PORTLAND GENERAL ELECTRIC COMPANY

TROJAN NUCLEAR PLANT

May 27, 1992

Revision 7 *

QUALITY-RELATED

EMERGENCY CONTINGENCY ACTION - ECA-3.1

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED

RESPONSIBLE DEPARTMENT: OPERATIONS

APPROVED BY: [signature] DATE: 9-29-92
PROCEDURE MANAGER

EFFECTIVE DATE: 9-30-92

This procedure contains the following attachments:

1. RCS SUBCOOLING CURVE.
2. STARTING AN INSTRUMENT AIR COMPRESSOR.
3. ESTABLISHING S/G BLOWDOWN SAMPLING.
4. EXPECTED CONTAINMENT SUMP LEVEL DETERMINATION.
5. NATURAL CIRCULATION VERIFICATION.
6. RCP NUMBER ONE SEAL LEAKOFF FLOW OPERATING RANGE.
7. RCS COOLDOWN DATA.

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.

* This procedure has been extensively revised.

ZNDM.708

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

B. ENTRY CONDITIONS

This procedure is entered from:

1. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 3, if a ruptured S/G can not be isolated from any intact S/G.

2. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 5, if PZR PORV can not be isolated by closing its block valve.

3. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 13, if a ruptured S/G pressure is <270 psig.

4. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 15, if no intact S/G is available for RCS cooldown.

5. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 16, if a ruptured S/G pressure continues to decrease following RCS cooldown.

6. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 17, if RCS subcooling is less than required.

7. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 20, if RCS pressure does not increase after closing PZR PORV and block valve.

8. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 21, and ECA-3.3, (SGTR WITHOUT PRESSURIZER PRESSURE CONTROL), Step 8, if ECCS can not be terminated.

9. EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 24, and ECA-3.3, (SGTR WITHOUT PRESSURIZER PRESSURE CONTROL), Step 11, if ECCS flow is required.

10. ES-3.1, (POST-SGTR COOLDOWN USING BACKFILL), Step 2.
ES-3.2, (POST-SGTR COOLDOWN USING BLOWDOWN), Step 2, and
ES-3.3, (POST-SGTR COOLDOWN USING STEAM DUMP), Step 2, if SI Accumulators should not be isolated.

11. ES-3.1, (POST-SGTR COOLDOWN USING BACKFILL), Step 6.
ES-3.2, (POST-SGTR COOLDOWN USING BLOWDOWN, Step 6 and Step 15.
ES-3.3, (POST-SGTR COOLDOWN USING STEAM DUMP), Step 6 and Step 15 if a non-ruptured S/G is not available for RCS cooldown.

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8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

** **
*
* CAUTION *
*
* • If RWST level reaches the low level setpoint of 48%, align *
* the ECCS for cold leg recirculation per ES-1.3, (TRANSFER *
* TO COLD LEG RECIRCULATION). *
*
* • If loss of off-site power occurs after SI reset, then only *
* those loads initiated by the Shutdown Sequencer will *
* restart on the EDG. *
*
* • Following SI reset, automatic reinitiation of SI will NOT *
* occur until the reactor trip breakers are closed. *
*
** **

1. **Reset SI**

2. **Reset CIS:**

   • Reset CIS Phase A

   • Reset CIS Phase B

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Action/Expected Response	Response Not Obtained
3. **Establish Instrument Air To Containment:**	
a. Check Instrument Air Compressor available. • Any Instrument Air Compressor - RUNNING • BCW Pump - RUNNING • BCW - COOLED BY SERVICE WATER	a. IF power available to any Instrument Air Compressor, THEN restore cooling from BCW and Service Water AND LOCALLY start an Instrument Air Compressor. IF NOT, THEN LOCALLY start Diesel Air Compressor. **REFER TO OI T-67, (TEMPORARY BACKUP DIESEL AIR COMPRESSOR).** IF NOT able to start Diesel Air Compressor, THEN LOCALLY start an Instrument Air Compressor using Attachment 2, STARTING AN INSTRUMENT AIR COMPRESSOR.
b. Instrument Air Supply To Containment (CV-4471) - OPEN	b. MANUALLY OR LOCALLY open valve. IF Instrument Air pressure is NOT normal, THEN dispatch operator to LOCALLY verify air compressors and air dryers operating correctly. **REFER TO ONI 51, (LOSS OF INSTRUMENT AIR).**

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8. **CONTINUOUS ACTION STEPS**
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   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

** **

CAUTION

EDGs should NOT be run for >4 hours with <1100 KW load.

** **

Action/Expected Response	Response Not Obtained
4. @ **Verify All AC Buses Energized By Off-Site Power:**	
a. V81 and V82 bus voltage - NORMAL	a. Coordinate with Load Dispatcher to restore an incoming line. **REFER TO ONI-31, (230 KV SYSTEM FAULTS).**
b. S/U transformer breakers to H1 and H2 - CLOSED • H-102 • H-202	b. IF power is available in the switchyard, THEN restore power to H1 and H2. **REFER TO ONI-32, (12.47 KV AND 4.16 KV SYSTEM FAULTS).**
c. Verify A1 AND A2 - ENERGIZED BY OFF-SITE POWER	c. Try to restore off-site power to A1 AND A2. **REFER TO ONI-32, (12.47 KV AND 4.16 KV SYSTEM FAULTS.** IF off-site power can NOT be restored to A1 AND A2, THEN place additional equipment on any loaded EDG. **REFER TO ONI-50, (PLANT OPERATION AFTER A LOSS OF OFF-SITE POWER).** CONTINUE efforts to restore power while continuing with this procedure.
d. Stop any unloaded EDG and place in Standby by performing the following: 1) Place unloaded EDG's IDLE AFTER AUTO START switch to IDLE 2) Place unloaded EDG's START/STOP CONTROL switch to STOP	

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   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
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   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
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   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
5. **Check If Containment Spray Should Be Stopped:**	
a. Containment Spray Pumps - AT LEAST ONE RUNNING	a. **GO TO Step 6. OBSERVE CAUTIONS prior to Step 6.**
b. Containment Pressure - <10 psig AND Spray Add Tank level - <4%	b. WHEN Spray Add Tank level <4%, THEN perform the following: 1) Reset SPRAY A. 2) Reset SPRAY B. 3) Close Spray Add Tank Valves MO-2056A and MO-2056B. WHEN Containment pressure <10 psig AND Spray Add Tank level <4%, THEN perform Step 5.c. While waiting for these conditions **GO TO Step 6. OBSERVE CAUTIONS prior to Step 6.**
c. Place Containment Spray System in standby lineup: 1) Reset SPRAY A 2) Reset SPRAY B 3) Stop Containment Spray Pumps 4) Close Containment Spray Pumps Discharge Valves: • MO-2053A • MO-2053B 5) Close NaOH To Containment Spray Pumps: • MO-2056A • MO-2056B	

