

**TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS
TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F**

**AOI 4.2.3
REV. 5**

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1.0 PURPOSE

- 1.1. This AOI is for use during a LOCA that began when RCS temperature was less than 350°F AND greater than or equal to 200°F. It provides guidance to the operators for transferring to Cold Leg Recirculation, sampling the water in Containment, with guidance for pH control, guidance for other post-accident Containment samples AND guidance for Hydrogen inventory control in Containment.

2.0 SYMPTOMS/ENTRY CONDITIONS

- 2.1. RWST LEVEL LOW LOW 9.24 FT Alarm (Window 3-8 or 4-8) on Panel SBF-2.
- 2.2. RWST level indicates less than 9.24 feet on Panel SB-1 OR Panel AS-3.

3.0 AUTOMATIC ACTIONS

None

4.0 IMMEDIATE OPERATOR ACTIONS

None

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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5.0 OPERATOR ACTIONS

NOTE

Adverse Containment conditions are in effect if Containment radiation levels ever exceed 1E5 R/hr OR Containment pressure remains above 4 psig.

1. CHECK plant status

- RWST level - LESS THAN 9.24 FEET
AND
- Safety Injection - ALIGNED TO RWST

1. RETURN to procedure AND step in effect

2. CHECK RWST level - GREATER THAN 3 FEET

2. WHEN RWST level less than 3 feet, STOP ALL pumps taking a suction on the RWST

CAUTION

- Steps 3 through 37 SHALL be performed without delay.
- SI Recirculation flow to the RCS SHALL be maintained at all times.
- IF offsite power is lost AFTER SI has been reset, manual action may be required to restart safeguards equipment.

3. CHECK SI - RESET

3. PERFORM the following:

a. PLACE SIA Normal/Defeat switches in DEFEAT (SB-2)

- SIA-1 TRAIN-A
- SIA-2 TRAIN-B

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>b. PRESS <u>BOTH</u> SI Reset pushbuttons (SB-2)</p> <ul style="list-style-type: none"> ● TRAIN A ● TRAIN B
	<div style="border: 2px solid black; padding: 10px; text-align: center;"> <p><u>CAUTION</u></p> <ul style="list-style-type: none"> ● PRIOR to dispatching personnel to perform local actions, an evaluation of local environmental conditions, including radiation SHALL be made. ● Do <u>NOT</u> energize MOV-894A, MOV-894B, MOV-894C or MOV-894D breakers <u>UNLESS</u> specifically directed to reposition the associated valves. </div>	
4.	CHECK SI Accumulators - ISOLATED	<p>4. ISOLATE SI Accumulators as follows</p> <p>a. ENERGIZE SI Accumulator Outlet Stop breakers</p> <ul style="list-style-type: none"> ● MOV-894A ● MOV-894B ● MOV-894C ● MOV-894D <p>b. CLOSE SI Accumulator Outlet Stops</p> <ul style="list-style-type: none"> ● MOV-894A ● MOV-894B ● MOV-894C ● MOV-894D <p>c. DE-ENERGIZE SI Accumulator Outlet Stop breakers</p> <ul style="list-style-type: none"> ● MOV-894A ● MOV-894B ● MOV-894C ● MOV-894D

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		<p>d. <u>IF</u> unable to isolate an SI Accumulator, VENT the affected accumulator</p> <ol style="list-style-type: none"> 1. VERIFY PCV-863, Accumulator N₂ Supply Line Stop, CLOSED 2. <u>IF</u> unable to close PCV-863, CLOSE Accumulator N₂ Supply Root Stops <ul style="list-style-type: none"> • 1811A • 1811B 3. OPEN affected Accumulator Gas Stop <ul style="list-style-type: none"> • 891A • 891B • 891C • 891D 4. OPEN HCV-943, Accumulators N₂ Vent Controller to 100 percent
5.	ENERGIZE <u>ALL</u> remaining MOVs <ul style="list-style-type: none"> • MCC 26A • MCC 26AA • MCC 26B • MCC 26BB 	
6.	STOP <u>ALL</u> Charging Pumps	
7.	VERIFY Auxiliary Component Cooling Pumps - RUNNING	7. START <u>BOTH</u> ACC Pumps

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

- The SI pumps SHALL be stopped if RCS pressure is greater than their shutoff head pressure.
- IF the flow path from the sump to the RCS CANNOT be established OR maintained during this procedure, AOI 4.2.5, Loss of Emergency Coolant Recirculation During LOCA When RCS Temperature at Least 200°F and less than 350°F, **SHALL** be performed.

