COMPLETE	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Maintain Plant Conditions - STABLE o RCS pressure o PRZR level o RCS temperatures	Control plant systems as necessary to maintain conditions stable.
36	Monitor SI Reinitiation Criteria: a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING b. PRZR level - GREATER THAN 10% [30% adverse CMUT]	a. Manually start SI pumps as necessary. Return to Step 2. b. Control charging flow to maintain PRZR level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary. Return to Step 2.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 10% [30% adverse CNMT] <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Go to Step 38.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented. <u>THEN</u> consult TSC for contingency actions.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0. FIGURE SDM	b. Borate as necessary.
39	Check RCS Hot Leg Temperatures - LESS THAN 350° F	Control feed flow and dump steam to establish RCS cooldown rate less than 100° F/hr in RCS cold legs.
*40	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 41.
	b. Check the following:	b. Stop affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves. o When using PRZR PORV, select one with operable block valve. 	
*41	Check RCS Pressure - LESS THAN 400 PSIG [300 PSIG adverse CNMT]	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Depressurize RCS using normal PRZR spray. <u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray. <u>IF NOT</u>, <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS. b. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F using FIG-1.0, FIGURE MIN SUBCOOLING. c. Return to Step 36.

EOP: ECA-2.1	TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	REV: 28 PAGE 35 of 36
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
42	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 36.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 40.
c.	Place letdown pressure controller (PCV-135) in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Return to Step 40.
f.	Place RCS overpressure protection system in service (Refer to O-7. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	f. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
g.	Establish RHR normal cooling (Refer to ATT-14.1. ATTACHMENT RHR COOL)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43	Continue RCS Cooldown To Cold Shutdown: a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Check narrow range level in both S/Gs - LESS THAN 50%	b. Control feed flow to maintain narrow range level less than 50% in both S/Gs.
44	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 43.
45	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	
-END-		

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ECA-2.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT FAULTED S/G (ATT-10.0)
- 6) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 7) ATTACHMENT NC (ATT-13.0)
- 8) ATTACHMENT RCP START (ATT-15.0)
- 9) ATTACHMENT N2 PORVS (ATT-12.0)
- 10) ATTACHMENT SEAL COOLING (ATT-15.2)
- 11) ATTACHMENT SI/UV (ATT 8.4)
- 12) ATTACHMENT D/G STOP (ATT-8.1)
- 13) ATTACHMENT SD-1 (ATT 17.0)
- 14) ATTACHMENT SD-2 (ATT 17.1)
- 15) ATTACHMENT RHF COOL (ATT 14.1)
- 16) ATTACHMENT NO SW PUMPS (ATT 2.4)
- 17) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 18) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 19) FOLDOUT

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% | [30% ADVERSE CNMT]

3. E-2 TRANSITION CRITERIA

IF any S/G pressure increases at any time (except while performing SI termination in Steps 17 and 18), THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

5. AFW SUPPLY SWITCHOVER CRITERION

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

6. E-3 TRANSITION CRITERIA

IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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GINNA STATION
CONTROLLED COPY NUMBER 23

R. J. [Signature]
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 2 of 39
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A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS for an SGTR concurrent with a LOCA (i.e. Ruptured-Faulted S/G).

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

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

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p> <p><u>NOTE:</u> o Foldout page should be open AND monitored periodically.</p> <p> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p>1 Reset SI</p> <p>2 Reset CI:</p> <p> a. Depress CI reset pushbutton</p> <p> b. Verify annunciator A-26. CNMT ISOLATION - EXTINGUISHED</p> <p> b. Perform the following:</p> <p> 1) Reset SI.</p> <p> 2) Depress CI reset pushbutton.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>3 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0. ATTACHMENT SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following:</p> <p>1) Ensure SW isolation.</p> <p>2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.</p> <p>3) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4 Establish IA to CNMT:

- a. Verify non-safeguards busses energized from offsite power

o Bus 13 normal feed - CLOSED

-OR-

o Bus 15 normal feed - CLOSED

- b. Check SW pumps - AT LEAST TWO PUMPS RUNNING

- c. Verify SW isolation valves to turbine building - OPEN

- MOV-4613 and MOV-4670
- MOV-4614 and MOV-4664

This Step continued on the next page.

- a. Perform the following:

- 1) Close non-safeguards bus tie breakers:

- Bus 13 to Bus 14 tie
- Bus 15 to Bus 16 tie

- 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).

IF NOT, THEN perform the following:

- o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)

-OR-

- o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).

- b. Perform the following:

- 1) Restore IA using service air compressor OR diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).

- 2) Go to Step 4d.

- c. Perform the following:

- 1) Manually align valves.
- 2) Dispatch A0 to locally reset compressors as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 4 continued from previous page)	
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 5. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 4f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 5	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed: b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 7) Refer to ATT-8.4. ATTACHMENT SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 9 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL INDICATES GREATER THAN
MINIMUM RECOMMENDED BY TSC TO ENSURE HEATERS ARE COVERED.

6 Deenergize PRZR Heaters

- a. Place PRZR proportional heaters
in PULL STOP
- b. Place PRZR backup heaters to OFF
- c. Consult TSC for a recommended
minimum indicated PRZR level
that will ensure heaters are
covered.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 10 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 7	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - ANY RUNNING	a. Go to Step 8.
b.	Check the following:	b. Continue with Step 8. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 7c through f.
	o CNMT pressure - LESS THAN 4 PSIG	
	o Sodium hydroxide tank level - LESS THAN 55%	
c.	Reset CNMT spray	
d.	Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE.
		• AOV-836A • AOV-836B
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves	
	• MOV-860A • MOV-860B • MOV-860C • MOV-860D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

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

8 Check Ruptured S/G Level:

a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]

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

1) Maintain feed flow to ruptured S/G until level greater than 7% [25% adverse CNMT].

2) Continue with Step 9. WHEN ruptured S/G level greater than 7% [25% adverse CNMT], THEN do Steps 8b through e.

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

b. Dispatch AO to locally close valve.

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

c. Pull stop MDAFW pump for ruptured S/G

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

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

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

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

e. Verify MDAFW pump cross-tie valves - CLOSED

e. Manually close valves.

- MOV-4000A
- MOV-4000B

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 12 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
* 9	Monitor If RHR Pumps Should Be Stopped:	
	<ul style="list-style-type: none"> a. RHR pumps - ANY RUNNING IN INJECTION MODE b. Check RCS pressure: <ul style="list-style-type: none"> o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] o Pressure - STABLE OR INCREASING c. Stop RHR pumps and place in AUTO 	<ul style="list-style-type: none"> a. Go to Step 10. b. Go to Step 10.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 13 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10 Evaluate Plant Status:		
a. Check auxiliary building radiation - NORMAL	<ul style="list-style-type: none"> • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • Letdown line monitor (R-9) • CHG pump room (R-4) 	a. Notify RP and refer to appropriate AR-RMS procedure. .
b. Direct RP to obtain following samples:	<ul style="list-style-type: none"> • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron • CNMT sump pH 	
c. Verify adequate Rx head cooling:	<ol style="list-style-type: none"> 1) Verify at least one control rod shroud fan RUNNING 2) Verify one Rx compartment cooling fan RUNNING 	<ol style="list-style-type: none"> 1) Manually start one fan as power supply permits (45 kw). 2) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 14 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Establish 75 GPM Charging Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to locally isolate seal injection to affected RCP. <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open.
	b. Align charging pump suction to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room). <u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
	c. Start charging pumps as necessary and establish 75 gpm total charging flow <ul style="list-style-type: none"> • Charging line flow • Seal injection 	

EOP: ECA-3.1	TIME: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 15 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 110 FSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> • Steamlines • Feedlines <p><u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
<p><u>NOTE</u>: TDAFW pump flow control AOVs may drift open on loss of IA.</p>		
*13	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 7% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in intact S/G. b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths: <ul style="list-style-type: none"> • TDAFW pump steam supply valves • S/G blowdown valves • Refer to ATT-16.0, ATTACHMENT RUPTURED S/G

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 16 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to FIG-2.0, FIGURE SDM).

14 Initiate RCS Cooldown To Cold Shutdown:

a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G

c. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available, and RHR system NOT in service, THEN perform the following:

o Use faulted S/G.

-OR-

o Use ruptured S/G.

*15 Monitor Conditions For Subcooled Recovery:

a. Check RWST level - GREATER THAN 50%

a. IF CNMT sump B level is less than 113 inches, THEN go to ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 1.

b. Check ruptured S/G narrow level - LESS THAN 90% [80% adverse CNMT]

b. Consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 17 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0° USING FIG-1.0, FIGURE MIN SUBCOOLING	Go to Step 28.
17	Check Safeguards Pump Status <ul style="list-style-type: none"> o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE 	Go to Step 24.
18	Check PRZR level - LESS THAN 20% [40% adverse CNMT]	Go to Step 20.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 18 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED						
<p>*****</p> <p style="text-align: center;"><u>CAUTION</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> <p>*****</p> <p><u>NOTE:</u> o When using PRZR PORV, select one with an operable block valve.</p> <p>o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>19 Depressurize RCS To Refill PRZR:</p> <table><tbody><tr><td>a. Use normal PRZR spray valve associated with running RCP<ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B</td><td>a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</td></tr><tr><td>b. PRZR level - GREATER THAN 20% [40% adverse CNMT]</td><td>b. Continue with Step 20. <u>WHEN</u> level greater than 20% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</td></tr><tr><td>c. Stop RCS depressurization</td><td></td></tr></tbody></table>			a. Use normal PRZR spray valve associated with running RCP <ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B	a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.	b. PRZR level - GREATER THAN 20% [40% adverse CNMT]	b. Continue with Step 20. <u>WHEN</u> level greater than 20% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.	c. Stop RCS depressurization	
a. Use normal PRZR spray valve associated with running RCP <ul style="list-style-type: none">• RCP A, PCV-431A• RCP B, PCV-431B	a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.							
b. PRZR level - GREATER THAN 20% [40% adverse CNMT]	b. Continue with Step 20. <u>WHEN</u> level greater than 20% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.							
c. Stop RCS depressurization								

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 19 of 39
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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 RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.</p> <p>*****</p>		
20	Check If An RCP Should Be Started:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 21.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	b. Go to Step 28.
	c. PRZR level - GREATER THAN 20% [40% adverse CMPT]	c. Return to Step 18.
	d. Try to start an RCP	
	1) Establish conditions for starting an RCP	
	o Bus 11A or 11B energized	
	o Refer to ATT 15.0. ATTACHMENT RCP START	
	2) Start one RCP	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 20 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 22.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIG-1.0, FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT], <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 28. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 21c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 28.
	c. Check PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 18.
	d. Stop one SI pump	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 21 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

a. Two SI pumps - RUNNING

a. Go to Step 23.

b. Determine required RCS
subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core
exit T/Cs - GREATER THAN VALUE
FROM TABLE ABOVE USING FIG-1.0.
FIGURE MIN SUBCOOLING

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

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

d. PRZR level - GREATER THAN 20%
[40% adverse CNMT]

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

e. Stop one SI pump

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 22 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 28. IF NOT, THEN go to Step 24.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	255°F [295°F adverse CNMT]
TWO	235°F [285°F adverse CNMT]
THREE	210°F [270°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIG-1.0. FIGURE MIN SUBCOOLING

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

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 23d. IF no RHR pump can be started in injection mode, THEN go to Step 28.

d. PRZR level - GREATER THAN 20% [40% adverse CNMT]

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

e. Stop running SI pump

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 23 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check If Charging Flow Should Be Controlled To Maintain PRZR Level: a. Check RHR pumps - RUNNING IN INJECTION MODE b. Go to Step 28	a. Start charging pumps and control charging flow to maintain PRZR level and go to Step 25.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 24 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

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

25 Check RCP Status

- | | |
|---|--|
| <p>a. Both RCPs - STOPPED</p> <p>b. Check RVLIS level (no RCPs) -
≥ 95%</p> | <p>a. Stop all but one RCP and go to Step 26.</p> <p>b. <u>IF</u> RVLIS level (no RCPs) less than 95%. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT] o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING o <u>WHEN</u> PRZR level indicates greater than minimum recommended by TSC. <u>THEN</u> energize PRZR heaters as necessary to saturate PRZR water <p><u>IF</u> conditions <u>NOT</u> met. <u>THEN</u> continue with Step 26. <u>WHEN</u> conditions met. <u>THEN</u> do Steps 25c and d.</p> |
|---|--|

This Step continued on the next page.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 25 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 25 continued from previous page)	
c.	Establish conditions for starting an RCP: <ul style="list-style-type: none"> o Ensure bus 11A or 11B energized. o Refer to ATT-15.0. ATTACHMENT RCP START. 	<p>c. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:</p> <p>1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p> <p>2) Go to Step 26.</p>
d.	Start one RCP	<p>d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 26 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.
 - o IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG (REFER TO STEP 29).
- *****

NOTE: o WHEN using a PRZR PORV. THEN select one with an operable block valve.

- o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

26 Depressurize RCS To Minimize
RCS Subcooling:

- | | |
|--|---|
| <p>a. Depressurize using normal PRZR spray if available</p> <p>b. <u>WHEN</u> PRZR level indicates greater than minimum recommended by TSC. <u>THEN</u> energize PRZR heaters as necessary</p> <p>c. Depressurize RCS until EITHER of the following conditions satisfied:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIG-1.0. FIGURE MIN SUBCOOLING | <p>a. Depressurize using one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0. ATTACHMENT N2 PORVS.</p> <p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> |
|--|---|

-OF

- o PRZR level GREATER THAN 75% [65% adverse CMGT]

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 27 of 39
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

27 Verify Adequate Shutdown Margin

- a. Direct RP to sample RCS and ruptured S/G for boron concentration
- b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM

- b. Borate as necessary.

28 Monitor SI Reinitiation Criteria:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING
- b. PRZR level - GREATER THAN 10% [30% adverse CNMT]

- a. Manually start SI pumps as necessary and go to Step 29.
- b. Manually start SI pumps as necessary and return to Step 18.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 28 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check If SI ACCUMs Should Be Isolated:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 10% [30% adverse CNMT]</p> <p>c. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>d. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>e. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. <u>IF</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> go to Step 29c.</p> <p><u>IF NOT</u>, <u>THEN</u> go to Step 30.</p> <p>b. Return to Step 18.</p> <p>d. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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30 Check If Emergency D/Gs
Should Be Stopped:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1. ATTACHMENT D/G STOP) | <ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1. RESTORATION OF OFFSITE POWER). |
|---|---|

31 Minimize Secondary System Contamination:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to ATT-16.0. ATTACHMENT RUPTURED S/G) | <ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing. <u>THEN</u> direct RP to sample hotwells for activity. |
|---|---|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	<p>Verify Adequate SW Flow To CCW Hx:</p> <p>a. Verify at least two SW pumps - RUNNING</p> <p>b. Verify AUX BLDG SW isolation valves - OPEN</p> <ul style="list-style-type: none"> MOV-4615 and MOV-4734 MOV-4616 and MOV-4735 	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following: <ul style="list-style-type: none"> a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER. Go to Step 33. <p>b. Manually align valves.</p>

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 32 continued from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33 Check RCP Cooling		Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).
a. Check CCW to RCPs		
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
b. Check RCP seal injection		
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	Check If Seal Return Flow Should Be Established:	
a.	Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
b.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 35.
c.	Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
d.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
e.	Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
f.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve • RCP A. AOV-270A • RCP B. AOV-270B <u>IF</u> both RCP seal discharge valves are shut. <u>THEN</u> go to Step 35.
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1. RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>	
35	<p>Check If Source Range Detectors Should Be Energized:</p>	
a.	Source range channels - DEENERGIZED	a. Go to Step 35e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS	<p>b. Perform the following:</p> <p>1) <u>IF</u> neither intermediate range channel is decreasing. <u>THEN</u> initiate boration.</p> <p>2) Continue with Step 36. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel. <u>THEN</u> do Steps 35c, d and e.</p>
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p>-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with Step 36. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 35d and e.
d.	Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).
		<p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 36.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	<p>Establish Normal Shutdown Alignment:</p> <ul style="list-style-type: none"> a. Check condenser - AVAILABLE b. Perform the following: <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump c. Verify ATT-17.0. ATTACHMENT SD-1 - COMPLETE 	<ul style="list-style-type: none"> a. Dispatch A0 to perform ATT-17.1. ATTACHMENT SD-2.

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 27 PAGE 36 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
*37	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> either of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig.
*38	Monitor RCP Operation:	
	<ul style="list-style-type: none"> a. RCPs - ANY RUNNING b. Check the following: <ul style="list-style-type: none"> o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF 	<ul style="list-style-type: none"> a. Go to Step 39. b. Stop affected RCP(s).

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 41.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 41.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371. letdown isolation valve • AOV-427. loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 41.
f.	Place RCS overpressure protection system in service (Refer to O. / . ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using ATT-14.1. ATTACHMENT RHR COOL	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 41.

41 Check CNMT Hydrogen Concentration:

a. Direct RP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

b. Consult TSC to determine if hydrogen recombiners should be placed in service.

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

Return to Step 9.

43 Evaluate Long Term Plant Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

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ECA-3.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 6) ATTACHMENT SI/UV (ATT-8.4)
- 7) ATTACHMENT RUPTURED S/G (ATT-16.0)
- 8) ATTACHMENT N2 PORVS (ATT-12.0)
- 9) ATTACHMENT RCP START (ATT-15.0)
- 10) ATTACHMENT D/G STOP (ATT-8.1)
- 11) ATTACHMENT SEAL COOLING (ATT-15.2)
- 12) ATTACHMENT SD-1 (ATT-17.0)
- 13) ATTACHMENT SD-2 (ATT-17.1)
- 14) ATTACHMENT RHR COOL (ATT 14.1)
- 15) ATTACHMENT NC (ATT 13.0)
- 16) ATTACHMENT NO SW PUMPS (ATT 2.4)
- 17) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 18) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 19) FOLDOUT.

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

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

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT]

3. SATURATED RECOVERY CRITERIA

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

4. SECONDARY INTEGRITY CRITERIA

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

5. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

6. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23

William C. Gorman
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 28 PAGE 2 of 27
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A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR WATER LEVEL INDICATES GREATER THAN MINIMUM RECOMMENDED BY TSC TO ENSURE HEATERS ARE COVERED.

NOTE: o Steps 1 through 15 of ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, should be performed before continuing with this procedure.

o FOLDOUT page should be open and monitored periodically.

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

1 Add Makeup To RWST As Necessary:

o Refer to ATT-18.0, ATTACHMENT SFP-RWST (~ 400 gpm can be expected)

-OR-

o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST TO SFP (~ 60 gpm can be expected)

-OR-

o Refer to S-9J, BLENDING TO RWST (~50 gpm can be expected)

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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 RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
2	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 7% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 7% [25% adverse CNMT].</p> <p>2) Continue with Step 3. <u>WHEN</u> ruptured S/G level greater than 7% [25% adverse CNMT], <u>THEN</u> do Steps 2b through e.</p>
b.	Close MDAFW pump discharge valve to ruptured S/G	b. Dispatch AO to locally close valve.
	<ul style="list-style-type: none"> • S/G A. MOV-4001 • S/G B. MOV-4008 	
c.	Pull stop MDAFW pump for ruptured S/G	
d.	Close TDAFW pump flow control valve to ruptured S/G	d. Dispatch AO with locked valve key to locally close TDAFW pump manual feedwater isolation valve to ruptured S/G.
	<ul style="list-style-type: none"> • S/G A. AOV-4291 • S/G B. AOV-4298 	<ul style="list-style-type: none"> • S/G A. V-4005 • S/G B. V-4006
e.	Verify MDAFW pump cross tie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> • MOV-4000A • MOV-4000B 	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 28 PAGE 5 of 27
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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, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>o RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.</p> <p>*****</p>		
* 3	Monitor If RHR Pumps Should Be Stopped:	
	a. RHR pumps - ANY RUNNING IN INJECTION MODE	a. Go to Step 4.
	b. Check RCS pressure:	b. Go to Step 4.
	1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]	
	2) RCS pressure - STABLE OR INCREASING	
	c. Stop RHR pumps and place in AUTO	
4	Check If S/G Secondary Side Is Intact;	IF any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:
	o Pressure in both S/Gs - STABLE OR INCREASING	
	o Pressure in both S/Gs - GREATER THAN 110 PSIG	<ul style="list-style-type: none"> • Steamlines • Feedlines
		IF NOT, <u>THEN</u> go to E-2. FAULTED STEAM GENERATOR ISOLATION. Step 1.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 28 PAGE 6 of 27
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

* 5 Monitor Intact S/G Level:

- | | |
|---|--|
| <p>a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p> | <p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.</p> <p>b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths:</p> <ul style="list-style-type: none"> • TDAFW pump steam supply valves • S/G blowdown valves • Refer to ATT-16.0. ATTACHMENT RUPTURED S/G |
|---|--|

NOTE: Shutdown margin should be monitored during RCS cooldown. Refer to FIG-2.0, FIGURE 2DM.

6 Initiate RCS Cooldown To Cold Shutdown:

- | | |
|--|---|
| <p>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR.</p> <p>b. Use RHR system if in service</p> <p>c. Dump steam to condenser from intact S/G</p> | <p>c. Manually or locally dump steam using intact S/G ARV.</p> <p><u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Use ruptured S/G. |
|--|---|

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 28 PAGE 7 of 27
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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7 Check RCS Subcooling Based On
Core Exit T/Cs - GREATER THAN
0°F USING FIG-1.0, FIGURE MIN
SUBCOOLING

Go to Step 18.

8 Check Safeguards Pump Status

Go to Step 14.

o SI pumps - ANY RUNNING

-OR-

o RHR pumps - ANY RUNNING IN
INJECTION MODE

CAUTION

THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT
RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

NOTE: o If auxiliary spray is in use, spray flow may be increased by
closing normal charging valve AOV-294 and normal PRZR spray valves.

o When using PRZR PORV, select one with an operable block valve.

9 Depressurize RCS To Refill
PRZR:

a. Use normal PRZR spray valve
associated with running RCP

- PCV-431A for A RCP
- PCV-431B for B RCP

a. Use one PRZR PORV. IF IA NOT
available, THEN refer to
ATT-12.0; ATTACHMENT N2 PORVS.

IF no PORV available, THEN use
auxiliary spray valve.

b. PRZR level - GREATER THAN 20%
[40% adverse CNMT]

b. Continue with Step 10. WHEN
level greater than 20% [40%
adverse CNMT], THEN stop RCS
depressurization.

c. Stop RCS depressurization

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> *****		
	o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION. o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST. *****	
10	Check If An RCP Should Be Started:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 11.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	b. Go to Step 18.
	c. PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Return to Step 9.
	d. Try to start an RCP	
	1) Establish conditions for starting an RCP	
	o Bus 11A or 11B energized	
	o Refer to ATT-15.0. ATTACHMENT RCP START	
	2) Start one RCP	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 12.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 10°F [10°F adverse CNMT] USING FIG-1.0, FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 18. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 11c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 18.
	c. Check PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 9.
	d. Stop one SI pump	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If One Of Two SI Pumps Should Be Stopped:	
	a. Two SI pumps - RUNNING	a. Go to Step 13. .
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [35°F adverse CNMT] USING FIG-1.0, FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 18. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 12c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 18.
	c. PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 9.
	d. Stop one SI pump.	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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13 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 18. IF NOT, THEN go to Step 14.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	215°F [215°F adverse CNMT]
TWO	150°F [150°F adverse CNMT]
THREE	80°F [80°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIG-1.0. FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 18.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 13d. IF no RHR pump can be started in injection mode, THEN go to Step 18.

d. PRZR level - GREATER THAN 20% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 9.

e. Stop running SI pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	<p>Check If Charging Flow Should Be Controlled To Maintain RCS Inventory:</p> <p>a. Check RHR pumps - RUNNING IN INJECTION MODE</p> <p>b. Go to Step 18</p>	<p>a. Perform the following:</p> <p>1) Control charging flow to maintain RCS inventory:</p> <ul style="list-style-type: none"> o RVLIS level (no RCPs) - BETWEEN 77% <u>AND</u> 82% [82% <u>AND</u> 85% adverse CNMT] <p>-OR-</p> <ul style="list-style-type: none"> o RVLIS fluid fraction (any RCP running) - BETWEEN 84% <u>AND</u> 90% <p>2) Go to Step 15.</p>

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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 RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>o INADVERTENT CRITICALITY MAY OCCUR FOLLOWING NATURAL CIRCULATION COOLDOWN IF THE RCP IN THE RUPTURED LOOP IS STARTED FIRST.</p> <p>*****</p>		
15	Check RCP Status	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 16.
	b. Check RVLIS level (no RCPs) - ≥ 95%	<p>b. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <p>o Increase PRZR level to greater than 65% [82% adverse CNMT]</p> <p>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING</p> <p>o <u>WHEN</u> PRZR level indicates greater than minimum recommended by the TSC, <u>THEN</u> energize PRZR heaters as necessary to saturate PRZR water</p> <p><u>IF</u> conditions <u>NOT</u> met, <u>THEN</u> continue with Step 16. <u>WHEN</u> conditions met, <u>THEN</u> do Steps 15c and d.</p>
This Step continued on the next page.		

EOP: ECA-3.2	TIME: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 28 PAGE 14 of 27
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 15 continued from previous page)	
c.	Establish conditions for starting an RCP:	c. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:
	o Ensure Bus 11A or 11B energized.	1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC)
	o Refer to ATT-15.0, ATTACHMENT RCP START.	<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.
		2) Go to Step 16.
d.	Start one RCP	d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).
		<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.
- o IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG (REFER TO STEP 19).

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

16 Depressurize RCS To
Saturation At Core Exit:

- a. Determine saturation pressure for core exit T/Cs using FIG-8.0, FIGURE TSAT
- b. Use normal PRZR spray valves associated with running RCP
 - PCV-431A for A RCP
 - PCV-431B for B RCP
- b. Use one PRZR PORV. IF IA NOT available, THEN refer to ATT-12.0, ATTACHMENT N2 PORVS.

IF PORV NOT available, THEN use auxiliary spray valve (AOV-296).
- c. WHEN PRZR level indicates greater than minimum recommended by the TSC, THEN energize PRZR heaters as necessary
- d. Depressurize RCS until EITHER of the following conditions satisfied:
 - o PRZR level - GREATER THAN 75% [65% adverse CNMT]

-OR-

- o RCS pressure - AT SATURATION FROM STEP 16a

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

17 Verify Adequate Shutdown Margin

- a. Direct RP to sample RCS and ruptured S/G for boron concentration
- b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM

b. Borate as necessary.

18 Monitor SI Reinitiation Criteria:

- a. Core exit T/Cs - STABLE OR DECREASING
- b. Check RVLIS indication:
 - o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]
 - OR
 - o Fluid Fraction (any RCP running) - GREATER THAN 84%

a. Manually start SI pumps as necessary.

b. Manually start SI pumps as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check If SI ACCUMs Should Be Isolated:	
a.	RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	a. <u>IF</u> both RCS hot leg temperatures less than 400°F. <u>THEN</u> go to Step 19c. <u>IF NOT</u> . <u>THEN</u> go to Step 20.
b.	PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Return to Step 9.
c.	Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841. MCC C position 12F • MOV-865. MCC D position 12C 	
d.	Close SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841 • MOV-865 	d. Vent any unisolated ACCUMs: <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented. <u>THEN</u> consult TSC for contingency actions.</p>
e.	Locally reopen breakers for MOV-841 and MOV-865	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power . (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
21	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to ATT-16.0, ATTACHMENT RUPTURED S/G) 	<ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing. <u>THEN</u> direct RP to sample hotwells for activity.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 23.</p>
b.	Verify AUX BLDG SW isolation valves - OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> • MOV-4615 and MOV 4/34 • MOV-4616 and MOV 4/35 	
This Step continued on the next page.		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 22 continued from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check RCP Cooling	Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).
a.	Check CCW to RCPs	
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
b.	Check RCP seal injection	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check If Seal Return Flow Should Be Established:	
a.	Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
b.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 25.
c.	Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
d.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
e.	Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
f.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down. <u>THEN</u> close the affected RCP seal discharge valve • RCP A. AOV-270A • RCP B. AOV-270B <u>IF</u> both RCP seal discharge valves are shut. <u>THEN</u> go to Step 25.
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1. RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>		
<p>25 Check If Source Range Detectors Should Be Energized:</p>		
a.	Source range channels - DEENERGIZED	a. Go to Step 25e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS	b. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration. 2) Continue with Step 26. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 25c, d and e.
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p>-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with Step 26. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 25d and e.
d.	Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).
		<p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALEFUNCTION and go to Step 26.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2.
	b. Perform the following:	
	o Open generator disconnects	
	• 1G13A71	
	• 9X13A73	
	o Place voltage regulator to OFF	
	o Open turbine drain valves	
	o Rotate reheater steam supply controller cam to close valves	
	o Place reheater dump valve switches to HAND	
	o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan RUNNING	2) Perform the following:
		o Dispatch AO to reset UV relays at MCC C and MCC D.
		o Manually start one fan as power supply permits (23 kw).
	d. Verify ATT-17.0, ATTACHMENT SD-1 - COMPLETE	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS IT IS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
*27	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> either of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig.
*28	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 29.
	b. Check the following:	b. Stop the affected RCP(s).
	<ul style="list-style-type: none"> o RCP #1 seal leak GREATER THAN 220 psig o Check RCP seal leakage WITHIN THE NORMAL OPERATING RANGE OF FIG 4.0, FIGURE RCP SEAL LEAKOFF 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.
30	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 31.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 31.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371. letdown isolation valve • AOV-427. loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 31.
f.	Place RCS overpressure protection system in service (Refer to O-7. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using ATT-14.1. ATTACHMENT RHR COOL	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 31.