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Action/Expected Response	Response Not Obtained
** * CAUTION * * * Feedflow should NOT be established to any RUPTURED S/G that * * is also FAULTED unless needed for RCS cooldown. * * **	
6. **Check RUPTURED S/Gs Level:** @	
a. Verify narrow range level - >7% (>14% ACC)	a. Maintain feedflow to RUPTURED S/Gs until narrow range level >7% (>14% ACC). **Continue with Step 7.** WHEN RUPTURED S/Gs level >7% (>14% ACC), THEN **stop** feedflow to RUPTURED S/Gs.
b. top feedflow to RUPTURED S/Gs	

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Action/Expected Response	Response Not Obtained

CAUTION

- Containment Hydrogen Concentration indication will not be correct until the Hydrogen Analyzer is properly warmed up.
- To prevent an H_2 burn or explosion, the Hydrogen Recombiners should not be turned on if Containment H_2 concentration is $\geq 4\%$.

NOTE

This procedure should be continued while obtaining the hydrogen sample in Step 10.

10. @	**Check Containment Hydrogen Concentration:**	
	a. Current H_2 concentration measurement - AVAILABLE	a. Start Post-Accident Hydrogen Analyzers **using OI 11-9, (POST-ACCIDENT HYDROGEN ANALYZER OPERATION).** IF NO Post-Accident Hydrogen Analyzer is available, THEN direct Chemistry to obtain H_2 concentration **using CMP 40, (A GENERAL GUIDE FOR POST-ACCIDENT SAMPLING PREPARATIONS), and CMP 42, (SAMPLING OF CONTAINMENT ATMOSPHERE USING THE POST-ACCIDENT SAMPLING SYSTEM).** WHEN hydrogen concentration measurement available, THEN perform Steps 10.b and 10.c. While waiting for H_2 sample results, **GO TO Step 11.**

Step 10 continued on next page

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Action/Expected Response	Response Not Obtained
Step 10 continued	
b. Containment H_2 concentration - <4%	b. Notify TSC of Containment hydrogen concentration. **GO TO Step 11.**
c. Containment H_2 concentration - <0.5%	c. Start Hydrogen Recombiners **using OI 10-3, (CONTAINMENT HVAC).** IF Hydrogen Recombiners are NOT available, THEN consult TSC concerning operation of Containment Hydrogen Vent System.
11. **Check Auxiliary Building Radiation:** • PRM-2 - RADIATION NORMAL • PRM-5 - RADIATION NORMAL • PRM-7 - RADIATION NORMAL • PRM-8 - RADIATION NORMAL • ALL Aux. Building ARMs - RADIATION NORMAL	IF radiation is high, THEN investigate cause. Identify and isolate leakage.
12. **Notify Chemistry To Take The Following Samples:** • RCS activity • RCS boron • PZR activity • PZR boron • PZR vapor space H_2	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO E1-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO E1-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
13. **Evaluate The Following Plant Parameters and Equipment For Long-Term Availability And Restore To Operable Status As Conditions Warrant:** • PZR PORVs • AFW flow • S/G levels • RWST level • ECCS flows • Containment pressure • BASTs level • CST level • CACs • H_2 recombiners • H_2 vent • H_2 mixing fans • Electrical Distribution • RHR System • CCW System • Service Water System • Additional Air Compressors • CRDM Fans	
14. **Check For FAULTED S/Gs:** a. Check Pressure in ALL S/Gs - • S/G PRESSURE STABLE OR DECREASING IN A CONTROLLED MANNER • NO S/G COMPLETELY DEPRESSURIZED	a. **GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1,** unless EI-2, (FAULTED STEAM GENERATOR ISOLATION), already performed for the FAULTED S/Gs.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
** * CAUTION * * * * AFW Pumps will trip at a CST level of 35% unless blocked. * * * **	
15. @ **Check INTACT S/G Levels:** a. Verify NR Level in at least one INTACT S/G - >7% (>14% ACC) b. Control feedflow to maintain NR level in all INTACT S/Gs - BETWEEN 7% AND 50% (BETWEEN 14% AND 50% ACC)	a. Maintain feedflow >720 gpm until NR level is >7% (>14% ACC) in at least one INTACT S/G. b. IF NR Level in any INTACT S/G continues to increase in an uncontrolled manner, THEN **GO TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1.**
16. **Verify RUPTURED S/Gs Blowdown Sampling - IN SERVICE**	Establish Blowdown Sampling for RUPTURED S/Gs. Use Attachment 3, ESTABLISHING S/G BLOWDOWN SAMPLING
17. @ **Verify Adequate Shutdown Margin:** a. Notify Chemistry to sample RUPTURED S/Gs for boron concentration b. Notify Chemistry to sample RCS for boron concentration	
Step 17 continued on next page	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
Step 17 continued	
c. Shutdown Margin - ADEQUATE FOR COLD SHUTDOWN 1) Consult TSC for effect of RUPTURED S/Gs on RCS boron concentration 2) **REFER TO OI 11-8, (SHUTDOWN MARGIN)**, for aid in determination of desired RCS boron concentration	c. Borate RCS as necessary to obtain desired RCS boron concentration.
d. Continuously sample RCS for boron concentration	
e. Borate RCS as necessary to maintain desired RCS boron concentration	
18. **Initiate RCS Cooldown To Cold Shutdown:** a. During RCS cooldown perform Attachment 7, RCS COOLDOWN DATA	
b. Maintain RCS cooldown rate - <100°F/hr	
c. Use RHR System if in service in cooldown mode	
Step 18 continued on next page	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{3}$ R/HR.

3. **EI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

Step 18 continued

** **
*
CAUTION
*
*
* If LOLO TAVE INTERLOCK Switches are placed in BYPASS before *
* TAVE <553°F, then the steam dumps will close when TAVE *
* reaches 553°F and the LOLO TAVE INTERLOCK Switches must be *
* placed in BYPASS again. *
*
** **

d. Dump steam to condenser from INTACT S/Gs:

1) CONDENSER AVAILABLE C9 light on Permissive Status Panel - LIT

2) Verify INTACT S/Gs MSIV or MSIV Bypass - OPEN

3) Place Steam Dump Mode Selector in Steam Pressure Mode

4) Place BOTH LOLO TAVE INTERLOCK Switches in BYPASS

5) Operate Condenser Steam Dumps

d. Dump steam using INTACT S/Gs PORVs.

OR

Dump steam using INTACT S/Gs steam supply valve to Turbine AFP.