**8. PLACE Safety Injection Recirc
Switch 1 to ON**

- | | |
|---|--|
| <p>(a) CHECK 22 SI Pump - STOPPED</p> <p>(b) VERIFY 22 SI Pump Suctions -
CLOSED</p> <ul style="list-style-type: none"> • MOV-887A • MOV-887B | <p>(a) <u>IF</u> three SI pumps running, STOP
22 SI Pump</p> <p>(b) CLOSE 22 SI Pump Suctions</p> <ul style="list-style-type: none"> • MOV-887A • MOV-887B |
|---|--|

**9. PLACE Safety Injection Recirc
Switch 3 to ON**

- | | |
|---|---------------------------------------|
| <p>(a) VERIFY <u>BOTH</u> RHR Pumps -
TRIPPED</p> <p>(b) VERIFY RHR Pump Suction
<u>AND</u> Discharge Stops - CLOSED</p> <ul style="list-style-type: none"> • MOV-882 • MOV-744 | <p>(a) TRIP <u>BOTH</u> RHR Pumps</p> |
|---|---------------------------------------|

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

The load on the EDGs should remain less than 1750KW, but may be increased to 2100KW for a maximum of 2 hours in any 24 hour period.

NOTE

It is acceptable for the EDG load to increase to 2300KW during performance of the recirculation switch sequence. Attachment 1 should be referred to for 480V equipment load ratings.

**10. PLACE Safety Injection Recirc
Switch 2 to ON**

- (a) CHECK Service Water
non-essential header - ONE
PUMP OPERATING

- (a) PERFORM the following:

1. IF non-essential header is
1-2-3, START 22, 23 OR 21
SW pump (preferred order)
2. IF non-essential header is
4-5-6, START 25, 26 OR 24
SW pump (preferred order)

- (b) VERIFY non-essential SW to
conventional header - ISOLATED

- (1) CHECK FCV-1111,
Service Water
Conventional from
Header 4 - CLOSED

- (1) CLOSE FCV-1111

- (2) CHECK FCV-1112,
Service Water
Conventional from
Header 1 - CLOSED

- (2) CLOSE FCV-1112

- (3) CHECK SWN-6, Oil
Coolers Supply from
Header 4 - CLOSED

- (3) CLOSE SWN-6

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(4) CHECK SWN-7, Oil Coolers Supply from Header 1 - CLOSED	(4) CLOSE SWN-7
	(c) CHECK <u>ONE</u> CCW Pump - RUNNING	(c) START 22, 21, or 23 CCW PUMP (preferred order)
	(d) CHECK River Water Temperature - LESS THAN <u>OR</u> EQUAL TO 85 °F	
	(1) START second CCW Pump	(1) CLOSE 804, Spent Fuel Pit Heat Exchanger Outlet Stop
11.	CHECK Containment level - GREATER THAN 47' 10" ON L-939 OR L-941	11. PERFORM <u>BOTH</u> of the following: <ul style="list-style-type: none"> a. IF containment level increases to greater than 47' 10", immediately RETURN to this step <li style="text-align: center;"><u>AND</u> b. GO TO AOI 4.2.5, Loss of Emergency Coolant Recirculation During LOCA When RCS Temperature at Least 200°F and less than 350°F
12.	PLACE Safety Injection Recirc Switch 4 to ON	
	(a) VERIFY 21 Recirculation Pump - RUNNING	(a) PERFORM the following: <ul style="list-style-type: none"> a. START 22 Recirculation Pump b. <u>IF</u> no Recirculation Pump will start, PERFORM Attachment 1, Cold Leg Recirculation Using RHR Pumps

