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JOSEPH A. WIDAY  
VICE PRESIDENT & PLANT MANAGER  
GINNA STATION

March 31, 2000

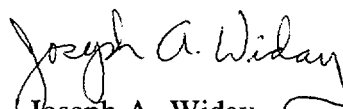
U.S. Nuclear Regulatory Commission  
Document Control Desk  
Attn: Guy S. Vissing  
Project Directorate I  
Washington, D.C. 20555

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

Dear Mr. Vissing:

As requested, enclosed are Ginna Station Emergency Operating Procedures.

Very truly yours,

  
Joseph A. Widay

JAW/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):

AP Index	AP-RHR.2, Rev 8	F-0.4, Rev 2
ATT Index	E-3, Rev 26	FR-I.1, Rev 12
E Index	ES-0.1, Rev 17	FR-I.3, Rev 14
ECA Index	ES-1.1, Rev 18	FR-P.1, Rev 22
ES Index	ES-1.2, Rev 21	
F Index	ECA-2.1, Rev 20	
FR Index	ECA-3.1, Rev 19	
ATT-9.1, Rev 3	ECA-3.2, Rev 22	



REPORT NO. 01  
REPORT: NPSP0200  
DOC TYPE: PRAP

GINNA NUCLEAR POWER PLANT  
PROCEDURES INDEX  
ABNORMAL PROCEDURE

03/30/00 PAGE: 1

PARAMETERS: DOC TYPES - PRAR PRATT PRAP PRER STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
AP-CCW.1	LEAKAGE INTO THE COMPONENT COOLING LOOP	013	10/30/98	05/01/98	05/01/03	EF
AP-CCW.2	LOSS OF CCW DURING POWER OPERATION	013	08/17/99	08/17/99	08/17/04	EF
AP-CCW.3	LOSS OF CCW - PLANT SHUTDOWN	011	08/17/99	08/17/99	08/17/04	EF
AP-CR.1	CONTROL ROOM INACCESSIBILITY	016	01/11/00	01/11/00	01/11/05	EF
AP-CVCS.1	CVCS LEAK	012	05/01/98	05/01/98	05/01/03	EF
AP-CVCS.3	LOSS OF ALL CHARGING FLOW	002	02/11/00	02/26/99	02/26/04	EF
AP-CW.1	LOSS OF A CIRC WATER PUMP	010	07/16/98	05/01/98	05/01/03	EF
AP-ELEC.1	LOSS OF 12A AND/OR 12B BUSES	019	12/02/99	05/01/98	05/01/03	EF
AP-ELEC.2	SAFEGUARD BUSES LOW VOLTAGE OR SYSTEM LOW FREQUENCY	009	03/22/99	03/22/99	03/22/04	EF
AP-ELEC.3	LOSS OF 12A AND/OR 12B TRANSFORMER (BELOW 350 F)	007	12/02/99	05/01/98	05/01/03	EF
AP-ELEC.14/16	LOSS OF SAFEGUARDS BUS 14/16	000	06/09/97	06/09/97	06/09/02	EF
AP-ELEC.17/18	LOSS OF SAFEGUARDS BUS 17/18	002	10/18/99	06/09/97	06/09/02	EF
AP-FW.1	PARTIAL OR COMPLETE LOSS OF MAIN FEEDWATER	012	02/11/00	02/27/98	02/27/03	EF
AP-IA.1	LOSS OF INSTRUMENT AIR	017	12/02/99	05/01/98	05/01/03	EF
AP-PRZR.1	ABNORMAL PRESSURIZER PRESSURE	011	12/02/99	12/02/99	12/02/04	EF
AP-RCC.1	CONTINUOUS CONTROL ROD WITHDRAWAL/INSERTION	006	02/24/96	05/14/98	05/14/03	EF
AP-RCC.2	RCC/RPI MALFUNCTION	008	11/16/98	02/06/97	02/06/02	EF
AP-RCC.3	DROPPED ROD RECOVERY	004	11/16/98	02/27/98	02/27/03	EF
AP-RCP.1	RCP SEAL MALFUNCTION	012	05/01/98	05/01/98	05/01/03	EF
AP-RCS.1	REACTOR COOLANT LEAK	014	04/14/99	05/01/98	05/01/03	EF
AP-RCS.2	LOSS OF REACTOR COOLANT FLOW	010	12/14/98	05/01/98	05/01/03	EF
AP-RCS.3	HIGH REACTOR COOLANT ACTIVITY	007	08/05/97	08/05/97	08/05/02	EF
AP-RCS.4	SHUTDOWN LOCA	011	12/02/99	05/01/98	05/01/03	EF
AP-RHR.1	LOSS OF RHR	013	01/25/99	05/01/98	05/01/03	EF

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GINNA NUCLEAR POWER PLANT  
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ABNORMAL PROCEDURE

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PARAMETERS: DOC TYPES - PRAR PRATT PRAP PRER STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
AP-RHR.2	LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	008	03/31/00	03/31/00	03/31/05	EF
AP-SW.1	SERVICE WATER LEAK	015	10/18/99	06/03/98	06/03/03	EF
AP-TURB.1	TURBINE TRIP WITHOUT RX TRIP REQUIRED	010	02/12/99	10/10/97	10/10/02	EF
AP-TURB.2	TURBINE LOAD REJECTION	017	02/11/00	05/13/98	05/13/03	EF
AP-TURB.3	TURBINE VIBRATION	010	02/11/00	02/10/98	02/10/03	EF
AP-TURB.4	LOSS OF CONDENSER VACUUM	014	05/01/98	05/01/98	05/01/03	EF
AP-TURB.5	RAPID LOAD REDUCTION	004	02/11/00	07/10/95	07/10/00	EF
TOTAL FOR PRAP	31					

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GINNA NUCLEAR POWER PLANT  
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EOP ATTACHMENTS

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PARAMETERS: DOC TYPES - PRAR PRATT PRAP PRER STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ATT-1.0	ATTACHMENT AT POWER CCW ALIGNMENT	001	07/26/94	02/10/98	02/10/03	EF
ATT-2.1	ATTACHMENT MIN SW	004	06/26/98	02/10/98	02/10/03	EF
ATT-2.2	ATTACHMENT SW ISOLATION	006	03/25/99	08/11/98	08/11/03	EF
ATT-2.3	ATTACHMENT SW LOADS IN CNMT	003	01/25/95	12/31/99	12/31/04	EF
ATT-3.0	ATTACHMENT CI/CVI	005	01/25/99	01/06/99	01/06/04	EF
ATT-3.1	ATTACHMENT CNMT CLOSURE	003	01/25/99	01/25/99	01/25/04	EF
ATT-4.0	ATTACHMENT CNMT RECIRC FANS	003	07/26/94	05/13/98	05/13/03	EF
ATT-5.0	ATTACHMENT COND TO S/G	004	01/25/95	12/31/99	12/31/04	EF
ATT-5.1	ATTACHMENT SAFW	006	07/07/98	12/31/99	12/31/04	EF
ATT-5.2	ATTACHMENT FIRE WATER COOLING TO TDAFW PUMP	003	01/14/99	01/14/99	01/14/04	EF
ATT-6.0	ATTACHMENT COND VACUUM	003	12/18/96	02/10/98	02/10/03	EE
ATT-7.0	ATTACHMENT CR EVAC	005	02/11/00	02/10/98	02/10/03	EF
ATT-8.0	ATTACHMENT DC LOADS	006	03/22/99	01/14/99	01/14/04	EF
ATT-8.1	ATTACHMENT D/G STOP	004	11/03/95	02/10/98	02/10/03	EF
ATT-8.2	ATTACHMENT GEN DEGAS	006	08/17/99	08/17/99	08/17/04	EF
ATT-8.3	ATTACHMENT NONVITAL	003	07/26/94	02/10/98	02/10/03	EF
ATT-8.4	ATTACHMENT SI/UV	004	04/24/97	02/10/98	02/10/03	EF
ATT-9.0	ATTACHMENT LETDOWN	006	04/07/97	01/06/99	01/06/04	EF
ATT-9.1	ATTACHMENT EXCESS L/D	003	03/31/00	02/10/98	02/10/03	EF
ATT-10.0	ATTACHMENT FAULTED S/G	005	10/03/96	05/13/98	05/13/03	EF
ATT-11.0	ATTACHMENT IA CONCERNS	002	04/07/97	08/11/98	08/11/03	EF
ATT-11.1	ATTACHMENT IA SUPPLY	002	04/07/97	08/11/98	08/11/03	EF
ATT-11.2	ATTACHMENT DIESEL AIR COMPRESSOR	000	04/03/98	04/03/98	04/03/03	EF
ATT-12.0	ATTACHMENT N2 PORVS	003	03/24/97	02/10/98	02/10/03	EF

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EOP ATTACHMENTS

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PARAMETERS: DOC TYPES - PRAR PRATT PRAP PRER STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ATT-13.0	ATTACHMENT NC	002	07/26/94	02/10/98	02/10/03	EF
ATT-14.0	ATTACHMENT NORMAL RHR COOLING	002	04/07/97	09/23/99	09/23/04	EF
ATT-14.1	ATTACHMENT RHR COOL	004	05/01/98	05/01/98	05/01/03	EF
ATT-14.2	ATTACHMENT RHR ISOL	001	07/26/94	02/10/98	02/10/03	EF
ATT-14.3	ATTACHMENT RHR NPSH	002	08/01/97	01/06/99	01/06/04	EF
ATT-14.4	ATTACHMENT RHR SAMPLE	001	07/26/94	01/06/99	01/06/04	EF
ATT-14.5	ATTACHMENT RHR SYSTEM	002	07/26/94	02/10/98	02/10/03	EF
ATT-14.6	ATTACHMENT RHR PRESS REDUCTION	001	01/14/99	01/14/99	01/14/04	EF
ATT-15.0	ATTACHMENT RCP START	005	05/22/97	03/17/00	03/17/05	EF
ATT-15.1	ATTACHMENT RCP DIAGNOSTICS	003	04/24/97	02/10/98	02/10/03	EF
ATT-15.2	ATTACHMENT SEAL COOLING	003	05/22/97	02/10/98	02/10/03	EF
ATT-16.0	ATTACHMENT RUPTURED S/G	009	01/11/00	01/11/00	01/11/05	EF
ATT-17.0	ATTACHMENT SD-1	008	02/29/00	02/29/00	02/28/05	EF
ATT-17.1	ATTACHMENT SD-2	005	09/26/96	09/10/96	09/10/01	EF
ATT-18.0	ATTACHMENT SFP - RWST	004	10/08/97	02/10/98	02/10/03	EF
ATT-20.0	ATTACHMENT VENT TIME	003	07/26/94	02/10/98	02/10/03	EF
ATT-21.0	ATTACHMENT RCS ISOLATION	001	07/26/94	02/10/98	02/10/03	EF
ATT-22.0	ATTACHMENT RESTORING FEED FLOW	001	02/12/99	03/24/97	03/24/02	EF
ATT-23.0	ATTACHMENT TRANSFER 4160V LOADS	000	02/26/99	02/26/99	02/26/04	EF
TOTAL FOR PRATT	43					

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EMERGENCY PROCEDURE

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PARAMETERS: DOC TYPES - PRE      PRES      PRECA      PRF      PRFR      STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
E-0	REACTOR TRIP OR SAFETY INJECTION	026	12/02/99	05/01/98	05/01/03	EF
E-1	LOSS OF REACTOR OR SECONDARY COOLANT	019	12/02/99	05/01/98	05/01/03	EF
E-2	FAULTED STEAM GENERATOR ISOLATION	008	05/01/98	05/01/98	05/01/03	EF
E-3	STEAM GENERATOR TUBE RUPTURE	026	03/31/00	05/01/98	05/01/03	EF

TOTAL FOR PRE      4

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GINNA NUCLEAR POWER PLANT  
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EMERGENCY CONTINGENCY ACTIONS PROC

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PARAMETERS: DOC TYPES - PRE PRES PRECA PRF PRFR STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ECA-0.0	LOSS OF ALL AC POWER	021	07/01/99	05/01/98	05/01/03	EF
ECA-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	017	12/02/99	05/01/98	05/01/03	EF
ECA-0.2	LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED	012	10/18/99	05/01/98	05/01/03	EF
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	018	12/02/99	05/01/98	05/01/03	EF
ECA-1.2	LOCA OUTSIDE CONTAINMENT	005	05/01/98	05/01/98	05/01/03	EF
ECA-2.1	UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	020	03/31/00	05/01/98	05/01/03	EF
ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED	019	03/31/00	05/01/98	05/01/03	EF
ECA-3.2	SGTR WITH LOSS OF REACTOR COOLANT-SATURATED RECOVERY DESIRED	022	03/31/00	05/01/98	05/01/03	EF
ECA-3.3	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL	023	02/02/00	05/01/98	05/01/03	EF

TOTAL FOR PRECA 9

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DOC TYPE: PRES

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EQUIPMENT SUB-PROCEDURE

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PARAMETERS: DOC TYPES - PRE PRES PRECA PRF PRFR STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
ES-0.0	REDIAGNOSIS	010	05/01/98	05/01/98	05/01/03	EF
ES-0.1	REACTOR TRIP RESPONSE	017	03/31/00	05/01/98	05/01/03	EF
ES-0.2	NATURAL CIRCULATION COOLDOWN	012	05/01/98	05/01/98	05/01/03	EF
ES-0.3	NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL	008	05/01/98	05/01/98	05/01/03	EF
ES-1.1	SI TERMINATION	018	03/31/00	05/01/98	05/01/03	EF
ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	021	03/31/00	05/01/98	05/01/03	EF
ES-1.3	TRANSFER TO COLD LEG RECIRCULATION	028	10/18/99	05/01/98	05/01/03	EF
ES-3.1	POST-SGTR COOLDOWN USING BACKFILL	013	05/01/98	05/01/98	05/01/03	EF
ES-3.2	POST-SGTR COOLDOWN USING BLOWDOWN	014	05/01/98	05/01/98	05/01/03	EF
ES-3.3	POST-SGTR COOLDOWN USING STEAM DUMP	014	05/01/98	05/01/98	05/01/03	EF

TOTAL FOR PRES 10

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DOC TYPE: PRF

GINNA NUCLEAR POWER PLANT  
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CRITICAL SAFETY FUNCTION STATUS PROC

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PARAMETERS: DOC TYPES - PRE PRES PRECA PRF PRFR STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
F-0.1	SUBCRITICALITY CSFST	001	07/21/89	07/13/99	07/13/04	EF
F-0.2	CORE COOLING CSFST	004	06/26/97	07/13/99	07/13/04	EF
F-0.3	HEAT SINK CSFST	003	06/03/96	07/13/99	07/13/04	EF
F-0.4	INTEGRITY CSFST	002	03/31/00	07/13/99	07/13/04	EF
F-0.5	CONTAINMENT CSFST	002	01/12/90	07/13/99	07/13/04	EF
F-0.6	INVENTORY CSFST	004	05/01/98	05/01/98	05/01/03	EF

TOTAL FOR PRF 6

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DOC TYPE: PRFR

GINNA NUCLEAR POWER PLANT  
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FUNCTIONAL RESTORATION GUIDELINE PROC

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PARAMETERS: DOC TYPES - PRE PRES PRECA PRF PRFR STATUS: EF QU 5 YEARS ONLY:

PROCEDURE NUMBER	PROCEDURE TITLE	REV	EFFECT DATE	LAST REVIEW	NEXT REVIEW	ST
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	017	12/02/99	05/01/98	05/01/03	EF
FR-C.2	RESPONSE TO DEGRADED CORE COOLING	015	12/02/99	05/01/98	05/01/03	EF
FR-C.3	RESPONSE TO SATURATED CORE COOLING	008	05/01/98	05/01/98	05/01/03	EF
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	022	12/02/99	05/01/98	05/01/03	EF
FR-H.2	RESPONSE TO STEAM GENERATOR OVERPRESSURE	004	05/01/98	05/01/98	05/01/03	EF
FR-H.3	RESPONSE TO STEAM GENERATOR HIGH LEVEL	005	05/01/98	05/01/98	05/01/03	EF
FR-H.4	RESPONSE TO LOSS OF NORMAL STEAM RELEASE CAPABILITIES	004	05/01/98	05/01/98	05/01/03	EF
FR-H.5	RESPONSE TO STEAM GENERATOR LOW LEVEL	007	12/02/99	05/01/98	05/01/03	EF
FR-I.1	RESPONSE TO HIGH PRESSURIZER LEVEL	012	03/31/00	05/01/98	05/01/03	EF
FR-I.2	RESPONSE TO LOW PRESSURIZER LEVEL	008	12/02/99	05/01/98	05/01/03	EF
FR-I.3	RESPONSE TO VOIDS IN REACTOR VESSEL	014	03/31/00	05/01/98	05/01/03	EF
FR-P.1	RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	022	03/31/00	05/01/98	05/01/03	EF
FR-P.2	RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITION	007	05/01/98	05/01/98	05/01/03	EF
FR-S.1	RESPONSE TO REACTOR RESTART/ATWS	013	12/14/98	05/01/98	05/01/03	EF
FR-S.2	RESPONSE TO LOSS OF CORE SHUTDOWN	008	05/01/98	05/01/98	05/01/03	EF
FR-Z.1	RESPONSE TO HIGH CONTAINMENT PRESSURE	005	12/14/98	05/01/98	05/01/03	EF
FR-Z.2	RESPONSE TO CONTAINMENT FLOODING	004	01/14/99	05/01/98	05/01/03	EF
FR-Z.3	RESPONSE TO HIGH CONTAINMENT RADIATION LEVEL	004	05/01/98	05/01/98	05/01/03	EF

TOTAL FOR PRFR 18

EOP: ATT-9.1	TITLE: ATTACHMENT EXCESS L/D	REV: 3 PAGE 1 of 1
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Responsible Manager BSilman Date 3-31-2000

Establish excess letdown:

- a. Ensure excess LTDN Loop A cold to Hx, AOV-310 is closed. |
- b. Ensure excess letdown flow control valve, HCV-123 is closed, demand at 0. |
- c. IF RCP seal return has been established, THEN place excess letdown divert valve, AOV-312, to NORMAL.
- d. Ensure CCW from EX LTDN Hx, AOV-745 - OPEN.
- e. Open excess LTDN Loop A cold to Hx, AOV-310.
- f. Slowly open excess letdown flow control valve, HCV-123, to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.
- g. Adjust charging pump speed as necessary.

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 1 of 14
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

*Residulin*  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_



EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 2 of 14
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A. PURPOSE - This procedure provides guidance necessary for maintaining core cooling and protecting the reactor core in the event that RHR cooling is lost during RCS reduced inventory operation, (i.e., at indicated Loop Levels of less than 64 inches with fuel in the vessel).

B. ENTRY CONDITIONS/SYMPTOMS

1. SYMPTOMS - The following symptoms are indicative of LOSS OF RHR AT RCS REDUCED INVENTORY CONDITIONS:
  - a. No RHR pumps running, or
  - b. Annunciator A-20, RESIDUAL HEAT REMOVAL LOOP LO FLOW 2900 GPM (Set at 400 GPM per 0-2.2 in RHR Cooling mode) lit, or
  - c. Unexpected increase in RCS temperature while on RHR cooling at low loop levels, or
  - d. Erratic or no flow on FI-626

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 3 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <ul style="list-style-type: none"> <li>o CHANGES IN RCS PRESSURE COULD RESULT IN INACCURACIES IN RCS LOOP LEVEL INDICATIONS.</li> <li>o SHOULD CORE BOILING OCCUR, "SURGE LINE FLOODING" MAY RESULT IN RCS PRESSURIZATION AND ERRONEOUS HIGH LOOP LEVEL INDICATION.</li> <li>o DO NOT START ANOTHER RHR PUMP UNTIL THE CAUSE OF THE ABNORMAL RHR INDICATIONS HAS BEEN DETERMINED AND CORRECTED. IF A RUNNING PUMP HAS TRIPPED FOR REASONS OTHER THAN LOW LOOP LEVEL OR LOSS OF SUCTION FLOW, THEN REDUNDANT PUMP MAY BE STARTED.</li> <li>o IA TO CNMT MAY BE REQUIRED FOR RCS MAKEUP AND SHOULD NOT BE ISOLATED UNTIL DIRECTED BY THIS PROCEDURE.</li> </ul> <p>*****</p> <p><u>NOTE:</u> Conditions should be evaluated for site contingency reporting (Refer to EPIP-1.0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).</p> <p>1 Initiate CNMT Closure (Refer to O-2.3.1A, CONTAINMENT CLOSURE CAPABILITY IN TWO HOURS DURING RCS REDUCED INVENTORY OPERATION)</p>		

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 4 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Check If RHR Pumps Should Be Stopped:	
	a. RHR pump - ANY RUNNING	a. Go to Step 3.
	b. Check RCS level:	b. Stop RHR pumps and go to Step 3.
	o Level - GREATER THAN 6 INCHES	
	o Level - STABLE	
	c. RHR flow - LESS THAN 500 GPM	c. Reduce RHR flow as necessary.
	d. RHR pumps cavitating:	d. Go to Step 18.
	o RHR pump flow - OSCILLATING	
	-OR-	
	o RHR pump NPSH - APPROXIMATELY ZERO (PPCS group GD NPSH)	
	e. Stop RHR pumps	
3	Isolate Letdown And Known Drain Paths	
	a. Verify the following valves - CLOSED	a. Manually close valves.
	• RCDT pump suctions from sump B, MOV-1813A and MOV-1813B	
	• Loop B cold leg to REGEN Hx, AOV-427	
	• Low pressure letdown pressure control valve, PCV-135	
	• RHR letdown flow control valve, HCV-133	
	• Excess letdown isolation valve, AOV-310	
	b. Evaluate normal drain lineups	
	c. Evaluate maintenance activities affecting RCS or RHR system	

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 5 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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4 Start Available CNMT RECIRC  
Fans

NOTE: Personnel remaining in CNMT to assist in event mitigation should consult Radiation Protection for changes in radiological concerns.