OR

Dump steam using INTACT S/Gs steamline low point drain to condenser:

1) LOCALLY close MANUAL isolation for RUPTURED S/Gs steamline low point drain to condenser:

S/G	MANUAL ISO
A	MS-012
B	MS-009
C	MS-010
D	MS-011

2) OPEN steamline HP Drain to condenser.

Step 18 continued on next page

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
Step 18 continued	
	3) LOCALLY OPEN steamline low point drain trap bypass from INTACT S/G to condenser: (Located on the 45' elevation between the Steam Dumps and the "B" Condenser)

S/G	BYPASS VALVE
A	CO-390
B	CO-395
C	CO-400
D	CO-405

IF no INTACT S/G available AND RHR System NOT in service, THEN perform the following:

- Use FAULTED S/G

OR

- Use RUPTURED S/G.

19. **Check RCS Subcooling Based On Core Exit TCs** - >25°F (>75°F ACC)	GO TO Step 33.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
20. @ **Check If Subcooled Recovery Is Appropriate:**	
a. Check RWST level - >60%	a. Determine expected Containment Sump level using Attachment 4, EXPECTED CONTAINMENT SUMP LEVEL DETERMINATION. IF Containment Sump level is less than expected, THEN **GO TO ECA-3.2, (SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED), Step 1.**
b. Check RUPTURED S/Gs NR level - <93% (<86% ACC)	b. Consult TSC to determine if recovery should be completed using ECA-3.2, (SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED).
21. **Check If ECCS Is In Service:** • SI Pumps - ANY RUNNING OR • BIT Outlet Valves - OPEN • MO-8801A • MO-8801B OR • RHR Pumps - ANY RUNNING IN SI MODE	**GO TO Step 29.**
22. **Place All PZR Heater Switches In The Off Position**	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

CAUTION

During rapid RCS depressurization void formation may occur in the reactor vessel head. This may result in rapid PZR level changes during depressurization, PZR spray, or pressurization.

Action/Expected Response	Response Not Obtained
23. <u>Depressurize The RCS To Refill The PZR</u>:	
a. Use normal PZR spray	a. Use one PZR PORV. <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray. **REFER TO OI 3-3, (PRESSURIZER SYSTEM OPERATION).**
b. PZR level - >21% (>45% ACC)	b. **Continue with Step 24.** <u>WHEN</u> PZR level >21% (>45% ACC), <u>THEN</u> stop RCS depressurization.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

** **
*
* CAUTION *
*
* • If RCP seal cooling has been previously lost, then the affected RCP should NOT be started prior to a status evaluation. *
*
* • On natural circulation, RTD bypass temperatures and associated interlocks will NOT be accurate. *
*
** **

NOTE

If possible RCP "B" should be run to provide normal PZR spray.

24.	**Check If An RCP Should Be Started:**	
	a. All RCPs - STOPPED	a. Stop all but one RCP. **GO TO Step 25. OBSERVE NOTEs prior to Step 25.**
	b. RCS subcooling based on core exit TCs - >25°F (>75°F ACC)	b. **GO TO Step 33.**
	c. PZR level - >21% (>45% ACC)	c. **RETURN TO Step 23. OBSERVE CAUTION prior to Step 23.**
	d. Establish conditions for starting an RCP, **REFER TO OI 3-4, (REACTOR COOLANT PUMP)** (exception: proper VCT pressure is not required for RCP restart)	
	e. Start one RCP	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO E1-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO E1-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

NOTE

- After stopping any ECCS Pumps, RCS pressure should be allowed to stabilize before stopping another ECCS Pump.
- The CCPs and SI Pumps should be stopped in alternate trains when possible.

25. **Check If One CCP Should Be Stopped:**	
a. Two CCPs - RUNNING	a. **GO TO Step 26.**
b. Determine required RCS subcooling using Table 1	

TABLE 1

SI PUMP STATUS	REQUIRED RCS SUBCOOLING
NONE RUNNING	94°F (221°F ACC)
ONE RUNNING	60°F (181°F ACC)
TWO RUNNING	57°F (177°F ACC)

c. RCS subcooling based on core exit TCs - GREATER THAN REQUIRED SUBCOOLING	c. IF RCS hot leg temperatures >395°F (>400°F ACC), THEN **GO TO Step 33.** IF RCS hot leg temperatures <395°F (<400°F ACC), THEN start one RHR pump if none running. IF at least one RHR Pump can NOT be started, THEN **GO TO Step 33.**
d. PZR level - >21% (>45% ACC)	d. Do NOT stop CCP. **RETURN TO Step 23. OBSERVE CAUTION prior to Step 23.**
e. Stop one CCP	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-3, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
26. **Check If One SI Pump Should Be Stopped:**	
a. Any SI Pump - RUNNING	a. **GO TO Step 27.**
b. Determine required RCS subcooling using Table 2	

TABLE 2

SI PUMP STATUS	REQUIRED RCS SUBCOOLING	
	ONE CCP RUNNING	NO CCP RUNNING
ONE RUNNING	144°F (269°F ACC)	500°F
TWO RUNNING	50°F (168°F ACC)	63°F (182°F ACC)

c. RCS subcooling based on core exit TCs - GREATER THAN REQUIRED SUBCOOLING	c. IF RCS hot leg temperatures >395°F (>400°F ACC), THEN **GO TO Step 33.** IF RCS hot leg temperatures <395°F (<400°F ACC), THEN start one RHR Pump if none running. IF at least one RHR Pump can NOT be started, THEN **GO TO Step 33.**
d. PZR level - >21% (>45% ACC)	d. Do NOT stop SI Pump. **RETURN TO Step 23. OBSERVE CAUTION prior to Step 23.**
e. Stop one SI Pump	
f. **RETURN TO Step 26.a**	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
27. **Check If Normal Charging Should Be Established:**	
a. Check the following: • SI Pumps - BOTH STOPPED • CCPs - ALL BUT ONE STOPPED	a. DO NOT ISOLATE BIT. **GO TO Step 33.**
b. RCS subcooling based on core exit TCs - >78°F (>200°F ACC)	b. IF RCS hot leg temperatures >395°F (>400°F ACC), THEN **GO TO Step 33.** IF RCS hot leg temperatures <395°F (<400°F ACC), THEN start one RHR Pump if none running. IF at least one RHR Pump can NOT be started, THEN **GO TO Step 33.**
c. PZR level - >21% (>45% ACC)	c. DO NOT ISOLATE BIT. **RETURN TO Step 23. OBSERVE CAUTION prior to Step 23.**
28. **Establish Normal Charging:** a. Close RCP Seal Flow Control Valve (HFK-182) b. Adjust CCP Flow Control Valve (FK-121) to minimum demand c. Open Charging Line Isolation Valves: • MO-8105 • MO-8106	