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>(b) CHECK Recirculation Pump Discharge Stops - OPEN</p> <ul style="list-style-type: none">• MOV-1802A• MOV-1802B	<p>(b) OPEN Recirculation Pump Discharge Stops</p> <ul style="list-style-type: none">• MOV-1802A• MOV-1802B										
13.	<p>CHECK <u>IF</u> low-head cold leg recirculation has been established</p> <p>(a) DETERMINE required core cooling flow from table below:</p> <table><tr><th>No. of 946A-D Flow Indicators Greater Than 400 gpm</th><th>Core Flow Rate on Indicators Greater Than 400 gpm</th></tr><tr><td>4</td><td>Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM</td></tr><tr><td>3</td><td>Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM</td></tr><tr><td>2</td><td>EACH GREATER THAN 500 GPM</td></tr><tr><td>1 <u>OR</u> None</td><td>Required Core Cooling - NOT MET</td></tr></table>		No. of 946A-D Flow Indicators Greater Than 400 gpm	Core Flow Rate on Indicators Greater Than 400 gpm	4	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM	3	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM	2	EACH GREATER THAN 500 GPM	1 <u>OR</u> None	Required Core Cooling - NOT MET
No. of 946A-D Flow Indicators Greater Than 400 gpm	Core Flow Rate on Indicators Greater Than 400 gpm											
4	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM											
3	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM											
2	EACH GREATER THAN 500 GPM											
1 <u>OR</u> None	Required Core Cooling - NOT MET											
	<p>(b) Core cooling flow required by table - ESTABLISHED</p>	<p>(b) ESTABLISH high-head cold leg recirculation, GO TO Step 24</p>										

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	PLACE Safety Injection Recirc Switch 7 to ON	
	(a) CHECK <u>ALL</u> SI Pumps - TRIPPED	(a) TRIP <u>ALL</u> SI Pumps
	(b) CHECK MOV-887A - CLOSED	(b) CLOSE MOV-887A
	(c) CHECK MOV-887B - CLOSED	(c) CLOSE MOV-887B
15.	PLACE Safety Injection Recirc Switch 8 to ON	
	(a) CHECK the following valves - CLOSED	(a) Manually CLOSE valves
	<ul style="list-style-type: none"> • MOV-1810, SI Pump Suction from RWST • SOV-1813, Containment Spray Pump Test Line 	
16.	CHECK <u>ALL</u> 480V AC buses powered from <u>ONE</u> of the following:	16. GO TO Step 21
	<ul style="list-style-type: none"> • Emergency Diesel Generators • Off-site power 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION

IF recirculation flow has been reduced to one recirculation pump, the operator SHALL monitor recirculation flow AND start the idle pump, IF the running pump is lost.

17. PLACE Safety Injection Recirc Switch 5 to ON

18. CHECK Service Water non-essential header - TWO PUMPS OPERATING

18. PERFORM the following:

- a. Manually START one NESW pump in preferred order.
 - 22, 23, 21 pump IF non-essential header is 1-2-3
 - 25, 26, 24 pump IF non-essential header is 4-5-6
- b. IF ONLY one Service Water pump operating, PERFORM the following:
 1. IF both recirculation pumps running, STOP one recirculation pump
 2. CLOSE 804, Spent Fuel Pit Heat Exchanger Outlet Stop

19. CHECK CCW - TWO PUMPS OPERATING

19. PERFORM the following:

- a. START 22, 21 OR 23 CCW Pump (preferred order)
- b. IF ONLY one CCW pump operating AND two recirculation pumps operating, STOP one recirculation pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	VERIFY 22 Recirculation Pump - OPERATING	20. START 21 Recirculation Pump
21.	LOCALLY CLOSE RHR Minimum Flow Test Line Stops (98 ft PAB) <ul style="list-style-type: none"> • MOV-743 • MOV-1870 	
22.	CLOSE SI Test Line Stops to RWST <p>(a) PLACE interlock switches to OFF</p> <ul style="list-style-type: none"> • MOV-842 • MOV-843 <p>(b) CLOSE SI Test Line Stops to RWST</p> <ul style="list-style-type: none"> • MOV-842 • MOV-843 	
23.	GO TO Step 37	
24.	PLACE Safety Injection Recirc Switch 6 to ON <p>(a) CHECK RHR Heat Exchanger Outlet Stops - CLOSED</p> <ul style="list-style-type: none"> • MOV-746 • MOV-747 	<p>(a) CLOSE RHR Heat Exchanger Outlet Stops</p> <ul style="list-style-type: none"> • MOV-746 • MOV-747