5 Initiate Actions To Protect  
Personnel In CNMT:

- a. Evacuate non-essential personnel  
from CNMT
- b. Periodically monitor CNMT  
radiation

\*\*\*\*\*

CAUTION

- o PERSONNEL WORKING IN CNMT SHOULD BE WARNED BEFORE REFILLING THE RCS TO AVOID INADVERTANT CONTAMINATION OF PERSONNEL WORKING NEAR RCS OPENINGS.
- o THE S/G OFFICE SHOULD BE NOTIFIED BEFORE RAISING LOOP LEVEL.
- o ONLY BORATED WATER SHOULD BE ADDED TO THE RCS TO MAINTAIN ADEQUATE SDM.

\*\*\*\*\*

\* 6 Check RCS Temp

Go to Step 11.

- o Core Exit TC's - LESS THAN 200°F
- o No visual steam at RCS vents

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 6 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check RCS Loop Level - LESS THAN 30 INCHES	Go to Step 12.
<p><u>NOTE:</u> The next four steps are sequenced to indicate the preferred order of RCS refill methods if core boiling is not occurring.</p>		
8	Refill The RCS By Gravity Feed From The RWST	
a.	Dispatch AO to locally throttle open RHR pump suction from RWST, MOV-856	
b.	Close RHR pump discharge valve to loop B cold leg, MOV-720	
c.	Verify MOV-856 indicates midposition	c. Perform the following:  1) Open MOV-720.  2) Go to Step 9.
d.	Verify RCS loop level - INCREASING AS EXPECTED	d. Perform the following:  1) Close MOV-856.  2) Open MOV-720.  3) <u>IF</u> RCS loop level greater than 6 inches, <u>THEN</u> go to Step 9. <u>IF NOT</u> , <u>THEN</u> go to Step 11.
e.	Check RCS loop level - GREATER THAN 30 INCHES	e. Continue filling RCS. <u>WHEN</u> RCS loop level greater than 30 inches, <u>THEN</u> do Steps 8f through h.
f.	Manually close MOV-856	f. Direct AO to locally close valve.
g.	Open RHR pump discharge valve to B loop cold leg, MOV-720	g. <u>IF</u> MOV-720 does <u>NOT</u> open, <u>THEN</u> open core deluge valves MOV-852A and MOV-852B.
h.	Go to Step 12	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9 Refill The RCS By Charging To  
B Loop Cold Leg:

- |  |   |
|--|---|
| <p>a. Verify IA to CNMT, AOV-5392 -<br/>OPEN</p> <p>b. Open and verify open charging<br/>line valve to loop B cold leg,<br/>AOV-294</p> <p>c. Verify HCV-142 demand at 0%</p> <p>d. Start operable charging pump and<br/>increase flow to maximum</p> <p>e. Verify charging flow - GREATER<br/>THAN ZERO</p> <p>f. Verify RCS loop level -<br/>INCREASING AS EXPECTED</p> <p>g. Check RCS loop level - GREATER<br/>THAN 30 INCHES</p> <p>h. Stop running charging pump</p> <p>i. Close or verify closed charging<br/>line valve to loop B cold leg,<br/>AOV-294 and AOV-392B</p> <p>j. Go to Step 12</p> | <p>a. Manually open valve.</p> <p>b. Open alternate charging line to<br/>loop A cold leg, AOV-392B, and<br/>go to Step 9d.</p> <p>e. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Stop operating charging pump.</li> <li>2) Close AOV-294.</li> <li>3) Go to Step 10.</li> </ol> <p>f. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Open or verify open alternate<br/>charging line to loop A cold<br/>leg, AOV-392B.</li> <li>2) Close AOV-294.</li> <li>3) Verify loop level increasing<br/>as expected. <u>IF NOT, THEN</u><br/>perform the following:               <ol style="list-style-type: none"> <li>a) Stop operating charging<br/>pump.</li> <li>b) Close AOV-392B.</li> <li>c) Close IA to CNMT, AOV-5392.</li> <li>d) Go to Step 10.</li> </ol> </li> </ol> <p>g. Continue filling RCS. <u>WHEN</u> loop<br/>level greater than 30 inches,<br/><u>THEN</u> do Steps 9h through j.</p> |
|--|---|

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 8 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Refill RCS Using SI Pumps To Cold Legs:	
a.	Open the appropriate SI pump discharge valves to loop cold legs <ul style="list-style-type: none"> <li>• A SI Pump - MOV-878B</li> <li>• B SI Pump - MOV-878D</li> <li>• C SI Pump - MOV-878B AND/OR MOV-878D</li> </ul>	a. Ensure at least one valve open.  <u>IF</u> valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to check breakers. <ul style="list-style-type: none"> <li>• MOV-878B, MCC D position 8C</li> <li>• MOV-878D, MCC D position 8F</li> </ul>
b.	Open SI pump suction valves from RWST <ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul>	b. Ensure at least one valve open.  <u>IF</u> valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to check breakers. <ul style="list-style-type: none"> <li>• MOV-825A, MCC C position 9J</li> <li>• MOV-825B, MCC D position 9J</li> </ul>
c.	Start operable SI pump	
d.	Verify the following: <ul style="list-style-type: none"> <li>o SI flow - GREATER THAN ZERO</li> <li>o RCS loop level - INCREASING AS EXPECTED</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Stop operating SI pump.</li> <li>2) Close loop cold leg inlet valves. <ul style="list-style-type: none"> <li>• MOV-878B</li> <li>• MOV-878D</li> </ul> </li> <li>3) Go to step 11.</li> </ol>
e.	Check RCS loop level - GREATER THAN 30 INCHES	e. Continue filling RCS. <u>WHEN</u> loop level greater than 30 inches, <u>THEN</u> do steps 10f through h.
f.	Stop running SI pump	
g.	Close SI discharge valves to loop cold legs, MOV-878B and MOV-878D	
h.	Go to Step 12	

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 9 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> SI Pump makeup should not be secured when core boiling is indicated.</p> <p>11 Refill RCS Using SI Pumps To Hot Legs:</p>	
	<p>a. Open the appropriate SI pump discharge valves to loop hot legs</p> <ul style="list-style-type: none"> <li>• A SI Pump - MOV-878A</li> <li>• B SI Pump - MOV-878C</li> <li>• C SI Pump - MOV-878A AND/OR MOV-878C</li> </ul>	<p>a. Ensure at least one valve open.</p> <p><u>IF</u> valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to check breakers.</p> <ul style="list-style-type: none"> <li>• MOV-878A, MCC C position 8C</li> <li>• MOV-878C, MCC C position 8F</li> </ul>
	<p>b. Open SI pump suction valves from RWST</p> <ul style="list-style-type: none"> <li>• MOV-825A</li> <li>• MOV-825B</li> </ul>	<p>b. Ensure at least one valve open.</p> <p><u>IF</u> valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to check breakers.</p> <ul style="list-style-type: none"> <li>• MOV-825A, MCC C position 9J</li> <li>• MOV-825B, MCC D position 9J</li> </ul>
	<p>c. Start operable SI pump</p>	
	<p>d. Verify the following:</p> <ul style="list-style-type: none"> <li>o SI flow - GREATER THAN ZERO</li> <li>o RCS loop level - INCREASING AS EXPECTED</li> </ul>	<p>d. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Stop operating SI pump.</li> <li>2) Close loop hot leg inlet valves. <ul style="list-style-type: none"> <li>• MOV-878A</li> <li>• MOV-878C</li> </ul> </li> <li>3) Ensure makeup flow is initiated <ul style="list-style-type: none"> <li>• Gravity feed from RWST</li> <li>• Charging pumps</li> <li>• SI pumps to cold legs</li> <li>• VCT overpressure</li> <li>• RWST purification pump</li> </ul> </li> </ol>
	<p>e. Operate SI Pump as necessary to maintain the following parameters:</p> <ul style="list-style-type: none"> <li>o Core Exit TC's - LESS THAN 200°F</li> <li>o No visual steam at RCS vents</li> <li>o RCS loop level - GREATER THAN 30 INCHES</li> </ul>	<p>e. <u>IF</u> core exit TC's continue to increase, <u>THEN</u> return to Step 9 to establish additional charging or SI flow to the RCS cold legs.</p>



EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 10 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Identify And Isolate Any RCS Leakage	
	<p><u>NOTE:</u> If adequate time to completely vent the RHR system is not available, then air can be swept out of the RHR lines by running an RHR pump at a flowrate between 1200 gpm and 1400 gpm.</p>	
13	Vent RHR System As Necessary	
	<p>a. Maintain RCS level while venting RHR system</p> <p>b. Direct AO to vent RHR suction line from loop A at valve V-2764 (in CNMT by loop A)</p>	
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>THE RHR PUMP FLOW CONTROL VALVES WILL FAIL OPEN ON LOSS OF INSTRUMENT AIR PRESSURE.</p> <p>*****</p>	
14	Check IA system:	Reset and start additional IA compressors as necessary (75 kw each).
	o Verify adequate air compressors - RUNNING	<p><u>IF</u> IA pressure can <u>NOT</u> be restored, <u>THEN</u> perform the following:</p> <p>a. Dispatch AO to locally throttle RHR Hx outlet valves to approximately half open.</p> <ul style="list-style-type: none"> <li>• V-715, B RHR Hx</li> <li>• V-717, A RHR Hx</li> </ul> <p>b. <u>WHEN</u> conditions permit, <u>THEN</u> refer to AP-IA.1, LOSS OF INSTRUMENT AIR, to restore IA.</p>
	o Verify IA pressure - GREATER THAN 60 PSIG	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Establish Conditions To Start RHR Pump:	
a.	Check RHR cooling valve alignment - NORMAL (Refer to Attachment NORMAL RHR COOLING)	a. Manually or locally align valves as necessary.
b.	Verify CCW cooling to RHR system - IN SERVICE	b. Restore CCW cooling.
c.	Verify the following RCS conditions:	c. Perform the following:
	o Core exit TC's - LESS THAN 200°F	1) Start trending core exit TCs.
	o No visual steam at RCS vents	2) Return to Step 5.
	o RCS loop level - GREATER THAN 30 INCHES	
d.	RHR pump - AVAILABLE	d. Perform the following:
		1) Start trending core exit TCs.
		2) Place RCDT pumps in service (Refer to ER-RHR.1, RCDT OPERATION FOR CORE COOLING).
		3) Return to Step 5.

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 12 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>STARTING AN RHR PUMP MAY RESULT IN AN RCS LEVEL DECREASE DUE TO SHRINK OR VOID COLLAPSE.</p> <p>*****</p>		
16	Restore RHR Flow:	
	<p>a. Close RHR pump flow control valves</p> <ul style="list-style-type: none"> <li>• HCV-624</li> <li>• HCV-625</li> </ul> <p>b. Place RHR Hx bypass valve, HCV-626, to MANUAL and close valve</p> <p>c. Start one RHR pump</p> <p>d. Ensure RHR flow - LESS THAN 1500 GPM</p> <p>e. Check RCS loop level - GREATER THAN 30 INCHES</p> <p>f. Gradually increase RHR bypass flow to desired flowrate</p> <p>g. RHR flow - RESTORED</p> <p>h. Establish desired RCS cooldown rate</p>	<p>a. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> ensure AO has locally throttled RHR Hx outlet valves and go to step 16c.</p> <p>d. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> direct AO to locally adjust flow using RHR Hx outlet valves.</p> <ul style="list-style-type: none"> <li>• V-715, B RHR Hx</li> <li>• V-717, A RHR Hx</li> </ul> <p>e. Establish adequate makeup flow to stabilize RCS loop level at greater than 30 inches.</p> <p>g. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Start trending core exit T/Cs.</li> <li>2) Place RCDT pumps in service (Refer to ER-RHR.1, RCDT OPERATION FOR CORE COOLING).</li> <li>3) Return to Step 5.</li> </ol>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Consult with Plant Staff to determine alternatives for long term cooling.

17 Establish Stable Plant Conditions:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. Verify Core Exit TC's - LESS THAN 200°F</li> <li>b. Check RCS loop level: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 30 INCHES</li> <li>o Level - STABLE</li> </ul> </li> <li>c. Stop any running SI pump</li> <li>d. Stop any running charging pump</li> <li>e. Maintain RCS level stable using RWST gravity feed as necessary</li> </ul> | <ul style="list-style-type: none"> <li>a. Continue cooling with RHR. Return to Step 16d.</li> <li>b. <u>IF</u> RCS loop level increasing, <u>THEN</u> reduce makeup rate to stabilize level. <u>IF</u> RCS loop level decreasing, <u>THEN</u> return to Step 8.</li> <li>e. Initiate makeup to the RCS using either of the following: <ul style="list-style-type: none"> <li>o One charging pump at maximum flow</li> </ul> </li> </ul> |
|---|---|

-OR-

- o One SI pump

18 Check CCW System Operation:

- o CCW pumps - AT LEAST ONE RUNNING
- o CCW to RHR Hxs, MOV-738A AND MOV-738B - OPEN AS NECESSARY
- o Annunciator A-21, COMP COOLING HX OUT HI TEMP - EXTINGUISHED
- o Annunciator A-22, CCW PUMP DISCHARGE LO PRESS - EXTINGUISHED
- o Annunciator A-30, CCW PUMP INLET HEADER HI TEMP - EXTINGUISHED

To restore CCW cooling to RHR Hxs, perform the following:

- a. Ensure the standby CCW pump is running.
- b. Open MOV-738A and MOV-738B as necessary.

IF CCW can NOT be restored, THEN continue attempts to restore CCW (Refer to AP-CCW.3, LOSS OF CCW - PLANT SHUTDOWN).

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8 PAGE 14 of 14
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check Core Exit TC's: <ul style="list-style-type: none"> <li>o Temperature - LESS THAN 140°F</li> <li>o Temperature - STABLE OR DECREASING</li> </ul>	Continue cooling with RHR. Return to Step 16d.
20	Initiate Monitoring of RCS Temperature	
	<u>NOTE:</u> Refer to 0-9.3, NRC IMMEDIATE NOTIFICATION, for reporting requirements.	
21	Notify Higher Supervision	
22	Return To Procedure Or Guidance In Effect	
	-END-	

EOP: AP-RHR.2	TITLE: LOSS OF RHR WHILE OPERATING AT RCS REDUCED INVENTORY CONDITIONS	REV: 8  PAGE 1 of 1
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AP-RHR.2 APPENDIX LIST

TITLE

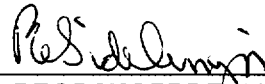
- 1) ATTACHMENT NORMAL RHR COOLING (ATT-14.0)

EOP: E-3	TITLE: STEAM GENERATOR TUBE RUPTURE	REV: 26 PAGE 1 of 39
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

  
\_\_\_\_\_  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP:  E-3	TITLE:  STEAM GENERATOR TUBE RUPTURE	REV: 26  PAGE 2 of 39
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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, 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.



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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: 26  PAGE 4 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p>Identify Ruptured S/G(s):</p> <ul style="list-style-type: none"> <li>o Unexpected increase in either S/G narrow range level</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o High radiation indication on main steamline radiation monitor <ul style="list-style-type: none"> <li>• R-31 for S/G A</li> <li>• R-32 for S/G B</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o AO reports local indication of high steamline radiation</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o RP reports high radiation from S/G activity sample</li> </ul>	<p>Continue with Steps 6 through 11. <u>WHEN</u> ruptured S/G(s) identified, <u>THEN</u> do Steps 3, 4 and 5.</p>

EOP:  E-3	TITLE:  STEAM GENERATOR TUBE RUPTURE	REV: 26  PAGE 5 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* * * * * <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> * * * * *		
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	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.  <u>IF</u> S/G ARV can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate.
	c. Close ruptured S/G TDAFW pump steam supply valve and place in PULL STOP <ul style="list-style-type: none"> <li>• S/G A, MOV-3505A</li> <li>• S/G B, MOV-3504A</li> </ul>	c. Dispatch AO with locked valve key to locally isolate steam from ruptured S/G to TDAFW pump. <ul style="list-style-type: none"> <li>• S/G A, V-3505</li> <li>• S/G B, V-3504</li> </ul>
	d. Verify ruptured S/G blowdown valve - CLOSED <ul style="list-style-type: none"> <li>• S/G A, AOV-5738</li> <li>• S/G B, AOV-5737</li> </ul>	d. Place S/G blowdown and sample valve isolation switch to CLOSE.  <u>IF</u> blowdown can <u>NOT</u> be isolated manually, <u>THEN</u> dispatch AO to locally isolate blowdown. <ul style="list-style-type: none"> <li>• S/G A, V-5701</li> <li>• S/G B, V-5702</li> </ul>

EOP:  E-3	TITLE:  STEAM GENERATOR TUBE RUPTURE	REV: 26  PAGE 6 of 39
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Complete Ruptured S/G Isolation:</p> <p>a. Close ruptured S/G MSIV - RUPTURED S/G MSIV CLOSED</p> <p>b. Dispatch AO to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G part A)</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Close intact S/G MSIV.</li> <li>2) Place intact S/G ARV controller at 1005 psig in AUTO.</li> <li>3) Adjust condenser steam dump controller to 1050 psig in AUTO.</li> <li>4) Place condenser steam dump mode selector switch to MANUAL.</li> <li>5) Adjust reheat steam supply controller cam to close reheat steam supply valves.</li> <li>6) Ensure turbine stop valves - CLOSED.</li> <li>7) Dispatch AO to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G, parts A and B).</li> </ol>

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 5% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].</p> <p>2) Continue with Step 6. <u>WHEN</u> ruptured S/G level greater than 5% [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"> <li>• S/G A, MOV-4007</li> <li>• S/G B, MOV-4008</li> </ul>	
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"> <li>• S/G A, AOV-4297</li> <li>• S/G B, AOV-4298</li> </ul>	<ul style="list-style-type: none"> <li>• S/G A, V-4005</li> <li>• S/G B, V-4006</li> </ul>
e.	Verify MDAFW pump crosstie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul>	

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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 6B).</p> <p>*****</p>		
* 6	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"> <li>• MOV-515, MCC D position 6C</li> <li>• MOV-516, MCC C position 6C</li> </ul>
	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
7	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> <li>o Pressure in both S/Gs - STABLE OR INCREASING</li> <li>o Pressure in both S/Gs - GREATER THAN 110 PSIG</li> </ul>	<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"> <li>• Steamlines</li> <li>• Feedlines</li> </ul> <p><u>IF</u> faulted S/G <u>NOT</u> isolated, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
	<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>	
* 8	<p>Monitor Intact S/G Level:</p> <ul style="list-style-type: none"> <li>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</li> <li>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</li> </ul>	<ul style="list-style-type: none"> <li>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</li> <li>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.</li> </ul>
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</p> <p>*****</p>		
9	Reset SI	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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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.

\*\*\*\*\*

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.