31 Check CNMT Hydrogen Concentration:

a. Direct RP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

b. Consult TSC to determine if hydrogen recombiners should be placed in service.

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

Return to Step 3.

33 Evaluate Long Term Plant Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

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ECA-3.2 APPENDIX LIST

TITLE

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

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

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

- o Core exit T/Cs - INCREASING

-OR-

- o Check RVLIS indication:

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

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

3. SECONDARY INTEGRITY CRITERIA

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

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

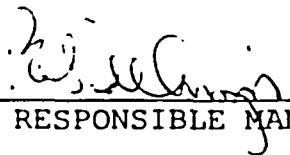
IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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A. PURPOSE - This procedure provides actions for a SGTR with coincident loss of normal and auxiliary PRZR sprays and PORVs.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-3, STEAM GENERATOR TUBE RUPTURE, when PRZR pressure control is not available.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o Foldout page should be open AND monitored periodically. o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. 		
1	Check Ruptured S/G Narrow Range Level - LESS THAN 85% [65% adverse CNMT]	Go to Step 8.
2	Check RCP Status - AT LEAST ONE RUNNING	<p>Try to start one RCP:</p> <ul style="list-style-type: none"> a. Establish conditions for starting RCP. <ul style="list-style-type: none"> o Bus 11A and Bus 11B energized o Refer to ATT-15.0, ATTACHMENT RCP START b. Start one RCP. <u>IF</u> no RCP can be started. <u>THEN</u> go to Step 4.
3	Check IF Normal PRZR Spray Available:	
	<p>a. Verify the following:</p> <ul style="list-style-type: none"> 1) Verify 1A to CNMT - AVAILABLE 2) Verify spray valve associated with running RCP - OPERABLE <p>b. Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 21</p>	<p>a. Perform the following:</p> <ul style="list-style-type: none"> 1) Place PRZR proportional heaters in PULL STOP. 2) Place PRZR backup heaters to OFF. 3) Place normal spray valve controllers to MANUAL at 0%. 4) Go to Step 4.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Try To Restore PRZR PORV:	
a.	Block valves - AT LEAST ONE OPEN <ul style="list-style-type: none"> • MOV-516 for PCV-430 • MOV-515 for PCV-431C 	a. Open one block valve unless it was closed to isolate an open PORV. If block valves can <u>NOT</u> be opened, <u>THEN</u> dispatch A0 to locally ensure breakers to block valves closed. <ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
b.	Check IA to CNMT - AVAILABLE	b. Refer to ATT-12.0, ATTACHMENT N2 PORVS to operate PORVs.
c.	Verify at least one PRZR PORV flow path - AVAILABLE	c. Go to Step 5.
d.	Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 22	

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

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

* 6 Monitor Intact S/G Level:

a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.

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

b. IF narrow range level in intact S/G continues to increase in an uncontrolled manner, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

7 Check PRZR Level - GREATER THAN 10% [30% adverse CNMT]

Return to Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	8 Check If SI Can Be Terminated:	
	<ul style="list-style-type: none"> a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING b. Secondary heat sink: <ul style="list-style-type: none"> o Total feed flow to intact S/Gs - GREATER THAN 200 GPM AVAILABLE -OR- o Narrow range level in intact S/G - GREATER THAN 7% [25% adverse CNMT] c. RVLIS indication <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 7% [22% adverse CNMT] -OR- o Fluid fraction (any RCP running) - GREATER THAN 84% d. Any ruptured S/G narrow range level - INCREASING IN AN UNCONTROLLED MANNER OF OFFSCALE HIGH 	<ul style="list-style-type: none"> a. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.. b. <u>IF</u> neither condition satisfied, <u>THEN</u> do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1. c. Do <u>NOT</u> stop SI pumps. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1. d. Do <u>NOT</u> stop SI pumps. Return to Step 2.

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If Charging Flow Has Been Established:	
	a. Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high. <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
	b. Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. Manually align valves as necessary. <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
	c. Start charging pumps as necessary and adjust charging flow to perform the following: <ul style="list-style-type: none"> o Restore PRZR level o Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	<p>Monitor RCS Inventory:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o RVLIS indication o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] <p>-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Manually start SI pumps as necessary. b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	<p>a. Manually start pumps as power supply permits (257 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 20.</p>
b.	Verify AUX BLDG SW isolation valves - OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 	
This Step continued on the next page.		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 12 continued from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored:	a. Continue with Step 17. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 13 through 16.
	o IA to CNMT (AOV-5392) - OPEN	
	o IA pressure - GREATER THAN 60 PSIG	
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following:
		1) Verify MCC A energized.
		2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following:
		1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s).
		• RCP A, MOV-749A and MOV-759A
		• RCP B, MOV-749B and MOV-759B
		2) Manually start one CCW pump.
d.	Charging pump: ANY RUNNING	d. Continue with Step 20. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 14 through 17.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> If PRZR level is less than 13%, letdown may be established by placing AOV-427 to OPEN.</p>	
14	Establish Normal Letdown:	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p>
a.	Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM	
b.	Place the following switches to CLOSE: <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx 	
c.	Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> • TCV-130 • PCV-135 	
d.	Reset both trains of XY relays for AOV-371 and AOV-427	
e.	Open AOV-371 and AOV-427	
f.	Open letdown orifice valves as necessary	
g.	Place PCV-135 in AUTO at 250 psig	
h.	Place TCV-130 in AUTO at the normal setpoint	
i.	Adjust charging pump speed and HCV-142 as necessary	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

15 Check VCT Makeup System:

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

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Check Charging Pump Suction
Aligned To VCT:

a. VCT level - GREATER THAN 20%

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

1) Ensure charging pump suction
aligned to RWST

o LCV-112B open

o LCV-112C closed

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

b. Verify charging pumps aligned to
VCT

b. Manually align valves as
necessary.

o LCV-112C - OPEN!

o LCV-112B - CLOSED

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check RCP Cooling:	Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).
	a. Check CCW to RCPs:	
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	b. Check RCP seal injection:	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 19.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
e.	Verify RCP #1 seal leakoff flow - LESS THAN 0.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down. <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> • RCP A. AOV-270A • RCP B. AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 19.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1. RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	<p>Equalize Charging And Letdown Flows:</p> <ul style="list-style-type: none"> a. Verify charging pump controllers in manual b. Control charging and seal injection flows to equal letdown and seal leakoff flows 	
20	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Minimize Secondary System Contamination:	
a.	Isolate reject from hotwell to CST:	a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct RP to sample hotwells for activity.
	o Place hotwell level controller (HC-107) in MANUAL at 50%	
	o Verify hotwell level - STABLE	
b.	Verify local actions to complete isolation of ruptured S/G (Refer to ATT-16.0. ATTACHMENT RUPTURED S/G)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>	
22	Check If Source Range Detectors Should Be Energized:	
a.	Source range channels - DEENERGIZED	a. Go to Step 22e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS	b. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration. 2) Continue with Step 23. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 22c through e.
c.	Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p>-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip 	c. Continue with Step 23. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 22d and e.
d.	Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2). <p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 22.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Establish Normal Shutdown Alignment:

a. Check condenser - AVAILABLE

a. Dispatch AO to perform ATT-17.1, ATTACHMENT SD-2.

b. Perform the following:

- o Open generator disconnects
 - 1G13A71
 - 9X13A73
- o Place voltage regulator to OFF
- o Open turbine drain valves
- o Rotate reheater steam supply controller cam to close valves
- o Place reheater dump valve switches to HAND
- o Stop all but one condensate pump

c. Verify adequate Rx head cooling:

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

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

2) Perform the following:

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

d. Verify ATT-17.0. ATTACHMENT SD-1 - COMPLETE

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Plant staff should decide whether to repair PRZR pressure control systems or continue with this procedure. If PRZR pressure control is established, PRZR level should be restored to greater than 10% [30% adverse CNMT] and then further recovery should continue with E-3. STEAM GENERATOR TUBE RUPTURE, Step 32.</p>	
24	<p>Check If SI ACCUMs Should Be Isolated:</p>	
	<p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING o RVLIS indication <ul style="list-style-type: none"> o Level (no RCPs - GREATER THAN 77% [82% adverse CNMT]) <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% 	
	<p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C 	
	<p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 	<p>c. Vent any unisolated ACCUMs:</p> <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A. AOV-834A • ACCUM B. AOV-834B 2) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC for contingency actions.</p>
	<p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 31 PAGE 24 of 30
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.</p>	
25	Verify Adequate Shutdown Margin	
	<ul style="list-style-type: none"> a. Direct RP to sample RCS and ruptured S/G for boron concentration b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM 	<ul style="list-style-type: none"> b. Borate as necessary.
26	Maintain Required RCP Seal Injection Flow And Labyrinth Seal D/P:	Perform the following:
	<ul style="list-style-type: none"> o Labyrinth seal D/P to each RCP - GREATER THAN 15 INCHES OF WATER o RCP seal injection flow - GREATER THAN 6 GPM 	<ul style="list-style-type: none"> o Adjust charging flow to REGEN Hx. HCV-142 as necessary. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to adjust seal injection needle valves V-300A and V-300B if necessary.
27	Initiate RCS Cooldown to 350°F In RCS Cold Legs:	
	<ul style="list-style-type: none"> a. Establish and maintain cooldown rate in RCS cold legs LESS THAN 100°F/HF b. Dump steam to condenser from intact S/G 	<ul style="list-style-type: none"> b. Manually or locally dump steam using intact S/G ARV. <p><u>IF</u> no intact S/G available, <u>THEN</u> use faulted S/G.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS AND RUPTURED S/G PRESSURES MUST BE MAINTAINED LESS THAN THE RUPTURED S/G ARV SETPOINT.</p> <p>*****</p>		
28	Control Charging Flow To Maintain RCS Subcooling:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIG-1.0, FIGURE MIN SUBCOOLING</p> <p>b. Ruptured S/G narrow range level - LESS THAN 90% [80% adverse CNMT]</p> <p>c. Ruptured S/G narrow range level - STABLE OR DECREASING</p>	<p>a. Increase charging flow to maintain subcooling greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING and go to Step 29.</p> <p>b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 29.</p> <p>c. <u>IF</u> ruptured S/G level increasing, <u>THEN</u> decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING.</p>
29	Check If RCS Cooldown Should Be Stopped:	
	<p>a. RCS cold leg temperatures LESS THAN 350°F</p> <p>b. Stop RCS cooldown</p>	<p>a. Return to Step 25.</p>

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 31 PAGE 26 of 30
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check RCS Pressure - GREATER THAN 400 PSIG [300 PSIG adverse CNMT]	Go to Step 33.
*31	Monitor Ruptured S/G Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> any of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases to 350 psig <u>AND</u> ruptured S/G level greater than 7% [25% adverse CNMT]

EOP: ECA-3.3	TITLE: SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	REV: 31 PAGE 27 of 30
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o STEAM SHOULD NOT BE RELEASED FROM A RUPTURED S/G IF WATER MAY EXIST IN ITS STEAMLINE.
- o RUPTURED S/G PRESSURE MAY DECREASE RAPIDLY WHEN STEAM IS RELEASED.

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

a. Perform the following:

- o Decrease charging and increase letdown to initiate backfill

-OR-

- o Initiate blowdown from ruptured S/G

-OR-

- o Dump steam from ruptured S/G

b. Check RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]

b. Return to Step 31.

c. Stop RCS depressurization

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 27.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 31.
	c. Place RCS overpressure protection system in service (Refer to 0-7. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to ATT-14.1. ATTACHMENT RHR COOL)	
	<u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.	
34	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS and ruptured S/G for boron concentration	
	b. Verify boron concentration GREATER THAN REQUIREMENTS OF FIG-2.0. FIGURE 3DM	b. Borate as necessary.

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ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 29 of 30

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Initiate RCS Cooldown To Cold Shutdown:	
	<ul style="list-style-type: none"> a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR b. Use RHR system if in service c. Dump steam to condenser from intact S/G 	<ul style="list-style-type: none"> c. Manually or locally dump steam from intact S/G using ARVs. <p><u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> use faulted S/G.</p>
36	Control Charging Flow To Maintain RCS Subcooling:	
	<ul style="list-style-type: none"> a. RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIG-1.0. FIGURE MIN SUBCOOLING b. Ruptured S/G narrow range level - LESS THAN 90% [80% adverse CNMT] c. Ruptured S/G narrow range level - STABLE OR DECREASING 	<ul style="list-style-type: none"> a. Increase charging flow to maintain subcooling greater than 20°F using FIG-1.0. FIGURE MIN SUBCOOLING and go to Step 37. b. Control charging flow to maintain RCS pressure at ruptured S/G pressure and go to Step 37. c. <u>IF</u> ruptured S/G level increasing, <u>THEN</u> decrease charging flow to stabilize level. Maintain RCS subcooling greater than 20°F using FIG-1.0. FIGURE MIN SUBCOOLING.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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***37 Monitor RCP Operation:**

- | | |
|---|---|
| <ul style="list-style-type: none"> a. RCPs - ANY RUNNING b. Check the following: <ul style="list-style-type: none"> o RCP #1 seal D/P - GREATER THAN 220 PSID o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0, FIGURE RCP SEAL LEAKOFF | <ul style="list-style-type: none"> a. Go to Step 39. b. Stop the affected RCP(s). |
|---|---|

38 Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 34.
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39 Evaluate Long Term Plant Status:

- a. Maintain cold shutdown conditions
- b. Consult TSC

END

EOP:	TITLE:	REV: 31
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	PAGE 1 of 1

ECA-3.3 APPENDIX LIST

TITLE

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

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually start SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING

- OR -

- o Check RVLIS indication:

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

3. SECONDARY INTEGRITY CRITERIA

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

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION


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

5. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 2 of 20
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- A. PURPOSE - This procedure provides the necessary instructions to stabilize and control the plant following a reactor trip without a safety injection.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-0, REACTOR TRIP OR SAFETY INJECTION,
when SI is neither actuated nor required.

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

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

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Verify At Least Two SW Pumps - RUNNING	<p>Manually start SW pumps as necessary.</p> <p><u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Pull stop D/G that is <u>NOT</u> supplied by alternate cooling <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b. Refer to ATT-2.4. ATTACHMENT NO SW PUMPS <p><u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Verify IA Available: <ul style="list-style-type: none"> o Adequate air compressor(s) - RUNNING o IA pressure - GREATER THAN 60 PSIG 	<p>Dispatch AO to locally reset and start adequate air compressors.</p> <p><u>IF</u> adequate electric air compressor(s) can <u>NOT</u> be operated. <u>THEN</u> use diesel air compressor. (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)</p> <p><u>IF</u> IA pressure can <u>NOT</u> be maintained. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Refer to AP-IA.1, LOSS OF INSTRUMENT AIR. b. Verify charging pump A <u>NOT</u> running and place in PULL STOP. c. Dispatch AO to locally open V-358. manual charging pump suction from RWST (charging pump room). d. <u>WHEN</u> V-358 open. <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Check PRZR Pressure Control:	
a.	PRZR pressure - GREATER THAN 1750 PSIG.	a. Perform the following: 1) Verify SI actuation. <u>IF NOT</u> , <u>THEN</u> manually actuate SI and CI. 2) Go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.
b.	PRZR pressure - GREATER THAN 2210 PSIG	b. <u>IF</u> pressure less than 2210 PSIG and decreasing, <u>THEN</u> perform the following: 1) Ensure PRZR PORVs closed. <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve. • PCV-430, MOV-516 • PCV-431C, MOV-515 2) Ensure normal PRZR spray valves closed. • PCV-431A • PCV-431B <u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> stop associated RCP(s). 3) Ensure PRZR heaters energized.
This Step continued on the next page.		

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check If TDAFW Pump Can Be Stopped:	
	<ul style="list-style-type: none"> a. Both MDAFW pumps - RUNNING b. PULL STOP TDAFW pump steam supply valves <ul style="list-style-type: none"> • MOV-3504A • MOV-3505A 	<ul style="list-style-type: none"> a. Go to Step 11.
11	Establish Condenser Steam Dump Pressure Control:	
	<ul style="list-style-type: none"> a. Verify condenser available: <ul style="list-style-type: none"> o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT b. Adjust condenser steam dump controller HC-484 to 1005 psig in AUTO c. Place steam dump mode selector switch to MANUAL d. Verify RCS Tavg - STABLE AT OR TRENDING TO 54°F 	<ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Place S/G ARV controller in AUTO at 1005 psig and verify proper operation. <u>IF</u> S/G ARV <u>NOT</u> controlling in AUTO, <u>THEN</u> control S/G ARV manually. 2) Go to Step 11d. d. Adjust steam dump to restore Tavg. <u>IF</u> steam dumps not available, <u>THEN</u> use ARVs.

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

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

13 Check If Source Range Detectors Should Be Energized:

- | | |
|--|--|
| <p>a. Source range channels - DEENERGIZED</p> | <p>a. Go to Step 13e.</p> |
| <p>b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10⁻¹⁰ AMPS</p> | <p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing <u>THEN</u> initiate boration. 2) Continue with Step 14. <u>WHEN</u> flux is less than 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 13c, d and e. |
| <p>c. Check the following:</p> <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip | <p>c. Continue with Step 14. <u>When</u> either condition met, <u>THEN</u> do Steps 13d and e.</p> |
| <p>d. Verify source range detectors ENERGIZED</p> | <p>d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).</p> <p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION, and go to Step 14.</p> |
| <p>e. Transfer Rk-45 recorder to one source range and one intermediate range channel</p> | |

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 15 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump (Refer to T-5F. STARTING OR STOPPING THE CONDENSATE PUMPS) <p>c. Verify adequate Rx head cooling:</p> <ul style="list-style-type: none"> 1) Verify at least one control rod shroud fan - RUNNING 2) Verify one Rx compartment cooling fan - RUNNING <p>d. Dispatch AO to perform ATT-17.0. ATTACHMENT SD-1</p>	<p>a. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2.</p> <p>1) Manually start one fan as power supply permits (45 kw).</p> <p>2) Manually start one fan as power supply permits (23 kw).</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 16 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Maintain Stable Plant Conditions:	
	a. PRZR pressure - BETWEEN 1800 PSIG AND 2260 PSIG	a. Control PRZR heaters and spray as necessary.
	b. PRZR level - BETWEEN 35% AND 40%	b. Control charging as necessary.
	c. S/G narrow range levels - BETWEEN 17% AND 52%	c. Control S/G feed flow as necessary.
	d. RCS Tav _g - GREATER THAN 540°F	d. Close both MSIVs.
16	Check VCT Makeup System:	
	a. Verify the following:	
	1) Adjust boric acid flow control valve to 9.5 gpm	
	2) Adjust RMW flow control valve to 40 gpm	
	3) RMW mode selector switch in AUTO	
	4) RMW control armed - RED LIGHT LIT	
	b. Check VCT level:	b. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20% OF	1) Ensure BA transfer pumps and RMW pumps running.
	o Level - STABLE OR INCREASING	2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 17 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	<p>Check Charging Pump Suction Aligned To VCT:</p> <p>a. VCT level - GREATER THAN 20%</p> <p>b. Align charging pumps to VCT</p> <ul style="list-style-type: none"> o LCV-112C OPEN o LCV-112F CLOSED 	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%. <u>THEN</u> perform the following:</p> <p>1) Ensure charging pump suction aligned to RWST</p> <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed <p>2) Continue with Step 18. <u>WHEN</u> VCT level greater than 40%. <u>THEN</u> do Step 17b.</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 18 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify TDAFW Pump Aligned For AUTO Start:	
a.	Any MDAFW pump - AVAILABLE	a. Verify TDAFW pump operating to maintain required S/G level and go to Step 20.
b.	Verify AMSAC TRIPPED status light - EXTINGUISHED	b. Reset AMSAC.
c.	Verify both S/G levels - GREATER THAN 17%	c. Continue with Step 20. <u>WHEN</u> S/G level greater than 17%, <u>THEN</u> do Steps 18d, e and 19.
d.	Verify Bus 11A and Bus 11B - AT LEAST ONE ENERGIZED	d. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> TDAFW pump <u>NOT</u> required to maintain S/G level, <u>THEN</u> pull stop TDAFW pump steam supply valves: <ul style="list-style-type: none"> • MOV-3504A • MOV-3505A 2) Go to Step 19.
e.	Verify the following: <ul style="list-style-type: none"> 1) TDAFW pump - OFF 2) TDAFW pump steam supply valve switches in AUTO 3) Verify TDAFW flow control valves - OPEN. DEMAND AT 0 <ul style="list-style-type: none"> • AOV-4297 • AOV-4298 	<ul style="list-style-type: none"> 1) Perform the following: <ul style="list-style-type: none"> a) <u>IF</u> TDAFW pump required to maintain S/G level, <u>THEN</u> go to Step 20. b) Stop TDAFW pump. 2) Place TDAFW pump steam supply valve switches in AUTO. 3) Open TDAFW flow control valves.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 19 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	<p>Establish Normal AFW Pump Shutdown Alignment:</p> <p>a. Verify the following:</p> <ul style="list-style-type: none"> o Both S/G levels - GREATER THAN 17% AND STABLE OR INCREASING o Total AFW flow - LESS THAN 200 GPM <p>b. Close MDAFW pump discharge valves</p> <ul style="list-style-type: none"> • MOV-4007 • MOV-4008 <p>c. Place AFW bypass switches to DEF</p> <p>d. Stop all but one MDAFW pump</p> <p>e. Open AFW discharge crossover valves</p> <ul style="list-style-type: none"> • MOV-4000A • MOV-4000B <p>f. Adjust AFW bypass valves to control S/G levels</p> <ul style="list-style-type: none"> • AOV-4480 • AOV-4481 	<p>a. Continue with Step 20. <u>WHEN</u> conditions met, <u>THEN</u> do Steps 19b through f.</p>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 20 of 20
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Determine If Cooldown Is Required:	
	a. Consult Plant Staff - COOLDOWN REQUIRED	a. Go to 0-3. HOT SHUTDOWN WITH XENON PRESENT.
	b. At least one RCP - RUNNING	b. Perform the following: 1) Ensure 2 control rod shroud fans running. 2) Go to ES-0.2, NATURAL CIRCULATION COOLDOWN, Step 1.
	c. Go to 0-2.1. NORMAL SHUTDOWN TO HOT SHUTDOWN	
	-END-	

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 1 of 1
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ES-0.1 APPENDIX LIST

TITLE

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

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 23 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI ACTUATION CRITERIA

IF ANY condition listed below occurs, THEN actuate SI and CI and go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING

- OR -

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

- OR -


- o Any automatic SI setpoint is reached

3. AFW SUPPLY SWITCHING CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

FIGORY 1.0

REVIEWED BY: _____

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 2 of 14
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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.

B. SYMPTOMS AND/OR ENTRY CONDITIONS

1. ENTRY CONDITIONS - This procedure is entered from:

- A) ES-0.2, NATURAL CIRCULATION COOLDOWN, after completing the first 13 steps, if rapid cooldown or depressurization is required.
- B) ES-0.2, NATURAL CIRCULATION COOLDOWN, if depressurization is required which may result in upper head voiding.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>		
o	IF SI ACTUATION OCCURS DURING THIS PROCEDURE, E-0, REACTOR TRIP OR SAFETY INJECTION, SHOULD BE PERFORMED.	
o	THE FIRST 13 STEPS OF ES-0.2, NATURAL CIRCULATION COOLDOWN, SHOULD BE PERFORMED BEFORE CONTINUING WITH THIS PROCEDURE.	
o	IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.	

<u>NOTE:</u> Foldout page should be open and monitored periodically.		
* 1 Monitor Conditions For RCP Restart:		
a.	Verify Bus 11A or Bus 11B - ENERGIZED	a. Go to Step 2.
b.	Establish conditions for starting an RCP (Refer to ATT-15.0, ATTACHMENT RCP START)	b. Go to Step 2.
c.	Check RVLIS indication:	c. Perform the following:
o	At least one train of RVLIS - AVAILABLE	1) Increase PRZR level to 65% using charging and letdown.
o	Level (no RCPs) - GREATER THAN 95%	2) Dump steam to establish subcooling based on core exit T/Cs greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING.
		3) Energize PRZR heaters as necessary to saturate PRZR water.
d.	Start one RCP	
e.	Any RCP - RUNNING	e. Go to Step 2.
f.	Go to 0-2.2. PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITION	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Saturated conditions in the PRZR should be established before trying to decrease PRZR level.</p>		
<p>2 Establish PRZR Level To Accommodate Void Growth:</p>		
	<p>a. Check PRZR level - BETWEEN 13% AND 30%</p> <p>b. Place charging pump speed controllers in MANUAL</p>	<p>a. Control charging and letdown as necessary. ----</p>
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o BORON ADDITION TO ESTABLISH CSD CONCENTRATION SHOULD BE COMPLETE BEFORE DECREASING RCS TEMPERATURE LESS THAN 500°F.</p> <p>o THE ΔT BETWEEN PRZR LIQUID AND THE HOT LEG TEMPERATURE SHOULD NOT BE PERMITTED TO EXCEED 200°F. IF THIS LIMIT IS EXCEEDED, THEN NOTIFY TECHNICAL ENGINEERING OF THE MAXIMUM ΔT OBSERVED.</p> <p>*****</p>		
<p>3 Decrease RCS Hot Leg Temperatures To 500°F:</p>		
	<p>a. Maintain cooldown rate in RCS cold legs - LESS THAN 50°F/HR</p> <p>b. Control RCS pressure - LESS THAN 1900 PSIG</p> <p>c. Maintain RCS cold leg temperatures and pressure - WITHIN LIMITS OF FIG-3.2, FIGURE NC C/D WITH VOID IN UPPER HEAD</p> <p>d. Maintain stable PRZR level using charging</p> <p>e. Check RCS hot leg temperatures - LESS THAN 500°F</p> <p>f. Stop RCS cooldown</p>	<p>e. Return to Step 3a.</p>

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 5 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<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 1992 PSIG.</p> <p>*****</p>		
4	Verify SI Blocked:	Perform the following:
	<ul style="list-style-type: none"> o SI block switches in BLOCK <ul style="list-style-type: none"> • Train A • Train B o SAFETY INJECTION BLOCKED status light - LIT 	<ul style="list-style-type: none"> a. Verify PRZR pressure less than 1950 psig. b. Place SI block switches to BLOCK: <ul style="list-style-type: none"> • Train A • Train B c. Verify SAFETY INJECTION BLOCKED status light lit. d. Go to Step 5. <p><u>IF</u> SI can <u>NOT</u> be blocked. <u>THEN</u> maintain PRZR pressure greater than 1750 psig and S/G pressure greater than 514 psig until SI blocked.</p>

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 6 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

NOTE:

- o If charging line to PRZR vapor ΔT exceeds 320°F, then plant staff should be consulted before using auxiliary spray.
- o WHEN using a PRZR PORV, THEN select one with an operable block valve.
- o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

5 Depressurize RCS To 1500 PSIG:

a. Check letdown - IN SERVICE	a. Try to establish letdown (Refer to ATT-9.0, ATTACHMENT LETDOWN). <u>IF</u> letdown can <u>NOT</u> be established, <u>THEN</u> depressurize RCS using one PRZR PORV and go to Step 5c.
b. Depressurize RCS using auxiliary spray valve (AOV-296)	b. <u>IF</u> auxiliary spray valve <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.
c. Check RCS pressure - APPROXIMATELY 1500 PSIG	c. Return to Step 5a.
d. Stop RCS depressurization	

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 7 of 14
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6 Isolate SI ACCUMs:

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

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

- b. Close SI ACCUM discharge valves

- ACCUM A, MOV-841
- ACCUM B, MOV-865

- b. Perform the following:

- 1) Dispatch personnel to locally close valves, as necessary.
- 2) Maintain RCS pressure greater than 1000 psig until both SI ACCUMs isolated.

IF any SI ACCUM can NOT be isolated AND RCS depressurization to less than 1000 psig is required. THEN:

- 1) Open vent valves for unisolated SI ACCUMs.

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

- 2) Open HCV-945.

- 3) Maintain RCS pressure greater than SI ACCUM pressure.

- c. Locally open breakers for MOV-841 and MOV-865

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 8 of 14
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF RCP SEAL COOLING TO ANY RCP IS LOST, THEN THE RCS COOLDOWN RATE SHALL NOT EXCEED 60°F/HR.

7 Continue RCS Cooldown And
Depressurization:

- | | |
|--|---|
| a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR | |
| b. Maintain RCS pressure - WITHIN LIMITS OF FIG-3.2, FIGURE NC C/D WITH VOID IN UPPER HEAD | |
| c. Check RCS cold leg temperature - GREATER THAN 335°F | c. Stabilize RCS temperature. |
| d. Check letdown IN SERVICE | d. Try to establish letdown (Refer to ATT-9.0, ATTACHMENT LETDOWN).