Step 28 continued on next page

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
Step 28 continued	
d. Close BIT Outlet Valves: • MO-8801A • MO-8801B	
e. Establish 60 gpm charging flow using CCP Flow Control Valve (FK-121) while adjusting RCP Seal Flow Control Valve (HFK-182) to maintain 6.6-13 gpm seal injection flow to each RCP (if seal injection established)	
f. Ensure CCP RECIRC Valves - OPEN • MO-8111 • MO-8110	
29. **Check If Charging Flow Should Be Controlled To Maintain PZR Level:**	
a. Check RHR Pumps - NONE RUNNING IN SI MODE	a. **GO TO Step 33.**
b. Control charging flow to maintain PZR level	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3 (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

CAUTION

- If RCP seal cooling has been previously lost, then the affected RCP should NOT be started prior to a status evaluation.
- On natural circulation, RTD bypass temperatures and associated interlocks will NOT be accurate.

NOTE

If possible RCP "B" should be run to provide normal PZR spray.

	Action/Expected Response	Response Not Obtained
30. @	**Check RCP Status:**	
	a. Verify RCPs - AT LEAST ONE RUNNING	a. Start one RCP by performing the following: 1) Establish conditions for starting an RCP. **REFER TO OI 3-4, (REACTOR COOLANT PUMP).** 2) Start one RCP. IF an RCP can NOT be started, THEN verify natural circulation. Use Attachment 5, NATURAL CIRCULATION VERIFICATION. IF natural circulation can NOT be verified, THEN increase dumping steam from INTACT S/Gs.
	b. Stop all but one RCP	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
** * CAUTION * * * During rapid RCS depressurization void formation may occur * * in the reactor vessel head. This may result in rapid PZR * * level changes during depressurization, PZR spray, or * * pressurization. * * **	
31. **Depressurize The RCS To MINIMIZE RCS SUBCOOLING:**	
a. Use normal PZR spray	a. Use one PZR PORV. IF no PORV available, THEN use auxiliary spray. **REFER TO OI 3-3, (PRESSURIZER SYSTEM OPERATION).**
b. Turn on PZR heaters as necessary	
c. Depressurize RCS until EITHER of the following conditions is satisfied: • PZR level - >75% (>60% ACC) OR • RCS subcooling based on core exit TCs - <35°F (<85°F ACC)	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
32. **Verify Adequate Shutdown Margin:**	
a. Notify Chemistry to sample RUPTURED S/Gs for boron concentration	
b. Notify Chemistry to sample RCS for boron concentration	
c. Shutdown Margin - ADEQUATE FOR COLD SHUTDOWN	c. Borate RCS as necessary to obtain desired RCS boron concentration.
1) Consult TSC for effect of RUPTURED S/Gs on RCS boron concentration	
2) **REFER TO OI 11-8, (SHUTDOWN MARGIN),** for aid in determination of desired RCS boron concentration	
d. Continuously sample RCS for boron concentration	
e. Borate RCS as necessary to maintain desired RCS boron concentration	
33. @ **Verify ECCS Flow NOT Required:**	
a. RCS subcooling based on core exit TCs - >25°F (>75°F ACC)	a. MANUALLY operate ECCS Pumps as necessary. **GO TO Step 34.**
b. PZR level - >5% (>30% ACC)	b. MANUALLY operate ECCS Pumps as necessary. **GO TO Step 34.**

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

34. **Check If SI Accumulators Should Be Isolated:**

a. RCS subcooling based on core exit TCs - >25°F (>75°F ACC)

b. PZR level - >5% (>30% ACC)

c. Close power supply breakers for all SI accumulator outlet valves:

VALVE	BREAKER
MO-8808A	B-2510
MO-8808B	B-2610
MO-8808C	B-2511
MO-8808D	B-2611

d. Close all SI accumulator outlet valves:

- MO-8808A
- MO-8808B
- MO-8808C
- MO-8808D

a. IF SI accumulators pressure <140 psig, THEN GO TO Step 34.c. IF NOT, THEN GO TO Step 35.

b. **RETURN TO Step 23. OBSERVE CAUTION prior to Step 23.**

d. Vent any unisolated SI accumulator:

1) Verify closed SI accumulator N_2 Supply (CV-8880)

2) Open SI accumulator N_2 fill valve for accumulator to be vented:

ACCUMULATOR	VALVE
A	CV-8875A
B	CV-8875B
C	CV-8875C
D	CV-8875D

Step 34 continued on next page

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
Step 34 continued	
e. Open power supply breakers for all SI accumulator outlet valves: VALVE / BREAKER MO-8808A / B-2510 MO-8808B / B-2610 MO-8808C / B-2511 MO-8808D / B-2611	3) Open SI accumulator vent (HPK-943). 4) WHEN SI Accumulator is depressurized, THEN close SI Accumulator N_2 fill valve opened in Step d.2). 5) Close SI Accumulators N_2 vent (HPK-943). IF NOT able to vent all unisolated SI accumulators, THEN contact TSC for assistance.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
** * CAUTION * * * EDGs should NOT be run for >4 hours with <1100 KW load. * * **	
35. **Verify All AC Buses Energized By Off-Site Power:**	
a. V81 and V82 bus voltage - NORMAL	a. Coordinate with Load Dispatcher to restore an incoming line. **REFER TO ONI-31, (230 KV SYSTEM FAULTS).**
b. S/U transformer breakers to H1 and H2 - CLOSED • H-102 • H-202	b. IF power is available in the switchyard, THEN restore power to H1 and H2. **REFER TO ONI-32, (12.47 KV AND 4.16 KV SYSTEM FAULTS).**
c. Verify A1 AND A2 - ENERGIZED BY OFF-SITE POWER	c. Try to restore off-site power to A1 AND A2. **REFER TO ONI-32, (12.47 KV AND 4.16 KV SYSTEM FAULTS.** IF off-site power can NOT be restored to A1 AND A2, THEN place additional equipment on any loaded EDG. **REFER TO ONI-50, (PLANT OPERATION AFTER A LOSS OF OFF-SITE POWER).** CONTINUE efforts to restore power while continuing with this procedure.
d. Stop any unloaded EDG and place in Standby by performing the following: 1) Place unloaded EDG's IDLE AFTER AUTO START switch to IDLE 2) Place unloaded EDG's START/STOP CONTROL switch to STOP	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
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   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
36. **Minimize Secondary Contamination:** a. Close Condenser Reject Valves: • CV-2954B • CV-2956B b. Open Condensate Demin Bypass Valves: • MO-7100A • MO-7100B c. Isolate other unnecessary flowpaths that could spread contamination, contact TSC for assistance	
37. **Check RCP Support Status:** a. Support conditions for the running RCPs - AVAILABLE 1) Seal injection flow - 6.6-13 gpm PER pump 2) RCP temperatures as indicated by computer display 4RC6 - NORMAL	a. 1) IF normal charging in service, THEN adjust RCP Seal Flow Control Valve (HFK-182) as necessary. 2) Verify the following valves open: • CCW TO B and C RCP (MO-3296) • CCW FROM B and C RCP (MO-3320) • CCW TO A and D RCP and HX (MO-3294) • CCW FROM A and D RCP and HX (MO-3300)