\*\*\*\*\*

11 Check If RHR Pumps Should Be Stopped:

- a. Check RCS pressure:
  - o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]
  - o Pressure - STABLE OR INCREASING
- b. Stop RHR pumps and place both in AUTO
- a. Go to Step 12.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> If ruptured S/G needed for cooldown, isolation is not necessary.</p>		
12	Verify Ruptured S/G Isolated:	
	a. Check ruptured MSIV - CLOSED	a. Ensure air ejector/gland steam supply and flange heating steam isolated. (Refer to ATTACHMENT RUPTURED S/G, part B).
	b. Ruptured S/G pressure - GREATER THAN 300 PSIG	b. Go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.
13	Establish Condenser Steam Dump Pressure Control:	
	a. Verify condenser available:	a. Adjust S/G ARV controllers to maintain intact S/G pressure in AUTO and go to Step 14.
	o Intact S/G MSIV - OPEN	
	o Annunciator G-15, STEAM DUMP ARMED - LIT	
	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

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

#### 14 Initiate RCS Cooldown:

- a. Determine required core exit temperature from below table

RUPTURED SG PRESSURE	REQUIRED CORE EXIT TEMPERATURE (°F)
1100 PSIG	525 [505 adverse CNMT]
1000 PSIG	510 [490 adverse CNMT]
900 PSIG	500 [475 adverse CNMT]
800 PSIG	485 [460 adverse CNMT]
700 PSIG	465 [440 adverse CNMT]
600 PSIG	450 [420 adverse CNMT]
500 PSIG	425 [395 adverse CNMT]
400 PSIG	405 [370 adverse CNMT]
300 PSIG	375 [330 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 15. WHEN core exit T/Cs less than required, THEN do Step 14d.

- 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
*15	<p>Monitor All AC Busses - BUSSES ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> <li>o Normal feed breakers to all 480 volt busses - CLOSED</li> <li>o 480 volt bus voltage - GREATER THAN 420 VOLTS</li> <li>o Emergency D/G output breakers - OPEN</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed.</li> <li>b. Perform the following as necessary: <ul style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> <li>• EH pumps</li> <li>• Turning gear oil pump</li> <li>• HP seal oil backup pump</li> </ul> </li> <li>3) Restore power to MCCs. <ul style="list-style-type: none"> <li>• A from Bus 13</li> <li>• B from Bus 15</li> <li>• E from Bus 15</li> <li>• F from Bus 15</li> </ul> </li> <li>4) Start HP seal oil backup pump.</li> <li>5) Start CNMT RECIRC fans as necessary.</li> <li>6) Ensure D/G load within limits.</li> <li>7) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ul> </li> <li>c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	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> :
		1) Ensure SW isolation.
		2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)
		3) Go to Step 18.
b.	Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ol style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <p><u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).</p> </li> </ol>
b.	Verify turbine building SW isolation valves - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	b. Manually align valves.
c.	Verify adequate air compressors - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 18. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 17e and f.</li> </ol>
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

# 18 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 with key to RWST gate to locally close seal injection needle valves to affected RCP.

- V-300A for RCP A
- V-300B for RCP B

2) Ensure HCV-142 demand at 0%.

b. Align charging pump suction to RWST:

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

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

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

- 1) Verify charging pump A NOT running and place in PULL STOP.
- 2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).

c. Start charging pumps as necessary and establish 75 gpm total charging flow

- Charging line flow
- Seal injection

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>RCS COOLDOWN IN STEP 14 SHOULD BE COMPLETED BEFORE CONTINUING TO STEP 19.</p> <p>*****</p>		
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 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"> <li>o Ruptured S/G level - LESS THAN 90% [80% adverse CNMT]</li> <li>o Any RCP - RUNNING</li> <li>o IA to CNMT - AVAILABLE</li> </ul>	<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"> <li>o PRZR level - GREATER THAN 75% [65% adverse CNMT]</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o RCS pressure - LESS THAN SATURATION USING FIGURE MIN SUBCOOLING</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o <u>BOTH</u> of the following: <ul style="list-style-type: none"> <li>1) RCS pressure - LESS THAN RUPTURED S/G PRESSURE</li> <li>2) PRZR level - GREATER THAN 5% [30% adverse CNMT]</li> </ul> </li> </ul>	
	<p>c. Close normal PRZR spray valves:</p> <ul style="list-style-type: none"> <li>1) Adjust normal spray valve controller to 0% DEMAND</li> <li>2) Verify PRZR spray valves - CLOSED <ul style="list-style-type: none"> <li>• PCV-431A</li> <li>• PCV-431B</li> </ul> </li> </ul>	<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>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o THE PRT MAY RUPTURE IF A PRZR PORV IS USED TO DEPRESSURIZE THE RCS. THIS MAY RESULT IN ABNORMAL CNMT CONDITIONS.</p> <p>o CYCLING OF THE PRZR PORV SHOULD BE MINIMIZED.</p> <p>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> <p>*****</p> <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>o When using a PRZR PORV select one with an operable block valve.</p> <p>22 Depressurize RCS Using PRZR PORV To Minimize Break Flow And Refill PRZR:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>a. Verify IA to CNMT - AVAILABLE</p> <p>b. PRZR PORVs - AT LEAST ONE AVAILABLE</p> </td> <td style="vertical-align: top;"> <p>a. Refer to Attachment N2 PORVS to operate PORVs.</p> <p>b. <u>IF</u> auxiliary spray available, <u>THEN</u> return to Step 21b.</p> <p><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> </td> </tr> </table>			<p>a. Verify IA to CNMT - AVAILABLE</p> <p>b. PRZR PORVs - AT LEAST ONE AVAILABLE</p>	<p>a. Refer to Attachment N2 PORVS to operate PORVs.</p> <p>b. <u>IF</u> auxiliary spray available, <u>THEN</u> return to Step 21b.</p> <p><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>a. Verify IA to CNMT - AVAILABLE</p> <p>b. PRZR PORVs - AT LEAST ONE AVAILABLE</p>	<p>a. Refer to Attachment N2 PORVS to operate PORVs.</p> <p>b. <u>IF</u> auxiliary spray available, <u>THEN</u> return to Step 21b.</p> <p><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: <ul style="list-style-type: none"> <li>o PRZR level - GREATER THAN 75% [65% adverse CNMT]</li> <li style="text-align: center;">-OR-</li> <li>o RCS pressure - LESS THAN SATURATION USING FIGURE MIN SUBCOOLING</li> <li style="text-align: center;">-OR-</li> <li>o BOTH of the following: <ul style="list-style-type: none"> <li>1) RCS pressure - LESS THAN RUPTURED S/G PRESSURE</li> <li>2) PRZR level - GREATER THAN 5% [30% adverse CNMT]</li> </ul> </li> </ul>	c. <u>IF</u> auxiliary spray available, <u>THEN</u> return to step 21b. <ul style="list-style-type: none"> <li>1) <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.</li> </ul>
	d. Close PRZR PORVs	d. <u>IF</u> either PRZR PORV can <u>NOT</u> be closed, <u>THEN</u> 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> <p>a. Monitor the following conditions for indication of leakage from PRZR PORV:</p> <ul style="list-style-type: none"> <li>o PORV outlet temp (TI-438) <u>NOT</u> decreasing.</li> <li>o PRT pressure, level or temperature continue to increase.</li> </ul> <p>b. 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
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>SI MUST BE TERMINATED WHEN TERMINATION CRITERIA ARE SATISFIED TO PREVENT OVERFILLING OF THE RUPTURED S/G.</p> <p>*****</p>		
24	<p>Check If SI Flow Should Be Terminated:</p> <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING 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 5% [25% adverse CNMT]</p> <p>c. RCS pressure - STABLE OR INCREASING</p> <p>d. PRZR level - GREATER THAN 5% [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 12.</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:
		1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to locally isolate seal injection to affected RCP:
		• 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	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**\*27 Monitor SI Reinitiation  
Criteria:**

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

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

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

b. Control charging flow to  
maintain PRZR level.

IF PRZR level can NOT be  
maintained, THEN manually start  
SI pumps as necessary and 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
<b>*28</b>	Monitor If CNMT Spray Should Be Stopped:	
a.	CNMT spray pumps - ANY RUNNING	a. Go to Step 29.
b.	Verify CNMT pressure - LESS THAN 4 PSIG	b. Continue with Step 29. <u>WHEN</u> CNMT pressure less than 4 psig. <u>THEN</u> do Steps 28c through f.
c.	Reset CNMT spray	
d.	Check NaOH tank outlet valves - CLOSED <ul style="list-style-type: none"> <li>• AOV-836A</li> <li>• AOV-836B</li> </ul>	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves <ul style="list-style-type: none"> <li>• MOV-860A</li> <li>• MOV-860B</li> <li>• MOV-860C</li> <li>• MOV-860D</li> </ul>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	<p>Check If SI ACCUMs Should Be Isolated:</p> <ul style="list-style-type: none"> <li>a. Check the following: <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</li> <li>o PRZR level - GREATER THAN 5% [30% adverse CNMT]</li> </ul> </li> <li>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves <ul style="list-style-type: none"> <li>• MOV-841, MCC C position 12F</li> <li>• MOV-865, MCC D position 12C</li> </ul> </li> <li>c. Close SI ACCUM discharge valves <ul style="list-style-type: none"> <li>• MOV-841</li> <li>• MOV-865</li> </ul> </li> <li>d. Locally reopen breakers for MOV-841 and MOV-865</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually operate SI pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1.</li> <li>c. Vent any unisolated ACCUMs: <ul style="list-style-type: none"> <li>1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> <li>• ACCUM A, AOV-834A</li> <li>• ACCUM B, AOV-834B</li> </ul> </li> <li>2) Open HCV-945.</li> </ul> </li> </ul>



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least three 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> go to Step 37.
b.	Verify AUX BLDG SW isolation valves - AT LEAST ONE SET 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. Dispatch A0 to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	a. Continue with Step 37. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 31 through 36.
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"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ol>
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ol>
d.	Charging pump - ANY RUNNING	d. Continue with Step 37. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 32 through 36.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 33.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul>	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"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST gate to locally open MOV-313.</li> </ol>
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> </li> </ol> <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 33.</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
33	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 35. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 34.
34	<p>Establish Normal Letdown:</p> <ul style="list-style-type: none"> <li>a. Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM</li> <li>b. Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>• Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>• Letdown isolation valve AOV-371</li> <li>• Loop B cold leg to REGEN Hx AOV-427</li> </ul> </li> <li>c. Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> <li>• TCV-130</li> <li>• PCV-135</li> </ul> </li> <li>d. Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>e. Open AOV-371 and AOV-427</li> <li>f. Open letdown orifice valves as necessary</li> <li>g. Place TCV-130 in AUTO at 105°F</li> <li>h. Place PCV-135 in AUTO at 250 psig</li> <li>i. Adjust charging pump speed and HCV-142 as necessary</li> </ul>	<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"> <li>o Place excess letdown divert valve, AOV-312, to NORMAL.</li> <li>o Ensure CCW from excess letdown open, (AOV-745).</li> <li>o Open excess letdown isolation valve AOV-310.</li> <li>o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> <li>o Adjust charging pump speed as necessary.</li> </ul> <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
35	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> reset MCC C and MCC D UV lockouts as necessary.
	-OR-	
	o Level - STABLE OR INCREASING	2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.
		3) Increase boric acid flow as necessary.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	<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"> <li>o LCV-112C - OPEN</li> <li>o LCV-112B - CLOSED</li> </ul>	<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"> <li>o LCV-112B open</li> <li>o LCV-112C closed</li> </ul> <p>2) Continue with Step 37. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 36b.</p> <p>b. Manually align valves as necessary.</p>

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

\*\*\*\*\*

CAUTION

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

\*\*\*\*\*

**\*37 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 13% [40% ADVERSE CNMT]	<ul style="list-style-type: none"> <li>o Increase charging flow</li> <li>o Depressurize RCS using Step 37b</li> </ul>	Increase charging flow	<ul style="list-style-type: none"> <li>o Increase charging flow</li> <li>o Maintain RCS and ruptured S/G pressure equal</li> </ul>
BETWEEN 13% [40% ADVERSE CNMT] AND 50%	Depressurize RCS using Step 37b	Energize PRZR heaters	Maintain RCS and ruptured S/G pressure equal
BETWEEN 50% AND 75% [65% ADVERSE CNMT]	<ul style="list-style-type: none"> <li>o Depressurize RCS using Step 37b</li> <li>o Decrease charging flow</li> </ul>	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 37a

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
38	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> <li>a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> <li>o Emergency D/G output breakers - OPEN</li> <li>o AC emergency bus voltage - GREATER THAN 420 VOLTS</li> <li>o AC emergency bus normal feed breakers - CLOSED</li> </ul> </li> <li>b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)</li> </ul>	<ul style="list-style-type: none"> <li>a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>
39	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> <li>a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> <li>o Place hotwell level controller (LC-107) in MANUAL at 50%</li> <li>o Verify hotwell level - STABLE</li> </ul> </li> <li>b. Check status of local actions to complete ruptured S/G isolation (Refer to Attachment RUPTURED S/G)</li> </ul>	<ul style="list-style-type: none"> <li>a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct RP to sample hotwells for activity.</li> </ul>



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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 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>*****</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>		
42	Check RCP Status:	
	a. RCPs - AT LEAST ONE RUNNING	<p>a. Perform the following:</p> <p>1) Try to start one RCP:</p> <ul style="list-style-type: none"> <li>a) Ensure conditions for starting an RCP. <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> </li> <li>b) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>o Increase PRZR level to greater than 65% [82% adverse CNMT].</li> <li>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING.</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water</li> </ul> </li> <li>c) Start one RCP.</li> </ul> <p>2) <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>
	b. Stop all but one RCP	

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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>43 Check If Source Range Detectors Should Be Energized:</p>		
a.	Source range channels - DEENERGIZED	a. Go to Step 43e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 <sup>-10</sup> 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 44. <u>WHEN</u> flux is LESS THAN 10<sup>-10</sup> amps on any operable channel, <u>THEN</u> do Steps 43c through e.</p>
c.	<p>Check the following:</p> <p>o Both intermediate range channels - LESS THAN 10<sup>-10</sup> AMPS</p> <p>-OR-</p> <p>o Greater than 20 minutes since reactor trip</p>	c. Continue with Step 44. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 43d and e.
d.	Verify source range detectors - ENERGIZED	<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 44.</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
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"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> <p>c. Verify adequate Rx head cooling:</p> <ul style="list-style-type: none"> <li>1) Verify at least one control rod shroud fan - RUNNING</li> <li>2) Verify one Rx compartment cooling fan - RUNNING</li> </ul> <p>d. Verify Attachment SD-1 - COMPLETE</p>	<p>a. Dispatch A0 to perform Attachment SD-2.</p> <p>1) Manually start one fan as power supply permits (45 kw)</p> <p>2) Perform the following:</p> <ul style="list-style-type: none"> <li>o Dispatch A0 to reset UV relays at MCC C and MCC D.</li> <li>o Manually start one fan as power supply permits (23 kw)</li> </ul>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

45 Consult TSC To Determine  
Appropriate Post-SGTR  
Cooldown Procedure:

- o Go to ES-3.1, POST-SGTR COOLDOWN  
USING BACKFILL, Step 1

-OR-

- o Go to ES-3.2, POST-SGTR COOLDOWN  
USING BLOWDOWN, Step 1

-OR-

- o Go to ES-3.3, POST-SGTR COOLDOWN  
USING STEAM DUMP, Step 1

-END-

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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) FOLDOUT

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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 5%  
[25% adverse CNMT] AND total feedwater flow  
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than  
100°F in last 60 minutes AND RCS cold leg  
temperature less than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

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FOLDOUT PAGE

1. 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 FIGURE MIN SUBCOOLING.

OR

- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT].

2. SECONDARY INTEGRITY CRITERIA

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

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

4. AFW SUPPLY SWITCHOVER CRITERION

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

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-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 1 of 19
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

*Robert J. ...*  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 2 of 19
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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.

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 3 of 19
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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>   o FOLDOUT page should be open and monitored periodically.</p> <p>          o Critical Safety Function Status Trees should be monitored. (Refer to Appendix 1 for Red Path Summary.)</p>		
* 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> <p>a. Stop dumping steam.</p> <p>b. Ensure S/G blowdown and sample valves closed.</p> <p>c. Ensure reheater steam supply valves are closed.</p> <p>d. <u>IF</u> MDAFW pumps supplying greater than 200 gpm, <u>THEN</u> ensure TDAFW pump steam supply valves in PULL STOP.</p> <p>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.</p> <p>f. <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
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF A MFW PUMP IS LEFT RUNNING ON RECIRC FOR EXTENDED PERIODS OF TIME, OVERHEATING MAY OCCUR.</p> <p>*****</p>		
2	Check S/G Feed Flow Status:	
a.	Check RCS Tavg - LESS THAN 554°F	a. Continue with Step 3. <u>WHEN</u> temperature less than 554°F, <u>THEN</u> do Steps 2b, c, d and e.
b.	Verify MFW flow control valves - CLOSED <ul style="list-style-type: none"> <li>• MFW regulating valves</li> <li>• MFW bypass valves</li> </ul>	b. Place A and B MFW regulating valve and bypass valve controllers in MANUAL at 0% demand.
c.	Verify total AFW flow - GREATER THAN 200 GPM	c. Manually start both MDAFW pumps.  <u>IF</u> total AFW flow greater than 200 gpm can <u>NOT</u> be established, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>o Manually start TDAFW pump.</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Perform the following: <ol style="list-style-type: none"> <li>1) Establish MFW on bypass valves.</li> <li>2) Go to step 3.</li> </ol> </li> </ul>
d.	Close MFW pump discharge valves <ul style="list-style-type: none"> <li>• MOV-3977, A MFW pump</li> <li>• MOV-3976, B MFW pump</li> </ul>	d. Manually stop MFW pumps.
e.	Stop MFW pumps	

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 5 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	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"> <li>a. Place RMW mode selector switch to BORATE.</li> <li>b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate.</li> <li>c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted).</li> <li>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.</li> </ul>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 6 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> <li>o Normal feed breakers to all 480 volt busses - CLOSED</li> <li>o 480 volt bus voltage - GREATER THAN 420 VOLTS</li> <li>o Emergency D/G output breakers - OPEN</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed.</li> <li>b. Perform the following as necessary: <ul style="list-style-type: none"> <li>1) Ensure one CCW pump running.</li> <li>2) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>3) Reset Bus 13 and Bus 15 lighting breakers.</li> <li>4) Dispatch AO to locally reset and start two IA compressors.</li> <li>5) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> <li>• EH pumps</li> <li>• Turning gear oil pump</li> <li>• HP seal oil backup pump</li> </ul> </li> <li>6) Restore power to MCCs. <ul style="list-style-type: none"> <li>• A from Bus 13</li> <li>• B from Bus 15</li> <li>• E from Bus 15</li> <li>• F from Bus 15</li> </ul> </li> <li>7) Start HP seal oil backup pump</li> <li>8) Start CNMT RECIRC fans as necessary.</li> <li>9) Ensure D/G load within limits.</li> </ul> </li> <li>c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 7 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Verify At Least Two SW Pumps - RUNNING	Manually start SW pumps as necessary.
6	Verify IA Available:  o Adequate air compressor(s) - RUNNING  o IA pressure - GREATER THAN 60 PSIG	Dispatch AO to locally reset and start air compressors as necessary.  <u>IF</u> IA pressure can <u>NOT</u> be maintained, <u>THEN</u> perform the following:  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 manual charging pump suction from RWST (V-358 in 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 (V-268 located in charging pump room).

EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 8 of 19
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check PRZR Level Control:	
a.	Verify charging pumps - ANY RUNNING	a. Manually start charging pumps as necessary.
b.	PRZR level - GREATER THAN 13%	b. Perform the following: <ul style="list-style-type: none"> <li>1) Place loop B cold leg isolation valve to REGEN Hx (AOV-427) switch to close.</li> <li>2) Verify excess letdown isolation valve (AOV-310) closed.</li> <li>3) Ensure PRZR heaters off.</li> <li>4) Control charging to restore PRZR level greater than 13%.</li> <li>5) Continue with Step 8. <u>WHEN</u> PRZR level greater than 13%, <u>THEN</u> do Steps 7c through e.</li> </ul>
c.	Verify letdown - IN SERVICE	c. Verify excess letdown in service. <u>IF NOT</u> , <u>THEN</u> manually place letdown in service (Refer to Attachment LETDOWN).
d.	PRZR level - TRENDING TO 35%	d. Control charging and letdown to maintain PRZR level at 35%.
e.	Check PRZR heaters - ENERGIZED AS NECESSARY <ul style="list-style-type: none"> <li>o PRZR heater control group</li> <li>o PRZR heater backup group</li> </ul>	e. Reset PRZR heaters and energize as necessary to restore PRZR pressure.



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8 Check PRZR Pressure Control:

a. PRZR pressure - GREATER THAN  
1750 PSIG

a. Perform the following:

1) Verify SI actuation. IF NOT,  
THEN manually actuate SI.

2) Go to E-0, REACTOR TRIP OR  
SAFETY INJECTION, Step 1.

b. PRZR pressure - GREATER THAN  
2210 PSIG

b. IF pressure less than 2210 PSIG  
and decreasing, THEN perform the  
following:

1) Ensure PRZR PORVs closed.

IF any valve can NOT be  
closed, THEN manually close  
its block valve.

- PCV-430, MOV-516
- PCV-431C, MOV-515

2) Ensure normal PRZR spray  
valves closed.