IF letdown can NOT be established, THEN depressurize RCS using one PRZR PORV and go to Step 8. |
| e. Depressurize RCS using auxiliary spray valve (AOV 290) | e. IF auxiliary spray valve NOT available, THEN use one PRZR PORV. |

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Control PRZR Level:	
a.	Level - GREATER THAN 13%	a. Control charging and letdown to increase PRZR level to greater than 13%.
b.	Level - LESS THAN 90%	b. Perform the following: <ul style="list-style-type: none"> 1) Turn on PRZR heaters to increase RCS pressure by 100 psi. 2) Decrease PRZR level to less than 30% by one of the following: <ul style="list-style-type: none"> o Control charging as necessary. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Continue cooldown to shrink RCS inventory.
9	Check RVLIS Indication:	
a.	At least one train of RVLIS - AVAILABLE	a. Go to Step 10.
b.	Check RVLIS level (no RCPs) - GREATER THAN 93%	b. Perform the following: <ul style="list-style-type: none"> 1) Repressurize RCS to maintain RVLIS level greater than 93%. 2) Return to Step 7.

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 10 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*10	Maintain Letdown Flow: <ul style="list-style-type: none"> a. Open letdown orifice isolation valves as necessary b. Adjust low pressure letdown pressure controller as necessary 	
*11	Maintain Required RCP Seal Injection Flow And Labyrinth Seal D/P: <ul style="list-style-type: none"> o Seal injection flow to each RCP - GREATER THAN 6 GPM o Labyrinth seal D/P to each RCP - GREATER THAN 15 INCHES OF WATER 	<p><u>IF</u> RCP seal injection in service, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Adjust charging flow to REGEN Hx (HCV-142) as necessary. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to adjust seal injection needle valves if necessary. <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B <p><u>IF</u> RCP seal injection <u>NOT</u> in service, <u>THEN</u> go to Step 12.</p>

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 11 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	<p>Check If SI System Normal Shutdown Alignment Should Be Established:</p> <p>a. RCS cold leg temperature - LESS THAN 350°F</p> <p>b. Lock out SI system as follows:</p> <ol style="list-style-type: none"> 1) Place all SI pump switches in PULL STOP 2) Locally close breakers for SI pump discharge valves to cold legs <ul style="list-style-type: none"> • MOV-878B, MCC D position 8C • MOV-878D, MCC D position 8F 3) Close SI pump discharge to cold legs <ul style="list-style-type: none"> • MOV-878B • MOV-878D 4) Locally open breakers for MOV-878B and MOV-878D 	a. Return to Step 7.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If RHR Normal Cooling Can Be Established:	
	a. RCS pressure - LESS THAN 400 PSIG	a. Stabilize RCS temperature and return to Step 7.
	b. Verify all SI pump switches in PULL STOP	b. Return to Step 12.
	c. Place RCS overpressure protection system in service (Refer to 0-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> consult Plant staff to determine if RHR normal cooling should be established and go to Step 14.
	d. Establish RHR normal cooling (Refer to ATT-14.1, ATTACHMENT RHR COOL)	
14	Continue RCS Cooldown To Cold Shutdown	

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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 ADDITIONAL VOID FORMATION IN THE RCS.</p> <p>*****</p>		
15	Continue Cooldown Of Inactive Portion Of RCS:	
	a. Cool upper head region using control rod shroud fans	
	b. Cool S/G U-tubes by dumping steam from all S/Gs	
	c. Check RVLIS indication:	
	1) At least one train of RVLIS AVAILABLE	1) Go to Step 16.
	2) Level (no RCPs) GREATER THAN 95%	2) Stabilize RCS pressure and return to Step 14.

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 14 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF NO CONTROL ROD SHROUD FANS ARE RUNNING, THE UPPER HEAD REGION MAY REMAIN ABOVE 200°F FOR UP TO 29 HOURS AFTER REACHING CSD.</p> <p>*****</p>		
16	Determine If RCS Depressurization Is Permitted:	
	a. Check PRZR level - LESS THAN 30%	a. Perform the following:
		1) Turn on PRZR heaters to maintain PRZR pressure stable.
		2) Decrease PRZR level to less than 30% by one of the following:
		o Control charging as necessary.
		-OR-
		o Continue cooldown to shrink RCS inventory.
	b. Entire RCS - LESS THAN 200°F	b. Do <u>NOT</u> depressurize RCS. Return to Step 14.
	<ul style="list-style-type: none"> • Core exit T/Gs • Upper head T/Gs • RCS hot leg temperature • RCS cold leg temperature 	
	c. Check control rod shroud fan status - BOTH RUNNING DURING COOLDOWN	c. Consult Plant staff to determine wait period for upper head cooling.
	d. Refer to 0-2.2. PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITIONS	
END		

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 1 of 1
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ES-0.3 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) FIGURE NC C/D WITH VOID IN UPPER HEAD (FIG-3.2)
- 3) ATTACHMENT RCP START (ATT-15.0)
- 4) ATTACHMENT RHR COOL (ATT-14.1)
- 5) ATTACHMENT LETDOWN (ATT-9.0)
- 6) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 7) FOLDOUT

EOP: ES-0.3	TITLE: NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	REV: 10 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI ACTUATION CRITERIA

IF EITHER condition listed below occurs, THEN actuate SI and CI and go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING

- OR -

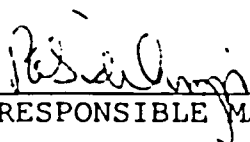
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5%

3. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET. THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p> <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o FOLDOUT page should be open AND monitored periodically. o Critical Safety Function Status Trees should be monitored (Refer to Appendix I for Red Path Summary). o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. <p>1 Reset SI</p> <p>2 Reset CI:</p> <ul style="list-style-type: none"> a. Depress CI reset pushbutton b. Verify annunciator A-26. CNMT ISOLATION - EXTINGUISHED b. Perform the following: <ul style="list-style-type: none"> 1) Reset SI. 2) Depress CI reset pushbutton. <p>3 Maintain PRZR Pressure Between 1800 PSIG And 2235 PSIG</p> <ul style="list-style-type: none"> o Reset PRZR heaters o Use normal PRZR spray 		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>4 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running. <u>THEN</u> perform the following: ----</p> <p>1) Ensure SW isolation.</p> <p>2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.</p> <p>3) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
o	Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
o	Bus 15 normal feed - CLOSED	• Bus 15 to Bus 16 tie
		2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).
		<u>IF NOT</u> , <u>THEN</u> perform the following:
		o Start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS)
		3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Check SW pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
		2) Go to step 5d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 5 continued from previous page)

c. Verify SW isolation valves to turbine building - OPEN

- MOV-4613 and MOV-4670
- MOV-4614 and MOV-4664

d. Verify adequate air compressor(s) - RUNNING

e. Check IA supply:

- o Pressure - GREATER THAN 60 PSIG
- o Pressure - STABLE OR INCREASING

f. Reset both trains of XY relays for IA to CNMT AOV-5392

g. Verify IA to CNMT AOV-5392 - OPEN

c. Perform the following:

- 1) Manually align valves.
- 2) Dispatch AO to locally reset compressors as necessary.

d. Manually start electric air compressors as power supply permits (75 kw each). IF electric air compressors can NOT be started, THEN start diesel air compressor (refer to ATT-11.2. ATTACHMENT DIESEL AIR COMPRESSOR).

e. Perform the following:

- 1) Continue attempts to restore IA (Refer to AP-IA.1. LOSS OF INSTRUMENT AIR).
- 2) Continue with Step 6. WHEN IA restored, THEN do Steps 5f and g.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	<p>b. Manually align valves as necessary.</p> <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:..</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary and adjust charging flow to restore PRZR level	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Stop SI And RHR Pumps And Place In AUTO	
8	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1. LOSS OF REACTOR OR SECONDARY COOLANT. Step 1.
	b. PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. IF PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to E-1. LOSS OF REACTOR OR SECONDARY COOLANT. Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 9	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - RUNNING	a. Go to Step 10.
b.	Check CNMT pressure - LESS THAN 4 PSIG	b. Continue with Step 10. <u>WHEN</u> CNMT pressure less than 4 psig. <u>THEN</u> do Steps 9c through f.
c.	Reset CNMT spray	
d.	Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE. <ul style="list-style-type: none"> • AOV-836A • AOV-836B
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D 	

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check RCS Hot Leg Temperatures - STABLE	Control steam dump and total feed flow to stabilize RCS temperature.
13	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	a. Manually start pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following: 1) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following: a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling, <u>AND</u> immediately depress VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS. 2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER. 3) Go to Step 19.
b.	Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
c.	Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Manually start an additional SW pump as power supply permits (257 kw each).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG 	a. Continue with Step 19. <u>WHEN</u> IA can be restored, THEN do Steps 14 through 18.
b.	Verify instrument bus D - ENERGIZED	b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available. <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply.
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high. <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump.
d.	Charging pump - ANY RUNNING	d. Continue with Step 19. <u>WHEN</u> any charging pump running. <u>THEN</u> do Steps 15 through 18.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Verify PRZR Level - GREATER THAN 20% [40% adverse CNMT]	Continue with Step 17. <u>WHEN</u> PRZR level increases to greater than 20% [40% adverse CNMT]. <u>THEN</u> do Step 16.
16	Establish Normal Letdown: <ul style="list-style-type: none"> a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM b. Place the following switches to CLOSE: <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx c. Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> • TCV-130 • PCV-135 d. Reset both trains of XY relays for AOV-371 and AOV-427 e. Open AOV-371 and AOV-427 f. Open letdown orifice valves as necessary g. Place PCV-135 in AUTO at 250 psig h. Place TCV-130 in AUTO at the normal setpoint i. Adjust charging pump speed and HCV-142 as necessary to control PRZR level 	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> o Place excess letdown divert valve, AOV-312, to NORMAL. o Ensure CCW from excess letdown open, (AOV-745). o Open excess letdown isolation valve AOV-310. o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. o Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult Plant Staff to determine if excess letdown should be placed in service.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check VCT Makeup System:	
	a. Adjust boric acid flow control valve in AUTO to 9.5 gpm	
	b. Adjust RMW flow control valve in AUTO to 40 gpm	
	c. Verify the following:	c. Adjust controls as necessary.
	1) RMW mode selector switch in AUTO	
	2) RMW control armed - RED LIGHT LIT	
	d. Check VCT level:	d. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20%	1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u> . <u>THEN</u> dispatch AO to locally reset MCC C and MCC D UV lockouts as necessary.
	-OR-	2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.
	o Level - STABLE OR INCREASING	3) Increase boric acid flow as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	<p>Check Charging Pump Suction Aligned To VCT:</p> <p>a. VCT level - GREATER THAN 20%</p> <p>b. Verify charging pumps aligned to VCT</p> <ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED 	<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed 2) Continue with Step 19. <u>WHEN</u> VCT level greater than 40%. <u>THEN</u> do Step 18b. <p>b. Manually align valves as necessary.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

- o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

19 Control PRZR Heaters And Operate Normal Spray To Stabilize RCS Pressure

IF normal spray NOT available and letdown is in service, THEN perform the following:

- a. Verify Regen Hx Chg outlet temp to PRZR Vapor temp ΔT less than 320°F. IF NOT, THEN control pressure using one PRZR PORV and go to Step 20.
- b. Control pressure using auxiliary spray.

IF auxiliary spray NOT available, THEN use one PRZR PORV.

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

*20 Monitor Intact S/G Levels:

a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.

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

b. IF narrow range level in any S/G continues to increase, THEN stop feed flow to that S/G.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> SW should be aligned to CCW Hxs before restoring RCP seal cooling.</p>	
21	Check RCP Cooling:	Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).
	a. Check CCW to RCPs:	
	o Annunciator A-7. RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15. RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	b. Check RCP seal injection:	
	o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 23.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	b. Manually open valves as necessary.
c.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
d.	Open RCP seal return isolation valve MOV-313	d. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve. <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 23.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 volt bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. . b. Perform the following as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Reset Bus 13 and Bus 15 lighting breakers. 3) Dispatch AO to locally reset and start two IA compressors. 4) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 5) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 6) Start HP seal oil backup pump. 7) Start CNMT RECIRC fans as necessary. 8) Ensure D/G load within limits. 9) Refer to ATT-8.4, ATTACHMENT SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

24 Check If Source Range Channels Should Be Energized:

a. Source range channels - DEENERGIZED

a. Go to Step 24e.

b. Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS

b. Perform the following:

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

2) Continue with Step 25. WHEN flux is LESS THAN 10^{-10} amps on any operable channel, THEN do Steps 24c, d and e.

c. Check the following:

c. Continue with step 25. WHEN either condition met, THEN do Steps 24d and e.

o Both intermediate range channels - LESS THAN 10^{-10} AMPS

-OR-

o Greater than 20 minutes since reactor trip

d. Verify source range detectors: ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1. SR MALFUNCTION, and go to Step 25.

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

26 Check RCP Status

- | | |
|---|--|
| <p>a. Both RCPs - STOPPED</p> <p>b. Ensure conditions for starting an RCP:</p> <ul style="list-style-type: none"> o Ensure bus 11A or 11B energized. o Refer to ATT-15.0, ATTACHMENT RCP START. | <p>a. Go to step 27.</p> <p>b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC). <u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam from intact S/Gs. 2) Go to step 27. |
|---|--|

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 26 continued from previous page)	
c.	Check RVLIS level (no RCPs) - $\geq 95\%$	<p>c. <u>IF</u> RVLIS level (no RCPs) less than 95%. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% (82% adverse CNMT). o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water. <p><u>IF</u> conditions <u>NOT</u> met, <u>THEN</u> continue with Step 27. <u>WHEN</u> conditions met, <u>THEN</u> do Step 26d.</p>
d.	Start one RCP	<p>d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam from intact S/Gs.</p>

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 27 PAGE 24 of 26
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Establish Normal Shutdown Alignment:	
a.	Check condenser - AVAILABLE	a. Dispatch A0 to perform ATT-17.1. ATTACHMENT SD-2.
b.	Perform the following:	
	o Open generator disconnects	
	• 1G13A71	
	• 9X13A73	
	o Place voltage regulator to OFF	
	o Open turbine drain valves	
	o Rotate reheater steam supply controller cam to close valves	
	o Place reheater dump valve switches to HAND	
	o Stop all but one condensate pump (Refer to T-5F, STARTING OR STOPPING THE CONDENSATE PUMPS	
c.	Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following:
		o Dispatch A0 to reset UV relays at MCC C and MCC D.
		o Manually start one fan as power supply permits (23 kw)
d.	Verify ATT-17.0. ATTACHMENT SD-1 - COMPLETE	

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 27 PAGE 25 of 26
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	Maintain Plant Conditions Stable:	
	a. RCS pressure - BETWEEN 1800 PSIG AND 2235 PSIG	a. Control PRZR heaters and spray, as necessary.
	b. PRZR level - BETWEEN 35% AND 40%	b. Control charging as necessary.
	c. Intact S/G narrow range levels - BETWEEN 17% AND 52%	c. Control S/G feed flow as necessary.
	d. RCS cold leg temperature - STABLE	d. Control dumping steam as necessary. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.
29	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	b. PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 27 PAGE 26 of 26
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Implement Plant Recovery Procedures: a. Review plant systems for realignment to normal conditions (Refer to ATT-26.0, ATTACHMENT RETURN TO NORMAL OPERATIONS) b. Go to 0-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN	
	-END-	

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 27 PAGE 1 of 1
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ES-1.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 4) ATTACHMENT D/G STOP (ATT-8.1)
- 5) ATTACHMENT NC (ATT-13.0)
- 6) ATTACHMENT SEAL COOLING (ATT-15.2)
- 7) ATTACHMENT RCP START (ATT-15.0)
- 8) ATTACHMENT SD-1 (ATT-17.0)
- 9) ATTACHMENT SD-2 (ATT-17.1)
- 10) ATTACHMENT SI/UV (ATT-8.4)
- 11) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 12) ATTACHMENT RETURN TO NORMAL OPERATIONS (ATT-26.0)
- 13) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 14) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 15) FOLDOUT

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 27 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

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

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING
- OR -
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT]

3. SECONDARY INTEGRITY CRITERIA

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

4. AFW SUPPLY SWITCHOVER CRITERION

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

EOP: ES-1.2	TITLE: POST LOCA COOLDOWN AND DEPRESSURIZATION	REV: 27 PAGE 1 of 28
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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP:	TITLE:	REV: 27
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	PAGE 2 of 28

A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions following a loss of reactor coolant inventory.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

E-1, LOSS OF REACTOR OR SECONDARY COOLANT,
when RCS pressure is greater than the shutoff head
pressure of the RHR pumps.

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ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	PAGE 3 of 28

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES IN AN UNCONTROLLED MANNER TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS.

- NOTE:
- o Foldout page should be open and monitored periodically.
 - o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Monitor If RHR Pumps Should Be Stopped:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. RHR pumps - ANY RUNNING IN INJECTION MODE b. Check RCS pressure: <ul style="list-style-type: none"> 1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] 2) Pressure - STABLE OR INCREASING c. Stop RHR pumps and place AUTO | <ul style="list-style-type: none"> a. Go to Step 2. b. Go to Step 2. |
|---|--|

EOP:	TITLE:	REV: 27
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	PAGE 4 of 28

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed: b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) Start HP seal oil backup pump. 5) Ensure D/G load within limits. 6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 7) Refer to ATT-8.4, ATTACHMENT SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Establish 75 GPM Charging Flow:	
a.	Charging pumps - ANY RUNNING	a. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to locally isolate seal injection to affected RCP: <ul style="list-style-type: none"> • V-300A for RCP A • V-300B for RCP B 2) Ensure HCV-142 open, demand at 0%.
b.	Align charging pump suction to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room). <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary (75 kw each) and establish 75 gpm total charging flow <ul style="list-style-type: none"> • Charging line flow • Seal injection flow 	

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ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	PAGE 6 of 28

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Establish Condenser Steam Dump Pressure Control:</p> <ul style="list-style-type: none"> a. Verify condenser available: <ul style="list-style-type: none"> o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO c. Place steam dump mode selector switch to MANUAL <p><u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA.</p>	<ul style="list-style-type: none"> a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 5.
* 5	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 7% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G. b. <u>IF</u> narrow range level in any S/G continues to increase in an uncontrolled manner, <u>THEN</u> stop RCS cooldown and go to E-3. STEAM GENERATOR TUBE RUPTURE. Step 1.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL INDICATES GREATER THAN MINIMUM RECOMMENDED BY TSC TO ENSURE HEATERS ARE COVERED.

6 Deenergize PRZR Heaters

- a. Place PRZR proportional heaters in PULL STOP
- b. Place PRZR backup heaters in OFF
- c. Consult TSC for a recommended minimum indicated PRZR water level that will ensure heaters are covered

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to FIG-2.0, FIGURE SDM).

7 Initiate RCS Cooldown To Cold Shutdown:

- a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HF
- b. Use RHR system if in service
- c. Dump steam to condenser from intact S/G(s)
- c. Manually or locally dump steam using intact S/Gs ARV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	Manually start SI pumps as necessary and go to Step 19.
9	Check SI and RHR Pump Status:	Go to Step 15.
	<ul style="list-style-type: none"> SI pumps - ANY RUNNING 	
	-OR-	
	<ul style="list-style-type: none"> RHR pumps - ANY RUNNING IN INJECTION MODE 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

 o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

10 Depressurize RCS To Refill
PRZR:

<p>a. Depressurize using normal PRZR spray if available</p> <p>b. PRZR level - GREATER THAN 20% [40% adverse CNMT]</p> <p>c. Stop RCS depressurization</p>	<p>a. Depressurize using one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0. ATTACHMENT N2 PORVS.</p> <p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p>b. Continue with Step 11. <u>WHEN</u> level greater than 20% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p>
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EOP:	TITLE:	REV: 27
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	PAGE 10 of 28

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p style="text-align: center;">*****</p>		
11	Check If An RCP Should Be Started:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 12.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	b. Go to Step 19.
	c. PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Return to Step 10.
	d. Try to start an RCP	d. Ensure at least one control rod shroud fan running (45 kw each).
	1) Establish conditions for starting an RCP	
	o Bus 11A or 11B energized	
	o Refer to ATT-15.0. ATTACHMENT RCP START	
	2) Start one RCP	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 13.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIG-1.0, FIGURE MIN SUBCOOLING	b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19. <u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 12c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 19.
	c. Check PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 10.
	d. Stop one SI pump	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

a. Two SI pumps - RUNNING

a. Go to Step 14.

b. Determine required RCS
subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core
exit T/Cs - GREATER THAN VALUE
FROM TABLE ABOVE USING FIG-1.0.
FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures
greater than 320°F [310°F
adverse CNMT] OR IF RHR normal
cooling in service, THEN go to
Step 19.

IF RHR normal cooling NOT in
service AND RCS hot leg
temperatures less than 320°F
[310°F adverse CNMT], THEN
ensure at least one RHR pump
running in injection mode and go
to Step 13d. IF no RHR pump can
be started in injection mode,
THEN go to Step 19.

d. PRZR level - GREATER THAN 20%
[40% adverse CNMT]

d. Do NOT stop SI pump. Return to
Step 10.

e. Stop one SI pump

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 19. IF NOT, THEN go to Step 15.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	255°F [295°F adverse CNMT]
TWO	235°F [285°F adverse CNMT]
THREE	210°F [270°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIG-1.0. FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 14d. IF no RHR pump can be started in injection mode, THEN go to Step 19.

d. PRZR level - GREATER THAN 20% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 10.

e. Stop running SI pump

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>		
16	Check RCP Status:	
a.	Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 17.
b.	Check RVLIS level (no RCPs) - $\geq 95\%$	<p>b. <u>IF</u> RVLIS level (no RCPs) less than 95%. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT]. o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING. o <u>WHEN</u> PRZR level indicates greater than minimum recommended by TSC. <u>THEN</u> energize PRZR heaters as necessary to saturate PRZR water. <p><u>IF</u> conditions <u>NOT</u> met. <u>THEN</u> continue with Step 17. <u>WHEN</u> conditions met. <u>THEN</u> do Steps 16c and d.</p>
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 16 continued from previous page)

c. Establish conditions for starting an RCP:

- o Ensure Bus 11A or 11B energized.
- o Refer to ATT-15.0, ATTACHMENT RCP START.

d. Start one RCP

c. IF conditions can NOT be met, THEN perform the following:

- 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).

IF natural circulation can NOT be verified, THEN increase dumping steam.

- 2) Go to Step 17.

d. IF an RCP can NOT be started, THEN verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).

IF natural circulation can NOT be verified, THEN increase dumping steam.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.
- o IF SI HAS BEEN TERMINATED, THE ACCUMS SHOULD BE ISOLATED PRIOR TO DEPRESSURIZING THE RCS TO LESS THAN 1000 PSIG. (REFER TO STEP 20).

NOTE: o WHEN using a PRZR PORV, THEN select one with an operable block valve.

- o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.

17 Depressurize RCS To Minimize
RCS Subcooling:

- a. Depressurize using normal PRZR spray if available
 - a. IF normal spray NOT available, THEN use one PRZR PORV. IF IA NOT available, THEN refer to ATT-12.0, ATTACHMENT N2 PORVS.
 - IF no PRZR PORV available, THEN use auxiliary spray valve (AOV-296).
 - b. WHEN PRZR level indicates greater than minimum recommended by TSC, THEN energize PRZR heaters as necessary
 - c. Depressurize RCS until EITHER of the following conditions satisfied:
 - o RCS subcooling based on core exit T/Cc - LESS THAN 10°F USING FIG-1.0. FIGURE MIN SUBCOOLING
- OR-
- o PRZR level - GREATER THAN 75% [65% adverse CNMT]

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate Shutdown Margin	
	a. Direct RP to sample RCS for boron concentration	
	b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM	b. Borate as necessary.
19	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to Step 20.
	b. PRZR level - GREATER THAN 10% [30% adverse CNMT]	b. Manually start SI pumps as necessary and return to Step 10.

EOP:	TITLE:	REV: 27
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If SI ACCUMs Should Be Isolated:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 10% [30% adverse CNMT]</p> <p>c. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841. MCC C position 12F • MOV-865. MCC D position 12C <p>d. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • ACCUM A. MOV-841 • ACCUM B. MOV-865 <p>e. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. <u>IF</u> both RCS hot leg temperatures less than 400°F. <u>THEN</u> go to Step 20c.</p> <p><u>IF NOT</u>. <u>THEN</u> go to Step 21.</p> <p>b. Return to Step 10.</p> <p>d. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A. AOV-834A • ACCUM B. AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented. <u>THEN</u> consult TSC to determine contingency actions.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

22 Verify Adequate SW Flow To
CCW Hx:

a. Verify at least two SW pumps -
RUNNING

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

1) IF NO SW pumps running, THEN
perform the following:

a) Pull stop any D/G that is
NOT supplied by alternate
cooling AND immediately
depress VOLTAGE SHUTDOWN
pushbutton.

b) Refer to ATT-2.4.
ATTACHMENT NO SW PUMPS.

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

3) Go to Step 23.

b. Verify AUX BLDG SW isolation
valves - OPEN

b. Manually align valves.

- MOV-4615 and MOV-4634
- MOV-4616 and MOV-4635

This Step continued on the next page

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 22 continued from previous page)

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW
discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check RCP Cooling	Establish normal cooling to RCPs (Refer to ATT-15.2, ATTACHMENT SEAL COOLING).
a.	Check CCW to RCPs	
	o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
	o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED	
b.	Check RCP seal injection	
	o Labyrinth seal D/PS - GREATER THAN 15 INCHES WATER	
	-OR-	
	o RCP seal injection flow to each RCP - GREATER THAN 6 GPM	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check If Seal Return Flow Should Be Established:	
a.	Verify instrument bus D - ENERGIZED	a. Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
b.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 25.
c.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> • AOV-270A • AOV-270B 	c. Manually open valves as necessary.
d.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
e.	Open RCP seal return isolation valve MOV-313	e. Perform the following: <ol style="list-style-type: none"> 1) Place MOV-313 switch to OPEN. 2) Dispatch AO to locally open MOV-313.
f.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: <ol style="list-style-type: none"> 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve. <ul style="list-style-type: none"> • RCP A, AOV-270A • RCP B, AOV-270B <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 25.</p>
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>	
25	<p>Check If Source Range Detectors Should Be Energized:</p>	
a.	Source range channels - DEENERGIZED	a. Go to Step 25e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 ⁻¹⁰ AMPS	<p>b. Perform the following:</p> <p>1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration.</p> <p>2) Continue with Step 26. <u>WHEN</u> flux is LESS THAN 10⁻¹⁰ amps on any operable channel, <u>THEN</u> do Steps 25c, d and e.</p>
c.	Check the following:	c. Continue with Step 26. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 25d and e.
	<p>o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS</p> <p>-OR-</p> <p>o Greater than 20 minutes since reactor trip</p>	
d.	Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).
		<p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 25.</p>
e.	Transfer Rk-45 recorder to one source range and one intermediate range channel	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Establish Normal Shutdown Alignment:	
	a. Check condenser - AVAILABLE	a. Dispatch AO to perform ATT-17.1, ATTACHMENT SD-2.
	b. Perform the following:	
	o Open generator disconnects	
	• 1G13A71	
	• 9X13A73	
	o Place voltage regulator to OFF	
	o Open turbine drain valves	
	o Rotate reheater steam supply controller cam to close valves	
	o Place reheater dump valve switches to HAND	
	o Stop all but one condensate pump	
	c. Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following:
		o Dispatch AO to reset UV relays at MCC C and MCC D.
		o Manually start one fan as power supply permits (23 kw)
	d. Verify ATT-17.0, ATTACHMENT SD-1 - COMPLETE	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*27 Monitor RCP Operation:		
a. RCPs - ANY RUNNING		a. Go to Step 28.
b. Check the following:		b. Stop affected RCP(s).
o RCP #1 seal D/P - GREATER THAN 220 PSID		
o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF		
28 Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG		Use intact S/G ARV for RCS temperature control.
29 Check If RHR Normal Cooling Can Be Established:		
a. RCS cold leg temperature - LESS THAN 350°F		a. Go to Step 30.
b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]		b. Go to Step 30.
c. Place RCS overpressure protection system in service (Refer to 0-1. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)		
d. Consult TSC to determine if RHR normal cooling should be established using ATT-14.1... ATTACHMENT RHR COOL		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 30.

30 Check CNMT Hydrogen Concentration:

- | | |
|---|--|
| a. Direct RP to start CNMT hydrogen monitors as necessary | |
| b. Hydrogen concentration - LESS THAN 0.5% | b. Consult TSC to determine if hydrogen recombiners should be placed in service. |

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

Return to Step 1.

32 Evaluate Long Term Plant Status:

- a. Maintain cold shutdown conditions
- b. Consult TSC

-END-

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ES-1.2 APPENDIX LIST

TITLE

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

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6. AFW SUPPLY SWITCHOVER CRITERION

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

7. E-3 TRANSITION CRITERIA

IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI Pumps as necessary, stop RCS cooldown AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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GINNA STATION
CONTROLLED COPY NUMBER 23

Res. Delmon
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 2 of 22
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A. PURPOSE - This procedure provides the necessary instructions for transferring the Safety Injection system and Containment Spray system to recirculation modes of operation.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure may be entered from:

- a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, or,
- b. ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, or,
- c. ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, or,
- d. FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, or,
- e. FR-C.2, RESPONSE TO DEGRADED CORE COOLING, or,
- f. FR-C.3, RESPONSE TO SATURATED CORE COOLING, or,
- g. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, or,
- h. FR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, on low RWST level.
- i. Other procedures whenever RWST level reaches the switchover setpoint (28%).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)
- o CONSULT WITH RADIATION PROTECTION BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING. SWITCHOVER TO RECIRCULATION MAY CAUSE HIGH RADIATION LEVELS.