Step 37 continued on next page

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
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3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3043B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
Step 37 continued	
3) Provide Seal Water HX cooling: • Open CCW TO CVCS HX (MO-3295) • Open CCW FROM CVCS HX (MO-3319)	
4) Open RCP Seal Water Return Valves: • MO-8100 • MO-8112	
38. @ **Check If Source Range Detectors Should Be Energized:**	
a. Check Intermediate Range flux - $<10^{-10}$ amps	a. **Continue with Step 39.** WHEN flux $<10^{-10}$ amps, THEN perform Steps 38.b and 38.c.
b. Verify Source Range detectors - ENERGIZED	b. MANUALLY energize Source Range detectors.
c. Transfer NR-45 Recorder to indicate both Source Ranges	

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

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3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
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   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
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   IF RWST level decreases to <48%, THEN GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained

NOTE

Performance of EOPs has priority over restoration of secondary Plant equipment.

Action/Expected Response	Response Not Obtained
39. <u>Shut Down Unnecessary Plant Equipment</u>: Refer To The Appropriate GOI For Plant Conditions	
40. <u>Notify Chemistry To Sample RCS For Iodine Two to Six Hours After Trip</u>	

CAUTION

Feedflow should NOT be established to any RUPTURED S/G that is also FAULTED unless needed for RCS cooldown.

Action/Expected Response	Response Not Obtained
41. @ <u>Check RUPTURED S/Gs NR Level - >14%</u>	Refill RUPTURED S/Gs to 64% (50% ACC) NR level using feedflow. <u>IF</u> either of the following conditions occurs, <u>THEN</u> stop feedflow to RUPTURED S/Gs: • RUPTURED S/G pressure decreases in an uncontrolled manner. <u>OR</u> • RUPTURED S/G pressure increases to 1100 psig.

1. **ADMINISTRATIVE FUNCTIONS**
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2. **ADVERSE CONTAINMENT CONDITIONS**
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   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
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   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

Action/Expected Response	Response Not Obtained
42. **Check If RCPs Should Be Stopped:**	
a. Check the following: • RCP number one seal differential pressure - <200 psid OR • RCP number one seal leakoff flow - LESS THAN THE LOWER LIMIT OF THE OPERATING RANGE OF ATTACHMENT 6, RCP NUMBER ONE SEAL LEAKOFF FLOW OPERATING RANGE	a. **GO TO Step 43.**
b. Stop affected RCPs	
43. **Check If RHR System Can Be Placed In Service:**	
a. Check the following: • RCS temperature - <350°F • RCS pressure - <380 psig	a. **GO TO Step 44.**
b. Consult with TSC to determine if RHR System should be placed in service	
44. **Check RCS Temperatures - <200°F**	**RETURN TO Step 6.**
45. **Evaluate Long-Term Plant Status:**	
a. Maintain cold shutdown conditions	
b. Consult TSC	

END OF ECA-3.1

1. **ADMINISTRATIVE FUNCTIONS**
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2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

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8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
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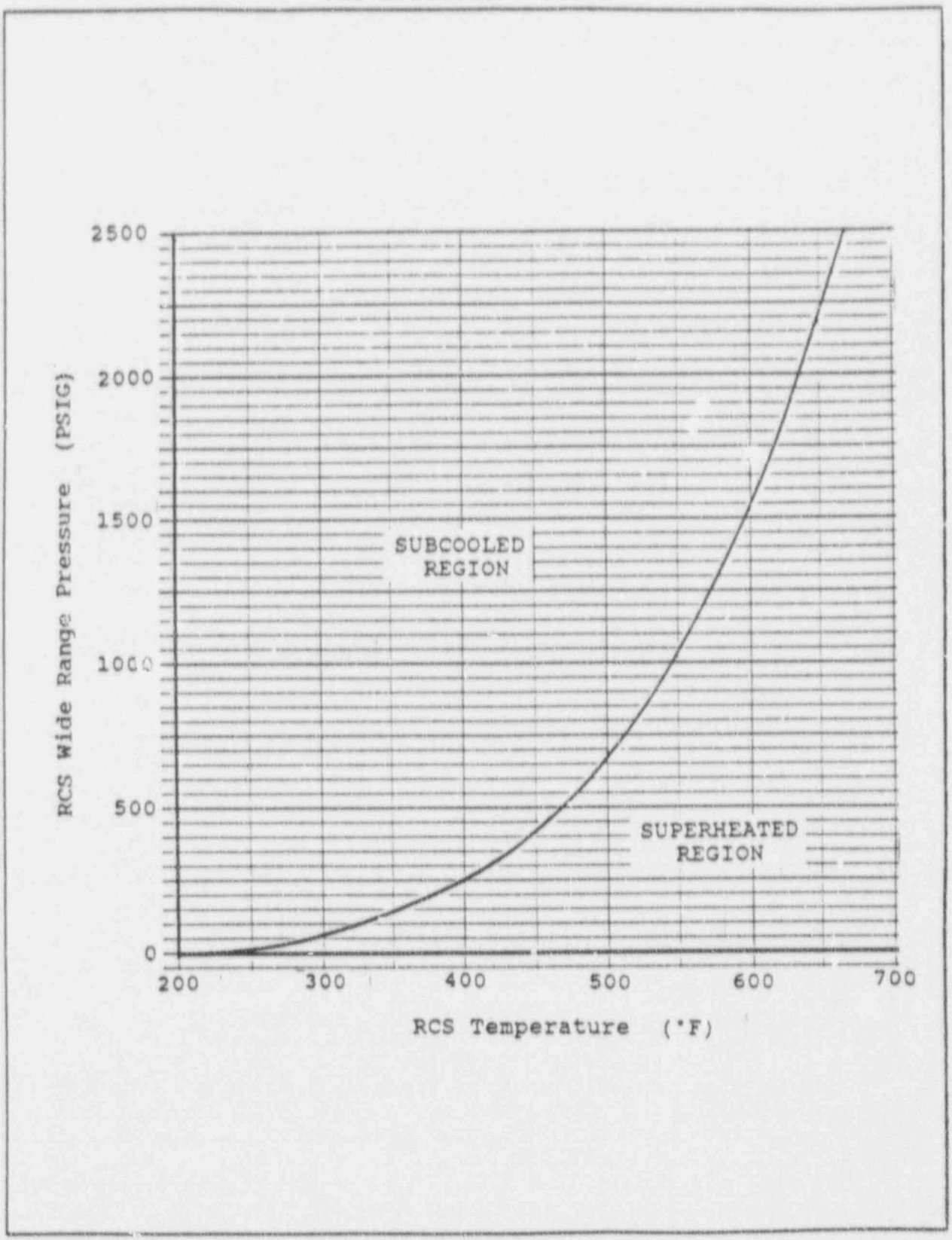
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