- PCV-431A
- PCV-431B

IF valves can NOT be closed,  
THEN 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 8 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"> <li>1) Verify demand on PRZR pressure controller PCV-431 greater than 50%. <u>IF NOT</u>, <u>THEN</u> place controller in MANUAL and increase as necessary.</li> <li>2) Ensure PRZR heaters off.</li> <li>3) Control pressure using normal PRZR spray.</li> </ol> <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"> <li>a) Verify spray line fluid to PRZR <math>\Delta T</math> less than 320°F. <u>IF NOT</u>, <u>THEN</u> use one PORV.</li> <li>b) Use auxiliary spray.</li> </ol> <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p>
* 9 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.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10 Check If TDAFW Pump Can Be Stopped:

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

a. Go to Step 11.

11 Establish Condenser Steam Dump Pressure Control:

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

a. Perform the following:

- 1) Place S/G ARV controller in AUTO at 1005 psig and verify proper operation. IF S/G ARV NOT controlling in AUTO, THEN control S/G ARV manually.
- 2) Go to Step 11d.

d. Return to Step 1.

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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"> <li>a. Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Verify bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> </li> <li>b. Start one RCP.</li> </ul> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> Loss of forced air cooling may result in failure of NIS detectors.</p>	
13	<p>Check If Source Range Detectors Should Be Energized:</p>	
a.	Source range channels - DEENERGIZED	a. Go to Step 13e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 <sup>-10</sup> 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 14. <u>WHEN</u> flux is less than 10<sup>-10</sup> amps on any operable channel, <u>THEN</u> do Steps 13c, d and e.</p>
c.	Check the following: <ul style="list-style-type: none"> <li>o Both intermediate range channels - LESS THAN 10<sup>-10</sup> AMPS</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since reactor trip</li> </ul>	c. Continue with Step 14. <u>When</u> either condition met, <u>THEN</u> do Steps 13d and e.
d.	Verify source range detectors - ENERGIZED	<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>
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

14 Establish Normal Shutdown Alignment:

a. Check condenser - AVAILABLE

a. Dispatch AO to perform Attachment SD-2.

b. Perform the following:

- o Open generator disconnects
  - 1G13A71
  - 9X13A73
- o Place voltage regulator to OFF
- o Open turbine drain valves
- o Rotate reheater steam supply controller cam to close valves
- o Place reheater dump valve switches to HAND
- o Stop all but one condensate pump (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
- 2) Verify one Rx compartment cooling fan - RUNNING

- 1) Manually start one fan as power supply permits (45 kw).
- 2) Manually start one fan as power supply permits (23 kw).

d. Dispatch AO to perform Attachment SD-1

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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 <sub>g</sub> - GREATER THAN 540°F	d. Control dumping steam as necessary. <u>IF</u> cooldown continues, <u>THEN</u> close both MSIVs.
16	Check VCT Makeup System:	
	a. Verify the following:	
	1) Adjust boric acid flow control valve to 9.5 gpm	
	2) Adjust RMW flow control valve to 40 gpm	
	3) RMW mode selector switch in AUTO	
	4) RMW control armed - RED LIGHT LIT	
	b. Check VCT level	b. Manually increase VCT makeup flow as follows:
	o Level - GREATER THAN 20%	1) Ensure BA transfer pumps and RMW pumps running.
	-OR-	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
17	<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"> <li>o LCV-112C - OPEN</li> <li>o LCV-112B - CLOSED</li> </ul>	<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"> <li>1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> <li>o LCV-112B open</li> <li>o LCV-112C closed</li> </ul> </li> <li>2) Continue with Step 18. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 17b.</li> </ol> <p>b. Manually align valves as necessary.</p>



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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 if necessary 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 and 19.
d.	Verify the following:	
	1) TDAFW pump - OFF	1) <u>IF</u> TDAFW pump <u>NOT</u> required to maintain S/G level, <u>THEN</u> stop pump if desired.
	2) TDAFW pump steam supply valve switches in AUTO	2) Place TDAFW pump steam supply valve switches in AUTO.

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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"> <li>o Both S/G levels - GREATER THAN 17% AND STABLE OR INCREASING</li> <li>o Total AFW flow - LESS THAN 200 GPM</li> </ul> <p>b. Close MDAFW pump discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-4007</li> <li>• MOV-4008</li> </ul> <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"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul> <p>f. Open AFW bypass valves as necessary to control S/G levels</p> <ul style="list-style-type: none"> <li>• AOV-4480</li> <li>• AOV-4481</li> </ul>	<p>a. Continue with Step 20. <u>WHEN</u> conditions met, <u>THEN</u> do Steps 19b through f.</p>

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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: 17 PAGE 1 of 1
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ES-O.1 APPENDIX LIST

TITLE

- 1) RED PATH SUMMARY
- 2) FIGURE MIN SUBCOOLING (FIG-1.0)
- 3) ATTACHMENT LETDOWN (ATT-9.0)
- 4) ATTACHMENT RCP START (ATT-15.0)
- 5) ATTACHMENT NC (ATT-13.0)
- 6) ATTACHMENT SD-1 (ATT-17.0)
- 7) ATTACHMENT SD-2 (ATT-17.1)
- 8) FOLDOUT



EOP: ES-0.1	TITLE: REACTOR TRIP RESPONSE	REV: 17 PAGE 1 of 1
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FOLDOUT PAGE

1. SI ACTUATION CRITERIA

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

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

- OR -

- o Any automatic SI setpoint is reached

2. AFW SUPPLY SWITCHOVER CRITERION

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

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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

Residulin  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP:  ES-1.1	TITLE:  SI TERMINATION	REV: 18  PAGE 2 of 24
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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.



EOP: ES-1.1	TITLE: SI TERMINATION	REV: 18 PAGE 3 of 24
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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 SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</p> <p>*****</p>		
<p><u>NOTE:</u>   o FOLDOUT page should be open AND monitored periodically.</p> <p>          o Critical Safety Function Status Trees should be monitored (Refer to Appendix I for Red Path Summary).</p> <p>          o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p>		
1	Reset SI	
2	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>
3	Maintain PRZR Pressure Between 1800 PSIG And 2235 PSIG	
	<p>o Reset PRZR heaters</p> <p>o Use normal PRZR spray</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	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"> <li>1) Ensure SW isolation.</li> <li>2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1).</li> <li>3) Go to Step 7.</li> </ol>
b.	Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

EOP: ES-1.1	TITLE: SI TERMINATION	REV: 18 PAGE 5 of 24
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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 <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ol style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).   <u>IF NOT, THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).</li> <li>3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ol>
b.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	b. Manually align valves.
c.	Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 6. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 5e and f.</li> </ol>
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	<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"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul> <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"> <li>1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol> <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 manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).</li> </ol>

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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 FIGURE MIN SUBCOOLING

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

a. Manually start SI pumps as  
necessary and go to E-1, LOSS OF  
REACTOR OR SECONDARY COOLANT,  
Step 1.

b. Control charging flow to  
maintain PRZR level.

IF PRZR level can NOT be  
maintained, THEN manually start  
SI 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
<p>* 9 Monitor If CNMT Spray Should Be Stopped:</p>		
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 tank outlet valves - CLOSED <ul style="list-style-type: none"> <li>• AOV-836A</li> <li>• AOV-836B</li> </ul>	d. Place NaOH tank outlet valve controllers to MANUAL and close valves.
e.	Stop CNMT spray pumps and place in AUTO	
f.	Close CNMT spray pump discharge valves <ul style="list-style-type: none"> <li>• MOV-860A</li> <li>• MOV-860B</li> <li>• MOV-860C</li> <li>• MOV-860D</li> </ul>	

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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"> <li>a. Place RMW mode selector switch to BORATE.</li> <li>b. Adjust boric acid flow control valve, FCV-110A, for desired flowrate.</li> <li>c. Set boric acid integrator to desired amount (650 gallons for each control rod not fully inserted).</li> <li>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.</li> </ul>
11	Establish Condenser Steam Dump Pressure Control:	
	<ul style="list-style-type: none"> <li>a. Verify condenser available: <ul style="list-style-type: none"> <li>o Any MSIV - OPEN</li> <li>o Annunciator G-15, STEAM DUMP ARMED - LIT</li> </ul> </li> <li>b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO.</li> <li>c. Place steam dump mode selector switch to MANUAL.</li> </ul>	<ul style="list-style-type: none"> <li>a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 12.</li> </ul>

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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	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> go to Step 18.
b.	Verify AUX BLDG SW isolation valves - OPEN  • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	b. Manually align valves.
c.	Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	c. Manually start an additional SW pump as power supply permits (257 kw each).



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	a. Continue with Step 18. <u>WHEN</u> IA can be restored, <u>THEN</u> do Steps 13 through 17.
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"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ol>
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ol>
d.	Charging pump - ANY RUNNING	d. Continue with Step 18. <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
14	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 16. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 15.
15	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> <li>Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM</li> <li>Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>AOV-371, letdown isolation valve</li> <li>AOV-427, loop B cold leg to REGEN Hx</li> </ul> </li> <li>Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> <li>TCV-130</li> <li>PCV-135</li> </ul> </li> <li>Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>Open AOV-371 and AOV-427</li> <li>Open letdown orifice valves as necessary</li> <li>Place TCV-130 in AUTO at 105°F</li> <li>Place PCV-135 in AUTO at 250 psig</li> <li>Adjust charging pump speed and HCV-142 as necessary to control PRZR level</li> </ol>	<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"> <li>Place excess letdown divert valve, AOV-312, to NORMAL.</li> <li>Ensure CCW from excess letdown open, (AOV-745).</li> <li>Open excess letdown isolation valve AOV-310.</li> <li>Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> <li>Adjust charging pump speed as necessary.</li> </ul> <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
16	Check VCT Makeup System:	
	<ul style="list-style-type: none"> <li>a. Adjust boric acid flow control valve in AUTO to 9.5 gpm</li> <li>b. Adjust RMW flow control valve in AUTO to 40 gpm</li> <li>c. Verify the following: <ul style="list-style-type: none"> <li>1) RMW mode selector switch in AUTO</li> <li>2) RMW control armed - RED LIGHT LIT</li> </ul> </li> <li>d. Check VCT level: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 20% -OR-</li> <li>o Level - STABLE OR INCREASING</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>c. Adjust controls as necessary.</li> <li>d. Manually increase VCT makeup flow as follows: <ul style="list-style-type: none"> <li>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.</li> <li>2) Place RMW flow control valve HCV-111 in MANUAL and increase RMW flow.</li> <li>3) Increase boric acid flow as necessary.</li> </ul> </li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17 Check Charging Pump Suction Aligned To VCT:		
a. VCT level - GREATER THAN 20%		a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:  1) Ensure charging pump suction aligned to RWST  o LCV-112B open  o LCV-112C closed  2) Continue with Step 18. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 17b.
b. Verify charging pumps aligned to VCT  o LCV-112C - OPEN  o LCV-112B - CLOSED		b. Manually align valves as necessary.
18 Check RCS Hot Leg Temperatures - STABLE		Control steam dump and total feed flow as necessary to stabilize RCS temperature.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> o WHEN using a PRZR PORV, THEN select one with an operable block valve.</p> <p>o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p>	
19	Control PRZR Heaters And Operate Normal Spray To Stabilize RCS Pressure	<p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> perform the following:</p> <p>a. Verify Regen Hx Chg outlet temp to PRZR Vapor temp <math>\Delta T</math> less than 320°F. <u>IF NOT</u>, <u>THEN</u> control pressure using one PRZR PORV and go to Step 20.</p> <p>b. Control pressure using auxiliary spray.</p> <p><u>IF</u> auxiliary spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p>
	<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>	
*20	Monitor Intact S/G Levels:	
	<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</p> <p>b. <u>IF</u> narrow range level in any S/G continues to increase, <u>THEN</u> stop feed flow to that S/G.</p>

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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 Attachment SEAL COOLING).
	a. Check CCW to RCPs:	
	<ul style="list-style-type: none"> <li>o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> <li>o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> </ul>	
	b. Check RCP seal injection:	
	<ul style="list-style-type: none"> <li>o Labyrinth seal D/Ps - GREATER THAN 15 INCHES WATER</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o RCP seal injection flow to each RCP - GREATER THAN 6 GPM</li> </ul>	

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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"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul>	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"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST gate to locally open MOV-313.</li> </ol>
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve. <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> </li> </ol> <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"> <li>o Normal feed breakers to all 480 volt busses - CLOSED</li> <li>o 480 volt bus voltage - GREATER THAN 420 VOLTS</li> <li>o Emergency D/G output breakers - OPEN</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed.</li> <li>b. Perform the following as necessary: <ul style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Reset Bus 13 and Bus 15 lighting breakers.</li> <li>3) Dispatch AO to locally reset and start two IA compressors.</li> <li>4) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> <li>• EH pumps</li> <li>• Turning gear oil pump</li> <li>• HP seal oil backup pump</li> </ul> </li> <li>5) Restore power to MCCs. <ul style="list-style-type: none"> <li>• A from Bus 13</li> <li>• B from Bus 15</li> <li>• E from Bus 15</li> <li>• F from Bus 15</li> </ul> </li> <li>6) Start HP seal oil backup pump.</li> <li>7) Start CNMT RECIRC fans as necessary.</li> <li>8) Ensure D/G load within limits.</li> <li>9) Refer to Attachment SI/UV for other equipment lost with loss of offsite power.</li> </ul> </li> <li>c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>



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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:

- |  |  |
|--|--|
| <p>a. Source range channels -<br/>DEENERGIZED</p> <p>b. Check intermediate range flux -<br/>EITHER CHANNEL LESS THAN<br/>10<sup>-10</sup> AMPS</p> <p>c. Check the following:</p> <ul style="list-style-type: none"> <li>o Both intermediate range<br/>channels - LESS THAN<br/>10<sup>-10</sup> AMPS</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since<br/>reactor trip</li> </ul> <p>d. Verify source range detectors -<br/>ENERGIZED</p> <p>e. Transfer Rk-45 recorder to one<br/>source range and one<br/>intermediate range channel</p> | <p>a. Go to Step 24e.</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> <li>1) <u>IF</u> neither intermediate range<br/>channel is decreasing, <u>THEN</u><br/>initiate boration.</li> <li>2) Continue with Step 25. <u>WHEN</u><br/>flux is LESS THAN 10<sup>-10</sup> amps<br/>on any operable channel, <u>THEN</u><br/>do Steps 24c, d and e.</li> </ul> <p>c. Continue with step 25. <u>WHEN</u><br/>either condition met, <u>THEN</u> do<br/>Steps 24d and e.</p> <p>d. Manually energize source range<br/>detectors by depressing P-6<br/>permissive defeat pushbuttons (2<br/>of 2).</p> <p><u>IF</u> source ranges can <u>NOT</u> be<br/>restored, <u>THEN</u> refer to<br/>ER-NIS.1, SR MALFUNCTION, and go<br/>to Step 25.</p> |
|--|--|

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

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

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

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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 FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Control charging flow to maintain PRZR level.  <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually start SI pumps as necessary and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Go To Procedure O-2.1, NORMAL SHUTDOWN TO HOT SHUTDOWN	
		-END-

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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) FOLDOUT





EOP: ES-1.1	TITLE: SI TERMINATION	REV: 18 PAGE 1 of 1
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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

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

2. SECONDARY INTEGRITY CRITERIA

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

3. AFW SUPPLY SWITCHOVER CRITERION

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

4. 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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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

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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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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, STEP 1.</p> <p>o IF PRZR LEVEL IS LESS THAN 50% OR IF ADVERSE CNMT CONDITIONS EXIST, THEN PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL IS EVALUATED BY THE TSC.</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> <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 <math>10^{+05}</math> R/hr.</p> <p><b>* 1 Monitor If RHR Pumps Should Be Stopped:</b></p> <p>a. Check RCS pressure:</p> <p>1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]</p> <p>2) Pressure - STABLE OR INCREASING</p> <p>b. Stop RHR pumps and place AUTO</p> <p>a. Go to Step 2.</p>		

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

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	<p>Establish Condenser Steam Dump Pressure Control:</p> <ul style="list-style-type: none"> <li>a. Verify condenser available: <ul style="list-style-type: none"> <li>o Any MSIV - OPEN</li> <li>o Annunciator G-15, STEAM DUMP ARMED - LIT</li> </ul> </li> <li>b. Adjust condenser steam dump controller HC-484 to desired pressure and verify in AUTO</li> <li>c. Place steam dump mode selector switch to MANUAL</li> </ul> <p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>	<ul style="list-style-type: none"> <li>a. Place S/G ARV controllers in AUTO at desired pressure and go to Step 5.</li> </ul>
* 5	<p>Monitor Intact S/G Levels:</p> <ul style="list-style-type: none"> <li>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</li> <li>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</li> </ul>	<ul style="list-style-type: none"> <li>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</li> <li>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.</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).</p>		
6	Initiate RCS Cooldown To Cold Shutdown:	
	<ul style="list-style-type: none"> <li>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</li> <li>b. Use RHR system if in service</li> <li>c. Dump steam to condenser from intact S/G(s)</li> </ul>	<ul style="list-style-type: none"> <li>c. Manually or locally dump steam using intact S/Gs ARV.</li> </ul>
7	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	Manually start SI pumps as necessary and go to Step 19.
8	Check SI and RHR Pump Status:	Go to Step 15.
	<ul style="list-style-type: none"> <li>o SI pumps - ANY RUNNING</li> <li>-OR-</li> <li>o RHR pumps - ANY RUNNING IN INJECTION MODE</li> </ul>	
9	Place PRZR Heater Switches In The Following Positions:	
	<ul style="list-style-type: none"> <li>o PRZR heater control group - PULL STOP</li> <li>o PRZR heater backup group - OFF</li> </ul>	



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

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

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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 13% [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 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 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</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>		
11	Check If An RCP Should Be Started:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 12.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Go to Step 19.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Return to Step 10.
	d. Try to start an RCP	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 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 FIGURE MIN SUBCOOLING	<p>b. <u>IF</u> RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 19.</p> <p><u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 320°F [310°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 12c. <u>IF</u> no RHR pump can be started in injection mode, <u>THEN</u> go to Step 19.</p>
c.	Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 10.
d.	Stop one SI pump	

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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 FIGURE  
MIN SUBCOOLING

c. IF RCS hot leg temperatures  
greater than 320°F [310°F  
adverse CNMT] OR IF RHR normal  
cooling in service, THEN go to  
Step 19.

IF RHR normal cooling NOT in  
service AND RCS hot leg  
temperatures less than 320°F  
[310°F adverse CNMT], THEN  
ensure at least one RHR pump  
running in injection mode and go  
to Step 13d. IF no RHR pump can  
be started in injection mode,  
THEN go to Step 19.

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

d. Do NOT stop SI pump. Return to  
Step 10.

e. Stop one SI pump

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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 FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 320°F [310°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 19.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 320°F [310°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 14d. IF no RHR pump can be started in injection mode, THEN go to Step 19.

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

d. Do NOT stop SI pump. Return to Step 10.

e. Stop running SI pump

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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. RCPs - AT LEAST ONE RUNNING	<p>a. Perform the following:</p> <p>1) Try to start one RCP:</p> <p>a) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Increase PRZR level to greater than 65% [82% adverse CNMT].</li> <li>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING.</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water.</li> </ul> <p>b) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> <li>o Verify Bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> <p>c) Start one RCP.</p> <p>2) <u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase dumping steam.</p>	
b. Stop all but one RCP		

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p style="text-align: center;">*****</p>		
<p><u>NOTE:</u></p> <ul style="list-style-type: none"> <li>o WHEN using a PRZR PORV, THEN select one with an operable block valve.</li> <li>o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</li> </ul>		
<p>17 Depressurize RCS To Minimize RCS Subcooling:</p>		
<ul style="list-style-type: none"> <li>a. Depressurize using normal PRZR spray if available</li> <li>a. <u>IF</u> normal spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</li> <li><u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</li> <li>b. Energize PRZR heaters as necessary</li> <li>c. Depressurize RCS until EITHER of the following conditions satisfied: <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING</li> </ul> </li> </ul>		
<p style="text-align: center;">-OR-</p>		
<ul style="list-style-type: none"> <li>o PRZR level - GREATER THAN 75% [65% adverse CNMT]</li> </ul>		



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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 FIGURE SDM	b. Borate as necessary.
*19	Monitor SI Reinitiation Criteria:	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	a. Manually start SI pumps as necessary and go to Step 20.
	b. PRZR level - GREATER THAN 5% [30% adverse CNMT]	b. Manually start SI pumps as necessary and return to Step 10.