- NOTE:
- o FOLDOUT page should be open and monitored periodically.
 - o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

- * 1 Verify RWST level - GREATER THAN 15%

IF sump recirculation NOT in progress, THEN pull-stop all pumps taking suction from RWST, EXCEPT one SI pump AND go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

- 2 Verify CNMT Sump B Level - AT LEAST 113 INCHES

IF RWST level is less than 28% AND CNMT sump B level is less than 113 inches, THEN go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.

NOTE: Steps 3 through 13 should be performed without delay. FR procedures should not be implemented prior to completion of these steps.

- 3 Reset SI

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: IF D/Gs supplying emergency AC busses, THEN non-essential loads may be shed as necessary to allow start of additional SW pumps.

4 Establish Adequate SW Flow:

a. Verify at least two SW pumps -
RUNNING

a. Start additional SW pumps as power supply permits (257 kw each). IF only 1 SW pump operable, THEN perform the following:

1) Ensure SW aligned to one CCW Hx per ATT-2.1, ATTACHMENT MIN SW.

2) Go to Step 5.

IF no SW pumps are available, THEN perform the following:

1) Pull stop any D/G that is NOT supplied by alternate cooling. AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.

2) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

b. Verify AUX BLDG SW isolation valves - OPEN

b. Manually align valves.

- MOV-4615 and MOV-4/34
- MOV-4616 and MOV-4/35

c. Dispatch AO to Check BOTH CCW Hxs - IN SERVICE

Locally place BOTH CCW Hxs in service

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 4 continued from previous page)

- d. Determine required SW flow to CCW HXs per table:

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

- e. Direct AO to adjust SW flow to required value

- o IF on normal SW discharge:

- V-4619. CCW HX A
- V-4620. CCW HX B

-OR-

- o IF on alternate SW discharge:

- V-4619C. CCW HX A
- V-4620B. CCW HX B

- e. IF the required SW flow can NOT be obtained, THEN perform the following:

- 1) Isolate SW to screenhouse and air conditioning headers.

- MOV-4609/MOV-4780 - AT LEAST ONE CLOSED
- MOV-4663/MOV-4733 - AT LEAST ONE CLOSED

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

- 3) Direct AO to locally isolate SW return from SFP Hxs:

- SFP Hx A (V-4622) (for alternate SW discharge use V-4622A)
- SFP Hx B (V-8689)

- 4) Verify SW portions of ATT-17.0, ATTACHMENT SD-1 are complete.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5 Establish CCW flow to RHR Hxs:

a. Check both CCW pumps - RUNNING

a. Perform the following:

- 1) Start CCW pumps as power supply permits (122 kw each).
 - 2) IF both CCW pumps are running, THEN go to step 5b.
 - 3) IF only one CCW pump is running, THEN perform the following:
 - a) Direct AO to isolate CCW to boric acid evaporator
 - o Close V-760A
 - b) Manually open CCW MOV to only one operable RHR loop.
 - o Open MOV-738A
- OR-
- o Open MOV-738B
 - c) Go to step 6.

b. Open CCW valves to RHR Hxs

b. Dispatch AO to locally open valves.

- MOV-738A
- MOV-738B

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o THE RHR HX OUTLET VALVES (HCV-624 AND HCV-625) WILL FAIL OPEN ON LOSS OF INSTRUMENT AIR PRESSURE.</p> <p>o CONSULT WITH RADIATION PROTECTION BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING. SWITCHOVER TO RECIRCULATION MAY CAUSE HIGH RADIATION LEVELS.</p> <p>*****</p>		
6 Check RHR Flow:	<p>o RHR flow - LESS THAN 1500 GPM PER OPERATING PUMP</p>	<p>Manually adjust RHR Hx outlet valves equally to reduce flow to less than 1500 gpm per operating pump</p> <ul style="list-style-type: none"> • RHR Hx A. HCV-625 • RHR Hx B. HCV-624 <p><u>IF</u> flow can <u>NOT</u> be reduced manually. <u>THEN</u> dispatch an AO with locked valve key to locally adjust RHR Hx outlet valve handwheels equally to reduce flow.</p> <ul style="list-style-type: none"> • RHR Hx A. HCV-625 handwheel • RHR Hx B. HCV-624 handwheel

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check IF Unnecessary Pumps Can Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 7c. .
	b. Stop SI pump C and place both switches in PULL STOP	
	c. Stop both RHR pumps and place in PULL STOP	
	d. Both CNMT spray pumps - RUNNING	d. Pull stop any idle CNMT spray pump and go to Step 7f.
	e. Pull stop one CNMT spray pump	
	f. Check CNMT pressure - LESS THAN 28 PSIG.	f. Go to Step 8.
	g. Place NaOH Tank outlet valve switches to OPEN.	
	<ul style="list-style-type: none"> • AOV-836A • AOV-836B 	
	h. Reset CNMT spray	
	i. Close discharge valves for idle CNMT spray pump(s)	
	<ul style="list-style-type: none"> o Pump A <ul style="list-style-type: none"> • MOV-860A • MOV-860B o Pump B <ul style="list-style-type: none"> • MOV-860C • MOV-860D 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8 Verify RHR System Alignment:		
a.	Verify the following valves - CLOSED <ul style="list-style-type: none"> o RHR suction valves from loop A hot leg <ul style="list-style-type: none"> • MOV-700 • MOV-701 o RHR discharge valves to loop B cold leg <ul style="list-style-type: none"> • MOV-720 • MOV-721 	a. Ensure at least one suction valve and one discharge valve closed.
b.	Verify RHR pump suction crosstie valves - OPEN <ul style="list-style-type: none"> • MOV-704A • MOV-704B 	b. Manually open valves. If valves can <u>NOT</u> be opened, <u>THEN</u> dispatch A0 to locally open valves.
c.	Verify the following valves - OPEN <ul style="list-style-type: none"> o RHR pump discharge to Rx vessel deluge valves <ul style="list-style-type: none"> • MOV-852A • MOV-852B o RHR suction from sump B (inside CNMT) <ul style="list-style-type: none"> • MOV-851A • MOV-851B 	c. Ensure at least one valve in each set open.
d.	Verify RCDT pump suction valves from sump B - CLOSED <ul style="list-style-type: none"> • MOV-1813A • MOV-1813B 	d. Manually close valves.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RHR FLOW INDICATED ON FI-626 SHOULD BE LIMITED TO 1500 GPM PER OPERATING PUMP TO ENSURE OPTIMUM PUMP PERFORMANCE.</p> <p>*****</p>		
9	Initiate RHR Sump Recirculation:	
a.	Close RWST outlet valve to RHR pump suction. MOV-856 (turn on DC power key switch)	a. Dispatch A0 to locally close valve and continue with Step 9b.
b.	Open both RHR suction valves from sump B (outside CNMT)	b. <u>IF</u> only one valve will open, <u>THEN</u> perform the following:
	o MOV-850A - OPEN	1) Initiate only one train of RHR recirculation (Refer to ATT-14.3, ATTACHMENT RHR NPSH for further guidance).
	o MOV-850B - OPEN	2) Go to step 9e.
		<u>IF</u> neither valve will open, <u>THEN</u> refer to ATT-14.6, ATTACHMENT RHR PRESS REDUCTION for further guidance.
c.	Check MOV-738A AND MOV-738B BOTH OPEN	c. Perform the following:
		1) <u>IF</u> MOV-738A open, <u>THEN</u> start RHR Pump A and go to step 9e.
		2) <u>IF</u> MOV-738B open, <u>THEN</u> start RHR Pump B and go to step 9e.
d.	Start both RHR pumps	
e.	Verify at least one RHR pump RUNNING	e. <u>IF</u> no RHR pump can be started, <u>THEN</u> go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, 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>SUMP RECIRCULATION FLOW TO RCS MUST BE MAINTAINED AT ALL TIMES, EXCEPT DURING ALIGNMENT FOR HIGH HEAD RECIRCULATION.</p> <p>*****</p> <p><u>NOTE:</u> The TSC should be requested to establish periodic monitoring of the AUX BLDG sub-basement, as radiological conditions permit, to monitor RHR pump operation.</p>		
10	Check RWST Level - LESS THAN 15%	DO <u>NOT</u> continue with this procedure until RWST level is less than 15%.
11	Stop All Pumps Supplied From RWST:	
	a. Stop all SI pumps and place in PULL STOP	
	b. Stop all charging pumps	
	c. Stop operating CNMT spray pump and place in PULL STOP	
	d. Check CNMT pressure - LESS THAN 28 PSIG	d. Go to Step 12.
	e. Reset CNMT spray if necessary	
	f. Close CNMT spray pump discharge valves	
	<ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">***** <u>CAUTION</u> RHR FLOW MUST BE MAINTAINED LESS THAN 1500 GPM PER OPERATING RHR PUMP AS DETERMINED BY THE TOTAL OF FI-931A, FI-931B AND FI-626 INDICATIONS. *****</p>		
12	Align SI And CNMT Spray For Sump Recirculation:	
a.	Verify SI pump suction valves from BASTs - CLOSED	a. Ensure at least one valve in each flowpath closed.
	<ul style="list-style-type: none"> • MOV-826A and MOV-826B • MOV-826C and MOV-826D 	
b.	Close RWST outlet valves to SI and CNMT spray pumps (turn on DC power key switches)	b. Ensure at least one valve closed.
	<ul style="list-style-type: none"> • MOV-896A • MOV-896B 	
c.	Close SI pump RECIRC valves	c. Ensure at least one valve closed.
	<ul style="list-style-type: none"> • MOV-898 • MOV-897 	
d.	Verify SI pump suction valves from RWST - OPEN	d. Ensure at least one valve open.
	<ul style="list-style-type: none"> • MOV-825A • MOV-825B 	
e.	Align operating RHR pump flow path(s) to SI and CNMT spray pump suction.	e. Ensure at least one flowpath aligned from RHR pump(s) to SI and CS pump suction header (Refer to ATT-14.5. ATTACHMENT RHR SYSTEM).
	<ul style="list-style-type: none"> o <u>IF</u> RHR Pump A operating. <u>THEN</u> open MOV-857A and MOV-857C o <u>IF</u> RHR Pump B operating. <u>THEN</u> open MOV-857B 	<p><u>IF</u> neither flow path can be aligned, <u>THEN</u> refer to ATT-14.6. ATTACHMENT RHR PRESS REDUCTION for further guidance.</p>

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 13 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

SI PUMPS SHOULD BE STOPPED IF RCS PRESSURE IS GREATER THAN THEIR SHUTOFF HEAD PRESSURE.

NOTE: Operation of SI pump C is preferred since it delivers to both RCS loops.

13 Verify Adequate RCS Makeup Flow:

a. RCS pressure - LESS THAN
225 psig [425 psig adverse CNMT]

a. Perform the following:

1) Check RCS conditions:

- o RCS subcooling based on core exit T/Cs greater than FIG-1.0. FIGURE MIN SUBCOOLING.
- o PRZR level greater than 10% [30% adverse CNMT].

IF either condition NOT met,
THEN start one SI pump.

2) Go to Step 14.

b. RHR injection flow adequate:

b. Start one SI pump.

- o Core exit T/Cs - LESS THAN REQUIREMENTS OF FIG-5.0. FIGURE RHR INJECTION
- o Check RVLIS level (no RCPS) - GREATER THAN 52% [55% adverse CNMT]

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 14 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF A CNMT SPRAY PUMP IS STARTED, THEN CNMT PRESSURE SHOULD BE CLOSELY MONITORED. CNMT PRESSURE SHOULD NOT BE REDUCED TO LESS THAN 22 PSIG.</p> <p>*****</p>		
*14	Check If CNMT Spray Is Required:	
	<p>a. CNMT pressure - GREATER THAN 28 PSIG</p> <p>b. Verify CNMT spray pump discharge valves - OPEN</p> <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D <p>c. Start selected CNMT spray pump</p> <p>d. Adjust RHR flow to maintain less than 1500 gpm per operating RHR pump as indicated by the total of FI-931A, FI-931R and FI-626 indications.</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CNMT spray previously actuated and NaOH tank level greater than 55%, <u>THEN</u> consult TSC to determine if CNMT spray should be restarted. 2) Go to Step 15. <p>b. Manually open valve(s) for selected pump.</p> <ul style="list-style-type: none"> • CS pump A, MOV-860A or MOV-860B • CS pump B, MOV-860C or MOV-860D <p>c. <u>IF</u> the selected CNMT spray pump will not start, <u>THEN</u> align and start the other CNMT spray pump. <u>IF</u> neither pump will start, <u>THEN</u> continue with Step 15. <u>WHEN</u> a CNMT spray pump can be started, <u>THEN</u> do steps 14d, e and f.</p>
This Step continued on the next page.		

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 15 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 14 continued from previous page)	
e.	Verify NaOH flow (FI-930)	e. <u>IF</u> NaOH flow <u>NOT</u> indicated, <u>THEN</u> place switches for NaOH tank outlet valves to OPEN. <ul style="list-style-type: none"> • AOV-836A • AOV-836B
f.	<u>WHEN</u> CNMT pressure decreases to 22 psig, <u>THEN</u> perform the following: 1) Reset CNMT spray 2) Check NaOH flow (FI-930) - NO FLOW 3) Stop CNMT spray pumps and place in PULL STOP 4) Close CNMT spray pump discharge valves <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D 	2) Place NaOH tank outlet valve switches to close <ul style="list-style-type: none"> • AOV-836A • AOV-836B
15	Verify Adequate Core Cooling: o Core exit T/Cs - STABLE OR DECREASING o RVLIS level (no RCPs) - STABLE OR INCREASING o RVLIS level (no RCPs) - GREATER THAN 52% [55% adverse CNMT]	<u>IF</u> both RHR pumps running, <u>THEN</u> ensure two SI pumps running. <u>IF</u> only one RHR pump running, <u>THEN</u> perform the following: a. Ensure one SI pump running. b. <u>WHEN</u> CNMT spray pumps stopped, <u>THEN</u> start one additional SI pump.

EOP:	TITLE:	REV: 37
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	PAGE 16 of 22

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*16	<p>Monitor Indications Of CNMT Sump B Blockage</p> <ul style="list-style-type: none"> o Check running RHR Pump motor current - STABLE <ul style="list-style-type: none"> • RHR Pump A. PPCS point I0685AD • RHR Pump B. PPCS point I0685BD o Check running RHR pump discharge flows - STABLE 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Stop all but one RHR pump b. Reduce RHR flow as low as possible but <u>NOT</u> less than requirements of FIG-6.0, FIGURE MIN RCS INJECTION. c. Contact the TSC for additional guidance.
	<p><u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA.</p>	
*17	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 7% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 17 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Establish Normal Shutdown Alignment:	
a.	Check condenser - AVAILABLE	a. Dispatch AO to perform ATT-17.1. ATTACHMENT SD-2.
b.	Perform the following:	
	o Open generator disconnects	
	• 1G13A71	
	• 9X13A73	
	o Place voltage regulator to OFF	
	o Open turbine drain valves	
	o Rotate reheater steam supply controller cam to close valves	
	o Place reheater dump valve switches to HAND	
	o Stop all but one condensate pump	
c.	Verify adequate Rx head cooling:	
	1) Verify at least one control rod shroud fan - RUNNING	1) Manually start one fan as power supply permits (45 kw)
	2) Verify one Rx compartment cooling fan - RUNNING	2) Perform the following:
		o Dispatch AO to reset UV relays at MCC C and MCC D.
		o Manually start one fan as power supply permits (23 kw)
d.	Verify ATT-17.0. ATTACHMENT SD-1 - COMPLETE	

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 18 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to ATT-8.1, ATTACHMENT D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

EOP:	TITLE:	REV: 37
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	PAGE 19 of 22

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check If SI ACCUMs Should Be Isolated:	
a.	Both RCS hot leg temperatures - LESS THAN 400°F	a. Continue with Step 21. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 20b through d.
b.	Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C 	
c.	Close SI ACCUM discharge valves <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 	c. Vent any unisolated ACCUMs: <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>
d.	Locally reopen breakers for MOV-841 and MOV-865	

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 20 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF FUEL DAMAGE IS SUSPECTED, MAINTAIN S/G PRESSURE SLIGHTLY GREATER THAN RCS PRESSURE.</p> <p>*****</p>		
21	<p>Check If Intact S/Gs Should Be Depressurized To RCS Pressure:</p> <p>a. RCS pressure - LESS THAN INTACT S/G PRESSURES</p> <p>b. Direct RP to sample S/Gs for activity</p> <p>c. Request TSC perform a dose projection on steaming S/Gs</p> <p>d. Dose projection for each S/G - ACCEPTABLE</p> <p>e. Dump steam to condenser from intact S/G(s) until S/G pressure less than RCS pressure</p>	<p>a. Go to Step 22.</p> <p>d. Do <u>NOT</u> dump steam from a S/G with an unacceptable dose projection.</p> <p>e. <u>IF</u> steam dump to condenser <u>NOT</u> available, <u>THEN</u> dump steam using intact S/G ARVs until S/G pressure less than RCS pressure.</p>
22	<p>Consult TSC to Determine If Rx Vessel Head Should Be Vented</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> This procedure should be continued while obtaining CNMT hydrogen sample in Step 23.</p>	
23	Check CNMT Hydrogen Concentration:	
	<ul style="list-style-type: none"> a. Direct RP to start CNMT hydrogen monitors as necessary b. Hydrogen concentration - LESS THAN 0.5% 	<ul style="list-style-type: none"> b. Consult TSC to determine if hydrogen recombiners should be placed in service.
	<p><u>NOTE:</u> The TSC should be consulted before changing recirculation lineups.</p>	
24	Check Event Duration - GREATER THAN 19 HOURS AFTER EVENT INITIATION	Consult TSC to evaluate long term plant status.
25	Secure CNMT Spray	
	<ul style="list-style-type: none"> a. Reset CNMT spray b. Place NaOH Tank outlet valve switches in AUTO <ul style="list-style-type: none"> • AOV-836A • AOV-836B c. Place CNMT spray pumps in PULL STOP d. Close discharge valves for idle CNMT spray pumps <ul style="list-style-type: none"> o Pump A <ul style="list-style-type: none"> • MOV-860A • MOV-860B o Pump B <ul style="list-style-type: none"> • MOV-860C • MOV-860D 	

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 37 PAGE 22 of 22
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Verify Two SI Pumps - RUNNING	Manually start pumps.
27	Check Core Exit T/Cs - LESS THAN REQUIREMENTS OF FIG-5.0, FIGURE RHR INJECTION	Perform the following: a. Manually open both PRZR PORVs and block valves. b. Verify core exit T/Cs decreasing to less than requirements of FIG-5.0, FIGURE RHR INJECTION. <u>IF NOT, THEN</u> dump steam from intact S/Gs until core exit T/Cs less than required.
28	Consult TSC To Evaluate Long Term Plant Status	
-END-		

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ES-1.3 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE RHR INJECTION (FIG-5.0)
- 3) FIGURE MIN SUBCOOLING (FIG-1.0)
- 4) FIGURE MIN RCS INJECTION (FIG-6.0)
- 5) ATTACHMENT D/G STOP (ATT-8.1)
- 6) ATTACHMENT SD-1 (ATT-17.0)
- 7) ATTACHMENT SD-2 (ATT-17.1)
- 8) ATTACHMENT RHR NPSH (ATT-14.3)
- 9) ATTACHMENT RHR SYSTEM (ATT-14.5)
- 10) ATTACHMENT MIN SW (ATT-2.1)
- 11) ATTACHMENT RHR PRESS REDUCTION (ATT-14.6)
- 12) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 13) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 14) FOLDOUT

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FOLDOUT PAGE

1. ECA-1.1 TRANSITION CRITERIA

IF emergency coolant recirculation is established and subsequently lost, THEN go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

2. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.
- c. Go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.

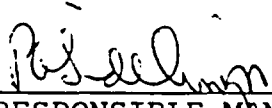
3. AFW SUPPLY SWITCHOVER CRITERION

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

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GINNA STATION

CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 2 of 11
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- A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by draining it through the ruptured S/G tubes into the RCS.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-3, STEAM GENERATOR TUBE RUPTURE, if plant staff selects backfill method.
 - b. ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, when blowdown is not available and plant staff selects backfill method.

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ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 3 of 11

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

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

NOTE:

- o FOLDOUT page should be open AND monitored periodically.
- o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Check RCP Status

a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 2.
b. Ensure conditions for starting an RCP.	b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:
o Bus 11A or 11B energized.	1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).
o Refer to ATT-15.0, ATTACHMENT RCP START.	<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.
	2) Go to Step 2.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 1 continued from previous page)	
c.	Check RVLIS level (no RCPs) - ≥ 95%	<p>c. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT]. o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water. <p><u>IF</u> conditions <u>NOT</u> met, <u>THEN</u> continue with Step 2. <u>WHEN</u> conditions met, <u>THEN</u> do Step 1d.</p>
d.	Start one RCP	<p>d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>2 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure</p> <p>3 Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 10% [30% adverse CNMT] <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM outlet valves</p> <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 6 of 11
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Leakage from ruptured S/G into RCS will dilute RCS boron concentration.</p>	
4	Verify Adequate Shutdown Margin	
	<p>a. Direct RP to sample RCS and ruptured S/G for boron concentration</p> <p>b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM</p>	<p>b. Borate as necessary.</p>
	<p><u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA.</p>	
* 5	Monitor Intact S/G Level:	
	<p>a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in the intact S/G.</p> <p>b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED. Step 1.</p>

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 7 of 11
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should not be delayed.

6 Initiate RCS Cooldown To Cold Shutdown:

a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G

c. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available and RHR system NOT in service, THEN perform the following:

o Use faulted S/G.

-OR-

o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED. Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 7	Monitor Ruptured S/G Narrow Range Level - LEVEL GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> any of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases to 350 psig <u>AND</u> ruptured S/G level greater than 7% [25% adverse CNMT].
* 8	Control Charging And Letdown Flow To Maintain PRZR Level:	
	<ul style="list-style-type: none"> a. PRZR level - GREATER THAN 20% [40% adverse CNMT] b. PRZR level - LESS THAN 75% [65% adverse CNMT] 	<ul style="list-style-type: none"> a. Increase charging flow as necessary and go to Step 9. b. Decrease charging flow to decrease level and go to Step 11.

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 9 of 11
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</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> <p>*****</p> <p><u>NOTE:</u> RCS depressurization may be stopped when RCS pressure decreases to less than 400 psig [300 psig adverse CNMT] to maintain adequate RCP #1 seal D/P.</p>		
* 9	Depressurize RCS To Backfill From Ruptured S/G:	
	<p>a. Depressurize using normal PRZR spray</p> <p>b. Maintain PRZR level - BETWEEN 20% AND 75% [BETWEEN 40% AND 65% . adverse CNMT]</p> <p>c. Check ruptured S/G level - GREATER THAN 1% [25% adverse CNMT]</p> <p>d. Energize PRZR heaters as necessary</p> <p>e. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p>	<p>a. <u>IF</u> letdown is in service. <u>THEN</u> depressurize using auxiliary spray valve (AOV-296). <u>IF NOT</u>. <u>THEN</u> use one PRZR PORV.</p> <p>c. Stop RCS depressurization.---</p>

EOP:	TITLE:	REV: 16
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	PAGE 10 of 11

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 Or O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
11	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 12.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 12.
	c. Place RCS overpressure protection system in service (Refer to O-7. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to ATT-14.1. ATTACHMENT RHR COOL)	
*12	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 13.
	b. Check the following:	b. Stop affected RCP(s).
	o RCP #1 seal D/P - GREATER THAN 220 PSID	
	o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF	

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 11 of 11
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check Core Exit T/Cs - LESS THAN 200° F	Return to Step 4.
14	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions (Refer to 0-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITIONS) b. Consult TSC	
-END-		

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 1 of 1
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ES-3.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT RHR COOL (ATT-14.1)
- 6) ATTACHMENT RCP START (ATT-15.0)
- 7) ATTACHMENT NC (ATT-13.0)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) FOLDOUT

EOP: ES-3.1	TITLE: POST-SGTR COOLDOWN USING BACKFILL	REV: 16 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

Following SI termination, IF either condition listed below occurs, THEN start SI pumps manually as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT].

3. SECONDARY INTEGRITY CRITERIA

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

4. AFW SUPPLY SWITCHOVER CRITERION

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

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 1 of 13
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GINNA STATION
CONTROLLED COPY NUMBER 23

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RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 2 of 13
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A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by draining via S/G blowdown.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-3, STEAM GENERATOR TUBE RUPTURE, if plant staff selects the blowdown method.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 3 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED		
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p> <p><u>NOTE:</u> o FOLDOUT page should be open AND monitored periodically.</p> <p> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10⁺⁰⁵ R/hr.</p> <p>* 1 Check RCP Status</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Both RCPs - STOPPED</p> <p>b. Ensure conditions for starting an RCP.</p> <p> o Bus 11A or 11B energized.</p> <p> o Refer to ATT-15.0. ATTACHMENT RCP START.</p> </td> <td style="vertical-align: top;"> <p>a. Stop all but one RCP and go to Step 2.</p> <p>b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:</p> <p> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p> <u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p> <p> 2) Go to Step 2.</p> </td> </tr> </table>			<p>a. Both RCPs - STOPPED</p> <p>b. Ensure conditions for starting an RCP.</p> <p> o Bus 11A or 11B energized.</p> <p> o Refer to ATT-15.0. ATTACHMENT RCP START.</p>	<p>a. Stop all but one RCP and go to Step 2.</p> <p>b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:</p> <p> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p> <u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p> <p> 2) Go to Step 2.</p>
<p>a. Both RCPs - STOPPED</p> <p>b. Ensure conditions for starting an RCP.</p> <p> o Bus 11A or 11B energized.</p> <p> o Refer to ATT-15.0. ATTACHMENT RCP START.</p>	<p>a. Stop all but one RCP and go to Step 2.</p> <p>b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following:</p> <p> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p> <u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p> <p> 2) Go to Step 2.</p>			
<p>This Step continued on the next page.</p>				

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 4 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 1 continued from previous page)

c. Check RVLIS level (no RCPs) -
≥ 95%

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

- o Increase PRZR level to greater than 65% [82% adverse CNMT].
- o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING.
- o Energize PRZR heaters as necessary to saturate PRZR water.

IF conditions not met, THEN continue with Step 2. WHEN conditions met, THEN do Step 1d.

d. Start one RCP

d. IF an RCP can NOT be started, THEN verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).

IF natural circulation can NOT be verified, THEN increase dumping steam.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 5 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>2 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure</p> <p>3 Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 10% [30% adverse CNMT] <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM outlet valves</p> <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions..</p>

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 6 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.

4 Verify Adequate Shutdown Margin

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Direct RP to sample RCS and ruptured S/G for boron concentration b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0, FIGURE SDM | <ul style="list-style-type: none"> b. Borate as necessary. |
|---|---|

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

* 5 Monitor Intact S/G Level:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 7% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% | <ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in intact S/G. b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED. Step 1. |
|--|--|

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 7 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should not be delayed.</p>	
6	Initiate RCS Cooldown To 350° F:	
	<p>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100° F/HR</p> <p>b. Dump steam to condenser from intact S/G</p>	<p>b. Manually or locally dump steam from intact S/G using S/G ARV.</p> <p><u>IF</u> no intact S/G available, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

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

* 7 Control RCS Pressure And
Charging Flow To Minimize
RCS-To-Secondary Leakage:

a. Perform appropriate action(s)
from table:

PRZR LEVEL	RUPTURED S/G NARROW RANGE LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 20% [40% ADVERSE CNMT]	<ul style="list-style-type: none"> o Increase charging flow o Depressurize RCS using Step 7b. 	Increase charging flow	<ul style="list-style-type: none"> o Increase charging flow o Maintain RCS and ruptured S/G pressure equal
BETWEEN 20% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 7b.	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	<ul style="list-style-type: none"> o Depressurize RCS using Step 7b. o Decrease charging flow 	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
GREATER THAN 75% [65% ADVERSE CNMT]	o Decrease charging flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal

b. Use normal PRZR spray to obtain desired results for Step 7a

b. IF letdown is in service, THEN use auxiliary spray (AOV-296).
IF NOT. THEN use one PRZR PORV.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 9 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 OR O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
9	Check If RCS Cooldown Should Be Stopped: a. RCS cold leg temperatures - LESS THAN 350°F b. Stop RCS cooldown c. Maintain RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 4.
*10	Monitor Ruptured S/G Narrow Range Level - LEVEL GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> any of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig. <p>--OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases to 350 psig <u>AND</u> ruptured S/G level greater than 7% [25% adverse CNMT].