RCS SUBCOOLING CURVE



Attachment 1
Page 1 of 1

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
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   4. Verify All AC Buses Energized By Off-Site Power
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   17. Verify Adequate Shutdown Margin
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   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   39. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

NOTE

This attachment provides instructions to start an Instrument Air Compressor under a variety of conditions.

1. IF power is available to an Instrument Air Compressor, THEN GO TO step 2 of this attachment. IF power is NOT available, THEN prepare to re-energize the Sullair or the A Joy Instrument Air Compressor by performing the following:

   a) Open all bus A5 breakers:

   - A-501 Bus A5 Feeder
   - A-502 A Heater Drain Pump
   - A-503 A Cooling Tower Makeup Pump
   - A-504 LC B09 Feeder
   - A-505 LC B05 Feeder
   - A-506 A5 to A6 Bus Tie
   - A-507 LC B07 Feeder
   - A-508 LC B13 Feeder
   - A-509 LC B15 Feeder
   - A-510 Startup Auxiliary Feed Pump

   b) Open all bus B07 breakers:

   - B0712 LC B07 Feeder
   - B0713 MCC B35 Feeder
   - B0714 Sullair Air Compressor Feeder
   - B0722 North Stator Cooling Water Pump Feeder
   - B0723 A Joy Air Compressor
   - B0724 North CRDM Feeder

   c) Open the B05 to B07 bus tie breaker (B0532).

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
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3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
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5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

NOTE

Equipment is provided locally to perform the following step.

2. IF cooling is available to the Instrument Air Compressor which is to be started, THEN GO TO Step 3 of this attachment. IF cooling is NOT available, THEN establish fire main cooling to the Instrument Air Compressor which is to be started by performing either a, b, or c.

   a. IF the A Joy Air Compressor is to be started, THEN:

      1) Attach one-inch hose from Fire Main Drain between Sprinkler Valves (FP-043) and (FP-044) to the Air Compressor Inlet Drain (BC-041).

      2) Attach one-inch hose to Compressor Outlet Drain (PP-3885A) and route to a suitable drain.

      3) Shut Bearing Cooling Water Supply Valves (BC-032) and (BC-038) and Return Valve (BC-044).

      4) Open the following valves:

         • Compressor Outlet Drain (PP-3885A)
         • Fire Main Drain
         • Bearing Cooling Water Supply (BC-041)

   b. IF the Sullair Air Compressor is to be started, THEN:

      1) Attach one-inch hose from Fire Main between Sprinkler Valves (FP-043) and (FP-044) to the Air Compressor Inlet Drain (BC-077).

      2) Attach one-inch hose to Compressor Outlet Drain (BC-078) and route to a suitable drain.

      3) Shut Bearing Cooling Water Supply Valve (BC-073) and Return Valve (BC-076).

      4) Open the following valves:

         • Compressor Outlet Drain (BC-078)
         • Fire Main Drain
         • Bearing Cooling Water Supply (BC-077)

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
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2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
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4. **SECONDARY INTEGRITY CRITERIA**

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   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

c. IF the B Joy Air Compressor is to be started, THEN:

1) Attach one-inch hose from Fire Main Drain between Sprinkler Valves (FP-043) and (FP-044) to the Air Compressor Inlet Drain (BC-042).

2) Attach one-inch hose to Compressor Outlet Drain (PP-3885B) and route to a suitable drain.

3) Shut Bearing Cooling Water Supply Valves (BC-033) and (BC-039) and Return Valve (BC-045).

4) Open the following valves:

- Compressor Outlet Drain (PP-3885B)
- Fire Main Drain
- Bearing Cooling Water Supply (BC-042)

3. Disable all air compressors which do not have cooling water available.

4. Start the desired air compressor by performing the applicable portion of this step:

a. IF the A Joy air compressor is to be started, THEN:

1) Close A-501, bus A5 feeder breaker, to energize bus A5.

2) Close A-507, LC B07 transformer high side breaker.

3) Close B0712, LC B07 feeder.

4) Start the A Joy air compressor.

b. IF the Sullair air compressor is to be started, THEN:

1) Close A-501, bus A5 feeder breaker, to energize bus A5.

2) Close A-507, LC B07 transformer high side breaker.

3) Close B0712, LC B07 feeder.

4) Close B0714 to energize Sullair air compressor.

5) LOCALLY start Sullair air compressor.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Loop

c. IF the B Joy Air Compressor is to be started, THEN:

1) Place the B Joy air compressor in OFF.

2) Reset lockout relay 86-B02.

3) Place the B Joy air compressor controller in constant and select lead Number 2.

5. **RETURN TO Procedure Step in effect.**

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

** **
* CAUTION *
* • If loss of off-site power occurs after SI reset, then only those loads initiated by the shutdown sequencer will restart on the EDG. *
* • Following SI reset, automatic reinitiation of SI will NOT occur until the reactor trip breakers are closed. *
** **

1. Reset SI.

2. Reset CIS:

   • Reset CIS Phase A
   • Reset CIS Phase B

3. Verifying an Instrument Air Compressor in service by performing the following:

   a. Check an Instrument Air Compressor available:

      • Any Instrument Air Compressor running
      • BCW Pump running
      • BCW cooled by Service Water

   b. IF an Instrument Air Compressor is available, THEN GO TO Step 4 of this attachment.

   c. IF power is available to any Instrument Air Compressor, THEN, restore cooling from BCW and Service Water AND LOCALLY start an Instrument Air Compressor.

   d. IF an Instrument Air Compressor is now available, THEN GO TO Step 4 of this attachment.

   e. LOCALLY start the Diesel Air Compressor. **REFER TO OI-T 67, (TEMPORARY BACKUP DIESEL AIR COMPRESSOR).**

   f. IF an Instrument Air Compressor is now available, THEN GO TO Step 4 of this attachment.

   g. LOCALLY start an Instrument Air Compressor using Attachment 2, STARTING AN INSTRUMENT AIR COMPRESSOR.