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

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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"> <li>a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> <li>o Emergency D/G output breakers - OPEN</li> <li>o AC emergency bus voltage - GREATER THAN 420 VOLTS</li> <li>o AC emergency bus normal feed breakers - CLOSED</li> </ul> </li> <li>b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)</li> </ul>	<ul style="list-style-type: none"> <li>a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>
22	<p>Verify Adequate SW Flow To CCW Hx:</p> <ul style="list-style-type: none"> <li>a. Verify at least two SW pumps - RUNNING</li> <li>b. Verify AUX BLDG SW isolation valves - OPEN <ul style="list-style-type: none"> <li>• MOV-4615 and MOV-4734</li> <li>• MOV-4616 and MOV-4735</li> </ul> </li> <li>c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED</li> </ul>	<ul style="list-style-type: none"> <li>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> go to Step 23.</li> <li>b. Manually align valves.</li> <li>c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.</li> </ul>

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

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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"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul>	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"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST gate to locally open MOV-313.</li> </ol>
f.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> </li> </ol> <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>		
<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 <sup>-10</sup> AMPS	b. Perform the following: <ul style="list-style-type: none"> <li>1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration.</li> <li>2) Continue with Step 26. <u>WHEN</u> flux is LESS THAN 10<sup>-10</sup> amps on any operable channel, <u>THEN</u> do Steps 25c, d and e.</li> </ul>
c.	Check the following: <ul style="list-style-type: none"> <li>o Both intermediate range channels - LESS THAN 10<sup>-10</sup> AMPS</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since reactor trip</li> </ul>	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 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	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> <p>c. Verify adequate Rx head cooling:</p> <ol style="list-style-type: none"> <li>1) Verify at least one control rod shroud fan - RUNNING</li> <li>2) Verify one Rx compartment cooling fan - RUNNING</li> </ol> <p>d. Verify Attachment SD-1 - COMPLETE</p>	<p>a. Dispatch AO to perform Attachment SD-2.</p> <p>1) Manually start one fan as power supply permits (45 kw)</p> <p>2) Perform the following:</p> <ul style="list-style-type: none"> <li>o Dispatch AO to reset UV relays at MCC C and MCC D.</li> <li>o Manually start one fan as power supply permits (23 kw)</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<b>*27 Monitor RCP Operation:</b>		
a. RCPs - ANY RUNNING		a. Go to Step 28.
b. Check the following:		b. Stop affected RCP(s).
o RCP #1 seal D/P - GREATER THAN 220 PSID		
o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF		
28 Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG		Use intact S/G ARV for RCS temperature control.
29 Check If RHR Normal Cooling Can Be Established:		
a. RCS cold leg temperature - LESS THAN 350°F		a. Go to Step 30.
b. RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]		b. Go to Step 30.
c. Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)		
d. Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL		



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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 30.</p>		
30	<p>Check CNMT Hydrogen Concentration:</p> <ul style="list-style-type: none"> <li>a. Direct RP to start CNMT hydrogen monitors as necessary</li> <li>b. Hydrogen concentration - LESS THAN 0.5%</li> </ul>	<ul style="list-style-type: none"> <li>b. Consult TSC to determine if hydrogen recombiners should be placed in service.</li> </ul>
31	<p>Check Core Exit T/Cs - LESS THAN 200° F</p>	<p>Return to Step 1.</p>
32	<p>Evaluate Long Term Plant Status:</p> <ul style="list-style-type: none"> <li>a. Maintain cold shutdown conditions</li> <li>b. Consult TSC</li> </ul>	
<p>-END-</p>		

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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) FOLDOUT

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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 5%  
[25% adverse CNMT] AND total feedwater flow  
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than  
100°F in last 60 minutes AND RCS cold leg  
temperature less than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

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# FOLDOUT PAGE

## 1. SI REINITIATION CRITERIA

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

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

## 2. SI TERMINATION CRITERIA

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

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING
- b. Total feed flow to intact S/Gs - GREATER THAN 200 GPM  
- OR -  
Narrow range level in at least one intact S/G - GREATER THAN 5% [25% adverse CNMT]
- c. RCS pressure:
  - o GREATER THAN 1625 PSIG [1825 psig adverse CNMT]
  - o STABLE OR INCREASING
- d. PRZR level - GREATER THAN 5% [30% adverse CNMT]

## 3. SECONDARY INTEGRITY CRITERIA

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

## 4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

## 5. AFW SUPPLY SWITCHOVER CRITERION

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

## 6. E-3 TRANSITION CRITERIA

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

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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

*Residman*  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP: ECA-2.1	TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	REV: 20 PAGE 2 of 32
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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.

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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"> <li>o FOLDOUT page should be open AND monitored periodically.</li> <li>o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).</li> <li>o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</li> </ul>		
1	<p>Check Secondary Pressure Boundary:</p> <ul style="list-style-type: none"> <li>o MSIVs - CLOSED</li> <li>o MFW flow control valves - CLOSED <ul style="list-style-type: none"> <li>• MFW regulating valves</li> <li>• MFW bypass valves</li> </ul> </li> <li>o MFW pump discharge valves - CLOSED</li> <li>o S/G blowdown and sample valves - CLOSED</li> <li>o TDAFW pump steam supply valves - PULL STOP</li> <li>o TDAFW pump flow control valves - CLOSED</li> <li>o S/G ARVs - CLOSED</li> <li>o Dispatch AO to locally isolate S/Gs (Refer to Attachment FAULTED S/G)</li> </ul>	<p>Manually close valves one loop at a time.</p> <p><u>IF</u> valves can <u>NOT</u> be closed, <u>THEN</u> dispatch AO to locally isolate flowpaths, as necessary, one loop at a time.</p>

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 5% [25% ADVERSE CNMT].

\*\*\*\*\*

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to 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 175 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
4	Check CST Level - GREATER THAN 5 FEET	Switch to alternate AFW suction supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).
<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	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"> <li>• MOV-515, MCC D position 6C</li> <li>• MOV-516, MCC C position 6C</li> </ul>
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 A0 to locally check breaker.</p> <ul style="list-style-type: none"> <li>• MOV-515, MCC D position 6C</li> <li>• MOV-516, MCC C position 6C</li> </ul>
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
6	<p>Check Secondary Radiation Levels - NORMAL</p> <ul style="list-style-type: none"> <li>o Steamline radiation monitor (R-31 and R-32)</li> <li>o Dispatch A0 to locally check steamline radiation</li> <li>o Request RP sample S/Gs for activity</li> </ul>	Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</p> <p>*****</p>		
7	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>		
* 8	Monitor If RHR Pumps Should Be Stopped:	
	a. RHR pumps - ANY RUNNING	a. Go to Step 9.
	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 9.
	c. Stop RHR pumps and place in AUTO	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

- |  |   |
|--|---|
| <p>a. CNMT spray pumps - RUNNING</p> <p>b. Check the following:</p> <ul style="list-style-type: none"> <li>o CNMT pressure - LESS THAN 4 PSIG</li> <li>o Sodium hydroxide tank level - LESS THAN 55%</li> </ul> <p>c. Reset CNMT spray</p> <p>d. Check NaOH tank outlet valves - CLOSED</p> <ul style="list-style-type: none"> <li>• AOV-836A</li> <li>• AOV-836B</li> </ul> <p>e. Stop CNMT spray pumps and place in AUTO</p> <p>f. Close CNMT spray pump discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-860A</li> <li>• MOV-860B</li> <li>• MOV-860C</li> <li>• MOV-860D</li> </ul> | <p>a. Go to Step 10.</p> <p>b. Continue with Step 10. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 9c through f.</p> <p>d. Place NaOH tank outlet valve controllers to MANUAL and close valves.</p> <ul style="list-style-type: none"> <li>• AOV-836A</li> <li>• AOV-836B</li> </ul> |
|--|---|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	Check RWST Level - GREATER THAN 28%	Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.
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.
12	Verify Adequate SW Flow:  a. Check at least two SW pumps - RUNNING          b. Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1)	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) Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1)  3) Go to Step 14.

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

## STEP

## ACTION/EXPECTED RESPONSE

## RESPONSE NOT OBTAINED

## 14 Check If SI ACCUMs Should Be Isolated:

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

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

c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

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

a. Go to Step 15.

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.

## 15 Check Normal Power Available To Charging Pumps:

o Bus 14 normal feed breaker -  
CLOSED

o Bus 16 normal feed breaker -  
CLOSED

Verify adequate emergency D/G  
capacity to run charging pumps  
(75 kw each).

IF NOT, THEN evaluate if CNMT  
RECIRC fans can be stopped (Refer  
to Attachment CNMT RECIRC FANS).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Check If Charging Flow Has Been Established:	
a.	Charging pumps - ANY RUNNING	<p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol>
b.	Align charging pump suction to RWST: <ul style="list-style-type: none"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul>	<p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).</li> </ol>
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
<p><b>*17 Monitor SI Termination Criteria:</b></p>		
a. SI pumps - ANY RUNNING		a. Go to Step 19.
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 FIGURE MIN SUBCOOLING		c. DO <u>NOT</u> stop SI pumps. Return to Step 2.
d. PRZR level - GREATER THAN 5% [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 17a.
<p><b>NOTE:</b>   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 18 and 19.</p>		
<p><b>18 Stop SI and RHR Pumps And Place In Auto</b></p>		

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**\*19 Monitor SI Reinitiation**  
Criteria:

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

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

a. Manually start SI pumps as necessary and return to Step 2.

b. Control charging flow to maintain PRZR level.

IF PRZR level can NOT be maintained, THEN manually start SI pumps as necessary and return to Step 2.

20 Check RCS Hot Leg Temperatures - STABLE OR DECREASING

Control feed flow or dump steam to stabilize RCS hot leg temperatures.

21 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.

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 go to Step 28.

b. Verify AUX BLDG SW isolation valves - OPEN

b. Manually align valves.

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

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

c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	a. Continue with Step 28. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 23 through 27.
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"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ol>
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ol>
d.	Charging pump - ANY RUNNING	d. Continue with Step 28. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 24 through 27.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]	Continue with Step 26. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 25.
25	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> <li>Verify charging line flow to REGEN Hx - GREATER THAN 20 GPM</li> <li>Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>AOV-371, letdown isolation valve</li> <li>AOV-427, loop B cold leg to REGEN Hx</li> </ul> </li> <li>Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> <li>TCV-130</li> <li>PCV-135</li> </ul> </li> <li>Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>Open AOV-371 and AOV-427</li> <li>Open letdown orifice valves as necessary</li> <li>Place TCV-130 in AUTO at 105°F</li> <li>Place PCV-135 in AUTO at 250 psig</li> <li>Adjust charging pump speed and HCV-142 as necessary</li> </ol>	<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"> <li>Place excess letdown divert valve, AOV-312, to NORMAL.</li> <li>Ensure CCW from excess letdown open, (AOV-745).</li> <li>Open excess letdown isolation valve AOV-310.</li> <li>Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> <li>Adjust charging pump speed as necessary.</li> </ul> <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>

EOP:

ECA-2.1

TITLE:

UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM  
GENERATORS

REV: 20

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

## 26 Check VCT Makeup System:

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

EOP:

ECA-2.1

TITLE:

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GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27 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 28. WHEN  
VCT level greater than 40%,  
THEN do Step 27b.

b. Verify charging pumps aligned to  
VCT:

o LCV-112C - OPEN

o LCV-112B - CLOSED

b. Manually align valves as  
necessary.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

28 Check RCP Cooling:

Establish normal cooling to RCPs  
(Refer to Attachment SEAL COOLING).

a. Check CCW to RCPs:

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

b. Check RCP seal injection:

- o Labyrinth seal D/Ps - GREATER  
THAN 15 INCHES OF WATER  
  
-OR-
- o RCP seal injection flow to  
each RCP - GREATER THAN 6 GPM

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 30.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul>	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"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST gate to locally open MOV-313.</li> </ol>
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> </li> </ol> <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 30.</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>   o   If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>          o   When using PRZR PORV, select one with an operable block valve.</p>	
30	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 Attachment N2 PORVS.</p>

EOP: ECA-2.1	TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS	REV: 20 PAGE 22 of 32
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> <li>o Normal feed breakers to all 480 volt busses - CLOSED</li> <li>o 480 bus voltage - GREATER THAN 420 VOLTS</li> <li>o Emergency D/G output breakers - OPEN</li> </ul>	<p>Perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed.</li> <li>b. Perform the following, as necessary: <ul style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> <li>• EH pumps</li> <li>• Turning gear oil pump</li> <li>• HP seal oil backup pump</li> </ul> </li> <li>3) Restore power to MCCs. <ul style="list-style-type: none"> <li>• A from Bus 13</li> <li>• B from Bus 15</li> <li>• E from Bus 15</li> <li>• F from Bus 15</li> </ul> </li> <li>4) Start HP seal oil backup pump</li> <li>5) Ensure D/G load within limits.</li> <li>6) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> <li>7) Refer to Attachment SI/UV for other equipment lost with loss of offsite power.</li> </ul> </li> <li>c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>

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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>		
32	Check RCP Status - AT LEAST ONE RUNNING	<p>Try to start one RCP</p> <p>a. <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Increase PRZR level to greater than 65% [82% adverse CNMT]</li> <li>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water</li> </ul> <p>b. Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> <li>o Verify bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> <p>c. Start one RCP.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase feed flow or dumping steam.</p>

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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>33 Check If Source Range Detectors Should Be Energized:</p>		
a.	Source range channels - DEENERGIZED	a. Go to Step 33e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 <sup>-10</sup> 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 34. <u>WHEN</u> flux is LESS THAN 10<sup>-10</sup> amps on any operable channel, <u>THEN</u> do Steps 33c, d and e.</p>
c.	Check the following: <ul style="list-style-type: none"> <li>o Both intermediate range channels - LESS THAN 10<sup>-10</sup> AMPS</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since reactor trip</li> </ul>	c. Continue with step 34. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 33d and e.
d.	Verify source range detectors - ENERGIZED	<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 34.</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
34	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> <li>a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> <li>o Emergency D/G output breakers - OPEN</li> <li>o AC emergency bus voltage - GREATER THAN 420 VOLTS</li> <li>o AC emergency bus normal feed breakers - CLOSED</li> </ul> </li> <li>b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)</li> </ul>	<ul style="list-style-type: none"> <li>a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	<p>Establish Normal Shutdown Alignment:</p> <ul style="list-style-type: none"> <li>a. Check condenser - AVAILABLE</li> <li>b. Perform the following: <ul style="list-style-type: none"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> </li> <li>c. Verify adequate Rx head cooling: <ul style="list-style-type: none"> <li>1) Verify at least one control rod shroud fan - RUNNING</li> <li>2) Verify one Rx compartment cooling fan - RUNNING</li> </ul> </li> <li>d. Verify Attachment SD-1 - COMPLETE</li> </ul>	<ul style="list-style-type: none"> <li>a. Dispatch A0 to perform Attachment SD-2.</li> <li>1) Manually start one fan as power supply permits (45 kw)</li> <li>2) Perform the following: <ul style="list-style-type: none"> <li>o Dispatch A0 to reset UV relays at MCC C and MCC D.</li> <li>o Manually start one fan as power supply permits (23 kw)</li> </ul> </li> </ul>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

36 Maintain Plant Conditions -  
STABLE

- o RCS pressure
- o PRZR level
- o RCS temperatures

Control plant systems as necessary  
to maintain conditions stable.

**\*37** Monitor SI Reinitiation  
Criteria:

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

a. Manually start SI pumps as  
necessary. Return to Step 2.

b. Control charging flow to  
maintain PRZR level.

IF PRZR level can NOT be  
maintained, THEN manually start  
SI pumps as necessary.  
Return to Step 2.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

38 Check If SI ACCUMs Should Be Isolated:

a. Check the following:

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

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

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

c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

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

a. Go to Step 39.

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.



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

39 Verify Adequate Shutdown Margin

- a. Direct RP to sample RCS for boron concentration
- b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM

b. Borate as necessary.

40 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.

\*41 Monitor RCP Operation:

- a. RCPs - ANY RUNNING
- b. Check the following:
  - o RCP #1 seal D/P - GREATER THAN 220 PSID
  - o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF

a. Go to Step 42.

b. Stop affected RCP(s).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- 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 operable block valve.

**\*42** Check RCS Pressure - LESS THAN 400 PSIG [300 PSIG adverse CNMT]

Perform the following:

- a. Depressurize RCS using normal PRZR spray.  
IF normal spray NOT available and letdown is in service, THEN use auxiliary spray.  
IF NOT, THEN use one PRZR PORV.  
IF IA NOT available, THEN refer to Attachment N2 PORVS.
- b. Maintain RCS subcooling based on core exit T/Cs - GREATER THAN 0°F using Figure MIN SUBCOOLING.
- c. Return to Step 37.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Return to Step 37.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Return to Step 41.
c.	Place letdown pressure controller (PCV-135) in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> <li>• AOV-371, letdown isolation valve</li> <li>• AOV-427, loop B cold leg to REGEN Hx</li> <li>• At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Reset both trains of XY relays for AOV-371 and AOV-427.</li> <li>2) Open AOV-371 and AOV-427.</li> <li>3) Open one letdown orifice valve.</li> </ol>
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Return to Step 41.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	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 Attachment RHR COOL)	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

44 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.

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

Return to Step 44.

46 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 RHR COOL (ATT-14.1)
- 16) FOLDOUT



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FOLDOUT PAGE

1. 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 FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% ADVERSE CNMT]

2. E-2 TRANSITION CRITERIA

IF any S/G pressure increases at any time (except while performing SI termination in Steps 18 and 19), THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

4. AFW SUPPLY SWITCHOVER CRITERION

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

5. E-3 TRANSITION CRITERIA

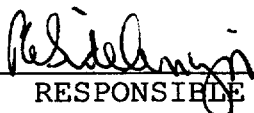
IF any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation, THEN manually start SI pumps as necessary AND go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_



EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 2 of 34
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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> <ul style="list-style-type: none"> <li>o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.</li> <li>o IF PRZR LEVEL IS LESS THAN 50% OR IF ADVERSE CNMT CONDITIONS EXIST, THEN PRZR HEATERS SHOULD NOT BE ENERGIZED UNTIL PRZR LEVEL IS EVALUATED BY THE TSC.</li> <li>o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</li> </ul> <p>*****</p> <p><u>NOTE:</u> o Foldout page should be open AND monitored periodically.</p> <p style="padding-left: 40px;">o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p> <p>1 Reset SI</p> <p>2 Reset CI:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED</p> </div> <div style="width: 45%;"> <p>b. Perform the following:</p> <p style="padding-left: 20px;">1) Reset SI.</p> <p style="padding-left: 20px;">2) Depress CI reset pushbutton.</p> </div> </div>		

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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 Attachment SD-1)</p>	<p>a. Manually start SW pumps as power supply permits (257 kw each).</p> <p><u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:</p> <p>1) Ensure SW isolation.</p> <p>2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1).</p> <p>3) Go to Step 5.</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. Verify SW isolation valves to turbine building - OPEN

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

c. Verify adequate air compressor(s) - RUNNING

d. Check IA supply:

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

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

f. Verify IA to CNMT AOV-5392 - OPEN

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 evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).

b. Manually align valves.

c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.

d. Perform the following:

1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).

2) Continue with Step 5. WHEN IA restored, THEN do Steps 4e and f.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**\* 5 Monitor All AC Busses -  
BUSSES ENERGIZED BY OFFSITE  
POWER**

- 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

Perform the following:

- a. IF any AC emergency bus normal  
feed breaker open, THEN ensure  
associated D/G breaker closed.
- b. Perform the following, as  
necessary:
  - 1) Close non-safeguards bus tie  
breakers:
    - Bus 13 to Bus 14 tie
    - Bus 15 to Bus 16 tie
  - 2) Place the following pumps in  
PULL STOP:
    - EH pumps
    - Turning gear oil pump
    - HP seal oil backup pump
  - 3) Restore power to MCCs.
    - 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) WHEN bus 15 restored, THEN  
reset control room lighting.
  - 7) Refer to Attachment SI/UV for  
other equipment lost with  
loss of offsite power.
- c. Try to restore offsite power to  
all AC busses (Refer to  
ER-ELEC.1, RESTORATION OF  
OFFSITE POWER).

EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -  
SUBCOOLED RECOVERY DESIRED

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

\* 6 Monitor If CNMT Spray Should  
Be Stopped:

- |   |  |
|---|--|
| a. CNMT spray pumps - ANY RUNNING             | a. Go to Step 7.   |
| b. Check the following:                       | b. Continue with Step 7. <u>WHEN</u> BOTH conditions satisfied, <u>THEN</u> do Steps 6c through f. |
| o CNMT pressure - LESS THAN 4 PSIG            |  |
| o Sodium hydroxide tank level - LESS THAN 55% |  |
| c. Reset CNMT spray                           |  |
| d. Check NaOH tank outlet valves - CLOSED     | d. Place NaOH tank outlet valve controllers to MANUAL and close valves.                            |
| • AOV-836A                                    |  |
| • AOV-836B                                    |  |
| e. Stop CNMT spray pumps and place in AUTO    |  |
| f. Close CNMT spray pump discharge valves     |  |
| • MOV-860A                                    |  |
| • MOV-860B                                    |  |
| • MOV-860C                                    |  |
| • MOV-860D                                    |  |

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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>		
7	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 5% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].</p> <p>2) Continue with Step 8. <u>WHEN</u> ruptured S/G level greater than 5% [25% adverse CNMT], <u>THEN</u> do Steps 7b 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"> <li>• S/G A, MOV-4007</li> <li>• S/G B, MOV-4008</li> </ul>	
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"> <li>• S/G A, AOV-4297</li> <li>• S/G B, AOV-4298</li> </ul>	<ul style="list-style-type: none"> <li>• S/G A, V-4005</li> <li>• S/G B, V-4006</li> </ul>
e.	Verify MDAFW pump crosstie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul>	



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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>		
8	<p>Check If RHR Pumps Should Be Stopped:</p> <p>a. Check RCS pressure:</p> <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]</li> <li>o Pressure - STABLE OR INCREASING</li> </ul> <p>b. Stop RHR pumps and place in AUTO</p>	<p>a. Go to Step 9.</p>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

## 9 Evaluate Plant Status:

a. Check auxiliary building radiation - NORMAL

- Plant vent iodine (R-10B)
- Plant vent particulate (R-13)
- Plant vent gas (R-14)
- CCW liquid monitor (R-17)
- Letdown line monitor (R-9)
- CHG pump room (R-4)

b. Direct RP to obtain following samples:

- RCS boron
- RCS activity
- CNMT hydrogen
- CNMT sump boron

c. Verify adequate Rx head cooling:

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

a. Notify RP and refer to appropriate AR-RMS procedure.

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).

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

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11 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

IF any S/G pressure decreasing in an uncontrolled manner OR completely depressurized, THEN verify faulted S/G isolated unless needed for RCS cooldown:

- Steamlines
- Feedlines

IF NOT, THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

NOTE: TDAFW pump flow control valves fail open on loss of IA.

\*12 Monitor Intact S/G Levels:

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

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in intact S/G.

b. IF narrow range level in the intact S/G continues to increase in an uncontrolled manner, THEN consider isolating unnecessary release paths:

- TDAFW pump steam supply valves
- S/G blowdown valves
- Refer to Attachment RUPTURED S/G

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

13 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, THEN perform the following:

o Use faulted S/G.

-OR-

o IF RHR system NOT in service, THEN use ruptured S/G.

\*14 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.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0° USING FIGURE MIN SUBCOOLING	Go to Step 28.
16	Check Safeguards Pump Status  o SI pumps - ANY RUNNING  -OR-  o RHR pumps - ANY RUNNING IN INJECTION MODE	Go to Step 24.
17	Place PRZR Heater Switches In The Following Positions:  o PRZR heater control group - PULL STOP  o PRZR heater backup group - OFF	
18	Check PRZR level - LESS THAN 13% [40% adverse CNMT]	Go to Step 20.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p>*****</p> <p><u>NOTE:</u>   o   When using PRZR PORV, select one with an operable block valve.</p> <p>          o   If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>19 Depressurize RCS To Refill PRZR:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>a. Use normal PRZR spray valve associated with running RCP</p> <ul style="list-style-type: none"> <li>• RCP A, PCV-431A</li> <li>• RCP B, PCV-431B</li> </ul> <p>b. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>c. Stop RCS depressurization</p> </div> <div style="width: 48%;"> <p>a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</p> <p>b. Continue with Step 20. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p> </div> </div>		

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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 FIGURE MIN SUBCOOLING	b. Go to Step 28.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	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 Attachment RCP START	
	2) Start one RCP	



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

a. Go to Step 22.

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

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

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

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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 FIGURE  
MIN SUBCOOLING

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

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

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

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

e. Stop one SI pump

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

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

b. Determine required RCS subcooling from table:

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

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN 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 13% [40% adverse CNMT]

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

e. Stop running SI pump

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 21 of 34
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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

a. Start charging pumps and control  
charging flow to maintain PRZR  
level and go to Step 25.

b. Go to Step 28

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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>		
25	Check RCP Status:	
	a. RCPs - AT LEAST ONE RUNNING	<p>a. Try to start one RCP</p> <p>1) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Increase PRZR level to greater than 65% [82% adverse CNMT]</li> <li>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water</li> </ul> <p>2) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> <li>o Verify bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> <p>3) Start one RCP.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	b. Stop all but one RCP	



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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 FIGURE SDM

b. Borate as necessary.

**\*28 Monitor SI Reinitiation Criteria:**

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

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

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

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 25 of 34
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29 Check If SI ACCUMs Should Be Isolated:

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

a. IF both RCS hot leg temperatures less than 400°F, THEN go to Step 29c.

IF NOT, THEN go to Step 30.

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

b. Return to Step 18.

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

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

d. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

d. Vent any unisolated ACCUMs:

1) Open vent valves for unisolated SI ACCUMs.

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

2) Open HCV-945.

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



EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -  
SUBCOOLED RECOVERY DESIRED

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30 Check If Emergency D/Gs  
Should Be Stopped:

- a. Verify AC emergency busses energized by offsite power:
  - o Emergency D/G output breakers - OPEN
  - o AC emergency bus voltage - GREATER THAN 420 VOLTS
  - o AC emergency bus normal feed breakers - CLOSED
- b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)

- a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

31 Minimize Secondary System  
Contamination:

- a. Isolate reject from hotwell to CST:
  - o Place hotwell level controller (HC-107) in MANUAL at 50%
  - o Verify hotwell level - STABLE
- b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)

- a. IF hotwell level increasing, THEN direct RP to sample hotwells for activity.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Verify Adequate SW Flow To CCW Hx:	
	<ul style="list-style-type: none"> <li>a. Verify at least two SW pumps - RUNNING</li> <li>b. Verify AUX BLDG SW isolation valves - OPEN <ul style="list-style-type: none"> <li>• MOV-4615 and MOV-4734</li> <li>• MOV-4616 and MOV-4735</li> </ul> </li> <li>c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED</li> </ul>	<ul style="list-style-type: none"> <li>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> go to Step 33.</li> <li>b. Manually align valves.</li> <li>c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.</li> </ul>
33	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
	<ul style="list-style-type: none"> <li>a. Check CCW to RCPs <ul style="list-style-type: none"> <li>o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> <li>o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> </ul> </li> <li>b. Check RCP seal injection <ul style="list-style-type: none"> <li>o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER</li> <li>-OR-</li> <li>o RCP seal injection flow to each RCP - GREATER THAN 6 GPM</li> </ul> </li> </ul>	

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 28 of 34
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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 with key to RWST gate to locally open MOV-313.
f.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	f. Perform the following: 1) Trip the affected RCP 2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 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

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

35 Check If Source Range  
Detectors Should Be Energized:

- |   |   |
|---|---|
| a. Source range channels -<br>DEENERGIZED   | a. Go to Step 35e.  |
| b. Check intermediate range flux -<br>EITHER CHANNEL LESS THAN<br>10 <sup>-10</sup> AMPS  | b. Perform the following:<br><br>1) <u>IF</u> neither intermediate range<br>channel is decreasing, <u>THEN</u><br>initiate boration.<br><br>2) Continue with Step 36. <u>WHEN</u><br>flux is LESS THAN 10 <sup>-10</sup> amps<br>on any operable channel, <u>THEN</u><br>do Steps 35c, d and e. |
| c. Check the following:<br><br>o Both intermediate range<br>channels - LESS THAN<br>10 <sup>-10</sup> AMPS<br><br>-OR-<br><br>o Greater than 20 minutes since<br>reactor trip | c. Continue with Step 36. <u>WHEN</u><br>either condition met, <u>THEN</u> do<br>Steps 35d and e.   |
| d. Verify source range detectors -<br>ENERGIZED   | d. Manually energize source range<br>detectors by depressing P-6<br>permissive defeat pushbuttons (2<br>of 2).<br><br><u>IF</u> source ranges can <u>NOT</u> be<br>restored, <u>THEN</u> refer to<br>ER-NIS.1, SR MALFUNCTION and go<br>to Step 36.   |
| e. Transfer Rk-45 recorder to one<br>source range and one<br>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"> <li>a. Check condenser - AVAILABLE</li> <li>b. Perform the following: <ul style="list-style-type: none"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> </li> <li>c. Verify Attachment SD-1 - COMPLETE</li> </ul>	<ul style="list-style-type: none"> <li>a. Dispatch AO to perform Attachment SD-2.</li> </ul>

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

\*\*\*\*\*  
CAUTION  
\*\*\*\*\*

FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED  
UNLESS IT IS NEEDED FOR RCS COOLDOWN.

\*37 Monitor Ruptured S/G(s)  
Narrow Range Level - GREATER  
THAN 17% [25% adverse CNMT]

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

IF either of the following  
conditions occurs, THEN stop feed  
flow to ruptured S/G unless needed  
for RCS cooldown:

- o Ruptured S/G pressure decreases  
in an uncontrolled manner.

-OR-

- o Ruptured S/G pressure increases  
to 1020 psig.

\*38 Monitor RCP Operation:

a. RCPs - ANY RUNNING

a. Go to Step 39.

b. Check the following:

b. Stop affected RCP(s).

- o RCP #1 seal D/P - GREATER  
THAN 220 PSID
- o Check RCP seal leakage -  
WITHIN THE NORMAL OPERATING  
RANGE OF FIGURE RCP SEAL  
LEAKOFF

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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, <u>THEN</u>:</p> <ul style="list-style-type: none"> <li>o Use faulted S/G.</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.</li> </ul>

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 33 of 34
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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"> <li>• AOV-371, letdown isolation valve</li> <li>• AOV-427, loop B cold leg to REGEN Hx</li> <li>• At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Reset both trains of XY relays for AOV-371 and AOV-427.</li> <li>2) Open AOV-371 and AOV-427.</li> <li>3) Open one letdown orifice valve.</li> </ol>
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 41.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	



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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 8.

43 Evaluate Long Term Plant  
Status:

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

-END-

EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 1 of 1
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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) FOLDOUT



EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 19 PAGE 1 of 1
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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

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

2. SATURATED RECOVERY CRITERIA

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

3. SECONDARY INTEGRITY CRITERIA

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

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

5. AFW SUPPLY SWITCHOVER CRITERION

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

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 1 of 25
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

*Richard J. ...*  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP:  ECA-3.2	TITLE:  SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22  PAGE 2 of 25
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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.

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 3 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>IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.</p> <p>*****</p> <p><u>NOTE:</u>   o Steps 1 through 14 of ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, should be performed before continuing with this procedure.</p> <p>          o FOLDOUT page should be open and monitored periodically.</p> <p>          o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10<sup>+05</sup> R/hr.</p> <p>1 Add Makeup To RWST As Necessary:</p> <p>          o Refer to S-9J, BLENDING TO RWST</p> <p style="text-align: center;">-OR-</p> <p>          o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST TO SFP</p> <p style="text-align: center;">-OR-</p> <p>          o Refer to Attachment SFP-RWST</p>		

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 4 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>IF ANY RUPTURED S/G IS FAULTED, FEED FLOW TO THAT S/G SHOULD REMAIN ISOLATED DURING SUBSEQUENT RECOVERY ACTIONS UNLESS NEEDED FOR RCS COOLDOWN.</p> <p>*****</p>		
2	Check Ruptured S/G Level:	
a.	Narrow range level - GREATER THAN 5% [25% adverse CNMT]	<p>a. <u>IF</u> ruptured S/G <u>NOT</u> faulted, <u>THEN</u> perform the following:</p> <p>1) Maintain feed flow to ruptured S/G until level greater than 5% [25% adverse CNMT].</p> <p>2) Continue with Step 3. <u>WHEN</u> ruptured S/G level greater than 5% [25% adverse CNMT], <u>THEN</u> do Steps 2b through e.</p>
b.	Close MDAFW pump discharge valve to ruptured S/G	b. Dispatch AO to locally close valve.
	<ul style="list-style-type: none"> <li>• S/G A, MOV-4007</li> <li>• S/G B, MOV-4008</li> </ul>	
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"> <li>• S/G A, AOV-4297</li> <li>• S/G B, AOV-4298</li> </ul>	<ul style="list-style-type: none"> <li>• S/G A, V-4005</li> <li>• S/G B, V-4006</li> </ul>
e.	Verify MDAFW pump crosstie valves - CLOSED	e. Manually close valves.
	<ul style="list-style-type: none"> <li>• MOV-4000A</li> <li>• MOV-4000B</li> </ul>	



EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 5 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>o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</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	<p>Check If RHR Pumps Should Be Stopped:</p> <p>a. Check RCS pressure:</p> <p>1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT]</p> <p>2) RCS pressure - STABLE OR INCREASING</p> <p>b. Stop RHR pumps and place in AUTO</p>	<p>a. Go to Step 4.</p>
4	<p>Check If S/G Secondary Side Is Intact:</p> <p>o Pressure in both S/Gs - STABLE OR INCREASING</p> <p>o Pressure in both S/Gs - GREATER THAN 110 PSIG</p>	<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"> <li>• Steamlines</li> <li>• Feedlines</li> </ul> <p><u>IF NOT, THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 6 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>	
	<p>* 5 Monitor Intact S/G Level:</p>	
	<p>a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]</p> <p>b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%</p>	<p>a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.</p> <p>b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths:</p> <ul style="list-style-type: none"> <li>• TDAFW pump steam supply valves</li> <li>• S/G blowdown valves</li> <li>• Refer to Attachment RUPTURED S/G</li> </ul>
	<p><u>NOTE:</u> Shutdown margin should be monitored during RCS cooldown. Refer to Figure SDM.</p>	
	<p>6 Initiate RCS Cooldown To Cold Shutdown:</p>	
	<p>a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR</p> <p>b. Use RHR system if in service</p> <p>c. Dump steam to condenser from intact S/G</p>	<p>c. Manually or locally dump steam using intact S/G ARV.</p> <p><u>IF</u> no intact S/G available, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Use faulted S/G.</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.</li> </ul>

EOP:

ECA-3.2

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -  
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

Go to Step 19.

8 Check Safeguards Pump Status

Go to Step 15.

o SI pumps - ANY RUNNING

-OR-

o RHR pumps - ANY RUNNING IN  
INJECTION MODE

9 Place PRZR Heater Switches In  
The Following Positions:

o PRZR heater control group - PULL  
STOP

o PRZR heater backup group - OFF

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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\*\*\*\*\*

CAUTION

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

\*\*\*\*\*

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

10 Depressurize RCS To Refill  
PRZR:

- a. Use normal PRZR spray valve associated with running RCP

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

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

- c. Stop RCS depressurization

- a. Use one PRZR PORV. IF IA NOT available, THEN refer to Attachment N2 PORVS.

IF no PORV available, THEN use auxiliary spray valve.

- b. Continue with Step 11. WHEN level greater than 13% [40% adverse CNMT], THEN stop RCS depressurization.

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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>		
11	<p>Check If An RCP Should Be Started:</p> <p>a. Both RCPs - STOPPED</p> <p>b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>c. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p>d. Try to start an RCP</p> <p>1) Establish conditions for starting an RCP</p> <p>o Bus 11A or 11B energized</p> <p>o Refer to Attachment RCP START</p> <p>2) Start one RCP</p>	<p>a. Stop all but one RCP and go to Step 12.</p> <p>b. Go to Step 19.</p> <p>c. Return to Step 10.</p>

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SATURATED RECOVERY DESIRED

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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
- b. RCS subcooling based on core  
exit T/Cs - GREATER THAN 10°F  
[10°F adverse CNMT] USING FIGURE  
MIN SUBCOOLING
- c. Check PRZR level - GREATER THAN  
13% [40% adverse CNMT]
- d. Stop one SI pump

a. Go to Step 13.

b. IF RCS hot leg temperatures  
greater than 320°F [310°F  
adverse CNMT] OR IF RHR normal  
cooling in service, THEN go to  
Step 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 12c. IF no RHR pump can  
be started in injection mode,  
THEN go to Step 19.

c. Do NOT stop SI pump. Return to  
Step 10.

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

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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	215°F [215°F adverse CNMT]
TWO	150°F [150°F adverse CNMT]
THREE	80°F [80°F adverse CNMT]

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

c. IF RCS hot leg temperatures  
greater than 320°F [310°F  
adverse CNMT] OR IF RHR normal  
cooling in service, THEN go to  
Step 19.

IF RHR normal cooling NOT in  
service AND RCS hot leg  
temperatures less than 320°F  
[310°F adverse CNMT], THEN  
ensure at least one RHR pump  
running in injection mode and go  
to Step 14d. IF no RHR pump can  
be started in injection mode,  
THEN go to Step 19.

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

d. Do NOT stop SI pump. Return to  
Step 10.

e. Stop running SI pump



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

15 Check If Charging Flow Should  
Be Controlled To Maintain RCS  
Inventory:

a. Check RHR pumps - RUNNING IN  
INJECTION MODE

a. Perform the following:

1) Control charging flow to  
maintain RCS inventory:

o RVLIS level (no RCPs) -  
BETWEEN 77% AND 82% [82%  
AND 85% adverse CNMT]

-OR-

o RVLIS fluid fraction (any  
RCP running) - BETWEEN 84%  
AND 90%

2) Go to Step 16.

b. Go to Step 19

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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>		
16 Check RCP Status:		
a. RCPs - AT LEAST ONE RUNNING	<p>a. Try to start one RCP</p> <p>1) <u>IF</u> RVLIS level (no RCPs) less than 95%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>o Increase PRZR level to greater than 65% [82% adverse CNMT]</li> <li>o Dump steam to establish RCS subcooling based on core exit T/Cs to greater than 20°F using Figure MIN SUBCOOLING</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water</li> </ul> <p>2) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> <li>o Verify bus 11A or 11B energized.</li> <li>o Refer to Attachment RCP START.</li> </ul> <p>3) Start one RCP.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>	
b. Stop all but one RCP		

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

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Verify Adequate Shutdown Margin	
	<ul style="list-style-type: none"> <li>a. Direct RP to sample RCS and ruptured S/G for boron concentration</li> <li>b. Verify boron concentration - GREATER THAN REQUIREMENTS OF FIGURE SDM</li> </ul>	<ul style="list-style-type: none"> <li>b. Borate as necessary.</li> </ul>
*19	Monitor SI Reinitiation Criteria:	
	<ul style="list-style-type: none"> <li>a. Core exit T/Cs - DECREASING</li> <li>b. Check RVLIS indication: <ul style="list-style-type: none"> <li>o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. Manually start SI pumps as necessary.</li> <li>b. Manually start SI pumps as necessary.</li> </ul>
	-OR-	
	<ul style="list-style-type: none"> <li>o Fluid Fraction (any RCP running) - GREATER THAN 84%</li> </ul>	

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

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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"> <li>a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> <li>o Emergency D/G output breakers - OPEN</li> <li>o AC emergency bus voltage - GREATER THAN 420 VOLTS</li> <li>o AC emergency bus normal feed breakers - CLOSED</li> </ul> </li> <li>b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)</li> </ul>	<ul style="list-style-type: none"> <li>a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).</li> </ul>
22	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> <li>a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> <li>o Place hotwell level controller (HC-107) in MANUAL at 50%</li> <li>o Verify hotwell level - STABLE</li> </ul> </li> <li>b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G)</li> </ul>	<ul style="list-style-type: none"> <li>a. <u>IF</u> hotwell level increasing. <u>THEN</u> direct RP to sample hotwells for activity.</li> </ul>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	Verify Adequate SW Flow To CCW Hx:	
	<ul style="list-style-type: none"> <li>a. Verify at least two SW pumps - RUNNING</li> <li>b. Verify AUX BLDG SW isolation valves - OPEN <ul style="list-style-type: none"> <li>• MOV-4615 and MOV-4734</li> <li>• MOV-4616 and MOV-4735</li> </ul> </li> <li>c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED</li> </ul>	<ul style="list-style-type: none"> <li>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> go to Step 24.</li> <li>b. Manually align valves.</li> <li>c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.</li> </ul>
24	Check RCP Cooling	Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).
	<ul style="list-style-type: none"> <li>a. Check CCW to RCPs <ul style="list-style-type: none"> <li>o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> <li>o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED</li> </ul> </li> <li>b. Check RCP seal injection <ul style="list-style-type: none"> <li>o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o RCP seal injection flow to each RCP - GREATER THAN 6 GPM</li> </ul>	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