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 10 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Blowdown from ruptured S/G may be stopped when RCS pressure decreases to less than 400 psig [300 psig adverse CNMT] to maintain adequate RCP #1 seal ΔP.</p>	
11	Consult TSC To Determine Appropriate Procedure To Establish Blowdown From Ruptured S/G	<p><u>IF</u> blowdown can <u>NOT</u> be initiated, <u>THEN</u> go to alternate post-SGTR cooldown procedure, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, Step 1, <u>OR</u> ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, Step 1.</p>
*12	Control Charging And Letdown Flow To Maintain PRZR Level:	
	a. PRZR level - GREATER THAN 20% [40% adverse CNMT]	a. Increase charging flow as necessary and go to Step 13.
	b. PRZR level - LESS THAN 75% [65% adverse CNMT]	b. Decreases charging flow to decrease level and go to Step 14.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 11 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</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> <p>*****</p>		
*13	Depressurize RCS To Minimize RCS-To-Secondary Leakage:	
	<p>a. Depressurize using normal PRZR spray</p> <p>b. Energize PRZR heaters as necessary</p> <p>c. Maintain RCS pressure at ruptured S/G pressure</p> <p>d. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING</p>	<p>a. <u>IF</u> letdown is in service. <u>THEN</u> depressurize using auxiliary spray valve (AOV-296). <u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.</p>
*14	Monitor RCP Operation:	
	<p>a. RCPS - ANY RUNNING</p> <p>b. Check the following:</p> <p>o RCP #1 seal D/P - GREATER THAN 220 PSID</p> <p>o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0. FIGURE RCP SEAL LEAKOFF</p>	<p>a. Go to Step 15.</p> <p>b. Stop affected RCP(s).</p>

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 12 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If RHR Normal Cooling Can Be Established:	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 10.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 10.
	c. Place RCS overpressure protection system in service (Refer to 0-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to ATT-14.1, ATTACHMENT RHR COOL)	
16	Continue RCS Cooldown To Cold Shutdown:	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Use RHR System	
	c. Dump steam to condenser from intact S/G	c. Manually or locally dump steam using intact S/G ARV. <u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following: o Use faulted S/G.
		-OR-
		o Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 13 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check Core Exit T/Cs - LESS THAN 200° F	Return to Step 10.
18	Evaluate Long Term Plant Status: <ul style="list-style-type: none">a. Maintain cold shutdown conditions - (Refer to O-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITIONS)b. Consult TSC	
		-END-

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 1 of 1
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ES-3.2 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT RHR COOL (ATT-14.1)
- 6) ATTACHMENT RCP START (ATT-15.0)
- 7) ATTACHMENT NC (ATT-13.0)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) FOLDOUT

EOP: ES-3.2	TITLE: POST-SGTR COOLDOWN USING BLOWDOWN	REV: 17 PAGE 1 of 1
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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

Following SI termination, IF either condition listed below occurs, THEN start SI pumps manually as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT].

3. SECONDARY INTEGRITY CRITERIA

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

4. AFW SUPPLY SWITCHOVER CRITERION

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

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 1 of 13
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GINNA STATION

CONTROLLED COPY NUMBER 23

Res. [Signature]
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 2 of 13
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- A. PURPOSE - This procedure provides actions to cool down and depressurize the plant to cold shutdown conditions following a SGTR. This recovery method depressurizes the ruptured S/G by dumping steam.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-3, STEAM GENERATOR TUBE RUPTURE, if plant staff selects steam dump method.
 - b. ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, when blowdown is not available and plant staff selects steam dump method.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 3 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o STEAM SHOULD NOT BE RELEASED FROM ANY RUPTURED S/G IF WATER MAY EXIST IN ITS STEAMLINE.
- o AN OFFSITE DOSE EVALUATION SHOULD BE COMPLETED PRIOR TO USING THIS PROCEDURE.
- o IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

- NOTE:
- o FOLDOUT page should be open AND monitored periodically.
 - o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

* 1 Check RCP Status

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Both RCPs - STOPPED b. Ensure conditions for starting an RCP. <ul style="list-style-type: none"> o Bus 11A or 11B energized. o Refer to ATT-15.0, ATTACHMENT RCP START. | <ul style="list-style-type: none"> a. Stop all but one RCP and go to Step 2. b. <u>IF</u> conditions can <u>NOT</u> be met, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).

<u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam. 2) Go to Step 2. |
|--|--|

This Step continued on the next page.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 4 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 1 continued from previous page)	
c.	Check RVLIS level (no RCPs) - $\geq 95\%$	<p>c. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Increase PRZR level to greater than 65% [82% adverse CNMT]. o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using FIG-1.0, FIGURE MIN SUBCOOLING. o Energize PRZR heaters as necessary to saturate PRZR water. <p><u>IF</u> conditions <u>NOT</u> met, <u>THEN</u> continue with Step 2. <u>WHEN</u> conditions met, <u>THEN</u> do Step 1d.</p>
d.	Start one RCP	<p>d. <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to ATT-13.0, ATTACHMENT NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>

EDP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 5 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	2 Energize PRZR Heaters As Necessary To Saturate PRZR Water At Ruptured S/G Pressure	
	3 Check If SI ACCUMs Should Be Isolated:	
	<ul style="list-style-type: none"> a. Check the following: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING o PRZR level - GREATER THAN 10% [30% adverse CNMT] b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C c. Close SI ACCUM outlet valves <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 d. Locally reopen breakers for MOV-841 and MOV-865 	<ul style="list-style-type: none"> a. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1. c. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 2) Open HCV-945. <p>IF an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 6 of 13
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

4 Verify Adequate Shutdown Margin

a. Direct RP to sample RCS and ruptured S/G for boron concentration

b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIG-2.0. FIGURE SDM

b. Borate as necessary.

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

* 5 Monitor Intact S/G Level:

a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]

b. Control feed flow to maintain narrow range level between 1% [25% adverse CNMT] and 50%

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in intact S/G.

b. IF narrow range level in the intact S/G continues to increase in an uncontrolled manner, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 7 of 13
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Since ruptured S/G may continue to depressurize to less than the minimum RCS pressure necessary for continued RCP operation, cooldown to cold shutdown should not be delayed.

6 Initiate RCS Cooldown To
350°F:

a. Establish and maintain cooldown
rate in RCS cold legs - LESS
THAN 100°F/HR

b. Dump steam to condenser from
intact S/G

b. Manually or locally dump steam
from intact S/G using S/G ARV.

IF no intact S/G available. THEN
perform the following:

o Use faulted S/G.

-OR-

o Go to ECA-3.1. SGTR WITH LOSS
OF REACTOR COOLANT -
SUBCOOLED RECOVERY DESIRED.
Step 1.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

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

* 7 Control RCS Pressure And
Charging Flow To Minimize
RCS-To-Secondary Leakage:

a. Perform appropriate action(s)
from table:

PRZR LEVEL	RUPTURED S/G NARROW RANGE LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 20% [40% ADVERSE CNMT]	<ul style="list-style-type: none"> o Increase charging flow o Depressurize RCS using Step 7b. 	Increase charging flow	<ul style="list-style-type: none"> o Increase charging flow o Maintain RCS and ruptured S/G pressure equal
BETWEEN 20% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 7b.	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	<ul style="list-style-type: none"> o Depressurize RCS using Step 7b. o Decrease charging flow 	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
GREATER THAN 75% [65% ADVERSE CNMT]	o Decrease charging flow	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal

b. Use normal PRZR spray to obtain
desired results for Step 7a

b. IF letdown is in service, THEN
use auxiliary spray (AOV-296).
IF NOT, THEN use one PRZR PORV.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 9 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Establish Required RCS Hydrogen Concentration (Refer to S-3.3C, H2 OR O2 REMOVAL FROM PRIMARY SYSTEM BY BURPING VCT)	
9	Check If RCS Cooldown Should Be Stopped: a. RCS cold leg temperatures - LESS THAN 350°F b. Stop RCS cooldown c. Maintain RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 4.
*10	Monitor Ruptured S/G Narrow Range Level - LEVEL GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> any of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G:</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases in an uncontrolled manner. <p>-OR-</p> <ul style="list-style-type: none"> o Ruptured S/G pressure increases to 1020 psig. <p>--OR--</p> <ul style="list-style-type: none"> o Ruptured S/G pressure decreases to 350 psig <u>AND</u> ruptured S/G level greater than 7% [25% adverse CNMT].

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 10 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RUPTURED S/G PRESSURE MAY DECREASE RAPIDLY WHEN STEAM IS RELEASED.</p> <p>*****</p> <p><u>NOTE:</u> Steam release from ruptured S/G may be stopped when RCS pressure decreases to less than 400 psig [300 psig adverse CNMT] to maintain adequate RCP #1 seal ΔP.</p>		
11	Initiate Cooldown Of Ruptured S/G:	
	<p>a. Verify condenser available:</p> <ul style="list-style-type: none"> o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT <p>b. Dispatch AO to locally align steam traps associated with the ruptured S/G.</p> <p>c. Dispatch AO to locally open ruptured S/G MSIV bypass valve</p> <p>d. Dump steam to condenser using steam dump pressure controller</p>	<p>a. Manually or locally dump steam using ruptured S/G ARV and go to Step 12.</p>
*12	Control Charging And Letdown Flow To Maintain PRZR Level:	
	<p>a. PRZR level - GREATER THAN 20% [40% adverse CNMT]</p> <p>b. PRZR level - LESS THAN 75% [65% adverse CNMT]</p>	<p>a. Increase charging flow as necessary and go to Step 13.</p> <p>b. Decrease charging flow to decrease level and go to Step 14.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

***13 Depressurize RCS To Minimize
RCS-To-Secondary Leakage:**

- | | |
|--|--|
| <p>a. Depressurize using normal PRZR spray associated with running RCP</p> <p>b. Energize PRZR heaters as necessary</p> <p>c. Maintain RCS pressure at ruptured S/G pressure</p> <p>d. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0, FIGURE MIN SUBCOOLING</p> | <p>a. <u>IF</u> letdown is in service, <u>THEN</u> depressurize using auxiliary spray valve (AOV-296). <u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.</p> |
|--|--|

***14 Monitor RCP Operation:**

- | | |
|---|--|
| <p>a. RCPs - ANY RUNNING</p> <p>b. Check the following:</p> <p>o RCP #1 seal D/P - GREATER THAN 220 PSID</p> <p>2) Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0, FIGURE RCP SEAL LEAKOFF</p> | <p>a. Go to Step 15.</p> <p>b. Stop affected RCP(s).</p> |
|---|--|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check If RHR Normal Cooling Can Be Established	
	a. RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 10.
	b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 10.
	c. Place RCS overpressure protection system in service (Refer to 0-7. ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	c. <u>IF</u> RCS overpressure protection system can <u>NOT</u> be placed in service, <u>THEN</u> notify TSC of potential Tech Spec violation if RHR system is placed in service.
	d. Establish RHR normal cooling (Refer to ATT-14.1. ATTACHMENT RHR COOL)	
16	Continue RCS Cooldown To Cold Shutdown:	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	b. Use RHR System	
	c. Dump steam to condenser from intact S/G	c. Manually or locally dump steam using intact S/G ARV
		<u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> perform the following:
		o Use faulted S/G.
		-OR-
		o Go to ECA-3.1. SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 13 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Check Core Exit T/Cs - LESS THAN 200° F	Return to Step 10.
18	Evaluate Long Term Plant Status: <ul style="list-style-type: none">a. Maintain cold shutdown conditions (Refer to 0-2.2, PLANT SHUTDOWN FROM HOT SHUTDOWN TO COLD CONDITIONS)b. Consult TSC	
-END-		

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 1 of 1
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ES-3.3 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) FIGURE SDM (FIG-2.0)
- 4) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 5) ATTACHMENT RHR COOL (ATT-14.1)
- 6) ATTACHMENT RCP START (ATT-15.0)
- 7) ATTACHMENT NC (ATT-13.0)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) FOLDOUT

EOP: ES-3.3	TITLE: POST-SGTR COOLDOWN USING STEAM DUMP	REV: 17 PAGE 1 of 1
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RED PATH SUMMARY

- a. SUBCRITICALITY - Nuclear power greater than 5%
- b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND
RVLIS level (no RCPs) less than 52% [55%
adverse CNMT]
- c. HEAT SINK - Narrow range level in all S/Gs less than 7%
[25% adverse CNMT] AND total feedwater flow
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than
100°F in last 60 minutes AND RCS cold leg
temperature less than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

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FOLDOUT PAGE

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

2. SI REINITIATION CRITERIA

Following SI termination, IF either condition listed below occurs, THEN start SI pumps manually as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:

- o RCS subcooling based on core exit T/Cs - LESS THAN 0°F USING REQUIREMENTS OF FIG-1.0, FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 10% [30% adverse CNMT].

3. SECONDARY INTEGRITY CRITERIA

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

4. AFW SUPPLY SWITCHOVER CRITERION

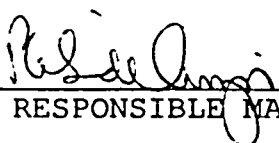
IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

5. MULTIPLE S/G TUBE RUPTURE CRITERIA

IF any intact S/G level increases in in an uncontrolled manner OR IF any intact S/G has abnormal radiation, THEN go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.

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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 2 of 18
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A. PURPOSE - This procedure provides actions to restore core cooling.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. F-0.2, CORE COOLING Critical Safety Function Status Tree, on a RED condition.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. o Foldout Page should be open and monitored periodically. 		
* 1 Monitor RWST Level - GREATER THAN 28%		<p>Perform the following:</p> <ul style="list-style-type: none"> a. Ensure SI system aligned for cold leg recirculation using Steps 1 through 13 of ES-1.3. TRANSFER TO COLD LEG RECIRCULATION. b. <u>WHEN</u> the SI system is aligned for sump recirculation. <u>THEN</u> go to Step 4.
2 Verify SI Pump Suction Aligned to RWST:		
<ul style="list-style-type: none"> a. Verify SI pump suction valves from RWST - OPEN <ul style="list-style-type: none"> • MOV-825A • MOV-825B 		<ul style="list-style-type: none"> a. Ensure at least one SI pump suction valve from RWST open. <ul style="list-style-type: none"> • MOV-825A • MOV-825B

EOP:	TITLE:	REV: 21
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	PAGE 4 of 18

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RHR PUMPS SHOULD NOT BE RUN LONGER THAN 1 HOUR WITHOUT CCW TO THE RHR HEAT EXCHANGERS.</p> <p>*****</p>		
3	Verify SI Pump And RHR Pump Emergency Alignment:	
	a. RHR pump discharge to Rx vessel deluge - OPEN	a. Ensure at least one valve open.
	<ul style="list-style-type: none"> • MOV-852A • MOV-852B 	
	b. Verify both RHR pumps - RUNNING	b. Manually start pumps
	c. Verify SI pump C - RUNNING	c. Manually start pump on available bus.
	d. Verify SI pump A - RUNNING	d. Perform the following:
		1) Ensure SI pumps B and C running.
		2) Ensure SI pump C aligned to discharge line A:
		<ul style="list-style-type: none"> o MOV-871B closed o MOV-871A open
		3) Go to Step 4.
	e. Verify SI pump B - RUNNING	e. Perform the following:
		1) Ensure SI pumps A and C running.
		2) Ensure SI pump C aligned to discharge line B:
		<ul style="list-style-type: none"> o MOV-871B open o MOV-871A closed
		3) Go to Step 4.
	f. Verify both SI pump C discharge valves - OPEN	f. Manually open valves as necessary.
	<ul style="list-style-type: none"> • MOV-8/1A • MOV-8/1B 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Verify SI Flow In Both Trains: o SI line loop A and B flow indicators - CHECK FOR FLOW o RHR loop flow indicator - CHECK FOR FLOW	Perform the following: a. Manually start pumps and align valves as necessary. b. Establish maximum charging flow. c. Continue efforts to establish SI or RHR flow.
5	Check RCP Support Conditions: a. Verify Bus 11A or 11B - ENERGIZED b. Check other RCP support conditions (Refer to ATT-15.0, ATTACHMENT RCP START)	a. Restore power to Bus 11A or 11B (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER). b. Continue attempts to establish RCP support conditions.
6	Check SI ACCUM Discharge Valves - OPEN • MOV-841 • MOV-865	<u>IF</u> SI ACCUM discharge valves closed after ACCUM discharge. <u>THEN</u> go to Step 7. <u>IF NOT</u> , <u>THEN</u> perform the following: a. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves. • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C b. Open SI ACCUM discharge valves. • ACCUM A, MOV-841 • ACCUM B, MOV-865

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 6 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check Core Exit T/Cs - LESS THAN 1200° F	Go to Step 10.
8	Check RVLIS Indication:	
	a. RCPs - BOTH SECURED	a. Return to procedure and step in effect
	b. RVLIS level - GREATER THAN 52% [55% adverse CNMT]	b. <u>IF</u> RVLIS increasing. <u>THEN</u> return to Step 1. <u>IF NOT</u> . <u>THEN</u> go to Step 9.
	c. Return to procedure and step in effect	
9	Check Core Exit T/Cs:	
	a. Temperature - LESS THAN 700° F	a. <u>IF</u> decreasing. <u>THEN</u> return to Step 1. <u>IF NOT</u> . <u>THEN</u> go to Step 10.
	b. Return to procedure and step in effect	

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

10	Reset SI	

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 7 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Reset CI: a. Depress CI reset pushbutton b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.
	<u>NOTE:</u> This procedure should be continued while obtaining CNMT hydrogen sample in Step 12.	
12	Check CNMT Hydrogen Concentration: a. Direct RP to start CNMT hydrogen monitors as necessary b. Hydrogen concentration - LESS THAN 0.5%	b. Consult TSC to determine if hydrogen recombiners should be placed in service.

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 8 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o IF CST LEVEL DECREASES TO LESS THAN 5 FEET. THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).
- o A FAULTED OR RUPTURED S/G SHOULD NOT BE USED IN SUBSEQUENT STEPS UNLESS NO INTACT S/G IS AVAILABLE.

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

***13 Monitor Intact S/G Levels:**

a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.

IF total feed flow greater than 200 gpm can NOT be established, THEN perform the following:

1) Continue attempts to establish a heat sink in at least one S/G (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

2) Go to Step 23.

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

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 9 of 18
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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, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 14B).</p> <p>*****</p>		
14	Check RCS Vent Paths:	
a.	Power to PRZR PORV block valves - AVAILABLE	a. Restore power to block valves unless block valve was closed to isolate an open PORV:
		<ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
b.	PORVs - CLOSED	b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs.
		<u>IF</u> any PORV 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.
d.	Rx vessel head vent valves - CLOSED	d. Manually close valves.
	<ul style="list-style-type: none"> • SOV-590 • SOV-591 • SOV-592 • SOV-593 	

EOP:	TITLE:	REV: 21
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	PAGE 10 of 18

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish Condenser Steam Dump Manual Control	
a.	Verify condenser available:	a. Place intact S/G ARV controller in MANUAL and go to Step 16.
	o Intact S/G MSIV - OPEN	
	o Annunciator G-15, STEAM DUMP ARMED - LIT	
b.	Place steam dump mode selector switch in MANUAL	
c.	Place steam dump controller in MANUAL	
NOTE: Partial uncovering of S/G tubes is acceptable in the following steps.		
16	Depressurize All Intact S/Gs To 200 PSIG:	
a.	Dump steam to condenser at maximum rate	a. Manually or locally dump steam at maximum rate using S/G ARVs.
b.	Check S/G pressure - LESS THAN 200 PSIG	b. <u>IF</u> S/G pressure decreasing, <u>THEN</u> return to Step 13. <u>IF NOT. THEN</u> go to Step 23.
c.	Check RCS hot leg temperatures - BOTH LESS THAN 400°F	c. <u>IF</u> RCS hot leg temperatures decreasing, <u>THEN</u> return to Step 13. <u>IF NOT. THEN</u> go to Step 23.
d.	Stop S/G depressurization	

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 11 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. RCS hot leg temperatures - BOTH LESS THAN 400°F</p> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves if necessary</p> <ul style="list-style-type: none"> • MOV-841 MCC C position 12F • MOV-865 MCC D position 12C <p>c. Verify SI reset</p> <p>d. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 <p>e. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Go to Step 23.</p> <p>c. Manually reset SI.</p> <p>d. Perform the following to vent an unisolated accumulator:</p> <ol style="list-style-type: none"> 1) Reset CI. 2) Ensure adequate air compressor(s) running. 3) Establish IA to CNMT. 4) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 5) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 12 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Stop Both RCPs	
19	Dump Steam to Condenser At Maximum Rate To Depressurize All Intact S/Gs To Atmospheric Pressure	Manually or locally dump steam at maximum rate using S/G ARVs.
20	Verify SI Flow: <ul style="list-style-type: none"> o SI line loop A and B flow indicators - CHECK FOR FLOW -OR- o RHR loop flow indicator - CHECK FOR FLOW 	Perform the following: <ul style="list-style-type: none"> a. Continue efforts to establish SI or RHR flow. b. Try to establish charging flow. c. <u>IF</u> core exit T/Cs less than 1200°F, <u>THEN</u> return to Step 19. <u>IF NOT</u>, <u>THEN</u> go to Step 23.
21	Check Core Cooling: <ul style="list-style-type: none"> a. Core exit T/Cs - LESS THAN 1200°F b. RCS hot leg temperatures - BOTH LESS THAN 320°F c. RVLIS level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] 	<ul style="list-style-type: none"> a. Go to Step 23. b. Return to Step 19. c. Return to Step 19.

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 13 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Go to Appropriate Plant Procedure	
a.	Check RWST level - GREATER THAN 28%	a. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
b.	Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 17	

EOP:	TITLE:	REV: 21
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	PAGE 14 of 18

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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NOTE: Normal conditions are desired but not required for starting the RCPs.

23 Check If RCPs Should Be Started:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Core Exit T/Cs - GREATER THAN 1200°F b. Check if an idle RCS cooling loop is available <ul style="list-style-type: none"> o Narrow range S/G level - GREATER THAN 7% [25% adverse CNMT] o RCP in associated loop - AVAILABLE AND NOT OPERATING c. Start RCP in one idle RCS cooling loop d. Return to Step 23a | <ul style="list-style-type: none"> a. Go to Step 24. b. Perform the following: <ul style="list-style-type: none"> 1) Reset SI. 2) Reset CI. 3) Ensure adequate air compressor(s) running. 4) Establish IA to CNMT. 5) Open all PRZR PORVs and block valves <ul style="list-style-type: none"> a) <u>IF</u> any block valve can <u>NOT</u> be opened, <u>THEN</u> ensure power supplied to block valve. b) <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS. 6) <u>IF</u> core exit T/Cs remain greater than 1200°F, <u>THEN</u> open Rx vessel head vent valves. <ul style="list-style-type: none"> • SOV-590 • SOV-591 • SOV-592 • SOV-593 7) Go to Step 24. |
|---|--|

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 15 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Dump Steam To Condenser At Maximum Rate To Depressurize All Intact S/Gs To Atmospheric Pressure:	<p>Manually or locally dump steam from all intact S/Gs using ARVs.</p> <p><u>IF</u> ARVs not available on intact S/Gs, <u>THEN</u>:</p> <ul style="list-style-type: none"> o Open TDAFW pump steam supply valve from intact S/G(s) <ul style="list-style-type: none"> • S/G A, MOV-3505A • S/G B, MOV-3504A <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Perform the following: <ul style="list-style-type: none"> a. Open intact S/G MISV bypass valves b. Open both priming air ejector steam inlet valves <ul style="list-style-type: none"> • V-3580 • V-3581 <p><u>IF</u> no intact S/G available, <u>THEN</u> use faulted or ruptured S/G.</p>
25	Check Core Exit T/Cs - LESS THAN 1200° F	<p><u>IF</u> core exit temperatures decreasing, <u>THEN</u> return to step 23.</p> <p><u>IF</u> core exit temperatures increasing, <u>THEN</u> go to SACRG-1, SEVERE ACCIDENT CONTROL ROOM GUIDELINE INITIAL RESPONSE, step 1.</p>

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 16 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Check If SI ACCUMs Should Be Isolated:	
a.	RHR loop flow indicator - AT LEAST INTERMITTENT FLOW	a. Go to Step 28.
b.	Dispatch A0 with locked valve key to locally close breakers for SI ACCUM discharge valves if necessary <ul style="list-style-type: none"> • MOV-841 MCC C position 12F • MOV-865 MCC D position 12C 	
c.	Reset SI.	
d.	Close SI ACCUM discharge valves <ul style="list-style-type: none"> • ACCUM A. MOV-841 • ACCUM B. MOV-865 	d. Perform the following to vent an unisolated accumulator: <ol style="list-style-type: none"> 1) Reset CI. 2) Ensure adequate air compressor(s) running. 3) Establish IA to CNMT. 4) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A. AOV-834A • ACCUM B. AOV-834B 5) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>
e.	Locally reopen breakers for MOV-841 and MOV-865	

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 17 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Check If RCPs Should Be Stopped: a. Both RCS hot leg temperatures - LESS THAN 320°F b. Stop all RCPs	a. Go to Step 28.
28	Verify SI Flow: o SI line loop A and B flow indicators - CHECK FOR FLOW -OR- o RHR loop flow indicator - CHECK FOR FLOW	Perform the following: a. Continue efforts to establish SI or RHR flow. b. Try to establish charging flow. c. Return to Step 23.
29	Check Core Cooling: a. RCS hot leg temperatures - LESS THAN 320°F b. RCPs - BOTH SECURED c. RVLIS level - GREATER THAN 77% [82% adverse CNMT]	a. Return to Step 23. b. Stop all RCPs. c. Return to Step 23.

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 18 of 18
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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30 Go to Appropriate Plant Procedure

a. IF PRZR PORVs and head vents were opened in Step 23. THEN consult TSC to evaluate long term status AND continue with transitions.

b. Check RWST level - GREATER THAN 28%

b. Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

c. Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 17.

-END-

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 1 of 1
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FR-C.1 APPENDIX LIST

TITLE

- 1) ATTACHMENT RCP START (ATT-15.0)
- 2) ATTACHMENT N2 PORVS (ATT-12.0)
- 3) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 4) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 5) FOLDOUT PAGE

EOP: FR-C.1	TITLE: RESPONSE TO INADEQUATE CORE COOLING	REV: 21 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-C series procedures.

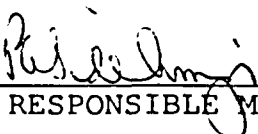
1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 1 of 14
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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 2 of 14
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A. PURPOSE - This procedure provides actions to restore adequate core cooling.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. F-0.2, CORE COOLING Critical Safety Function Status Tree, on any ORANGE condition.

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 3 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr. o Normal conditions for running RCPs are desired, but RCPs should NOT be tripped if normal conditions cannot be established or maintained. o Foldout Page should be open and monitored periodically. 		
* 1	Monitor RWST Level - GREATER THAN 28%	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Ensure SI system aligned for cold leg recirculation using Steps 1 through 13 of ES-1.3, TRANSFER TO COLD LEG RECIRCULATION. b. Go to Step 4.
2	Verify SI Pump Suction Aligned To RWST:	
	<p>a. SI pump suction valves from RWST - OPEN</p> <ul style="list-style-type: none"> • MOV-825A • MOV-825B 	<p>a. Ensure at least one SI pump suction valve from RWST open</p> <ul style="list-style-type: none"> • MOV-825A • MOV-825B

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 4 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify SI Pump And RHR Pump Emergency Alignment:	
	a. RHR pump discharge to Rx vessel deluge - OPEN	a. Ensure at least one valve open.
	<ul style="list-style-type: none"> • MOV-852A • MOV-852B 	
	b. Verify SI pump C - RUNNING	b. Manually start pump on available bus.
	c. Verify SI pump A - RUNNING	c. Perform the following: <ul style="list-style-type: none"> 1) Ensure SI pumps B and C running. 2) Ensure SI pump C aligned to discharge line A: <ul style="list-style-type: none"> o MOV-871B closed o MOV-871A open 3) Go to Step 4.
	d. Verify SI pump B - RUNNING	d. Perform the following: <ul style="list-style-type: none"> 1) Ensure SI pumps A and C running. 2) Ensure SI pump C aligned to discharge line B: <ul style="list-style-type: none"> o MOV-871B open o MOV-871A closed 3) Go to Step 4.
	e. Verify both SI pump C discharge valves - OPEN	e. Manually open valves as necessary.
	<ul style="list-style-type: none"> • MOV-871A • MOV-871B 	

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 5 of 14
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4 Verify SI Flow In Both Trains:

a. SI line loop A and B flow indicators - CHECK FOR FLOW

a. Perform the following:

- 1) Manually start SI pumps and align valves as necessary.
- 2) Establish maximum charging flow.

b. RCS pressure - LESS THAN 250 psig [465 psig adverse CNMT]

b. Go to Step 5.

c. RHR loop flow indicator - CHECK FOR FLOW

c. Manually start RHR pumps and align valves.