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25.	CHECK valve alignment <u>AND</u> prepare to start SI pump	
	(a) CHECK RHR Heat Exchanger Outlet to SI Pump Suction Stops - OPEN	(a) OPEN MOV-888A and MOV-888B
	<ul style="list-style-type: none"> • MOV-888A • MOV-888B 	
26.	CLOSE SI Test Line Stops to RWST	
	(a) PLACE interlock switches to OFF	
	<ul style="list-style-type: none"> • MOV-842 • MOV-843 	
	(b) CLOSE SI Test Line Stops to RWST	
	<ul style="list-style-type: none"> • MOV-842 • MOV-843 	
27.	PLACE High Head Low Suction Pressure Alarm Switch to ON (Panel SB-1)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	CHECK SI Pumps - AT LEAST 2 RUNNING	<p>28. PERFORM the following:</p> <ul style="list-style-type: none"> a. VERIFY Safety Injection Recirc Switch 7 is OFF b. START two SI Pumps <ul style="list-style-type: none"> ● 21 SI Pump ● 23 SI Pump c. <u>IF</u> SI Pump 21 <u>OR</u> 23 can <u>NOT</u> be started, PERFORM the following: <ul style="list-style-type: none"> 1. PLACE Safety Injection Recirc Switch 1 to OFF 2. OPEN 22 SI Pump Suctions <ul style="list-style-type: none"> ● MOV-887A ● MOV-887B 3. START 22 SI Pump 4. <u>IF</u> 21 SI Pump <u>NOT</u> running, CLOSE MOV-851B, 22 SI Pump Tie Valve to Outlet of 23 SI Pump 5. <u>IF</u> 23 SI Pump <u>NOT</u> running, CLOSE MOV-851A, 22 SI Pump Tie Valve to Outlet of 21 SI Pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29.	LOCALLY CLOSE RHR Minimum Flow Test Line Stops (98 ft PAB) <ul style="list-style-type: none"> • MOV-743 • MOV-1870 	
30.	PLACE Safety Injection Recirc Switch 8 to ON <p>(a) CHECK the following valves - CLOSED</p> <ul style="list-style-type: none"> • MOV-1810, SI Pump Suction from RWST • SOV-1813, Containment Spray Pump Test Line 	<p>(a) Manually CLOSE valves</p>
31.	CHECK <u>ALL</u> 480V AC buses powered from <u>ONE</u> of the following: <ul style="list-style-type: none"> • Emergency Diesel Generators • Off-site power 	<p>31. GO TO Step 37</p>
<div style="border: 2px solid black; padding: 10px; text-align: center;"> <p><u>CAUTION</u></p> <p><u>IF</u> recirculation flow has been reduced to one recirculation pump, the operator SHALL monitor recirculation flow <u>AND</u> start the idle pump, if the running pump is lost.</p> </div>		
32.	PLACE Safety Injection Recirc Switch 5 to ON	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33.	CHECK Service Water non-essential header - TWO PUMPS OPERATING	33. PERFORM the following: <ol style="list-style-type: none"> a. Manually START one NESW pump in preferred order. <ul style="list-style-type: none"> ● 22, 23, 21 pump <u>IF</u> non-essential header is 1-2-3 ● 25, 26, 24 pump <u>IF</u> non-essential header is 4-5-6 b. <u>IF</u> ONLY one Service Water pump operating, PERFORM the following: <ol style="list-style-type: none"> 1. <u>IF</u> both recirculation pumps running, STOP one recirculation pump 2. CLOSE 804, Spent Fuel Pit Heat Exchanger Outlet Stop
34.	CHECK CCW - TWO PUMPS OPERATING	34. PERFORM the following: <ol style="list-style-type: none"> a. START 22, 21 <u>OR</u> 23 CCW Pump (preferred order) b. <u>IF</u> ONLY one CCW pump operating <u>AND</u> two recirculation pumps operating, STOP one recirculation pump
35.	VERIFY 22 Recirculation Pump - OPERATING	35. START 21 Recirculation Pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36.	CLOSE SI Test Line Stops to RWST	
	(a) PLACE interlock switches to OFF	
	<ul style="list-style-type: none"> • MOV-842 • MOV-843 	
	(b) CLOSE SI Test Line Stops to RWST	
	<ul style="list-style-type: none"> • MOV-842 • MOV-843 	
37.	CHECK adequate CCW system performance	
	(a) CHECK CCW System temperature - LESS THAN 150 °F	(a) CLOSE <u>ONE</u> RHR Heat Exchanger Flow Control Valve
		<ul style="list-style-type: none"> • HCV -638 • HCV-640
	(b) CHECK CCW System temperature - LESS THAN 130 °F	(b) ESTABLISH backup cooling to SI <u>AND</u> RHR pumps per SOP 4.1.2, Component Cooling System Operation
	(c) CHECK CCW System temperature - STABLE <u>OR</u> DECREASING	(c) VERIFY maximum available service water flow through CCW heat exchangers