25 Check If Seal Return Flow  
Should Be Established:

- |  |  |
|--|--|
| <p>a. Verify instrument bus D -<br/>ENERGIZED</p> <p>b. Verify RCP #1 seal outlet<br/>temperature - LESS THAN 235°F</p> <p>c. Verify RCP seal outlet valves -<br/>OPEN</p> <ul style="list-style-type: none"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul> <p>d. Reset both trains of XY relays<br/>for RCP seal return isolation<br/>valve MOV-313</p> <p>e. Open RCP seal return isolation<br/>valve MOV-313</p> <p>f. Verify RCP #1 seal leakoff flow<br/>- LESS THAN 6.0 GPM</p> <p>g. Verify RCP #1 seal leakoff flow<br/>- GREATER THAN 0.8 GPM</p> | <p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Ensure steam dump mode<br/>control in MANUAL.</li> <li>2) Restore power to instrument<br/>bus D from MCC B or MCC A<br/>(maintenance supply).</li> </ol> <p>b. Go to Step 26.</p> <p>c. Manually open valves as<br/>necessary.</p> <p>e. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST<br/>gate to locally open MOV-313.</li> </ol> <p>f. Perform the following:</p> <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump<br/>coast down, <u>THEN</u> close the<br/>affected RCP seal discharge<br/>valve</li> </ol> <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> <p><u>IF</u> both RCP seal discharge<br/>valves are shut, <u>THEN</u> go to<br/>Step 26.</p> <p>g. Refer to AP-RCP.1, RCP SEAL<br/>MALFUNCTION.</p> |
|--|--|



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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>		
26	Check If Source Range Detectors Should Be Energized:	
a.	Source range channels - DEENERGIZED	a. Go to Step 26e.
b.	Check intermediate range flux - EITHER CHANNEL LESS THAN 10 <sup>-10</sup> AMPS	b. Perform the following: <ul style="list-style-type: none"> <li>1) <u>IF</u> neither intermediate range channel is decreasing, <u>THEN</u> initiate boration.</li> <li>2) Continue with Step 27. <u>WHEN</u> flux is LESS THAN 10<sup>-10</sup> amps on any operable channel, <u>THEN</u> do Steps 26c, d and e.</li> </ul>
c.	Check the following: <ul style="list-style-type: none"> <li>o Both intermediate range channels - LESS THAN 10<sup>-10</sup> AMPS</li> </ul> <p>-OR-</p> <ul style="list-style-type: none"> <li>o Greater than 20 minutes since reactor trip</li> </ul>	c. Continue with Step 27. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 26d and e.
d.	Verify source range detectors - ENERGIZED	d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).
		<u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 27.
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
27	<p>Establish Normal Shutdown Alignment:</p> <ul style="list-style-type: none"> <li>a. Check condenser - AVAILABLE</li> <li>b. Perform the following: <ul style="list-style-type: none"> <li>o Open generator disconnects <ul style="list-style-type: none"> <li>• 1G13A71</li> <li>• 9X13A73</li> </ul> </li> <li>o Place voltage regulator to OFF</li> <li>o Open turbine drain valves</li> <li>o Rotate reheater steam supply controller cam to close valves</li> <li>o Place reheater dump valve switches to HAND</li> <li>o Stop all but one condensate pump</li> </ul> </li> <li>c. Verify adequate Rx head cooling: <ul style="list-style-type: none"> <li>1) Verify at least one control rod shroud fan - RUNNING</li> <li>2) Verify one Rx compartment cooling fan - RUNNING</li> </ul> </li> <li>d. Verify Attachment SD-1 - COMPLETE</li> </ul>	<ul style="list-style-type: none"> <li>a. Dispatch A0 to perform Attachment SD-2.</li> <li>1) Manually start one fan as power supply permits (45 kw)</li> <li>2) Perform the following: <ul style="list-style-type: none"> <li>o Dispatch A0 to reset UV relays at MCC C and MCC D.</li> <li>o Manually start one fan as power supply permits (23 kw).</li> </ul> </li> </ul>

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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>		
*28	Monitor Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	<p>Refill ruptured S/G to 80% [60% adverse CNMT] using feed flow.</p> <p><u>IF</u> either of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> <li>o Ruptured S/G pressure decreases in an uncontrolled manner.</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Ruptured S/G pressure increases to 1020 psig.</li> </ul>
*29	Monitor RCP Operation:	
	a. RCPs - ANY RUNNING	a. Go to Step 30.
	b. Check the following:	b. Stop the affected RCP(s).
	<ul style="list-style-type: none"> <li>o RCP #1 seal D/P - GREATER THAN 220 PSID</li> <li>o Check RCP seal leakage - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF</li> </ul>	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 24 of 25
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	Use intact S/G ARV for RCS temperature control.
31	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 32.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 32.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> <li>• AOV-371, letdown isolation valve</li> <li>• AOV-427, loop B cold leg to REGEN Hx</li> <li>• At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202)</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Reset both trains of XY relays for AOV-371 and AOV-427.</li> <li>2) Open AOV-371 and AOV-427.</li> <li>3) Open one letdown orifice valve.</li> </ol>
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 32.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 25 of 25
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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

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

32 Check CNMT Hydrogen  
Concentration:

a. Direct RP to start CNMT hydrogen  
monitors as necessary

b. Hydrogen concentration - LESS  
THAN 0.5%

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

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

Return to Step 3.

34 Evaluate Long Term Plant  
Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22  PAGE 1 of 1
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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) FOLDOUT



EOP: ECA-3.2	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED	REV: 22 PAGE 1 of 1
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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

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

- o Core exit T/Cs - INCREASING

-OR-

- o Check RVLIS indication:

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

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

2. SECONDARY INTEGRITY CRITERIA

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

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

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

4. AFW SUPPLY SWITCHOVER CRITERION

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



EOP: F-0.4	TITLE: INTEGRITY	REV: 2 PAGE 1 of 2
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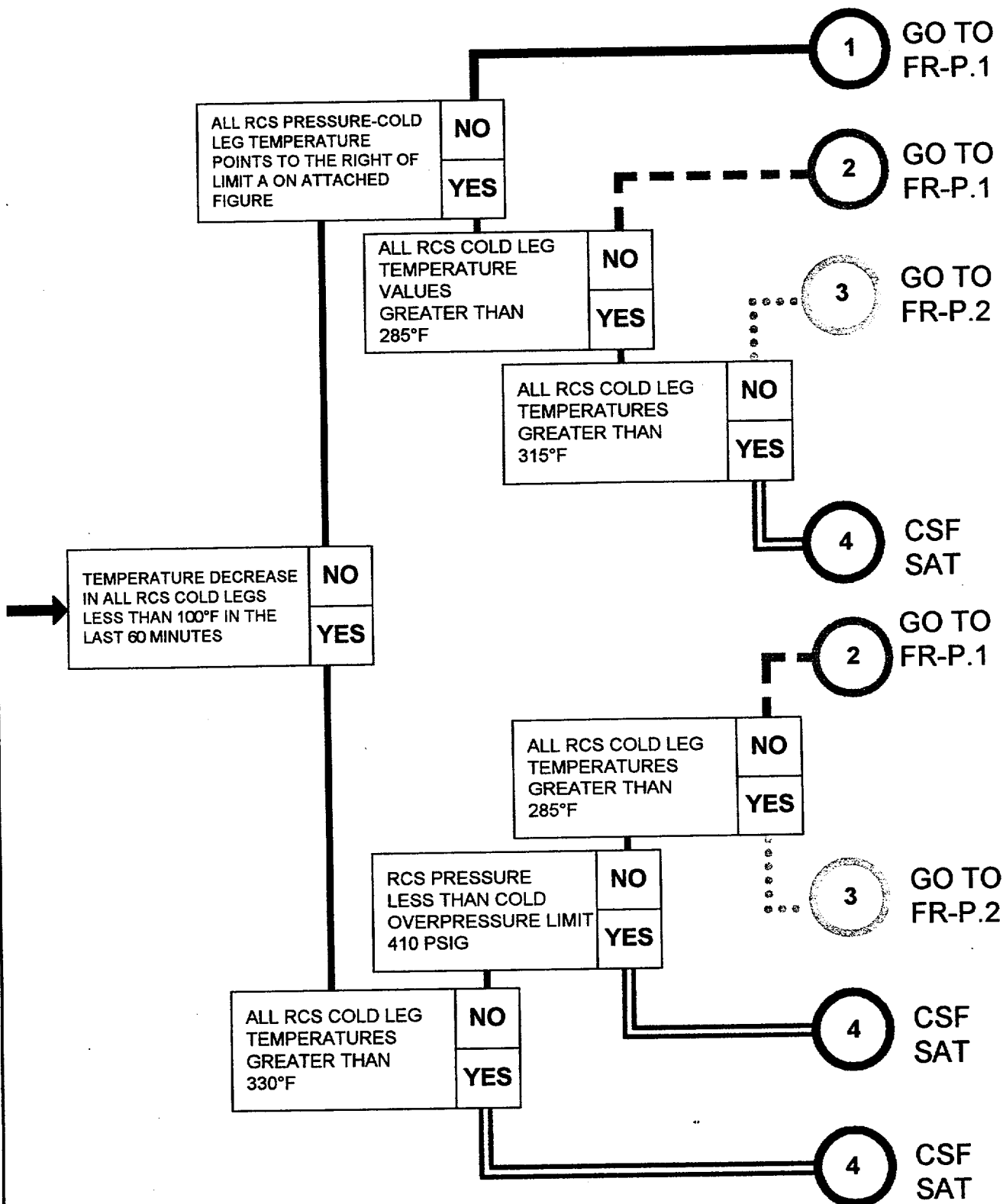
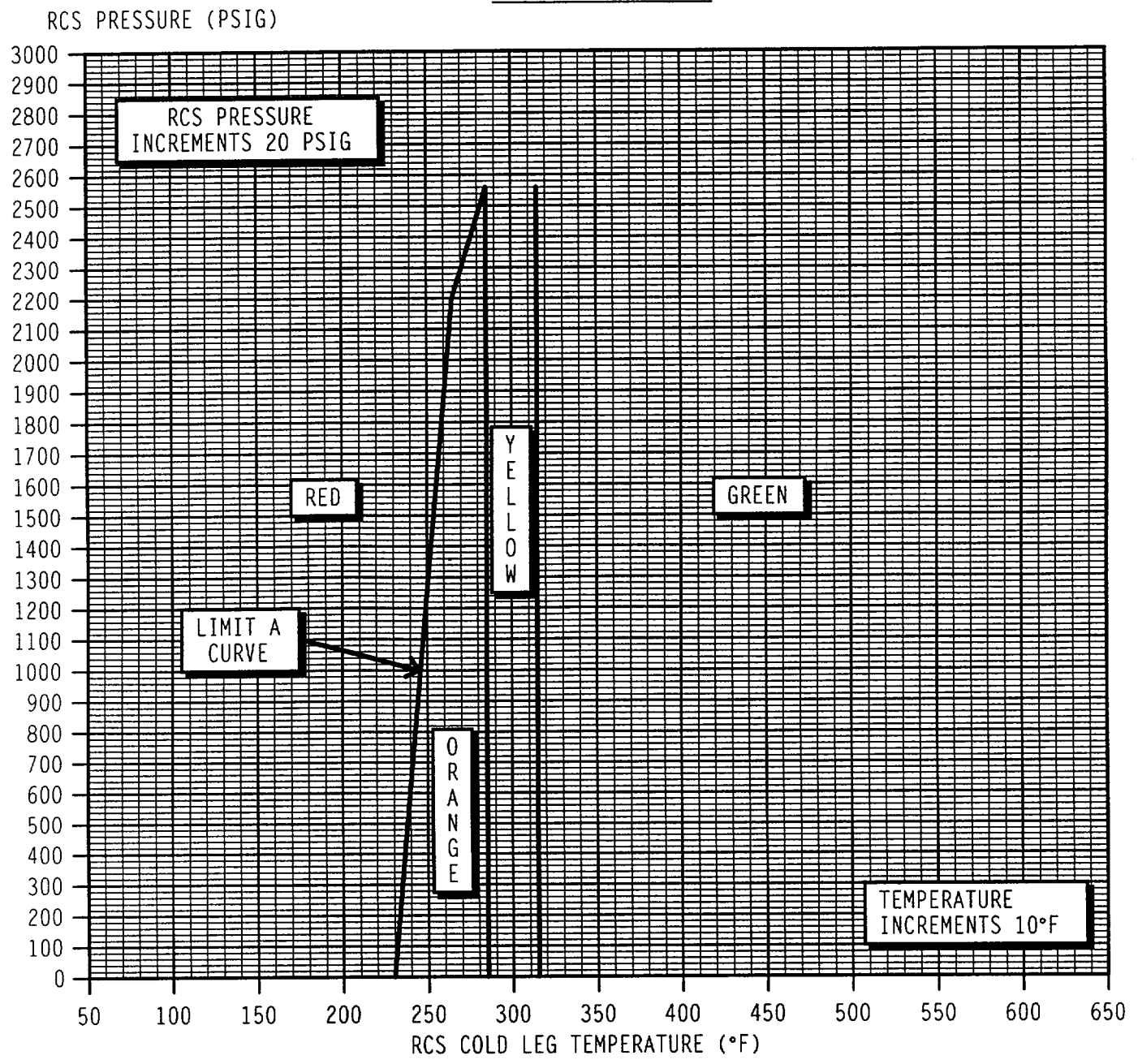


FIGURE LIMIT A



EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 1 of 12
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EOP:  FR-I.1	TITLE:  RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12  PAGE 2 of 12
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- A. PURPOSE - This procedure provides actions to respond to a high 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.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 3 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	Check RCS Hot Leg Temperature - STABLE OR DECREASING	Dump steam from intact S/G(s) to stabilize RCS temperature.
2	Verify Adequate SW Flow:	
a.	At least three 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) Ensure SW isolation  2) Go to Step 7.
b.	Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	
c.	Verify AUX BLDG SW isolation valves - AT LEAST ONE SET OPEN  • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735	c. Manually align valves.
d.	Verify CNMT RECIRC fans annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED	d. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 4 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	3 Establish IA to CNMT:	
	a. Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ul style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers:               <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ul>
	b. Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	b. Manually align valves.
	c. Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch A0 to locally reset compressors as necessary.
	d. Check IA supply: <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ul style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 7. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 3e and f.</li> </ul>
	e. Reset both trains of XY relays for IA to CNMT AOV-5392	
	f. Verify IA to CNMT AOV-5392 - OPEN	

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 5 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>CHARGING AND LETDOWN FLOW SHOULD BE CAREFULLY CONTROLLED TO AVOID SUDDEN RCS PRESSURE CHANGES SINCE THE PRZR MAY BE WATER SOLID.</p> <p>*****</p>		
4	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored:	a. Continue with Step 7. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 4 through 6.
	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.



EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 6 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Check If Seal Return Flow Should Be Established:	
a.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	a. Go to Step 7.
b.	Verify RCP seal outlet valves - OPEN <ul style="list-style-type: none"> <li>• AOV-270A</li> <li>• AOV-270B</li> </ul>	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"> <li>1) Place MOV-313 switch to OPEN.</li> <li>2) Dispatch AO with key to RWST gate to locally open MOV-313.</li> </ol>
e.	Verify RCP #1 seal leakoff flow - LESS THAN 6.0 GPM	e. Perform the following: <ol style="list-style-type: none"> <li>1) Trip the affected RCP</li> <li>2) Allow 4 minutes for pump coast down, <u>THEN</u> close the affected RCP seal discharge valve <ul style="list-style-type: none"> <li>• RCP A, AOV-270A</li> <li>• RCP B, AOV-270B</li> </ul> </li> </ol> <p><u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 7.</p>
f.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.8 GPM	f. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 7 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6 Check Normal Letdown - IN SERVICE	<p>Establish excess letdown as follows:</p> <ul style="list-style-type: none"> <li>o Place AOV-312 to NORMAL</li> <li>o Ensure open CCW from excess letdown, AOV-745.</li> <li>o Open excess letdown isolation valve AOV-310.</li> <li>o Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> </ul>	

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 8 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<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"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul> <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"> <li>1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to locally close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol> <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 manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).</li> </ol>

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 9 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Check Normal Letdown - IN SERVICE	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> <li>Establish charging flow to REGEN Hx greater than 20 gpm.</li> <li>Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>AOV-427, loop B cold leg to REGEN Hx</li> <li>AOV-371, letdown isolation valves</li> </ul> </li> <li>Place letdown controllers TCV-130 and PCV-135 in MANUAL at 40% open <ul style="list-style-type: none"> <li>TCV-130</li> <li>PCV-135</li> </ul> </li> <li>Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>Open AOV-371 and AOV-427</li> <li>Open letdown orifice valves as necessary</li> <li>Place TCV-130 in AUTO at 105°F</li> <li>Place PCV-135 in AUTO at 250 psig</li> <li>Adjust charging pump speed and HCV-142 as necessary</li> <li><u>WHEN</u> normal letdown in service, <u>THEN</u> secure excess letdown. <ul style="list-style-type: none"> <li>Close excess letdown flow control valve, HCV-123.</li> <li>Close excess letdown isolation valve, AOV-310.</li> </ul> </li> </ol>

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 10 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Check PRZR Pressure:	
a.	Pressure - LESS THAN 2335 PSIG	a. Verify at least one PRZR PORV and block valve open. <u>IF NOT</u> , <u>THEN</u> open one PORV and block valve as necessary until pressure less than 2335 psig. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS to operate PORVs.
b.	Pressure - LESS THAN 2260 PSIG	b. Control charging and letdown flow as necessary to decrease PRZR pressure to less than 2260 psig.
10	Verify PRZR PORVs - CLOSED	Manually close PORVs. <u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.
11	Restore PRZR To Saturation Conditions:	
a.	Verify letdown - IN SERVICE	a. Do <u>NOT</u> energize PRZR heaters. Continue with Step 13. <u>WHEN</u> letdown established, <u>THEN</u> energize PRZR heaters.
b.	Energize PRZR heaters	

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 11 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Check PRZR Spray Valves:	
	<p>a. Auxiliary spray valve (AOV-296) - CLOSED</p> <p>b. Verify normal PRZR spray valves - CLOSED</p> <ul style="list-style-type: none"> <li>• PCV-431A</li> <li>• PCV-431B</li> </ul>	<p>a. 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"> <li>1) Establish excess letdown (Refer to Step 6).</li> <li>2) Close loop B cold leg to REGEN Hx (AOV-427).</li> <li>3) Ensure HCV-142 demand at 0%.</li> </ol> <p>b. 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>
	<p><u>NOTE:</u> PRZR temperature at which bubble should form may be determined from steam table.</p>	
13	Control Charging And Letdown Flow As Necessary To Maintain RCS Pressure Stable	
14	Check PRZR level - LESS THAN 87%	Return to Step 13.

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 12 of 12
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Return To Procedure And Step In Effect	
-END-		

EOP: FR-I.1	TITLE: RESPONSE TO HIGH PRESSURIZER LEVEL	REV: 12 PAGE 1 of 1
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FR-I.1 APPENDIX LIST

TITLE

- 1) ATTACHMENT N2 PORVS (ATT-12.0)
- 2) ATTACHMENT SD-1 (ATT-17.0)



EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14 PAGE 1 of 16
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EOP:  FR-I.3	TITLE:  RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14  PAGE 2 of 16
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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.