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 6 of 14
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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, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 5B).</p> <p>*****</p>		
5 Check RCS Vent Paths:		
a. Power to PRZR PORV block valves - AVAILABLE		a. Restore power to block valves unless block valve was closed to isolate an open PORV:
		<ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
b. PORVs - CLOSED		b. <u>IF</u> PRZR pressure less than 2335 psig, <u>THEN</u> manually close PORVs.
		<u>IF</u> any PORV 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.
d. Rx vessel head vent valves - CLOSED		d. Manually close valves.
<ul style="list-style-type: none"> • SOV-590 • SOV-591 • SOV-592 • SOV-593 		

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 7 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check RCP Status:	
	a. At least one RCP - RUNNING	a. Go to Step 9.
	b. Support conditions for the operating RCP(s) available (Refer to ATT-15.0, ATTACHMENT RCP START)	b. Try to establish support conditions for the operating RCP.
7	Check RVLIS Fluid Fraction	
	a. Fluid fraction (any RCP on) - GREATER THAN 66%	a. <u>IF</u> increasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , then go to Step 8.
	b. Return to procedure and step in effect.	
8	Check If One RCP Should Be Stopped:	
	a. Both RCPs - RUNNING	a. Go to Step 10.
	b. Stop one RCP	
	c. Go to Step 10	
9	Check Core Cooling:	
	a. RVLIS level (no RCPs) - GREATER THAN 52% [55% adverse CNMT]	a. <u>IF</u> increasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 10.
	b. Core exit T/Cs - LESS THAN 700°F	b. <u>IF</u> decreasing, <u>THEN</u> return to Step 1. <u>IF NOT</u> , <u>THEN</u> go to Step 10.
	c. Return to procedure and step in effect	

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 8 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check SI ACCUM Discharge Valves - OPEN <ul style="list-style-type: none"> • MOV-841 • MOV-865 	IF SI ACCUM discharge valves closed after ACCUM discharge, <u>THEN</u> go to Step 11. <u>IF NOT</u> , <u>THEN</u> perform the following: <ul style="list-style-type: none"> a. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves. <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C b. Open SI ACCUM discharge valves. <ul style="list-style-type: none"> • ACCUM A, MOV-841 • ACCUM B, MOV-865
***** <div>CAUTION</div> ***** <ul style="list-style-type: none"> o IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS). o A FAULTED OR RUPTURED S/G SHOULD NOT BE USED IN SUBSEQUENT STEPS UNLESS NO INTACT S/G IS AVAILABLE. *****		
<u>NOTE:</u> TDAFW pump flow control AOVs may drift open on loss of IA.		
*11	Monitor Intact S/G Levels:	
	a. Narrow range level - GREATER THAN 7% [25% adverse CNMT]	a. Increase total feed flow to restore narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.
	b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%	

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 9 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	<p>Establish Condenser Steam Dump Manual Control</p> <p>a. Verify condenser available:</p> <ul style="list-style-type: none"> o Intact S/G MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT <p>b. Place steam dump mode selector switch in MANUAL</p> <p>c. Place steam dump controller in MANUAL</p>	<p>a. Place intact S/G ARV controller in MANUAL and go to Step 13.</p>

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 10 of 14
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

THE FOLLOWING STEP WILL CAUSE SI ACCUMULATOR INJECTION WHICH MAY RESULT IN A RED PATH CONDITION IN F-0.4, INTEGRITY STATUS TREE. THIS PROCEDURE SHOULD BE COMPLETED BEFORE TRANSITION TO FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK.

13 Depressurize All Intact S/Gs
To 200 PSIG:

a. Maintain cooldown rate in RCS
cold legs - LESS THAN 100°F/HR

b. Dump steam to condenser

b. Manually or locally dump steam
from intact S/Gs:

o Use S/G ARVs.

-OR-

o Open TDAFW pump steam supply
valve(s) for affected S/G(s):

- S/G A, MOV-3505A
- S/G B, MOV-3504A

-OR-

o Locally perform the following:

o Open intact S/G MSIV
bypass valve.

o Open priming air ejector
steam isolation valves.

- V-3580
- V-3581

c. Check S/G pressures - LESS THAN
200 PSIG

c. Return to Step 11.

d. Check RCS hot leg temperatures -
BOTH LESS THAN 400°F

d. Return to Step 11.

e. Stop S/G depressurization

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 12 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Isolate Both SI ACCUMs	
	<p>a. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves if necessary</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>b. Reset SI</p> <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>c. Perform the following to vent an unisolated accumulator:</p> <ol style="list-style-type: none"> 1) Reset CI 2) Ensure adequate air compressor(s) running 3) Establish IA to CNMT 4) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B 5) Open HCV-945. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 13 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>SYMPTOMS FOR FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, SHOULD BE CLOSELY MONITORED DURING SUBSEQUENT STEPS.</p> <p>*****</p>		
16	Stop All RCPs	
17	Depressurize All Intact S/Gs To Atmospheric Pressure:	
	<p>a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Dump steam to condenser</p>	<p>b. Manually or locally dump steam from intact S/Gs:</p> <p>1) Use S/G ARVs.</p> <p>2) Open TDAFW pump steam supply valve(s) for affected S/G(s):</p> <ul style="list-style-type: none"> • S/G A. MOV-3505A • S/G B. MOV-3504A <p>3) Locally perform the following:</p> <ul style="list-style-type: none"> o Open intact S/G MSIV bypass valve. o Open priming air ejector steam isolation valves. <ul style="list-style-type: none"> • V-3580 • V-3581

EOP:

FR-C.2

TITLE:

RESPONSE TO DEGRADED CORE COOLING

REV: 19

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18 Verify SI Flow:

- o SI line loop A and B flow indicators - CHECK FOR FLOW

-OR-

- o RHR loop flow indicator - CHECK FOR FLOW

Perform the following:

- a. Continue efforts to establish SI or RHR flow.
- b. Try to establish maximum charging flow.
- c. Return to Step 17.

19 Check Core Cooling:

- o RVLIS level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]
- o Both RCS hot leg temperatures - LESS THAN 320°F

Return to Step 17.

20 Go to Appropriate Plant Procedure

- a. Check RWST level - GREATER THAN 28%
- b. Go to E-1. LOSS OF REACTOR OR SECONDARY COOLANT. Step 17

- a. Go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION. Step 1.

-END-

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 1 of 1
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FR-C.2 APPENDIX LIST

TITLE

- 1) ATTACHMENT RCP START (ATT-15.0)
- 2) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 3) FOLDOUT

EOP: FR-C.2	TITLE: RESPONSE TO DEGRADED CORE COOLING	REV: 19 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-C series procedures.

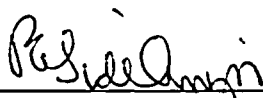
1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 1 of 31
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GINNA STATION
CONTROLLED COPY NUMBER 23


RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 2 of 31
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A. PURPOSE - This procedure provides actions for responding to a loss of secondary heat sink in both S/Gs.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-0, REACTOR TRIP OR SAFETY INJECTION, when minimum AFW flow is not verified AND narrow range level in both S/Gs is less than 7% [25% adverse CNMT] |
- b. F-0.3, HEAT SINK Critical Safety Function Status Tree on a RED condition.

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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 TOTAL FEED FLOW IS LESS THAN 200 GPM DUE TO OPERATOR ACTION, THIS PROCEDURE SHOULD NOT BE PERFORMED.</p> <p>o FEED FLOW SHOULD NOT BE REESTABLISHED TO A FAULTED S/G IF A NON-FAULTED S/G IS AVAILABLE.</p> <p>*****</p> <p><u>NOTE:</u> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p>o Foldout Page should be open and monitored periodically.</p> <p>1 Check If Secondary Heat Sink Is Required:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. RCS pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE</p> </td> <td style="vertical-align: top;"> <p>a. <u>IF</u> RWST level greater than 28%. <u>THEN</u> return to procedure and step in effect.</p> <p><u>IF</u> RWST level less than 28%. <u>THEN</u> go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION, Step 1.</p> </td> </tr> </table>			<p>a. RCS pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE</p>	<p>a. <u>IF</u> RWST level greater than 28%. <u>THEN</u> return to procedure and step in effect.</p> <p><u>IF</u> RWST level less than 28%. <u>THEN</u> go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION, Step 1.</p>
<p>a. RCS pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE</p>	<p>a. <u>IF</u> RWST level greater than 28%. <u>THEN</u> return to procedure and step in effect.</p> <p><u>IF</u> RWST level less than 28%. <u>THEN</u> go to ES-1.3. TRANSFER TO COLD LEG RECIRCULATION, Step 1.</p>			
<p>This Step continued on the next page.</p>				

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 1 continued from previous page)	
b.	Check RCS cold leg temperature - GREATER THAN 350°F	<p>b. <u>IF</u> RCS pressure less than 400 psig [300 psig adverse CNMT], <u>THEN</u> try to place RHR System in service while continuing with this procedure:</p> <ol style="list-style-type: none"> 1) Reset SI. 2) Place letdown pressure controller in MANUAL CLOSED. 3) Open the following valves (reset xy relays): <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 4) <u>IF</u> pressure on PI-135 less than 400 psig, <u>THEN</u> establish RHR normal cooling (Refer to ATT-14.1, ATTACHMENT RHR COOL). 5) <u>IF</u> adequate cooling with RHR system established, <u>THEN</u> return to procedure and step in effect.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 2	Monitor Secondary Heat Sink:	<u>IF</u> a loss of heat sink is indicated. <u>THEN</u> perform the following:
o	Verify either S/G level - WIDE RANGE GREATER THAN 50 inches [100 inches adverse CNMT]	a. Trip both RCPs.
o	Verify PRZR pressure - LESS THAN 2335 PSIG	b. Go to Step 13 to initiate bleed and feed cooling.

EOP:	TITLE:	REV: 31
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE 6 of 31

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).</p> <p>*****</p>		
3	Try to Establish AFW Flow To At Least One S/G:	
	<p>a. Check S/G blowdown and samples valves - CLOSED</p> <p>b. Check MCB indications for cause of AFW failure:</p> <p>1) Verify CST level - GREATER THAN 5 FEET</p> <p>2) Verify busses supplying power to MDAFW pumps - ENERGIZED</p> <ul style="list-style-type: none"> • Bus 14 • Bus 16 <p>3) Determine AFW flow requirements per ATT-22.0. ATTACHMENT RESTORING FEED FLOW</p> <p>4) Check AFW valve alignment</p> <ul style="list-style-type: none"> o AFW pump discharge valves - OPEN <ul style="list-style-type: none"> • MOV-4007 • MOV-4008 • MOV-3996 o TDAFW pump flow control valves - OPEN <ul style="list-style-type: none"> • AOV-4297 • AOV-4298 	<p>a. Place S/G blowdown and sample valve isolation switch to CLOSE.</p> <p>1) Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS.</p> <p>2) Continue attempts to restore power to MDAFW pumps.</p> <p>4) Dispatch AO to locally align valves.</p>
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 3 continued from previous page)	
	c. Check AFW pumps - ALL RUNNING	c. Perform the following: <ul style="list-style-type: none"> 1) Manually start MDAFW pumps. 2) Check TDAFW pump steam supply valves OPEN. <ul style="list-style-type: none"> • MOV-3504A • MOV-3505A 3) If necessary dispatch AO to locally reset TDAFW pump governor valve. 4) <u>IF</u> NO AFW pumps operable, <u>THEN</u> go to Step 4.
	d. Control AFW flow per requirements of ATT-22.0. ATTACHMENT RESTORING FEED FLOW	
	e. Check total flow to S/Gs - GREATER THAN 200 GPM	e. Continue attempts to restore AFW flow and go to Step 4.
	f. Return to procedure and step in effect	
4	Stop Both RCPs	

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

5	Reset SI If Actuated	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Try To Establish MFW Flow To At Least One S/G:	
a.	Check any MFW pump - AVAILABLE	a. Go to Step 7.
b.	Check condensate system: <ul style="list-style-type: none"> o Condensate pump - ANY RUNNING o MFW pump suction pressure - GREATER THAN 185 PSIG 	b. <u>IF</u> offsite power available, <u>THEN</u> try to place condensate system in service. <u>IF NOT</u> , <u>THEN</u> go to Step 7.
c.	Establish MFW flow: <ol style="list-style-type: none"> 1) Check MFW pump discharge valves - CLOSED 2) Verify MFW regulating or bypass valves - OPERABLE 3) Depress MANUAL pushbuttons for A and B MFW regulating valve and bypass valve controllers <u>AND</u> adjust to 0% demand. 4) Dispatch AO to restore MFW pump SW cooling 5) Verify S/G blowdown key switches in NORMAL 6) Ensure Annunciator H-4, MAIN FEED PUMP OIL SYSTEM - EXTINGUISHED 7) Close Condensate Bypass valve, AOV-3959. 8) Ensure Annunciator H-11, FEED PUMP SEAL WATER LO DIFF PRESS 15 PSI - EXTINGUISHED 9) Ensure one MFW pump recirc valve - OPEN 	c. <u>IF</u> MFW flow can <u>NOT</u> be established, <u>THEN</u> go to Step 7.
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 6 continued from previous page)	
	10) Start selected MFW pump	
	11) Open MFW pump discharge valve	
	12) Adjust MFW regulating or bypass valves to control MFW flow per requirements of ATT-22.0, ATTACHMENT RESTORING FEED FLOW	
	d. Go to Step 11	
	7 Establish SAFW Flow:	
	a. Perform the following:	a. <u>IF</u> greater than 200 gpm total SAFW flow can <u>NOT</u> be established, <u>THEN</u> go to Step 8.
	1) Align SAFW system for operation (Refer to ATT-5.1, ATTACHMENT SAFW)	
	2) Determine SAFW flow requirements per ATT-22.0. ATTACHMENT RESTORING FEED FLOW	
	3) Start both SAFW pumps	
	4) Control SAFW flow per requirements of ATT-22.0. ATTACHMENT RESTORING FEED FLOW	
	5) Verify SAFW total flow - GREATER THAN 200 GPM	
	b. Go to Step 11	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF WIDE RANGE LEVEL IN BOTH S/GS DECREASES TO LESS THAN 50 INCHES [100 INCHES ADVERSE CNMT] OR IF PRZR PRESSURE INCREASES TO GREATER THAN 2335 PSIG DUE TO LOSS OF HEAT SINK, THEN STEPS 13 THROUGH 15 SHOULD BE IMMEDIATELY INITIATED FOR BLEED AND FEED.</p> <p>*****</p>		
8	<p>Establish Conditions to Feed S/G(s) From Condensate System:</p> <p>a. Check condensate pumps - ANY RUNNING</p> <p>b. Establish condensate flowpath (Refer to ATT-5.0, ATTACHMENT COND TO S/G)</p> <p>c. De-energize PRZR heaters</p>	<p>a. <u>IF</u> offsite power available, <u>THEN</u> manually start at least one condensate pump. <u>IF</u> a condensate pump can <u>NOT</u> be started, <u>THEN</u> go to Step 12.</p>
9	<p>Establish Condenser Steam Dump Pressure Control:</p> <p>a. Verify condenser available:</p> <ul style="list-style-type: none"> o Any MSIV - OPEN o Annunciator G-15, STEAM DUMP ARMED - LIT <p>b. Adjust condenser steam dump controller HC-484 to highest S/G pressure</p> <p>c. Verify condenser steam dump controller HC-484 in AUTO</p> <p>d. Place steam dump mode selector switch to MANUAL</p>	<p>a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 10.</p>

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

FOLLOWING BLOCK OF AUTOMATIC SI ACTUATION, MANUAL SI ACTUATION MAY BE
 REQUIRED IF CONDITIONS DEGRADE.

NOTE: If auxiliary spray is in use, spray flow may be increased by closing
 normal charging valve AOV-294 and normal PRZR spray valves.

10 Establish Condensate Flow to
 S/G:

- | | |
|--|---|
| <p>a. Check RCS pressure - GREATER THAN 1950 PSIG</p> <p>b. Depressurize RCS to less than 1950 psig:</p> <p>1) Check letdown - IN SERVICE</p> <p>2) Depressurize using auxiliary spray valve (AOV-296)</p> <p>c. WHEN PRZR pressure less than 1950 psig, THEN place SI block switches to BLOCK</p> <ul style="list-style-type: none"> • Train A • Train B <p>d. Verify SAFETY INJECTION BLOCKED status light - LIT</p> | <p>a. Go to Step 10c.</p> <p>1) Use one PRZR PORV. <u>IF</u> IA to CNMT, AOV-5392, <u>NOT</u> open, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS.</p> <p>a) <u>IF</u> PORV <u>NOT</u> available, <u>THEN</u> use auxiliary spray valve, AOV-296 and go to step 10c.</p> <p>2) Use one PRZR PORV. <u>IF</u> IA to CNMT, AOV-5392, <u>NOT</u> open, <u>THEN</u> refer to ATT-12.0, ATTACHMENT N2 PORVS.</p> |
|--|---|

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 10 continued from previous page)	
	e. Stop depressurizing RCS and maintain RCS pressure less than 1950 psig	
	f. Depress MANUAL pushbuttons <u>AND</u> manually adjust MFW regulating or bypass valves to control feed flow per requirements of ATT-22.0. ATTACHMENT RESTORING FEED FLOW	
	g. Dump steam to condenser at maximum rate to depressurize at least one S/G to less than 380 psig	g. Manually or locally dump steam using intact S/G ARV at maximum rate to depressurize at least one S/G to less than 380 psig.
	h. Verify condensate flow to S/Gs	h. Go to Step 12.
11	Check S/G Levels:	
	a. Narrow range level in at least one S/G - GREATER THAN 7% [25% adverse CNMT]	a. <u>IF</u> feed flow verified and level increasing in at least one S/G, <u>THEN</u> maintain flow to restore narrow range level greater than 7% [25% adverse CNMT]. <u>IF NOT</u> verified, <u>THEN</u> go to Step 12.
	b. Return to procedure and step in effect	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12 Verify Secondary Heat Sink:

a. Check the following:

- o Either S/G level - WIDE RANGE
GREATER THAN 50 inches
[100 inches adverse CNMT]
- o PRZR pressure - LESS THAN
2335 PSIG

b. Return to Step 1

a. IF loss of heat sink is indicated, THEN perform the following:

- 1) Go to Step 13 to initiate bleed and feed cooling.

CAUTION

STEPS 13 THROUGH 15 MUST BE PERFORMED QUICKLY IN ORDER TO ESTABLISH RCS HEAT REMOVAL BY RCS BLEED AND FEED.

13 Actuate SI and CI

14 Verify RCS Feed Path:

- a. Check SI pumps - AT LEAST ONE
RUNNING
- b. Check valve alignment for
operating SI pumps - PROPER
EMERGENCY ALIGNMENT

Manually start pumps and align valves as necessary to establish RCS feed path.

IF a feed path can NOT be established, THEN continue attempts to establish feed flow. Return to Step 3.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish RCS Bleed Path:	
a.	Open both PRZR PORV block valves	a. Ensure power to MCCs supplying block valves. <ul style="list-style-type: none"> • MCC D for MOV-515 • MCC C for MOV-516 <p><u>IF</u> any block valve can <u>NOT</u> be opened, <u>THEN</u> dispatch A0 to locally check breaker:</p> <ul style="list-style-type: none"> • MOV-515, MCC D position 6C • MOV-516, MCC C position 6C
b.	Place both PRZR PORV switches to OPEN	
c.	Align RCS overpressure protection system to open both PRZR PORVs (Refer to ATT-12.0, ATTACHMENT N2 PORVS)	
d.	Verify PORVs - BOTH OPEN	d. <u>IF</u> BOTH PRZR PORVs can <u>NOT</u> be opened, <u>THEN</u> ensure both <u>PORV</u> switches in OPEN.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

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

16 Check If SI Can Be Reset:

- | | |
|---|---|
| <p>a. Check SI blocked status light - EXTINGUISHED</p> <p>b. Check the following:</p> <ul style="list-style-type: none"> o PRZR pressure - LESS THAN 1750 PSIG <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Either steamline pressure - LESS THAN 514 PSIG <p>c. Reset SI</p> | <p>a. Place SI block switches to UNBLOCK</p> <p>b. <u>IF</u> PRZR pressure stable or increasing. <u>THEN</u> reset SI and go to Step 17.</p> <p><u>IF</u> PRZR pressure decreasing. <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) <u>WHEN</u> PRZR pressure less than 1750 psig. <u>THEN</u> reset SI. 2) Go to Step 17. |
|---|---|

17 Reset CI:

- | | |
|---|---|
| <p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26. CONTAINMENT ISOLATION - EXTINGUISHED</p> | <p>b. Perform the following:</p> <ul style="list-style-type: none"> 1) Reset SI. 2) Depress CI reset pushbutton |
|---|---|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate SW Flow:	
a.	Verify at least two SW pumps - RUNNING	<p>a. Manually start pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling, <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4. ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 19.</p>
b.	Verify AUX BLDG SW isolation valves - AT LEAST ONE SET OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Establish IA to CNMT:	
	<p>a. Verify non-safeguards busses energized from offsite power</p> <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED <p>b. Check SW pumps - AT LEAST TWO PUMPS RUNNING</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR). -OR- o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS). <ol style="list-style-type: none"> 3) Start HP seal oil backup pump. 4) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. <p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) Restore IA using service air compressor <u>OR</u> diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR). 2) Go to Step 19d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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(Step 19 continued from previous page)

c. Verify turbine building SW isolation valves - OPEN

- MOV-4613 and MOV-4670
- MOV-4614 and MOV-4664

d. Verify adequate air compressor(s) - RUNNING

e. Check IA supply:

- o Pressure - GREATER THAN 60 PSIG
- o Pressure - STABLE OR INCREASING

f. Reset both trains of XY relays for IA to CNMT AOV-5392

g. Verify IA to CNMT AOV-5392 - OPEN

c. Perform the following:

- 1) Manually align valves.
- 2) Dispatch AO to locally reset compressors as necessary.

d. Manually start electric air compressors as power supply permits (75 kw each). IF electric air compressors can NOT be started, THEN start diesel air compressor (refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).

e. Perform the following:

- 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).
- 2) Continue with Step 21. WHEN IA restored, THEN do Steps 19f, g and 20.

g. Continue with Step 21. WHEN IA restored to CNMT, THEN do Step 20.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> PRZR PORVs may close temporarily until adequate IA pressure is restored in CNMT.</p>	
20	<p>Restore RCS Overpressure Protection System To Standby:</p>	
	<p>a. Verify instrument bus D - ENERGIZED</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
	<p>b. Place PORV PCV-430 and PCV-431C N₂ arming switches to BLOCK</p> <ul style="list-style-type: none"> • SOV-8619A • SOV-8619B 	
	<p>c. Close PORV PCV-430 and PCV-431C N₂ SURGE TK VLVs</p> <ul style="list-style-type: none"> • SOV-8616A • SOV-8616B 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<p>Verify Adequate RCS Bleed Path:</p> <ul style="list-style-type: none"> o Core exit T/Cs - STABLE OR DECREASING o RVLIS Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Open Rx head vent valves. <ul style="list-style-type: none"> • SOV-590 • SOV-591 • SOV-592 • SOV-593 b. Align any available low pressure water source to intact S/Gs. <u>IF</u> no low pressure water source can be aligned, <u>THEN</u> go to Step 22. c. Depressurize at least one intact S/G to atmospheric pressure using S/G ARV.
<p style="text-align: center;">***** <u>CAUTION</u> ACTIONS TAKEN TO INITIATE RCS BLEED AND FEED SHALL NOT BE REVERSED WHEN PERFORMING STEPS 1 THROUGH 12 OF E-0, REACTOR TRIP OR SAFETY INJECTION. *****</p>		
22	<p>Complete Steps 1 through 12 Of E-0, REACTOR TRIP OR SAFETY INJECTION, While Continuing With This Procedure</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE RCS BLEED PATH MUST BE MAINTAINED EVEN IF RCS PRESSURE REMAINS GREATER THAN SI PUMP SHUTOFF HEAD.</p> <p>*****</p>		
23	Maintain RCS Heat Removal:	
	<ul style="list-style-type: none"> o Maintain SI flow o Maintain both PRZR PORVs and block valves - OPEN 	
24	Check Normal Power Available To Charging Pumps:	Verify adequate emergency D/G capacity to run charging pumps (75 kw each).
	<ul style="list-style-type: none"> o Bus 14 normal feed breaker - CLOSED o Bus 16 normal feed breaker - CLOSED 	<p><u>IF NOT. THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to ATT-4.0. ATTACHMENT CNMT RECIRC FANS).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	<p>Check If Charging Flow Has Been Established:</p> <p>a. Charging pumps - ANY RUNNING</p> <p>b. Align charging pump suction to RWST:</p> <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED <p>c. Start charging pumps as necessary to establish maximum charging flow</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to locally close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A. V-300A • RCP B. V-300B 2) Ensure HCV-142 open, demand at 0%. <p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 23 of 31
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING STEPS 1 THROUGH 14 OF ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.
- o IF CONTAINMENT PRESSURE INCREASES TO GREATER THAN 28 PSIG, CONTAINMENT SPRAY SHOULD BE VERIFIED.
- o RHR PUMPS SHOULD NOT BE RUN LONGER THAN 1 HOUR WITHOUT CCW TO THE RHR HEAT EXCHANGERS.

*26 Monitor If CNMT Spray Should Be Stopped:

a. CNMT spray pumps - RUNNING	a. Go to Step 27.
b. Check the following: <ul style="list-style-type: none">o CNMT pressure - LESS THAN 4 PSIGo Sodium hydroxide tank level - LESS than 55%	b. Continue with Step 27. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 26c through 26f.
c. Reset CNMT spray	
d. Check NaOH flow (FI-930) - NO FLOW	d. Place NaOH tank outlet valve switches to CLOSE. <ul style="list-style-type: none">• AOV-836A• AOV-836B
e. Stop CNMT spray pumps and place in AUTO	
f. Close CNMT spray pump discharge valves <ul style="list-style-type: none">• MOV-860A• MOV-860B• MOV-860C• MOV-860D	

EOP:	TITLE:	REV: 31
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE 24 of 31

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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27 Continue Attempts To
Establish Secondary Heat Sink
In At Least One S/G:

- a. Attempt to restore one or more
of the following:
 - AFW flow
 - Main FW flow
 - Standby AFW flow
 - Condensate flow
- b. WHEN a feed source is available,
THEN control feed flow per
requirements of ATT-22.0,
ATTACHMENT RESTORING FEED FLOW

28 Check For Adequate Secondary
Heat Sink:

- | | |
|--|---|
| <ol style="list-style-type: none"> a. Check narrow range level in at
least one S/G - GREATER THAN 7%
[25% adverse CNMT] b. Adjust S/G ARV controllers to
existing S/G pressure | <ol style="list-style-type: none"> a. Return to Step 27. |
|--|---|

CAUTION

IF THE RCS IS WATER SOLID. THEN ANY INCREASE IN RCS TEMPERATURE MAY RESULT IN
A SIGNIFICANT RCS PRESSURE INCREASE. RCS HEATUP SHOULD BE PREVENTED.

29 Monitor RCS Temperatures:

- o Core exit T/Cs - DECREASING
- o RCS hot leg temperatures -
DECREASING

Perform the following:

- a. Control steam dump and feed flow
to establish natural circulation
and stabilize RCS temperature.
- b. Return to Step 27.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check CCW Pumps - ANY RUNNING	<p>Perform the following:</p> <p>a. <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s).</p> <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B <p>b. Manually start one CCW pump (122 kw).</p> <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCS IS SOLID. CLOSURE OF HEAD VENTS MAY RESULT IN RAPID RCS PRESSURE INCREASE UNLESS RCS TEMPERATURE AND RCS INFLOW AND OUTFLOW ARE CAREFULLY CONTROLLED.</p> <p>*****</p>
31	Verify Reactor Head Vent Valves - CLOSED	<p>Manually close valves.</p> <ul style="list-style-type: none"> • SOV-590 • SOV-591 • SOV-592 • SOV-593

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 26 of 31
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCS IS SOLID, THEN TERMINATION OF BLEED AND FEED MAY RESULT IN RAPID RCS PRESSURE INCREASE UNLESS RCS TEMPERATURE AND RCS INFLOW AND OUTFLOW ARE CAREFULLY CONTROLLED.</p> <p>*****</p>		
32	Check If One Of Three SI Pumps Should Be Stopped:	
	a. Three SI pumps - RUNNING	a. Go to Step 33.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIG-1.0, FIGURE MIN SUBCOOLING	b. Check the following: <ul style="list-style-type: none"> o RCS pressure greater than 1625 psig [1825 psig adverse CNMT] o RCS subcooling based on core exit T/Cs greater than 0°F using FIG-1.0, FIGURE MIN SUBCOOLING <p style="text-align: center;"><u>IF NOT. THEN</u> go to Step 35.</p>
	c. Check PRZR level - GREATER THAN 20% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Go to Step 35.
	d. Stop one SI pump	

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 27 of 31
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

a. Two SI pumps - RUNNING

a. Go to Step 34.

b. Determine required RCS
subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core
exit T/Cs - GREATER THAN VALUE
FROM TABLE ABOVE USING FIG-1.0.
FIGURE MIN SUBCOOLING

c. Check the following:

- o RCS pressure greater than
1625 psig [1825 psig adverse
CNMT]
- o RCS subcooling based on core
exit T/Cs greater than 0°F
using FIG-1.0, FIGURE MIN
SUBCOOLING

IF NOT. THEN go to Step 35.

d. PRZR level - GREATER THAN 20%
[40% adverse CNMT]

d. Do NOT stop SI pump. Go to
Step 35.

e. Stop one SI pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	<p>Check If Last SI Pump Should Be Stopped:</p> <ul style="list-style-type: none"> a. One SI pump - RUNNING b. Check the following: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs greater than 0°F using FIG-1.0, FIGURE MIN SUBCOOLING o RCS pressure greater than 1625 psig [1825 psig adverse CNMT] c. PRZR level - GREATER THAN 20% [40% adverse CNMT] d. Stop running SI pump e. Go to Step 37 	<ul style="list-style-type: none"> a. Go to Step 37. b. Go to Step 35. c. Do <u>NOT</u> stop SI pump. Go to Step 35.
<p><u>NOTE:</u> After closing a PORV, it may be necessary to wait for RCS pressure to increase to permit stopping SI pumps in SI reduction steps.</p>		
35	<p>Check PRZR PORVs And Associated Block Valves - ANY BLEED PATH OPEN</p>	<p>Go to appropriate plant procedure:</p> <ul style="list-style-type: none"> o <u>IF</u> RWST level greater than 28%, <u>THEN</u> go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o <u>IF</u> RWST level less than 28%, <u>THEN</u> go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 29 of 31
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF RCS IS SOLID, CLOSURE OF PORVS WILL RESULT IN RAPID RCS PRESSURE INCREASE
UNLESS RCS TEMPERATURE AND RCS INFLOW AND OUTFLOW ARE CAREFULLY CONTROLLED.