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38.	CHECK IF Intact Steam Generators (SGs) should be depressurized to RCS pressure	
	(a) CHECK RCS pressure - LESS THAN INTACT SG PRESSURE	(a) GO TO Step 39
	(b) CHECK SGs radiation - NORMAL	(b) Do <u>NOT</u> dump steam from any SG with high radiation
	<ul style="list-style-type: none"> ● R-49, Steam Generator Blowdown Radiation Recorder ● R-28, R-29, R-30 or R-31, Main Steam Line Radiation Recorder ● R-45, Air Ejector Radiogas Monitor Recorder 	
	(c) DUMP steam to condenser from intact SGs <u>UNTIL</u> SG pressure less than RCS pressure	(c) DUMP steam using intact SGs atmospheric steam dumps <u>UNTIL</u> SG pressure less than RCS pressure
39.	DETERMINE IF Reactor Vessel Head should be vented	
	(a) CONSULT Technical Support Center	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40.	CHECK <u>IF</u> EDGs should be stopped	
	(a) CHECK AC 480V buses - ENERGIZED FROM OFFSITE SOURCES	
	(b) CHECK lighting - RESET	(b) RESET lighting
	(c) CHECK <u>ALL</u> MCCs <u>EXCEPT</u> MCC 28 <u>AND</u> MCC 28A - ENERGIZED	(c) ENERGIZE MCCs
	(d) STOP any unloaded EDG	
	(1) PLACE EDG in standby	
41.	DIRECT Chemistry to OBTAIN the following samples	
	● RCS boron concentration	
	● RCS activity	
	● Containment Atmosphere (H2/O2)	
	● Containment Sump boron concentration	
	● Activity of all Steam Generators	
	● Recirculation Sump pH	
42.	OBTAIN Recirculation Sump pH sample results	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43.	CHECK Recirculation Sump water pH - BETWEEN 7.0 and 9.5	<p>43. PERFORM the following:</p> <p>a. IF pH is less than 7.0, CONSULT Technical Support Center (TSC) for methods of raising pH</p> <p>1. INCREASE Recirculation Sump pH as directed by TSC</p> <p>2. GO TO Step 42 to determine effect of pH adjustment <u>AND</u> CONCURRENTLY GO TO Step 44</p> <p>b. IF pH is greater than 9.5, ADD boric acid from the BAST to RCS through normal <u>OR</u> alternate charging path</p> <p>1. GO TO Step 42 to determine effect of pH adjustment <u>AND</u> CONCURRENTLY GO TO Step 44</p>
44.	CHECK Containment Hydrogen concentration - LESS THAN 3 PERCENT	44. PLACE Post Accident Vent System in service per SOP 10.9.2, Post Accident Vent System Operation
45.	CHECK Cold Leg recirculation in service - GREATER THAN 24 HOURS	45. GO TO Step 37
	(a) GO TO AOI 4.2.4, Transfer to Hot Leg Recirculation During LOCA When RCS Temperature At Least 200°F And Less Than 350°F	
END		

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6.0 REFERENCES

6.1 DEVELOPMENT DOCUMENTS

EOP ES-1.3, Transfer to Cold Leg Recirculation

6.2 INTERFACING DOCUMENTS

6.2.1 PROCEDURES

AOI 4.2.5 Loss Of Emergency Coolant Recirculation During LOCA When
RCS Temperature At Least 200°F And Less Than 350°F

SOP 4.1.2 Component Cooling System Operation

SOP 10.9.2 Post Accident Vent System Operation

AOI 4.2.4 Transfer to Hot Leg Recirculation During LOCA When RCS
Temperature At Least 200°F And Less Than 350°F