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14 PAGE 3 of 16
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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 CONTROLLED NATURAL CIRCULATION COOLDOWN IS IN PROGRESS AND A VOID IN THE REACTOR VESSEL UPPER HEAD IS EXPECTED, THIS PROCEDURE SHOULD NOT BE PERFORMED.</p> <p>*****</p> <p><u>NOTE:</u> Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p> <p>1 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>		

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14 PAGE 4 of 16
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	Verify Adequate SW Flow To CCW Hx:	
a.	Verify at least two SW pumps - RUNNING	a. Perform the following:  1) Verify adequate power to operate two SW pumps (257 kw per pump).  <u>IF NOT, THEN</u> shed sufficient non-essential loads.  • CNMT RECIRC fans • Charging pumps • IA compressors • PRZR heaters • Rx compartment cooling fans • Control rod shroud fans  2) Ensure two SW pumps running.
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. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14 PAGE 5 of 16
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Establish IA to CNMT:	
a.	Verify non-safeguards busses energized from offsite power <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ol style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ol>
b.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	b. Perform the following: <ol style="list-style-type: none"> <li>1) Manually open valves.</li> <li>2) Dispatch AO to reset air compressors as required.</li> </ol>
c.	Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each).
d.	Check IA supply: <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 4. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 3e and f.</li> </ol>
e.	Reset both trains of XY relays for IA to CI valve AOV-5392	
f.	Open IA AOV-5392	

EOP: FR-I.3	TITLE: RESPONSE TO VOIDS IN REACTOR VESSEL	REV: 14 PAGE 6 of 16
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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"> <li>1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol>
b.	Charging pump suction aligned to RWST: <ul style="list-style-type: none"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul>	<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 manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).</li> </ol>
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>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	<p>Check If Normal CVCS Operation Can Be Established</p> <p>a. Verify IA restored:</p> <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul> <p>b. Verify instrument bus D - ENERGIZED</p> <p>c. CCW pumps - ANY RUNNING</p>	<p>a. Continue with Step 8. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 5 through 7.</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"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ul> <p>c. Perform the following:</p> <ul style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ul>
6	<p>Verify PRZR Level - GREATER THAN 13% [40% adverse CNMT]</p>	<p>Continue with Step 8. <u>WHEN</u> PRZR level increases to greater than 13% [40% adverse CNMT], <u>THEN</u> do Step 7.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> <li>Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM</li> <li>Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>AOV-371, letdown isolation valve</li> <li>AOV-427, loop B cold leg to REGEN Hx</li> </ul> </li> <li>Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> <li>TCV-130</li> <li>PCV-135</li> </ul> </li> <li>Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>Open AOV-371 and AOV-427</li> <li>Open letdown orifice valves as necessary</li> <li>Place TCV-130 in AUTO at 105°F</li> <li>Place PCV-135 in AUTO at 250 psig</li> <li>Adjust charging pump speed and HCV-142 as necessary</li> </ol>	<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"> <li>Place excess letdown divert valve, AOV-312, to NORMAL.</li> <li>Ensure CCW from excess letdown open, (AOV-745).</li> <li>Open excess letdown isolation valve AOV-310.</li> <li>Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> <li>Adjust charging pump speed as necessary.</li> </ul> <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
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.
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RHR NORMAL COOLING IN SERVICE, THEN RCS PRESSURE SHOULD BE MAINTAINED LESS THAN THE RCS OVERPRESSURE PROTECTION SETPOINT (410 PSIG).</p> <p>*****</p>		
10	Check If RCS Pressure Should Be Increased:	
	a. Pressure - AT LEAST 100 PSI BELOW LIMIT ON FIGURE TECH SPEC C/D (100°F/HR)	a. Go to Step 13.
	b. Energize PRZR heaters to increase RCS pressure by 50 psi	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Control Charging And Letdown As Necessary To Maintain PRZR Level Greater Than 13% [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
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CAUTION

IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.

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13 Try To Start One RCP:

- |   |  |
|---|--|
| <p>a. Establish the following conditions prior to RCP start:</p> <ul style="list-style-type: none"> <li>o PRZR level - GREATER THAN 65% [82% adverse CNMT]</li> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING</li> <li>o Energize PRZR heaters as necessary to saturate PRZR water</li> <li>o Bus 11A or 11B - ENERGIZED</li> <li>o Refer to Attachment RCP START</li> </ul> <p>b. Start one RCP</p> | <p>a. <u>IF</u> conditions can <u>NOT</u> be established, <u>THEN</u> go to Step 16.</p> |
|---|--|

14 Check RVLIS Indication

Go to Step 16.

- o Level (no RCPs) - GREATER THAN 95%

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 97%

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15	Go To Step 24	
16	Direct RP To Start CNMT Hydrogen Monitors	
17	Check If SI Should Be Blocked:	
	a. PRZR pressure - GREATER THAN 1750 PSIG	a. Go to Step 18.
	b. PRZR pressure - LESS THAN 1950 PSIG	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.
	c. Block SI	
18	Record RCS Pressure and CNMT Hydrogen Concentration on Attachment VENT TIME	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 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.
20 Prepare CNMT For Reactor Vessel Venting:		
a. Verify CNMT ventilation isolation valves - CLOSED		a. Manually close valves.
<ul style="list-style-type: none"> <li>• CNMT MINI PURGE EXH VLVs (AOV-7970, AOV-7971)</li> <li>• CNMT MINI PURGE SPLY VLVs (AOV-7445, AOV-7448)</li> <li>• CNMT AIR SAMPLE ISO VLVs (AOV-1597, AOV-1598, AOV-1599)</li> </ul>		
b. Verify the following CNMT ventilation equipment in service:		b. Manually start fans as power supply permits.
<ul style="list-style-type: none"> <li>• All CNMT RECIRC fans</li> <li>• One reactor compartment cooling fan</li> <li>• One control rod shroud fan</li> </ul>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Determine Maximum Allowable Venting Time:	
	<ul style="list-style-type: none"> <li>a. CNMT hydrogen concentration - LESS THAN 3%</li> <li>b. Determine maximum venting time (Refer to Attachment VENT TIME)</li> </ul>	<ul style="list-style-type: none"> <li>a. Consult TSC to evaluate methods to reduce hydrogen concentration to less than 3%.</li> </ul>
22	Review Reactor Vessel Venting Termination Criteria:	
	<ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs -LESS THAN 10°F USING FIGURE MIN SUBCOOLING</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o PRZR level - LESS THAN 13% [40% adverse CNMT]</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o RCS pressure - DECREASES BY 200 PSI</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o Venting time - GREATER THAN MAXIMUM TIME CALCULATED IN STEP 21</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o RVLIS level (no RCPs) - GREATER THAN 95%</li> </ul>	
	-OR-	
	<ul style="list-style-type: none"> <li>o RVLIS fluid fraction (any RCP running) - GREATER THAN 97%</li> </ul>	

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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.

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NOTE: The reactor vessel head vents should not be opened unless specifically directed by PORC.

23 Vent Reactor Vessel:

a. Open train A Rx vessel head vent valves <ul style="list-style-type: none"><li>• SOV-590</li><li>• SOV-592</li></ul>	a. <u>IF</u> either valve fails to open, <u>THEN</u> close both valves and open train B valves. <ul style="list-style-type: none"><li>• SOV-591</li><li>• SOV-593</li></ul>
b. Any venting termination criterion - EXCEEDED	b. Continue venting. <u>WHEN</u> any venting termination criterion is exceeded, <u>THEN</u> do Steps 23c, 24, 25 and 26.
c. Close all vent valves	

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%	
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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-		



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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)

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 22 PAGE 1 of 22
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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

  
RESPONSIBLE MANAGER

3-31-2000  
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: \_\_\_\_\_

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 22 PAGE 2 of 22
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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.

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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 SWITCH TO ALTERNATE AFW WATER SUPPLY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO THE AFW PUMPS).</p> <p>*****</p> <p><u>NOTE</u>: Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than <math>10^{+05}</math> R/hr.</p> <div> <div> 1 Check RCS Pressure - GREATER THAN 250 PSIG [465 PSIG adverse CNMT] </div> <div> <u>IF</u> RHR flow greater than 475 gpm, <u>THEN</u> return to procedure and step in effect. </div> </div>		

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 22 PAGE 4 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 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> <ol style="list-style-type: none"> <li>a. Ensure S/G ARVs closed.</li> <li>b. Close both S/G MSIVs.</li> <li>c. Ensure MFW flow control valves closed. <ul style="list-style-type: none"> <li>• MFW regulating valves</li> <li>• MFW bypass valves</li> </ul> </li> <li>d. Ensure MFW pumps tripped.</li> <li>e. Ensure reheater steam supply valves are closed.</li> <li>f. <u>IF</u> S/G pressure less than condensate pressure, <u>THEN</u> stop all condensate pumps.</li> <li>g. <u>IF</u> RHR system in service, <u>THEN</u> stop any cooldown from RHR system.</li> <li>h. Control total feed flow to non-faulted S/G(s) greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one non-faulted S/G. <u>WHEN</u> S/G level greater than 5% [25% adverse CNMT] in one non-faulted S/G, <u>THEN</u> limit feed flow to stop RCS cooldown.</li> </ol>

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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>		
3	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> <li>o Pressure in both S/Gs - STABLE OR INCREASING</li> <li>o Pressure in both S/Gs - GREATER THAN 110 PSIG</li> </ul>	<p>Minimize cooldown from faulted S/G(s):</p> <ul style="list-style-type: none"> <li>a. Close faulted S/G(s) TDAFW pump steam supply valve(s). <ul style="list-style-type: none"> <li>• S/G A, MOV-3505A</li> <li>• S/G B, MOV-3504A</li> </ul> </li> <li>b. <u>IF</u> both S/G(s) faulted, <u>THEN</u> control feed flow at 50 gpm to each S/G.</li> <li>c. <u>IF</u> any S/G <u>NOT</u> faulted, <u>THEN</u> isolate all feedwater to faulted S/G 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.</li> </ul>
4	<p>Check PRZR PORV Block Valves:</p> <ul style="list-style-type: none"> <li>a. Power to PORV block valves - AVAILABLE</li> <li>b. Block valves - AT LEAST ONE OPEN</li> </ul>	<ul style="list-style-type: none"> <li>a. Restore power to block valves unless block valve was closed to isolate an open PORV: <ul style="list-style-type: none"> <li>• MOV-515, MCC D position 6C</li> <li>• MOV-516, MCC C position 6C</li> </ul> </li> <li>b. Open one block valve unless it was closed to isolate an open PORV. <p><u>IF</u> at least one block valve can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally check breaker.</p> <ul style="list-style-type: none"> <li>• MOV-515, MCC D position 6C</li> <li>• MOV-516, MCC C position 6C</li> </ul> </li> </ul>

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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, THEN STEP 5 SHOULD BE PERFORMED AFTER PRESSURE DECREASES TO LESS THAN THE APPLICABLE PORV SETPOINT.</p> <p>*****</p>		
5	Check PRZR PORV Status:	
a.	Check Reactor Vessel Overpressure Protection System - IN SERVICE	a. Go to Step 5d.
b.	Check RCS pressure - LESS THAN 410 PSIG	b. Perform the following: <ul style="list-style-type: none"> <li>1) Ensure at least one PRZR PORV open.</li> <li>2) Continue with Step 6. <u>WHEN</u> pressure less than setpoint, <u>THEN</u> do Step 5e.</li> </ul>
c.	Go to Step 5e	
d.	PRZR pressure - LESS THAN 2335 PSIG	d. Perform the following: <ul style="list-style-type: none"> <li>1) Ensure at least one PRZR PORV open.</li> <li>2) Continue with Step 6. <u>WHEN</u> pressure less than setpoint, <u>THEN</u> do Step 5e.</li> </ul>
e.	Verify PRZR PORVs - CLOSED	e. Manually close valve. <p><u>IF</u> any valve can <u>NOT</u> be closed, <u>THEN</u> manually close its block valve.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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6 Check SI Pumps - ANY RUNNING

Go to Step 14.

7 Check If SI Can Be Terminated:

Perform the following:

- o RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIGURE MIN SUBCOOLING
- o Check RVLIS indication:
  - o Level (no RCPs) - GREATER THAN 77% [82% adverse CNMT]

- a. IF RCS subcooling based on core exit T/Cs greater than 0°F using Figure MIN SUBCOOLING and no RCP running, THEN attempt to start an RCP:

- 1) Establish conditions for starting an RCP:

-OR-

- o Bus 11A or 11B energized

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

- o Refer to Attachment RCP START

- 2) IF conditions established, THEN start one RCP.

b. Go to Step 28.

\*\*\*\*\*

CAUTION

IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.

\*\*\*\*\*

8 Reset SI



EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 22 PAGE 8 of 22
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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          b. Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1)	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) Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1).  3) Go to Step 13. <u>WHEN</u> adequate SW available, <u>THEN</u> do Step 12.

EOP: FR-P.1	TITLE: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	REV: 22 PAGE 9 of 22
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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 <ul style="list-style-type: none"> <li>o Bus 13 normal feed - CLOSED</li> <li>-OR-</li> <li>o Bus 15 normal feed - CLOSED</li> </ul>	a. Perform the following: <ol style="list-style-type: none"> <li>1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> <li>• Bus 13 to Bus 14 tie</li> <li>• Bus 15 to Bus 16 tie</li> </ul> </li> <li>2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).  <u>IF NOT, THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).</li> <li>3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting.</li> </ol>
b.	Verify SW isolation valves to turbine building - OPEN <ul style="list-style-type: none"> <li>• MOV-4613 and MOV-4670</li> <li>• MOV-4614 and MOV-4664</li> </ul>	b. Manually align valves.
c.	Verify adequate air compressor(s) - RUNNING	c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.
d.	Check IA supply: <ul style="list-style-type: none"> <li>o Pressure - GREATER THAN 60 PSIG</li> <li>o Pressure - STABLE OR INCREASING</li> </ul>	d. Perform the following: <ol style="list-style-type: none"> <li>1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).</li> <li>2) Continue with Step 13. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12e and f.</li> </ol>
e.	Reset both trains of XY relays for IA to CNMT AOV-5392	
f.	Verify IA to CNMT AOV-5392 - OPEN	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13	<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"> <li>o LCV-112B - OPEN</li> <li>o LCV-112C - CLOSED</li> </ul> <p>c. Start charging pumps as necessary to establish charging line flow to REGEN HX - GREATER THAN 20 GPM</p>	<p>a. Perform the following:</p> <ol style="list-style-type: none"> <li>1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with key to RWST gate to locally close seal injection needle valve(s) to affected RCP: <ul style="list-style-type: none"> <li>• RCP A, V-300A</li> <li>• RCP B, V-300B</li> </ul> </li> <li>2) Ensure HCV-142 open, demand at 0%.</li> </ol> <p>b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).</p> <p><u>IF</u> LCV-112C can <u>NOT</u> be closed, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> <li>1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.</li> <li>2) Direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).</li> </ol>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*14	<p>Monitor SI Reinitiation Criteria:</p> <ul style="list-style-type: none"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN FIGURE MIN SUBCOOLING</li> <li>o RVLIS indication: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 77% [82% adverse CNMT]</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 84%</li> </ul>	<p>Manually start SI pumps as necessary and perform the following:</p> <ul style="list-style-type: none"> <li>a. <u>IF</u> RCS subcooling based on core exit T/Cs greater than Figure MIN SUBCOOLING and no RCP running, <u>THEN</u> attempt to start a RCP: <ul style="list-style-type: none"> <li>1) Establish conditions for starting an RCP: <ul style="list-style-type: none"> <li>o Bus 11A or 11B energized</li> <li>o Refer to Attachment RCP START</li> </ul> </li> <li>2) <u>IF</u> conditions established, <u>THEN</u> start one RCP.</li> </ul> </li> <li>b. Go to Step 28.</li> </ul>
15	<p>Check RCS Hot Leg Temperatures - STABLE</p>	<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>

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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"> <li>o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</li> <li>o RVLIS indication: <ul style="list-style-type: none"> <li>o Level - GREATER THAN 77% [82% adverse CNMT]</li> </ul> </li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>o Fluid fraction (any RCP running) - GREATER THAN 84%</li> </ul> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-841, MCC C position 12F</li> <li>• MOV-865, MCC D position 12C</li> </ul> <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> <li>• MOV-841</li> <li>• MOV-865</li> </ul> <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"> <li>1) Open vent valves for unisolated SI ACCUMs. <ul style="list-style-type: none"> <li>• ACCUM A, AOV-834A</li> <li>• ACCUM B, AOV-834B</li> </ul> </li> <li>2) Open HCV-945.</li> <li>3) Continue with Step 17. Do <u>NOT</u> decrease RCS pressure to less than unisolated ACCUM pressure.</li> </ol>

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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 RCS SHOULD NOT BE DEPRESSURIZED TO LESS THAN SI ACCUM PRESSURE UNTIL SI ACCUMS ISOLATED.</p> <p>o VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p>*****</p> <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>o When using a PRZR PORV select one with an operable block valve.</p> <p>17 Depressurize RCS To Decrease RCS Subcooling:</p> <p>a. Depressurize using normal PRZR spray if available</p> <p>a. <u>IF</u> normal spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p><u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p>b. Depressurize RCS until one of the following conditions satisfied:</p> <p>o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING</p> <p style="text-align: center;">-OR-</p> <p>o PRZR level - GREATER THAN 75% [65% adverse CNMT]</p> <p style="text-align: center;">-OR-</p> <p>o RCS pressure - LESS THAN 160 psig [200 psig adverse CNMT]</p> <p>c. Stop RCS depressurization</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>*18 Monitor RCP Operation:</b></p> <p>a. RCPs - ANY RUNNING</p> <p>b. Check the following:</p> <ul style="list-style-type: none"> <li>o RCP #1 seal D/P - GREATER THAN 220 PSID</li> <li>o RCP #1 seal leakoff - WITHIN THE NORMAL OPERATING RANGE OF FIGURE RCP SEAL LEAKOFF</li> </ul> <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>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.</p> <p>*****</p>		
19 Check PRZR Level - GREATER THAN 13% [40% adverse CNMT]		<p>Try to restore level with charging while maintaining stable RCS pressure. <u>IF</u> level can <u>NOT</u> be restored, <u>THEN</u> go to Step 27.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	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> go to Step 25. <u>WHEN</u> two SW pumps can be operated <u>THEN</u> do Steps 21 through 24.
b.	Verify AUX BLDG SW isolation valves - OPEN	b. Manually align valves.
	<ul style="list-style-type: none"> <li>• MOV-4615 and MOV-4734</li> <li>• MOV-4616 and MOV-4735</li> </ul>	
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
21	Check If Normal CVCS Operation Can Be Established	
a.	Verify IA restored: <ul style="list-style-type: none"> <li>o IA to CNMT (AOV-5392) - OPEN</li> <li>o IA pressure - GREATER THAN 60 PSIG</li> </ul>	a. Continue with Step 25. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 21 through 24.
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"> <li>1) Verify MCC A energized.</li> <li>2) Place instrument bus D on maintenance supply.</li> </ol>
c.	CCW pumps - ANY RUNNING	c. Perform the following: <ol style="list-style-type: none"> <li>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"> <li>• RCP A, MOV-749A and MOV-759A</li> <li>• RCP B, MOV-749B and MOV-759B</li> </ul> </li> <li>2) Manually start one CCW pump.</li> </ol>
d.	Charging pump - ANY RUNNING	d. Continue with Step 26. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 22 through 26.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;">*****  <u>CAUTION</u>  IF RCS PRESSURE LESS THAN 250 PSIG, THEN PCV-135 SHOULD BE ADJUSTED TO ESTABLISH DESIRED LETDOWN FLOW, NOT TO INCREASE PRESSURE.  *****</p>		
22	<p>Establish Normal Letdown:</p> <ol style="list-style-type: none"> <li>Establish charging line flow to REGEN Hx - GREATER THAN 20 GPM</li> <li>Place the following switches to CLOSE: <ul style="list-style-type: none"> <li>Letdown orifice valves (AOV-200A, AOV-200B, and AOV-202)</li> <li>AOV-371, letdown isolation valve</li> <li>AOV-427, loop B cold leg to REGEN Hx</li> </ul> </li> <li>Place letdown controllers in MANUAL at 40% open <ul style="list-style-type: none"> <li>TCV-130</li> <li>PCV-135</li> </ul> </li> <li>Reset both trains of XY relays for AOV-371 and AOV-427</li> <li>Open AOV-371 and AOV-427</li> <li>Open letdown orifice valves as necessary</li> <li>Place TCV-130 in AUTO at 105°F</li> <li>Place PCV-135 in AUTO at 250 psig</li> <li>Adjust charging pump speed and HCV-142 as necessary</li> </ol>	<p>IF RCP seal return has been established, <u>THEN</u> establish excess letdown as follows:</p> <ul style="list-style-type: none"> <li>Place excess letdown divert valve, AOV-312, to NORMAL.</li> <li>Ensure CCW from excess letdown open, (AOV-745).</li> <li>Open excess letdown isolation valve AOV-310.</li> <li>Slowly open HCV-123 to maintain excess letdown temperature less than 195°F and pressure less than 100 psig.</li> <li>Adjust charging pump speed as necessary.</li> </ul> <p>IF 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
23	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
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"> <li>1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> <li>o LCV-112B open</li> <li>o LCV-112C closed</li> </ul> </li> <li>2) Continue with Step 25. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 24b.</li> </ol>
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>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><u>NOTE:</u> For optimum long term pressure control, saturated conditions should be restored in the PRZR.</p>		
26	Verify PRZR Liquid Temperature (TI-424) - AT SATURATION FOR DESIRED PRESSURE	<u>IF</u> PRZR liquid temperature low, <u>THEN</u> energize PRZR heaters as necessary to establish desired temperature.
27	Check RCS Subcooling Based On Core Exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING	<p><u>IF</u> RCS pressure less than 160 psig [200 psig adverse CNMT], <u>THEN</u> go to Step 28. <u>IF NOT</u>, <u>THEN</u> depressurize using normal spray. Return to step 17b.</p> <p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray for any further depressurization. Return to Step 17b.</p> <p><u>IF</u> auxiliary spray <u>NOT</u> available, <u>THEN</u> return to Step 17a.</p>
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	

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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 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 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 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 Attachment RCP START
- b. IF conditions established, THEN start one RCP.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Return To Procedure And Step In Effect	
		-END-

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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)