36 Isolate PRZR Bleed Paths:

a. PRZR PORVs - BOTH OPEN

a. Perform the following:

- 1) Stop all but one charging pump.
- 2) Control charging flow as necessary to maintain RCS pressure and PRZR level.
- 3) Establish excess letdown as follows:
 - a) Place AOV-312 to NORMAL.
 - b) Ensure CCW pump running.
 - c) Manually open CCW from excess letdown Hx open (AOV-745).
 - d) Ensure excess letdown flow control valve, HCV-123 is closed, demand at 0.
 - e) Reset both trains of XY relays for MOV-313.
 - f) Open MOV-313.
 - g) Open excess letdown isolation valve AOV-310.
 - h) Slowly open HCV-123.

This Step continued on the next page.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 36 continued from previous page)

b. Close one open PRZR PORV

b. Close PORV block valve. IF block valve can NOT be closed, THEN go to appropriate plant procedure:

- o IF RWST level greater than 28%, THEN go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT.

-OR-

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

c. Return to Step 32

37 Check PRZR PORVs - BOTH CLOSED

Close both PRZR PORVs. IF any PRZR PORV can NOT be closed, THEN manually close its block valve.

38 Check If RHR Pumps Should Be Stopped:

a. RHR pumps - ANY RUNNING IN INJECTION MODE

a. Go to Step 39.

b. Check RCS pressure:

b. Go to appropriate plant procedure:

1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]

- o IF RWST level greater than 28%, THEN go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

2) Pressure - STABLE OR INCREASING

-OR-

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

c. Stop RHR pumps and place in AUTO

EOP:	TITLE:	REV: 31
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE 1 of 1

FR-H.1 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 3) ATTACHMENT COND TO S/G (ATT-5.0)
- 4) ATTACHMENT N2 PORVS (ATT-12.0)
- 5) ATTACHMENT RHR COOL (ATT-14.1)
- 6) ATTACHMENT SAFW (ATT-5.1)
- 7) ATTACHMENT RESTORING FEED FLOW (ATT-22.0)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 11) FOLDOUT

EOP: FR-H.1	TITLE: RESPONSE TO LOSS OF SECONDARY HEAT SINK	REV: 31 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-H series procedures.

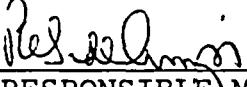
1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 1 of 7
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GINNA STATION
CONTROLLED COPY NUMBER 23



RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 2 of 7
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- A. PURPOSE - This procedure provides actions to respond to a S/G high level condition and to address the S/G overfill concern.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure is entered from:
 - a. F-0.3, HEAT SINK Critical Safety Function Status Tree on a YELLOW condition, and
 - b. FR-H.2, RESPONSE TO STEAM GENERATOR OVERPRESSURE, if the affected S/G narrow range level is high.

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 3 of 7
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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 S/G NARROW RANGE LEVEL HAS INCREASED TO GREATER THAN 90% [80% ADVERSE CNMT]. THEN AN EVALUATION SHOULD BE MADE FOR S/G OVERFILL CONSIDERATIONS. STEAM SHOULD NOT BE RELEASED FROM ANY S/G WITH LEVEL GREATER THAN 90% [80% ADVERSE CNMT] PRIOR TO OVERFILL EVALUATION.</p> <p>o IF S/G OVERFILL IS EXPECTED AN ATTEMPT SHOULD BE MADE TO DISPATCH PERSONNEL TO PIN MAIN STEAMLINES.</p> <p>*****</p> <p><u>NOTE:</u> o Throughout this procedure, "affected" refers to any S/G in which narrow range level is greater than 85%.</p> <p>o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p>o Foldout Page should be open and monitored periodically.</p>		
1	Check Affected S/G(s) Narrow Range Level - GREATER THAN 85%	IF less than 85% in all S/Gs, <u>THEN</u> return to procedure and step in effect.
2	Verify FW Isolation To Affected S/G(s):	
	a. MFW pumps - TRIPPED	a. Trip MFW pumps.
	b. MFW flow control valve(s) - CLOSED	b. Depress MANUAL pushbutton(s) <u>AND</u> manually close valves.
	<ul style="list-style-type: none"> • MFW regulating valve(s) • MFW bypass valve(s) 	
	c. Verify both S/G pressures - GREATER THAN CONDENSATE HEADER PRESSURE	c. Stop any running condensate pumps.

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 4 of 7
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	<p>Close AFW And SAFW Flow Control Valves To Affected S/G(s):</p> <ul style="list-style-type: none"> o S/G A <ul style="list-style-type: none"> • MOV-4007 and AOV-4480, MDAFW pump • AOV-4297, TDAFW pump • MOV-9701A, SAFW pump o S/G B <ul style="list-style-type: none"> • MOV-4008 and AOV-4481, MDAFW pump • AOV-4298, TDAFW pump • MOV-9701B, SAFW pump 	Stop pumps feeding affected S/G(s).

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 5 of 7
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check Affected S/G(s) Level:	
a.	Narrow range level - LESS THAN 90% [80% adverse CNMT]	a. Go to Step 5.
b.	Narrow range level - DECREASING	b. <u>IF</u> affected S/G level continues to increase, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Dispatch AO to locally isolate affected S/G: <ul style="list-style-type: none"> o For S/G A, close MFW regulating and bypass valve outlet isolation valves, V-3987 and V-3991 -OR- o For S/G B, close MFW regulating and bypass valve outlet isolation valves, V-3986 and V-3990
c.	Control AFW flow to maintain narrow range level between 17% [25% adverse CNMT] and 52%	
d.	Return to procedure and step in effect	2) Go to Step 5.

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 6 of 7
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Adjust Affected S/G(s) ARV Setpoint To 1050 PSIG	

<u>CAUTION</u>		
IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.		

6	Close Affected S/G TDAFW Pump Steam Supply Valve And Place In PULL STOP	
	<ul style="list-style-type: none"> • S/G A. MOV-3505A • S/G B. MOV-3504A 	
7	Close Affected S/G(s) MSIV And Bypass Valves	
8	Check Affected S/G(s) Radiation Levels - NORMAL	
	<ul style="list-style-type: none"> • S/G blowdown. R-19 • S/G A. R-31 • S/G B. R-32 	<p><u>IF</u> an E-3 or ECA-3 series procedure is in effect, <u>THEN</u> return to procedure and step in effect. <u>IF</u> <u>NOT</u>, <u>THEN</u> go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p>

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 7 of 7
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish Blowdown From Affected S/G(s): a. Reset SI and CI b. Reset XY relays for affected S/G blowdown valves c. Place blowdown key switch for affected S/G to defeat d. Verify S/G blowdown valves - OPEN e. Dispatch AO to establish blowdown to condenser or flash tank, as desired (Refer to T-14F, STEAM GENERATOR BLOWDOWN SYSTEM STARTUP)	
10	Return To Procedure And Step In Effect	

-END-

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 1 of 1
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FR-H.3 APPENDIX LIST

- 1) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 2) FOLDOUT

EOP: FR-H.3	TITLE: RESPONSE TO STEAM GENERATOR HIGH LEVEL	REV: 8 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-H series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 1 of 5
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Robert M. [Signature]
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 2 of 5
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A. PURPOSE - This procedure provides actions to respond to a S/G low level condition.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. F-0.3, HEAT SINK Critical Safety Function Status Tree, on a YELLOW condition.

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 3 of 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>		
STEAM RELEASES FROM AFFECTED S/G(S) SHOULD BE MINIMIZED.		

<u>NOTE:</u>	<div></div>	
o	Throughout this procedure "affected" refers to any S/G in which narrow range level is less than 7% [25% adverse CNMT].	
o	Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.	
o	Foldout Page should be open and monitored periodically.	
1 Identify Affected S/G(s):		
a.	Narrow range level - LESS THAN 7% [25% adverse CNMT]	a. Return to procedure and step in effect.
2 Verify S/G Blowdown Isolation Valves From Affected S/G(s) - CLOSED		
•	AOV-5738 for S/G A	
•	AOV-5737 for S/G B	
	Place S/G blowdown valves master switch to CLOSE.	
	<u>IF</u> valves can <u>NOT</u> be closed manually, <u>THEN</u> dispatch AO to locally isolate blowdown.	
	o S/G A. close V-5701	
	o S/G B. close V-5702	

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 4 of 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	<p>Check If Affected S/G(s) Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in affected S/G(s) - STABLE OR INCREASING o Pressure in affected S/G(s) - GREATER THAN 110 PSIG 	<p><u>IF</u> affected S/G(s) previously identified as faulted, <u>THEN</u> return to procedure and step in effect.</p> <p><u>IF</u> affected S/G pressure decreasing in an uncontrolled manner or completely depressurized and has not been previously isolated, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
4	<p>Check AFW Flow To Affected S/G(s) - GREATER THAN 50 GPM</p>	<p><u>IF</u> affected S/G(s) wide range level greater than 50 inches [100 inches adverse CNMT], <u>THEN</u> establish AFW flow as necessary to refill affected S/G(s).</p> <p><u>IF</u> affected S/G(s) wide range level less than 50 inches [100 inches adverse CNMT], <u>THEN</u> do not establish AFW flow to affected S/G(s). Consult the plant engineering staff to evaluate refilling the affected S/G(s) as part of long-term plant recovery and go to Step 6.</p>
5	<p>Continue Filling Affected S/G(s) Until Narrow Range Level Greater Than 7% [25% adverse CNMT]</p>	

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 5 of 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Return To Procedure And Step In Effect	
		-END-

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 1 of 1
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FR-H.5 APPENDIX LIST

- 1) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 2) FOLDOUT

EOP: FR-H.5	TITLE: RESPONSE TO STEAM GENERATOR LOW LEVEL	REV: 10 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-H series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 1 of 8
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GINNA STATION

CONTROLLED COPY NUMBER 23

Robert L. Smith
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 2 of 8
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A. PURPOSE - This procedure provides actions to respond to a low PRZR level.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

a. F-0.6, INVENTORY Critical Safety Function Status Tree, on a YELLOW condition.

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 3 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, OR ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, IS IN EFFECT, THIS PROCEDURE SHOULD NOT BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p> o Foldout Page should be open and monitored periodically.</p>		
1	Check SI Pumps - ALL STOPPED	Return to procedure and step in effect.
2	Verify Normal And Excess Letdown Isolation Valves - CLOSED <ul style="list-style-type: none"> • Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) • Loop B cold leg to REGEN Hx (AOV-427) • Excess letdown isolation valve (AOV-310) 	Manually close valves.
3	Reset CI:	
	a. Depress CI reset pushbutton b. Verify annunciator A-26. CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 4 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>4 Verify Adequate SW Flow:</p> <p>a. Check at least two SW pumps - RUNNING</p> <p>b. Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0. ATTACHMENT SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:</p> <p>1) Ensure SW isolation.</p> <p>2) <u>IF NO</u> SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>3) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2. LOSS OF SERVICE WATER.</p>

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 5 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power	a. Perform the following:
o	Bus 13 normal feed - CLOSED	1) Close non-safeguards bus tie breakers:
	-OR-	• Bus 13 to Bus 14 tie
		• Bus 15 to Bus 16 tie
o	Bus 15 normal feed - CLOSED	2) Verify adequate emergency D/G capacity to run air compressors (75 kw each)
		<u>IF NOT, THEN</u> perform the following:
		o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR
		-OR-
		o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS.
		3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.
b.	Check SW pumps - AT LEAST TWO PUMPS RUNNING	b. Perform the following:
		1) Restore IA using service air compressor <u>OR</u> diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
		2) Go to Step 5d.

This Step continued on the next page.

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 6 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 5 continued from previous page)	
c.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 6. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 5f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 7 of 8
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6 Establish Charging Flow:

a. Charging pumps - ANY RUNNING

a. Perform the following:

- 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO to locally close seal injection needle valves to affected RCP.

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

2) Ensure HCV-142 demand at 0%.

3) Start one charging pump.

b. Align charging pump suction to RWST:

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

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

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

1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room).

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

3) WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).

c. Charging flow - ESTABLISHED

c. Start additional charging pumps as necessary.

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 8 of 8
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Increase Charging Flow To Restore PRZR Level	
8	Check PRZR Level:	
	a. Level - GREATER THAN 10% (30% adverse CNMT)	a. Go to step 9.
	b. Level - STABLE OR INCREASING	b. Go to step 9.
	c. Level - GREATER THAN 13% (40% adverse CNMT)	c. Return to step 7.
9	Return To Procedure And Step In Effect	

-END-

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 1 of 1
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FR-I.2 APPENDIX LIST

TITLE

- 1) ATTACHMENT SD-1 (ATT-17.0)
- 2) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 3) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 4) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 5) FOLDOUT

EOP: FR-I.2	TITLE: RESPONSE TO LOW PRESSURIZER LEVEL	REV: 12 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-I series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

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GINNA STATION
CONTROLLED COPY NUMBER 23

Res. Admin.
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 20 PAGE 2 of 19
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- A. PURPOSE - This procedure provides actions to respond to voids in the reactor vessel head.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. F-0.6, INVENTORY Critical Safety Function Status Tree on a YELLOW condition.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Verify Adequate SW Flow To CCW Hx:</p> <p>a. Verify at least two SW pumps - RUNNING</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Verify adequate power to operate two SW pumps (257 kw per pump). <u>IF NOT</u>, <u>THEN</u> shed sufficient non-essential loads. <ul style="list-style-type: none"> • CNMT RECIRC fans • Charging pumps • IA compressors • PRZR heaters • Rx compartment cooling fans • Control rod shroud fans 2) Ensure two SW pumps running. 3) <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following: <ol style="list-style-type: none"> a) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1. Pull stop any D/G that is not supplied by alternate cooling, <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. 2. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. b) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER. c) Go to Step 3.

This Step continued on the next page.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

(Step 2 continued from previous page)

b. Verify AUX BLDG SW isolation valves - OPEN

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

b. Manually align valves.

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

c. Perform the following:

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

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

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

o IF on normal SW discharge:

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

-OR-

o IF on alternate SW discharge:

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>3 Establish IA to CNMT:</p> <p>a. Verify non-safeguards busses energized from offsite power</p> <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Bus 15 normal feed - CLOSED <p>b. Check SW pumps - AT LEAST TWO PUMPS RUNNING</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR) <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS). <ol style="list-style-type: none"> 3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. <p>b. Perform the following:</p> <ol style="list-style-type: none"> 1) Restore IA using service air compressor <u>OR</u> diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR). 2) Go to Step 3d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 3 continued from previous page)	
c.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch A0 to locally reset air compressors as necessary.
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 4. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 3f and g.
f.	Reset both trains of XY relays for IA to CI valve AOV-5392	
g.	Open IA AOV-5392	

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 20 PAGE 8 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 open, demand at 0%.
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> o LCV-112B - OPEN o LCV-112C - CLOSED 	<p>b. Manually align valves as necessary.</p> <p><u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open V-358, manual charging pump suction from RWST (in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room). 2) Verify charging pump A <u>NOT</u> running and place in PULL STOP. 3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).
c.	Start charging pumps as necessary and adjust charging flow to control PRZR level	<p>c. <u>IF</u> at least 20 gpm charging flow can <u>NOT</u> be established, <u>THEN</u> return to procedure and step in effect.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5 Check If Normal CVCS
Operation Can Be Established

a. Verify IA restored:

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

b. Verify instrument bus D -
ENERGIZED

c. CCW pumps - ANY RUNNING

a. Continue with Step 8. WHEN IA restored, THEN do Steps 5 through 7.

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

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

c. Perform the following:

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

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

- 2) Manually start one CCW pump.

6 Verify PRZR Level - GREATER
THAN 20% [40% adverse CNMT]

Continue with Step 8. WHEN PRZR level increases to greater than 20% [40% adverse CNMT], THEN do Step 7.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM Place the following switches to CLOSE: <ul style="list-style-type: none"> Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202) AOV-371, letdown isolation valve AOV-427, loop B cold leg to REGEN Hx Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> TCV-130 PCV-135 Reset both trains of XY relays for AOV-371 and AOV-427 Open AOV-371 and AOV-427 Open letdown orifice valves as necessary Place PCV-135 in AUTO at 250 psig Place TCV-130 in AUTO at the normal setpoint Adjust charging pump speed and HCV-142 as necessary 	<p><u>IF</u> RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> Place excess letdown divert valve, AOV-312, to NORMAL. Ensure CCW from excess letdown open, (AOV-745). Open excess letdown isolation valve AOV-310. Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig. Adjust charging pump speed as necessary. <p><u>IF</u> RCP seal return <u>NOT</u> established, <u>THEN</u> consult TSC to determine if excess letdown should be placed in service.</p>

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Establish Stable RCS Conditions:	
	a. PRZR level - GREATER THAN 65% [82% adverse CNMT]	a. Control charging and letdown as necessary to establish the required PRZR level. <u>WHEN</u> PRZR level is greater than 65% [82% adverse CNMT], <u>THEN</u> continue with step 8b.
	b. RCS pressure - STABLE	b. Energize PRZR heaters and use normal PRZR spray as necessary. <u>IF</u> normal spray <u>NOT</u> available and letdown in service, <u>THEN</u> use auxiliary spray valve (AOV-296).
	c. RCS hot leg temperatures - STABLE	c. Control steam dump and total feed flow as necessary to stabilize RCS temperature.
9	Check RCPS - BOTH STOPPED	Go to Step 16.

CAUTION		
IF RHR NORMAL COOLING IN SERVICE, THEN RCS PRESSURE SHOULD BE MAINTAINED LESS THAN THE RCS OVERPRESSURE PROTECTION SETPOINT (410 PSIG).		

10	Check If RCS Pressure Should Be Increased:	
	a. Pressure - AT LEAST 100 PSI BELOW LIMIT ON FIG-9.0, FIGURE TECH SPEC C/D (100°F/HR)	a. Go to Step 13.
	b. Energize PRZR heaters to increase RCS pressure by 50 psi	

EOP:

FR-I.3

TITLE:

RESPONSE TO VOIDS IN REACTOR VESSEL

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11 Control Charging And Letdown
As Necessary To Maintain PRZR
Level Greater Than 20% [40%
adverse CNMT]

12 Check RVLIS Indication:

a. Level (no RCPs) - INCREASING

a. Go to Step 13.

b. Level (no RCPs) - GREATER THAN
95%

b. Return to Step 10.

c. Turn off PRZR heaters to
stabilize RCS pressure

d. Return to procedure and step in
effect

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

13 Try To Start One RCP:

a. Establish the following conditions prior to RCP start:

a. IF conditions can NOT be established, THEN go to Step 16.

- o PRZR level - GREATER THAN 65% [82% adverse CNMT]
- o RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIG-1.0, FIGURE MIN SUBCOOLING
- o Energize PRZR heaters as necessary to saturate PRZR water
- o Bus 11A or 11B - ENERGIZED
- o Refer to ATT-15.0, ATTACHMENT RCP START

b. Start one RCP

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check RVLIS Indication	Go to Step 16.
	<ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 95% -OR- o Fluid fraction (any RCP running) - GREATER THAN 97% 	
15	Go To Step 24	
16	Direct RP To Start CNMT Hydrogen Monitors	
17	Check If SI Should Be Blocked:	
	<ul style="list-style-type: none"> a. PRZR pressure - GREATER THAN 1750 PSIG b. PRZR pressure - LESS THAN 1950 PSIG c. Block SI 	<ul style="list-style-type: none"> a. Go to Step 18. b. Decrease PRZR pressure to less than 1950 psig using normal PRZR spray. <u>IF</u> normal spray <u>NOT</u> available and letdown in service, <u>THEN</u> use auxiliary spray (AOV-296). <u>IF</u> <u>NOT</u>, <u>THEN</u> use one PRZR PORV.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Record RCS Pressure and CNMT Hydrogen Concentration on ATT-20.0, ATTACHMENT VENT TIME	
19	Establish Following RCS Conditions:	
	a. PRZR level - GREATER THAN 65% [82% adverse CNMT]	a. Control charging and letdown as necessary to establish the required PRZR level. <u>WHEN</u> PRZR level is greater than 65% [82% adverse], <u>THEN</u> continue with step 19b.
	b. RCS pressure - STABLE	b. Energize PRZR heaters and use normal PRZR spray as necessary. <u>IF</u> normal spray <u>NOT</u> available and letdown in service, <u>THEN</u> use auxiliary spray (AOV-296).
	c. RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIG-1.0. FIGURE MIN SUBCOOLING	c. Dump steam as necessary.
	d. RCS hot leg temperatures - STABLE	d. Control steam dump and total feed flow as necessary to stabilize RCS temperature.

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 20 PAGE 16 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20 Prepare CNMT For Reactor Vessel Venting:		
a. Verify CNMT ventilation isolation valves - CLOSED		a. Manually close valves.
<ul style="list-style-type: none"> • CNMT MINI PURGE EXH VLVs (AOV-7970, AOV-7971) • CNMT MINI PURGE SPLY VLVs (AOV-7445, AOV-7448) • CNMT AIR SAMPLE ISO VLVs (AOV-1597, AOV-1598, AOV-1599) 		
b. Verify the following CNMT ventilation equipment in service:		b. Manually start fans as power supply permits.
<ul style="list-style-type: none"> • All CNMT RECIRC fans • One reactor compartment cooling fan • One control rod shroud fan 		
21 Determine Maximum Allowable Venting Time:		
a. CNMT hydrogen concentration - LESS THAN 3%		a. Consult TSC to evaluate methods to reduce hydrogen concentration to less than 3%.
b. Determine maximum venting time (Refer to ATT-20.0, ATTACHMENT VENT TIME)		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	<p>Review Reactor Vessel Venting Termination Criteria:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs -LESS THAN 10°F USING FIG-1.0, FIGURE MIN SUBCOOLING -OR- o PRZR level - LESS THAN 20% [40% adverse CNMT] -OR- o RCS pressure - DECREASES BY 200 PSI -OR- o Venting time - GREATER THAN MAXIMUM TIME CALCULATED IN STEP 21 -OR- o RVLIS level (no RCPs) - GREATER THAN 95% -OR- o RVLIS fluid fraction (any RCP running) - GREATER THAN 97% 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

VENTING SHOULD BE STOPPED IF ANY VENTING TERMINATION CRITERION IN STEP 22 IS EXCEEDED.

NOTE: The reactor vessel head vents should not be opened unless specifically directed by PORC.

23 Vent Reactor Vessel:

- | | |
|---|---|
| <p>a. Open train A Rx vessel head vent valves</p> <ul style="list-style-type: none"> • SOV-590 • SOV-592 <p>b. Any venting termination criterion - EXCEEDED</p> <p>c. Close all vent valves</p> | <p>a. <u>IF</u> either valve fails to open, <u>THEN</u> close both valves and open train B valves.</p> <ul style="list-style-type: none"> • SOV-591 • SOV-593 <p>b. Continue venting. <u>WHEN</u> any venting termination criterion is exceeded, <u>THEN</u> do Steps 23c, 24, 25 and 26.</p> |
|---|---|

24 Check RVLIS Indication -

- o Level (no RCPs) - GREATER THAN 95%

Increase RCS pressure to value recorded in Step 18. Return to Step 16.

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 97%

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 20 PAGE 19 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25	Check PRZR Level - STABLE	Control charging and letdown as necessary to stabilize PRZR level.
26	Return To Procedure And Step In Effect	
-END-		

EOP:	TITLE:	REV: 20
FR-I.3	RESPONSE TO VOIDS IN REACTOR VESSEL	PAGE 1 of 1

FR-I.3 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) FIGURE TECH SPEC C/D (FIG-9.0)
- 3) FIGURE CNMT HYDROGEN (FIG-12.0)
- 4) ATTACHMENT VENT TIME (ATT-20.0)
- 5) ATTACHMENT RCP START (ATT-15.0)
- 6) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 7) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 8) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 9) FOLDOUT

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 20 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-I series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 1 of 23
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GINNA STATION
CONTROLLED COPY NUMBER 23

Patricia Quinn
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 2 of 23
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A. PURPOSE - This procedure provides actions to avoid, or limit, thermal shock or pressurized thermal shock to the reactor pressure vessel, or overpressure conditions at low temperature.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. F-0.4, INTEGRITY Critical Safety Function Status Tree, on either a RED or ORANGE condition.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 3 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN SWITCH TO ALTERNATE AFW
WATER SUPPLY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO THE AFW PUMPS).

NOTE: o Adverse CNMT values should be used whenever CNMT pressure is
greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.

o Foldout Page should be open and monitored periodically.

1 Check RCS Pressure - GREATER
THAN 250 PSIG [465 PSIG
adverse CNMT]

IF RHR flow greater than 475 gpm.
THEN return to procedure and step
in effect.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 4 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>*****</p>		
2	Check RCS Cold Leg Temperatures - STABLE OR INCREASING	<p>Try to stop RCS cooldown:</p> <ul style="list-style-type: none"> a. Ensure S/G ARVs closed. b. Close both S/G MSIVs. c. Ensure MFW flow control valves closed. <ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves d. Ensure MFW pumps tripped. e. Ensure reheater steam supply valves are closed. f. <u>IF</u> S/G pressure less than condensate pressure, <u>THEN</u> stop all condensate pumps. g. <u>IF</u> RHR system in service, <u>THEN</u> stop any cooldown from RHR system. h. Control total feed flow to non-faulted S/G(s) greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one non-faulted S/G. <u>WHEN</u> S/G level greater than 7% [25% adverse CNMT] in one non-faulted S/G, <u>THEN</u> limit feed flow to stop RCS cooldown.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 5 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: A faulted S/G is any S/G that is depressurizing in an uncontrolled manner or is completely depressurized.

3 Check If S/G Secondary Side Is Intact:

- o Pressure in both S/Gs - STABLE OR INCREASING
- o Pressure in both S/Gs - GREATER THAN 110 PSIG

Minimize cooldown from faulted S/G(s):

- a. Close faulted S/G(s) TDAFW pump steam supply valve(s).
 - S/G A, MOV-3505A
 - S/G B, MOV-3504A
- b. IF both S/G(s) faulted, THEN control feed flow at 50 gpm to each S/G.
- c. IF any S/G NOT faulted, THEN isolate all feedwater to faulted S/G unless necessary for RCS temperature control. IF a faulted S/G is necessary for RCS temperature control, THEN control feed flow at 50 gpm to that S/G.

4 Check PRZR PORV Block Valves:

- a. Power to PORV block valves - AVAILABLE
- b. Block valves - AT LEAST ONE OPEN

- a. Restore power to block valves unless block valve was closed to isolate an open PORV:
 - MOV-515, MCC D position 6C
 - MOV-516, MCC C position 6C
- b. Open one block valve unless it was closed to isolate an open PORV.

IF at least one block valve can NOT be opened, THEN dispatch AO to locally check breaker.

- MOV-515, MCC D position 6C
- MOV-516, MCC C position 6C

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, THEN STEP 5 SHOULD BE PERFORMED AFTER PRESSURE DECREASES TO LESS THAN THE APPLICABLE PORV SETPOINT.

5 Check PRZR PORV Status:

a. Check Reactor Vessel
Overpressure Protection System -
IN SERVICE

b. Check RCS pressure - LESS THAN
410 PSIG

c. Go to Step 5e

d. PRZR pressure - LESS THAN
2335 PSIG

e. Verify PRZR PORVs - CLOSED

a. Go to Step 5d.

b. Perform the following:

1) Ensure at least one PRZR PORV
open.

2) Continue with Step 6. WHEN
pressure less than setpoint,
THEN do Step 5e.

d. Perform the following:

1) Ensure at least one PRZR PORV
open.

2) Continue with Step 6. WHEN
pressure less than setpoint,
THEN do Step 5e.

e. Manually close valve.

IF any valve can NOT be closed,
THEN manually close its block
valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Check SI Pumps - ANY RUNNING	Go to Step 14.
7	<p>Check If SI Can Be Terminated:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIG-1.0, FIGURE MIN SUBCOOLING o Check RVLIS indication: <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT] <p>-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> RCS subcooling based on core exit T/Cs greater than 0°F using FIG-1.0, FIGURE MIN SUBCOOLING and no RCP running, <u>THEN</u> attempt to start an RCP: <ul style="list-style-type: none"> 1) Establish conditions for starting an RCP: <ul style="list-style-type: none"> o Bus 11A or 11B energized o Refer to ATT-15.0. ATTACHMENT RCP START 2) <u>IF</u> conditions established, <u>THEN</u> start one RCP. b. Go to Step 28.
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN MANUAL ACTION MAY BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. (REFER TO ATT-8.5, ATTACHMENT LOSS OF OFFSITE POWER)</p> <p>*****</p>		
8	Reset SI	

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 8 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Stop SI And RHR Pumps And Place In AUTO	
10	Reset CI: a. Depress CI reset pushbutton b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: 1) Reset SI. 2) Depress CI reset pushbutton.
11	Verify Adequate SW Flow: a. Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following: 1) Ensure SW isolation. 2) <u>IF NO</u> SW pumps running, <u>THEN</u> perform the following: a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling, <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton. b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS. 3) <u>IF</u> only one SW pump running, <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.
	b. Dispatch AO to establish normal shutdown alignment (Refer to ATT-17.0, ATTACHMENT SD-1)	

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 9 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12 Establish IA to CNMT:

- a. Verify non-safeguards busses energized from offsite power

o Bus 13 normal feed - CLOSED

-OR-

o Bus 15 normal feed - CLOSED

- b. Check SW pumps - AT LEAST TWO PUMPS RUNNING

- a. Perform the following:

- 1) Close non-safeguards bus tie breakers:

- Bus 13 to Bus 14 tie
- Bus 15 to Bus 16 tie

- 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).