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

4. Establish Instrument Air to Containment:

   a. MANUALLY or LOCALLY open Instrument Air Supply To Containment (CV-4471).

   b. IF Instrument Air Pressure is NOT normal, THEN LOCALLY verify air compressors and air dryers operating correctly. **REFER TO ONI 51, (LOSS OF INSTRUMENT AIR).**

** **
* CAUTION *
* *
* The following steps will block Auxiliary Feedwater Pump auto *
* start signals. If Auxiliary Feedwater is needed, then the *
* pumps will have to be MANUALLY started. *
* *
** **

5. Block BOTH AFP Auto Start on loss of Main Feed Pumps.

6. Block BOTH AFP Auto Start on Lo-Lo S/G level at Panels C49A and C49B. (Key Numbers 02 and 03)

7. Reset S/G Blowdown Sample CIS.

8. Establish CCW flow to SCII equipment by opening the following valves:

   Train A:
   - CV-3303
   - CV-3287

   OR

   Train B:
   - CV-3304
   - CV-3288

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^{5}$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <46%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

NOTE

- A PRM-10 ALERT can be bypassed at Panel C-41.
- A PRM-10 HIGH alarm can be cleared by local flushing.

9. Coordinate with Chemistry to establish S/G Blowdown sampling for RUPTURED S/Gs:

   a. Open RUPTURED S/Gs Blowdown Common Sample ISO:

S/G	COMMON SAMPLE ISO
A	CV-2811
B	CV-2880
C	CV-2814
D	CV-2809

   b. Request Chemistry sample RUPTURED S/Gs.

10. **RETURN TO Procedure Step in effect.**

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - SIR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

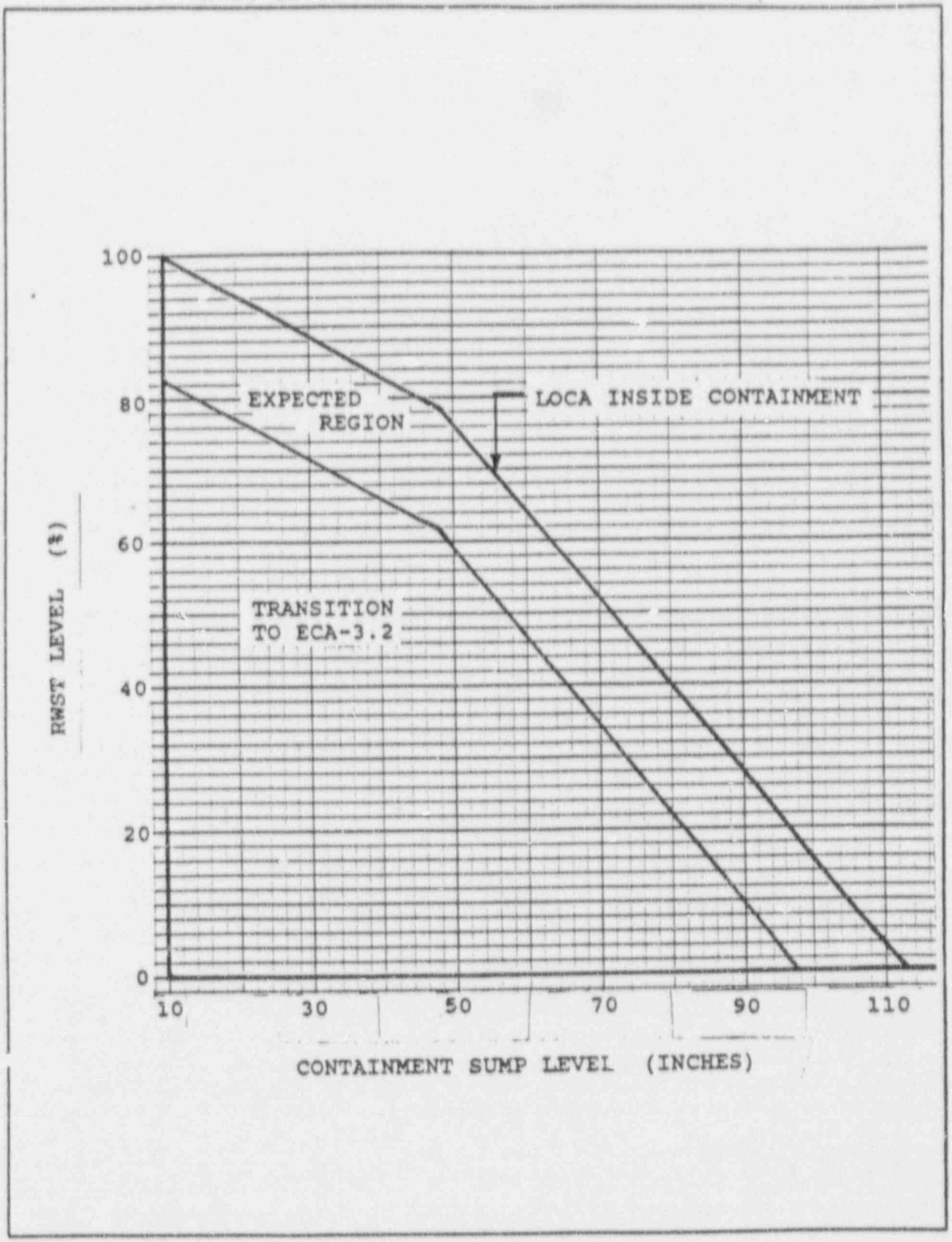
6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

RWST LEVEL VS. CONTAINMENT SUMP LEVEL



Attachment 4
Page 1 of 1

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

NATURAL CIRCULATION VERIFICATION

The following are indications of subcooled natural circulation:

- RCS subcooling - >25°F (>75°F ACC)
- S/G pressures - STABLE OR DECREASING
- RCS hot leg temperatures - STABLE OR DECREASING
- Core exit TCs - STABLE OR DECREASING
- RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR S/G PRESSURE
- RCS Delta-T - <66°F AND STABLE