IF NOT, THEN perform the following:

- o Start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR)

-OR-

- o Evaluate if CNMT RECIRC fans should be stopped (Refer to ATT-4.0, ATTACHMENT CNMT RECIRC FANS).

- 3) WHEN bus 15 restored, THEN reset control room lighting.

- b. Perform the following:

- 1) Restore IA using service air compressor OR diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).

- 2) Go to Step 12d.

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 12 continued from previous page)	
c.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 	c. Perform the following: <ol style="list-style-type: none"> 1) Manually align valves. 2) Dispatch AO to locally reset compressors as necessary.
d.	Verify adequate air compressor(s) - RUNNING	d. Manually start electric air compressors as power supply permits (75 kw each). <u>IF</u> electric air compressors can <u>NOT</u> be started, <u>THEN</u> start diesel air compressor (Refer to ATT-11.2, ATTACHMENT DIESEL AIR COMPRESSOR).
e.	Check IA supply: <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING 	e. Perform the following: <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 13. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12f and g.
f.	Reset both trains of XY relays for IA to CNMT AOV-5392	
g.	Verify IA to CNMT AOV-5392 - OPEN	

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 11 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13 Check If Charging Flow Has
Been Established:

a. Charging pumps - ANY RUNNING

a. Perform the following:

- 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO to locally close seal injection needle valve(s) to affected RCP:

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

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

b. Align charging pump suction to RWST:

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

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

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

- 1) Direct AO to locally open V-358, manual charging pump suction from RWST (charging pump room).

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

- 3) WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (charging pump room).

c. Start charging pumps as necessary to establish charging line flow to REGEN HX - GREATER THAN 20 GPM

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 12 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*14 Monitor SI Reinitiation Criteria:	<ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN FIG-1.0, FIGURE MIN SUBCOOLING o RVLIS indication: <ul style="list-style-type: none"> o Level - GREATER THAN 77% [82% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% 	<p>Manually start SI pumps as necessary and perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> RCS subcooling based on core exit T/Cs greater than FIG-1.0, FIGURE MIN SUBCOOLING and no RCP running, <u>THEN</u> attempt to start a RCP: <ul style="list-style-type: none"> 1) Establish conditions for starting an RCP: <ul style="list-style-type: none"> o Bus 11A or 11B energized o Refer to ATT-15.0, ATTACHMENT RCP START 2) <u>IF</u> conditions established, <u>THEN</u> start one RCP. b. Go to Step 28.
15 Check RCS Hot Leg Temperatures - STABLE		<p><u>IF</u> increasing, <u>THEN</u> control feed flow and dump steam to stabilize RCS hot leg temperatures.</p> <p><u>IF</u> decreasing, <u>THEN</u> verify that actions of Step 2 and 3 have been performed before continuing with procedure.</p>

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 13 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	<p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIG-1.0. FIGURE MIN SUBCOOLING o RVLIS indication: <ul style="list-style-type: none"> o Level - GREATER THAN 77% [82% adverse CNMT] <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 84% <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841. MCC C position 12F • MOV-865. MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. Return to Step 14.</p> <p>c. Vent any unisolated ACCUMs:</p> <ol style="list-style-type: none"> 1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> • ACCUM A. AOV-834A • ACCUM B. AOV-834B 2) Open HCV-945. 3) Continue with Step 17. Do <u>NOT</u> decrease RCS pressure to less than unisolated ACCUM pressure. <p><u>IF</u> an accumulator can <u>NOT</u> be isolated or vented, <u>THEN</u> consult TSC to determine contingency actions.</p>

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 14 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o THE RCS SHOULD NOT BE DEPRESSURIZED TO LESS THAN SI ACCUM PRESSURE UNTIL SI ACCUMS ISOLATED.
- o THE UPPER HEAD REGION MAY VOID DURING RCS DEPRESSURIZATION IF RCPS ARE NOT RUNNING. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.

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

17 Depressurize RCS To Decrease
RCS Subcooling:

- a. Depressurize using normal PRZR spray if available
 - a. IF normal spray NOT available, THEN use one PRZR PORV. IF IA NOT available, THEN refer to ATT-12.0, ATTACHMENT N2 PORVS.
 - IF no PRZR PORV available, THEN use auxiliary spray valve (AOV-296).
- b. Depressurize RCS until one of the following conditions satisfied:
 - o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIG-1.0, FIGURE MIN SUBCOOLING
 - OR-
 - o PRZR level - GREATER THAN 75% [65% adverse CNMT]
 - OR-
 - o RCS pressure - LESS THAN 160 psig [200 psig adverse CNMT]
- c. Stop RCS depressurization

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 15 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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*18 Monitor RCP Operation:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. RCPs - ANY RUNNING b. Check the following: <ul style="list-style-type: none"> o RCP #1 seal D/P - GREATER THAN 220 PSID o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIG-4.0, FIGURE RCP SEAL LEAKOFF | <ul style="list-style-type: none"> a. Go to Step 19. b. Stop affected RCP(s). |
|--|---|

CAUTION

AN INCREASE IN RCS PRESSURE MAY RESULT IN EXCESSIVE REACTOR VESSEL STRESS. RCS PRESSURE AND TEMPERATURE SHOULD BE MAINTAINED STABLE WHILE PERFORMING SUBSEQUENT STEPS IN THIS PROCEDURE.

19 Check PRZR Level - GREATER THAN 20% [40% adverse CNMT]

Try to restore level with charging while maintaining stable RCS pressure. IF level can NOT be restored, THEN go to Step 27.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 16 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	<p>Verify Adequate SW Flow To CCW Hx:</p> <p>a. Verify at least two SW pumps - RUNNING</p> <p>b. Verify AUX BLDG SW isolation valves -. OPEN</p> <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 <p>c. Verify CNMT RECIRC fan annunciator C-2. HIGH TEMPERATURE ALARM - EXTINGUISHED</p>	<p>a. Manually start pumps as power supply permits (257 kw each). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> perform the following:</p> <p>1) <u>IF</u> NO SW pumps running. <u>THEN</u> perform the following:</p> <p>a) Pull stop any D/G that is <u>NOT</u> supplied by alternate cooling. <u>AND</u> immediately depress associated VOLTAGE SHUTDOWN pushbutton.</p> <p>b) Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.</p> <p>2) <u>IF</u> only one SW pump running. <u>THEN</u> refer to AP-SW.2, LOSS OF SERVICE WATER.</p> <p>3) Go to Step 25.</p> <p><u>WHEN</u> two SW pumps can be operated <u>THEN</u> do Steps 21 through 24:</p> <p>b. Manually align valves.</p> <p>c. Manually start an additional SW pump as power supply permits (257 kw each).</p>

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 17 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	<p>Check If Normal CVCS Operation Can Be Established</p> <p>a. Verify IA restored:</p> <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG <p>b. Verify instrument bus D - ENERGIZED</p> <p>c. CCW pumps - ANY RUNNING</p> <p>d. Charging pump - ANY RUNNING</p>	<p>a. Continue with Step 25. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 21 through 24.</p> <p>b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply. <p>c. Perform the following:</p> <ul style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump. <p>d. Continue with Step 26. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 22 through 26.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF RCS PRESSURE LESS THAN 250 PSIG, THEN PCV-135 SHOULD BE ADJUSTED TO ESTABLISH DESIRED LETDOWN FLOW, NOT TO INCREASE PRESSURE.

22 Establish Normal Letdown:

- a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM
- b. Place the following switches to CLOSE:
 - Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)
 - AOV-371, letdown isolation valve
 - AOV-427, loop B cold leg to REGEN Hx
- c. Place letdown controllers in MANUAL at 40% open
 - TCV-130
 - PCV-135
- d. Reset both trains of XY relays for AOV-371 and AOV-427
- e. Open AOV-371 and AOV-427
- f. Open letdown orifice valves as necessary
- g. Place PCV-135 in AUTO at 250 psig
- h. Place TCV-130 in AUTO at the normal setpoint
- i. Adjust charging pump speed and HCV-142 as necessary

IF RCP seal return has been established, THEN establish excess letdown as follows:

- o Place excess letdown divert valve, AOV-312, to NORMAL.
- o Ensure CCW from excess letdown open. (AOV-745).
- o Open excess letdown isolation valve AOV-310.
- o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.
- o Adjust charging pump speed as necessary.

IF RCP seal return NOT established, THEN consult TSC to determine if excess letdown should be placed in service.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 19 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check VCT Makeup System:	
	<ul style="list-style-type: none"> a. Adjust boric acid flow control valve in AUTO to 9.5 gpm b. Adjust RMW flow control valve in AUTO to 40 gpm c. Verify the following: <ul style="list-style-type: none"> 1) RMW mode selector switch in AUTO 2) RMW control armed - RED LIGHT LIT d. Check VCT level: <ul style="list-style-type: none"> o Level - GREATER THAN 20% <ul style="list-style-type: none"> -OR- o Level - STABLE OR INCREASING 	<ul style="list-style-type: none"> c. Adjust controls as necessary. d. Manually increase VCT makeup flow as follows: <ul style="list-style-type: none"> 1) Ensure BA transfer pumps and RMW pumps running. <u>IF NOT</u>, <u>THEN</u> reset MCC C and MCC D UV lockouts as necessary. 2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow. 3) Increase boric acid flow as necessary.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 20 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24 Check Charging Pump Suction Aligned To VCT:		
a. VCT level - GREATER THAN 20%		<p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed 2) Continue with Step 25. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 24b.
b. Verify charging pumps aligned to VCT		b. Manually align valves as necessary.
o LCV-112C - OPEN		
o LCV-112B - CLOSED		
25 Check PRZR Level - LESS THAN 75% [65% adverse CNMT]		<p>Control charging and letdown as necessary to reduce PRZR level to less than 75% [65% adverse CNMT]. If necessary establish excess letdown.</p> <p><u>IF</u> no letdown available <u>AND</u> CCW to RCPs established, <u>THEN</u> cycle charging pumps as necessary to control PRZR level.</p>

EOP:	TITLE:	REV: 29
FR-P.1	RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	PAGE 21 of 23

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: For optimum long term pressure control, saturated conditions should be restored in the PRZR.

26 Verify PRZR Liquid Temperature (TI-424) - AT SATURATION FOR DESIRED PRESSURE

IF PRZR liquid temperature low, THEN energize PRZR heaters as necessary to establish desired temperature.

27 Check RCS Subcooling Based On Core Exit T/Cs - LESS THAN 10°F USING FIG-1.0, FIGURE MIN SUBCOOLING

IF RCS pressure less than 160 psig [200 psig adverse CNMT], THEN go to Step 28. IF NOT, THEN depressurize using normal spray. Return to step 17b.

IF normal spray NOT available and letdown is in service, THEN use auxiliary spray for any further depressurization. Return to Step 17b.

IF auxiliary spray NOT available, THEN return to Step 17a.

28 Check Cool Down Rate In RCS Cold Legs - GREATER THAN 100°F IN ANY 60 MINUTES PERIOD

Return to procedure and step in effect.

29 Maintain RCS Pressure And Temperature Stable For At Least 1 Hour

a. Control steam dump and feed flow as necessary

b. Perform actions of other procedures in effect which do not cool down the RCS or increase RCS pressure until the RCS temperature soak has been completed

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 22 of 23
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: The following pressure, temperature and cooldown rate limits remain applicable in subsequent procedures.

30 WHEN 1 HOUR Soak Is Complete,
THEN Continue RCS Cooldown
And Depressurization As
Necessary

- a. Maintain RCS pressure and cold leg temperature within the limits of FIG-11.0, FIGURE SOAK LIMITS
- b. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 50°F IN ANY 60 MINUTES PERIOD

31 Verify SI Flow Not Required:

- o RCS subcooling based on core exit T/Cs - GREATER THAN FIG-1.0, FIGURE MIN SUBCOOLING
- o RVLIS indication:
 - o Level - GREATER THAN 77% [82% adverse CNMT]
- OR-
- o Fluid fraction (any RCP running) - GREATER THAN 84%

Manually start SI pumps as necessary.

IF RCS subcooling based on core exit T/Cs greater than FIG-1.0, FIGURE MIN SUBCOOLING and no RCP running, THEN perform the following:

- a. Establish conditions for starting an RCP:
 - o Bus 11A or 11B energized
 - o Refer to ATT-15.0, ATTACHMENT RCP START
- b. IF conditions established, THEN start one RCP.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 23 of 23
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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32 Return To Procedure And Step
In Effect

-END-

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 1 of 1
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FR-P.1 APPENDIX LIST

TITLE

- 1) FIGURE MIN SUBCOOLING (FIG-1.0)
- 2) FIGURE SOAK LIMITS (FIG-11.0)
- 3) FIGURE RCP SEAL LEAKOFF (FIG-4.0)
- 4) ATTACHMENT RCP START (ATT-15.0)
- 5) ATTACHMENT SD-1 (ATT-17.0)
- 6) ATTACHMENT CNMT RECIRC FANS (ATT-4.0)
- 7) ATTACHMENT N2 PORVS (ATT-12.0)
- 8) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 9) ATTACHMENT LOSS OF OFFSITE POWER (ATT-8.5)
- 10) ATTACHMENT DIESEL AIR COMPRESSOR (ATT-11.2)
- 10) FOLDOUT

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 29 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-P series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 1 of 6
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GINNA STATION
CONTROLLED COPY NUMBER 23

Patricia A. Smith
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 2 of 6
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A. PURPOSE - This procedure provides actions to respond to a limited overcooling condition or to an overpressure condition at low temperature.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. F-0.4, INTEGRITY Critical Safety Function Status Tree, on either branch YELLOW condition.

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 3 of 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>*****</p> <p><u>NOTE:</u> o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> <p> o Foldout Page should be open and monitored periodically.</p>		
1	Check RCS Cold Leg Temperatures - STABLE OR INCREASING	<p>Try to stop RCS cooldown:</p> <ul style="list-style-type: none"> a. Ensure S/G ARVs closed. b. Close both S/G MSIVs. c. Ensure MFW flow control valves closed. <ul style="list-style-type: none"> • MFW regulating valves • MFW bypass valves d. Ensure MFW pumps tripped. e. <u>IF</u> S/G pressure less than condensate pressure. <u>THEN</u> stop all condensate pumps. f. <u>IF</u> RHR system in service. <u>THEN</u> stop any cooldown from RHR system. g. Control total feed flow to non-faulted S/G(s) greater than 200 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one non-faulted S/G. <u>WHEN</u> S/G level greater than 7% [25% adverse CNMT] in one non-faulted S/G, <u>THEN</u> limit feed flow to stop RCS cooldown.

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 4 of 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> A faulted S/G is any S/G that is depressurizing in an uncontrolled manner or is completely depressurized.</p>		
2	<p>Check If SG Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 110 PSIG 	<p>Minimize cooldown from faulted S/G(s):</p> <ul style="list-style-type: none"> a. Close faulted S/G(s) TDAFW pump steam supply valve(s). <ul style="list-style-type: none"> • S/G A, MOV-3505A • S/G B, MOV-3504A b. <u>IF</u> both S/G(s) faulted. <u>THEN</u> control feed flow at 50 gpm to each S/G. c. <u>IF</u> any S/G <u>NOT</u> faulted. <u>THEN</u> isolate all feedwater to faulted S/G(s) unless necessary for RCS temperature control. <u>IF</u> a faulted S/G is necessary for RCS temperature control, <u>THEN</u> control feed flow at 50 gpm to that S/G.
3	<p>Check If SI Has Been Terminated - NO SI PUMPS RUNNING</p>	<p>Go to Step 7.</p>

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 5 of 6
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF RHR NORMAL COOLING IN SERVICE, THEN RCS PRESSURE SHOULD BE MAINTAINED LESS THAN THE RCS OVERPRESSURE PROTECTION SETPOINT (410 PSIG).

4 Check RCS Cold Leg
Temperature - GREATER THAN
330° F

IF normal RHR cooling NOT in
service, THEN verify the following:

- o MOV-700 or MOV-701 closed
- o MOV-720 or MOV-721 closed

IF normal RHR cooling in service,
THEN perform the following:

- a. Reduce RCS pressure to less than
410 psig.
- b. Place RCS overpressure
protection system in service
(Refer to 0-7, ALIGNMENT AND
OPERATION OF THE REACTOR VESSEL
OVERPRESSURE PROTECTION SYSTEM)

5 Check RCS Pressure - WITHIN
LIMITS OF FIG-9.0, FIGURE
TECH SPEC C/D FOR 100° F/HR

Decrease RCS pressure to within
limits of FIG-9.0, FIGURE TECH SPEC
C/D using normal PRZR spray. IF
normal spray NOT available and
letdown is in service, THEN use
auxiliary spray. IF auxiliary
spray NOT available, THEN use one
PRZR PORV. IF IA NOT available for
PORV, THEN refer to ATT-12.0,
ATTACHMENT N2 PORVS..

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 6 of 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Determine If Additional RCS Cooldown Restrictions Are Required: a. Cooldown rate in RCS cold legs - GREATER THAN 100°F IN ANY 60 MINUTES PERIOD b. RCS cooldown is permitted with the following restrictions: 1) Maintain RCS pressure and cold leg temperatures within the limits of FIG-9.1, FIGURE C/D LIMITS 2) Maintain cooldown rate in RCS cold legs less than 100°F in any 60 minutes period	a. Additional restrictions are not required. Go to Step 7.
7	Return To Procedure And Step In Effect	

-END-

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 1 of 1
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FR-P.2 APPENDIX LIST

TITLE

- 1) FIGURE TECH SPEC C/D (FIG-9.0)
- 2) FIGURE C/D LIMITS (FIG-9.1)
- 3) ATTACHMENT N2 PORVS (ATT-12.0)
- 4) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 5) FOLDOUT

EOP: FR-P.2	TITLE: RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	REV: 9 PAGE 1 of 1
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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-P series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 1 of 13
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GINNA STATION
CONTROLLED COPY NUMBER 23

Robert L. Long
RESPONSIBLE MANAGER

11-17-2004
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 2 of 13
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- A. PURPOSE - This procedure provides actions to add negative reactivity to a core which is observed to be critical when expected to be shut down.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-0, REACTOR TRIP OR SAFETY INJECTION, when reactor trip is not verified and manual trip is not effective.
 - b. F-0.1, SUBCRITICALITY, Critical Safety Function Status Tree on either a RED or ORANGE condition.

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 3 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p>		
1	<p>Verify Reactor Trip:</p> <ul style="list-style-type: none"> o At least one train of reactor trip breakers - OPEN o Neutron flux - DECREASING o MRPI indicates - ALL CONTROL AND SHUTDOWN RODS ON BOTTOM 	<p>Manually trip reactor.</p> <p><u>IF</u> reactor trip breakers <u>NOT</u> open, <u>THEN</u> manually insert control rods.</p>
2	<p>Verify Turbine Stop Valves - CLOSED</p>	<p>Manually trip turbine.</p> <p><u>IF</u> turbine trip can <u>NOT</u> be verified, <u>THEN</u> close both MSIVs.</p>
3	<p>Check AFW Pumps Running:</p> <ul style="list-style-type: none"> a. MDAFW pumps - RUNNING b. TDAFW pump - RUNNING IF NECESSARY 	<p>a. Manually start MDAFW pumps.</p> <p>b. Manually open steam supply valves.</p> <ul style="list-style-type: none"> • MOV-3505A • MOV-3504A

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 4 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>ACTIONS TAKEN TO INITIATE RCS BORATION SHALL NOT BE REVERSED WHEN PERFORMING STEPS 1 THROUGH 12 OF E-0, REACTOR TRIP OR SAFETY INJECTION.</p> <p>*****</p> <p><u>NOTE:</u> o If offsite power is lost coincident with SI, then MCC C and MCC D lockout relays must be reset to restore BA and RMW pumps.</p> <p> o Foldout page should be open and monitored periodically.</p> <p>4 Initiate Emergency Boration Of RCS:</p> <p>a. Check SI status:</p> <p> o All SI annunciators - EXTINGUISHED</p> <p> o All SI pumps - OFF IN AUTO</p> <p>b. Verify at least one charging pump - RUNNING</p> <p>c. Align boration path:</p> <p> 1) Start two BA transfer pumps</p> <p> 2) Open MOV-350</p> <p> 3) Verify BA flow</p> <p>d. Verify charging flow path:</p> <p> o Charging valve to loop B cold leg (AOV-294) - OPEN</p> <p> o Charging flow control valve (HCV-142) - DEMAND AT 0%</p>		
		<p>a. Perform the following:</p> <p> 1) Complete steps 1 through 12 of E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this procedure</p> <p> 2) <u>IF</u> SI flow indicated, <u>THEN</u> go to Step 5. <u>IF NOT</u>, <u>THEN</u> go to Step 4b.</p> <p>b. Perform the following:</p> <p> 1) Reset SI if necessary.</p> <p> 2) Start one charging pump.</p> <p>c. Initiate normal boration at maximum rate using the boric acid flow control valve, FCV-110A. <u>IF</u> flow can <u>NOT</u> be established, <u>THEN</u> refer to ER-CVCS.1, REACTOR MAKEUP CONTROL MALFUNCTION.</p> <p>d. Manually align valves and verify flow.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5 Check PRZR PORV Status:

a. RCS pressure - LESS THAN
2335 PSIG

a. Verify PRZR PORVs and block
valves open. IF NOT, THEN open
PRZR PORVs and block valves as
necessary until PRZR pressure
less than 2335 psig.

b. Check PORVs - BOTH CLOSED

b. IF PRZR pressure less than
2335 psig, THEN manually close
PORVs.

IF any PORV can NOT be closed,
THEN manually close its block
valve. IF block valve can NOT
be closed, THEN dispatch AO to
locally check breaker.

- MOV-515, MCC D position 6C
- MOV-516, MCC C position 6C

6 Verify CNMT Ventilation
Isolation

a. CVI annunciator - LIT

- Annunciator A-25, CNMT
VENTILATION ISOLATION

a. Momentarily deenergize CNMT
particulate monitor, R-11, to
actuate CVI.

b. Verify CVI valve status lights -
BRIGHT

b. Manually close CVI valves as
required

IF valves can NOT be verified
closed by MCB indication, THEN
dispatch AO to locally close
valves (Refer to ATT-3.0,
ATTACHMENT CI/CVI for alternate
isolation valves).

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 6 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>Check If The Following Trips Have Occurred:</p> <p>a. Reactor trip</p> <p>b. Turbine trip</p>	<p>a. Dispatch AO to locally trip reactor:</p> <ul style="list-style-type: none"> o Trip MG set breakers at bus 13 and bus 15. <p>-OR-</p> <ul style="list-style-type: none"> o Open reactor trip breakers locally. <p>b. Dispatch AO to locally trip turbine using manual trip lever on west end of HP turbine.</p>
* 8	<p>Check If Reactor Is Subcritical:</p> <p>a. Energize MCC A <u>AND</u> B</p> <p>b. Check power range channels - LESS THAN 5%</p> <p>c. Check Intermediate range channels</p> <ul style="list-style-type: none"> o Startup rate - NEGATIVE <p>-OR-</p> <ul style="list-style-type: none"> o Intermediate range channels - DECREASING <p>d. Go to Step 18.</p>	<p>b. Go to Step 9.</p> <p>c. Go to Step 9.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

* 9 Monitor S/G Level:

a. Narrow range level in at least one S/G - GREATER THAN 7% [25% adverse CNMT]

a. Perform the following:

1) Verify total feed flow greater than 400 gpm.

IF NOT. THEN manually start pumps and align valves as necessary.

IF AFW can NOT be established. THEN establish SAFW (Refer to ATT-5.1, ATTACHMENT SAFW)

2) Maintain total feed flow greater than 400 gpm until narrow range level greater than 7% [25% adverse CNMT] in at least one S/G.

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

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 8 of 13
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10 Verify Dilution Paths -
ISOLATED

- a. Place RMW mode switch to BORATE
- b. Stop RMW pumps
- b. Perform the following:
 - 1) Close RMW to blender (AOV-111)
 - 2) Direct AO to locally open RMW pump breaker
 - RMW Pump A. MCC C Pos 13B
 - RMW Pump B. MCC D Pos 1B

11 Stabilize RCS Temperature:

- a. Control steam dump as necessary
- b. Verify the following:
 - o Core exit T/Cs - STABLE OR INCREASING
 - o Pressure in both S/Gs - STABLE OR INCREASING
 - o Pressure in both S/Gs - GREATER THAN 110 PSIG
- c. Go to Step 16
- b. IF RCS cooldown can NOT be controlled, THEN close both MSIVs and go to Step 12.

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 9 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Verify MFW Isolation: a. MFW pumps - TRIPPED b. Depress MANUAL pushbutton for A and B S/G MFW regulating valve and bypass valve controllers <u>AND</u> adjust to 0% demand.	a. Manually close MFW pump discharge valves and trip MFW pumps.
13	Identify Faulted S/G: o Any S/G Pressure - DECREASING IN AN UNCONTROLLED MANNER -OR- o Any S/G Pressure - LESS THAN 110 PSIG	Go to Step 16.

EOP:

FR-S.1

TITLE:

RESPONSE TO REACTOR RESTART/ATWS

REV: 17

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o AT LEAST ONE S/G SHALL BE MAINTAINED AVAILABLE FOR RCS COOLDOWN.
- o IF BOTH S/GS ARE FAULTED, AT LEAST 50 GPM FEED FLOW SHOULD BE MAINTAINED TO EACH S/G.

14 Isolate Feed Flow To Faulted S/G:

Manually close valves.

IF valves can NOT be closed, THEN dispatch AO to locally isolate flowpaths as necessary.

- o Close faulted S/G MDAFW pump discharge valve
 - S/G A. MOV-4007
 - S/G B. MOV-4008
- o Pull stop faulted S/G MDAFW pump
- o Close faulted S/G TDAFW flow control valve
 - S/G A. AOV-4297
 - S/G B. AOV-4298
- o Verify faulted S/G MFW regulating valve and bypass valve - CLOSED
 - S/G A. HCV-466 and HCV-480
 - S/G B. HCV-476 and HCV-481
- o Verify MDAFW pump crosstie valves - BOTH CLOSED
 - MOV-4000A
 - MOV-4000B
- o Close faulted S/G SAFW pump discharge valve
 - S/G A. MOV-9701A
 - S/G B. MOV-9701B

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 11 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.</p> <p>*****</p>		
15	<p>Isolate Steam Flow From Faulted S/G:</p> <ul style="list-style-type: none"> o Verify faulted S/G ARV - CLOSED <ul style="list-style-type: none"> • S/G A. AOV-3411 • S/G B. AOV-3410 o Close faulted S/G TDAFW pump steam supply valve and place in PULL STOP <ul style="list-style-type: none"> • S/G A. MOV-3505A • S/G B. MOV-3504A o Verify faulted S/G blowdown and sample valves - CLOSED <ul style="list-style-type: none"> • S/G A. AOV-5738 and AOV-5735 • S/G B. AOV-5737 and AOV-5736 o Dispatch AO to complete faulted S/G isolation (Refer to ATT-10.0, ATTACHMENT FAULTED S/G) 	<p>Manually close valves.</p> <p><u>IF</u> valves can <u>NOT</u> be closed. <u>THEN</u> dispatch AO to locally isolate flowpaths as necessary.</p>

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 12 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check Core Exit T/Cs - LESS THAN 1200°F	<p><u>IF</u> core exit temperatures greater than 1200°F and increasing. <u>THEN</u> go to SACRG-1, SEVERE ACCIDENT CONTROL ROOM GUIDELINE INITIAL RESPONSE, step 1.</p> <p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p>
17	Verify Reactor Subcritical:	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Stabilize RCS temperature. b. Continue to inject boric acid. c. Perform actions of other FR procedures in effect which do <u>NOT</u> cooldown or otherwise add positive reactivity to the core. d. Direct RP to sample RCS and PRZR for boron concentration. e. Verify boron concentration greater than FIG-2.0, FIGURE SDM. <p><u>IF</u> adequate shutdown margin verified, <u>THEN</u> go to Step 18.</p> <p><u>IF NOT</u>, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> a. Allow RCS to heat up. b. Perform actions of other FR procedures in effect which do <u>NOT</u> cooldown or otherwise add positive reactivity to the core. c. Return to Step 4.

EOP: FR-S.1	TITLE: RESPONSE TO REACTOR RESTART/ATWS	REV: 17 PAGE 13 of 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p><u>CAUTION</u></p> <p>BORATION SHOULD CONTINUE TO OBTAIN ADEQUATE SHUTDOWN MARGIN DURING SUBSEQUENT ACTIONS.</p> <p>*****</p>	
18	Return to Procedure And Step In Effect	
	-END-	

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FR-S.1 APPENDIX LIST

TITLE

- 1) FIGURE SDM (FIG-2.0)
- 2) ATTACHMENT FAULTED S/G (ATT-10.0)
- 3) ATTACHMENT CI/CVI (ATT-3.0)
- 4) ATTACHMENT SAFW (ATT-5.1)
- 5) ATTACHMENT NO SW PUMPS (ATT-2.4)
- 6) FOLDOUT

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FOLDOUT PAGE

NOTE: This Foldout Page applies to all FR-S series procedures.

1. LOSS OF SW CRITERIA

IF no SW pumps are available, THEN perform the following:

- a. Pull stop any D/G that is NOT supplied by alternate cooling, AND immediately depress associated VOLTAGE SHUTDOWN pushbutton.
- b. Refer to ATT-2.4, ATTACHMENT NO SW PUMPS.