Attachment 5
Page 1 of 1

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

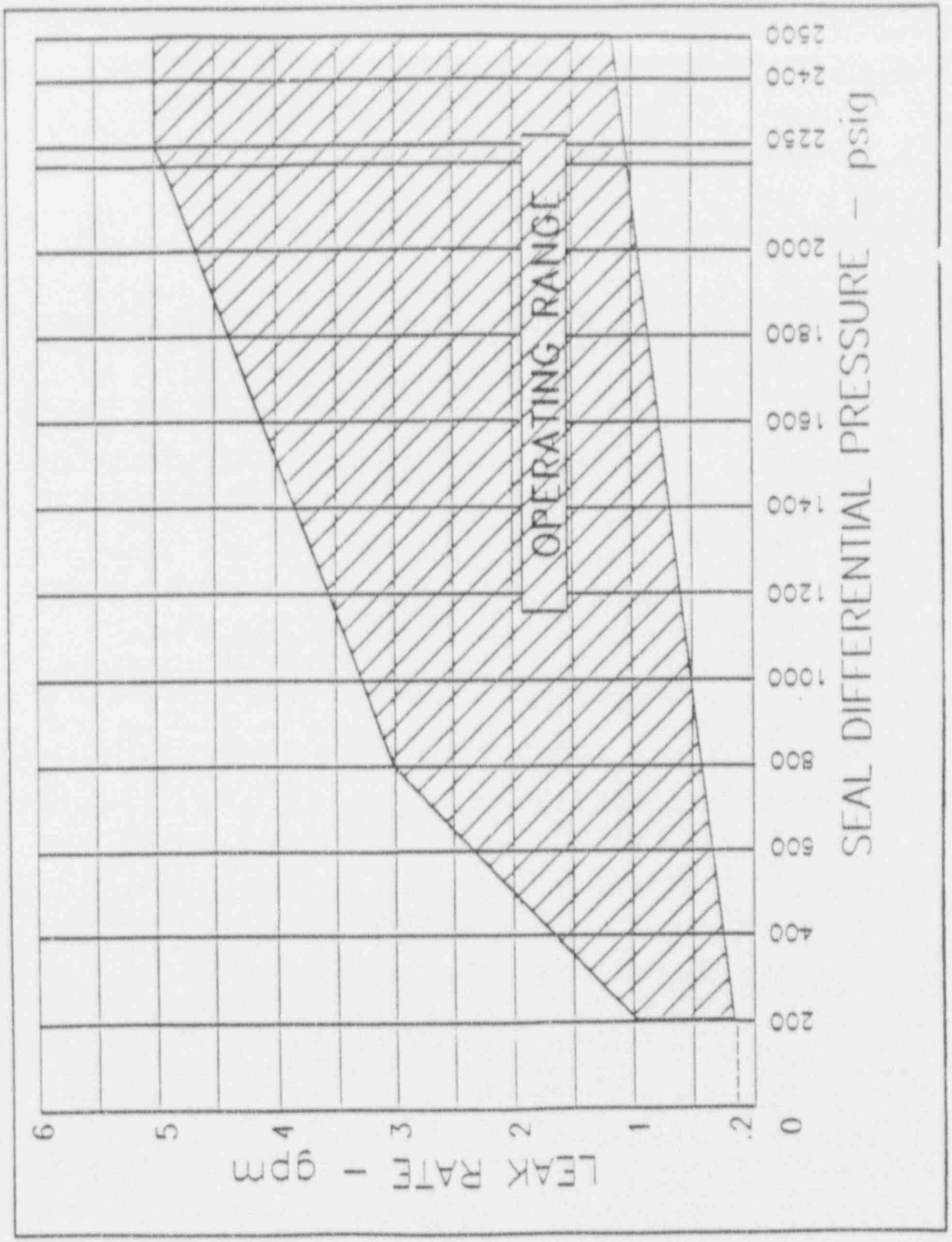
6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

RCP SEAL NUMBER ONE LEAKOFF FLOW OPERATING RANGE



Attachment 6
Page 1 of 1

1. **ADMINISTRATIVE FUNCTIONS**
   - Monitor CSF Status Trees
   - Monitor Emergency Action Levels (EALs)

2. **ADVERSE CONTAINMENT CONDITIONS**
   ACC is defined as Containment Pressure >3.5 psig OR Containment Radiation has been at any time $\geq 10^5$ R/HR.

3. **SI REINITIATION CRITERIA**

   MANUALLY operate ECCS pumps as necessary if EITHER condition listed below occurs:
   - RCS subcooling <25°F (<75°F ACC)
   - PZR level can NOT be maintained >5% (>30% ACC)

4. **SECONDARY INTEGRITY CRITERIA**

   GO TO EI-2, (FAULTED STEAM GENERATOR ISOLATION), Step 1, if EITHER condition listed below occurs:
   - Any S/G pressure is decreasing in an uncontrolled manner and has NOT been isolated
   - Any S/G is completely depressurized and has NOT been isolated

5. **COLD LEG RECIRCULATION SWITCHOVER CRITERION**
   IF RWST level decreases to <48%, THEN **GO TO ES-1.3, (TRANSFER TO COLD LEG RECIRCULATION), Step 1.**

6. **AFW SUPPLY SWITCHOVER CRITERIA**
   IF CST level decreases to <9%, THEN supply AFW from Service Water by opening MO-3045A and MO-3045B.

7. **MULTIPLE TUBE RUPTURE CRITERIA**

   RETURN TO EI-3, (STEAM GENERATOR TUBE RUPTURE), Step 1, if EITHER condition listed below occurs:
   - Any INTACT S/G level increases in an uncontrolled manner
   - Any INTACT S/G has abnormal radiation

8. **CONTINUOUS ACTION STEPS**
   4. Verify All AC Buses Energized By Off-Site Power
   5. Stopping Containment Spray, Isolation Of Spray Add Tank
   6. RUPTURED S/Gs NR Level >7% (>14% ACC)
   7. Restart RHR Pumps When RCS Pressure <200 psig (<480 psig ACC)
   10. Containment H_2 Concentration
   15. S/G Levels And Total Feedflow
   17. Verify Adequate Shutdown Margin
   20. Check Containment Sump Level To See If This Procedure Appropriate
   30. Start An RCP, Verify Natural Circulation
   33. Verify ECCS Flow Not Required
   38. Energize Source Ranges When Flux $<10^{-10}$ amps
   41. RUPTURED S/Gs NR Level >14%
   42. RCP Trip Criteria - Single Pump

RC: 0 5 1
OOR: Operations
CFP: POW ST OP 2-2-2
Letter No. N/A
System No. N/A
No of Pages:
Document Date:
Reference: RCS Cooldown Data ECA-3.1

QA RECORD WHEN COMPLETED

RCS COOLDOWN DATA

1. Record the following data, every fifteen minutes, during the RCS cooldown:

TIME	RCS WR COLD LEG TEMP				RCS COOLDOWN RATE (°F/hr)	RCS PRESS	
	TE-413B	TE-423B	TE-433B	TE-443B		PIR-405	PI-403

Approved: _____ Date: _____
Shift Manager

Attachment 7
Page 1 of 1