6.2.2 TECHNICAL SPECIFICATIONS

None

6.3 COMMITMENTS

None

Number: AOI 4.2.3	Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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6.4 UFSAR

1.3.5 Reactivity Control

3.1.2.5 Reactivity Shutdown Capability

6.2.2.1.1 Injection Phase

6.2.2.1.2 Recirculation Phase

6.2.2.1.4 Changeover From Injection Phase To Recirculation Phase

6.2.2.3 Components; reference to NaOH in paragraph 4

6.3 Containment Spray System

6.8.2.1 Hydrogen Recombiners

6.8.2.2 Containment Vent System

6.8.3 Post Accident Hydrogen Generation

Figure 6A-1 Sump pH vs. Time After LOCA

7.5.2.1.3 Containment Hydrogen Concentration

9.2.1.2 Reactivity Hold-Down Capability

9.2.2 [System Design And Operation CVCS]

9.2.2.4.16 Boric Acid Storage Tanks

9.2.2.4.18 Batching Tank

9.2.2.4.20 Boric Acid Blender

14.3.2.2 Description Of Small Break LOCA Transient

14.3.3.1.2 Small Break LOCA Evaluation Model

Number: AOI 4.2.3	Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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ATTACHMENT 1

COLD LEG RECIRCULATION USING RHR PUMPS

1. ESTABLISH RHR Cold Leg Recirculation

(a) PLACE Safety Injection Recirc
Switch 3 to OFF

(b) ESTABLISH Recirculation flow (b)
path

GO TO AOI 4.2.5, Loss Of Emergency
Coolant Recirculation During LOCA When RCS
Temperature At Least 200°F And Less Than
350°F

(1) CHECK MOV-882 -
CLOSED

(1) CLOSE MOV-882

(2) OPEN MOV-744

(3) OPEN MOV-1805

(4) OPEN MOV-885A

(5) OPEN MOV-885B

(6) START ONE RHR
Pump:

(6) GO TO AOI 4.2.5, Loss Of Emergency
Coolant Recirculation During LOCA When RCS
Temperature At Least 200°F And Less Than
350°F

• 21 RHR Pump

• 22 RHR Pump

(c) RETURN TO Step 13

END OF ATTACHMENT 1

Number: AOI 4.2.3	Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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ATTACHMENT 2

480V BUS EQUIPMENT LOAD RATINGS

<u>LOAD</u>	<u>21 EDG</u>	<u>22 EDG</u>		<u>23 EDG</u>
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 Service water pump	277 KW			
22 Service water pump		277 KW <u>OR</u> 277 KW		
23 Service water pump				277 KW
24 Service water pump	277 KW			
25 Service water pump		277 KW <u>OR</u> 277 KW		
26 Service water pump				277 KW
PRZR Control Heaters				277 KW
21 PRZR BU Heaters			554 KW	
22 PRZR BU Heaters		485 KW		
23 PRZR BU Heaters	485 KW			
21 AFW Pump			375 KW	
22 AFW Pump				375 KW
21 Fan Cooler Unit	250 KW			
22 Fan Cooler Unit	250 KW			
23 Fan Cooler Unit		250 KW		
24 Fan Cooler Unit			250 KW	
25 Fan Cooler Unit				250 KW
21 SI Pump	327 KW			
22 SI Pump		327 KW <u>OR</u> 327 KW		
23 SI Pump				327 KW
21 CS Pump	348 KW			
22 CS Pump				348 KW

Number: AOI 4.2.3	Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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ATTACHMENT 2
480V BUS EQUIPMENT LOAD RATINGS (Continued)

<u>LOAD</u>	<u>21 EDG</u>	<u>22 EDG</u>		<u>23 EDG</u>
	BUS 5A	BUS 2A	BUS 3A	BUS 6A
21 RHR Pump			319 KW	
22 RHR Pump				319 KW
21 Charging Pump	150 KW			
22 Charging Pump			150 KW	
23 Charging Pump				150 KW
21 Recirc Pump	304 KW			
22 Recirc Pump				304 KW
21 CCW Pump	228 KW			
22 CCW Pump		228 KW		
23 CCW Pump				228 KW
21 Lighting Xformer		150 KW (N)		150 KW (E)
22 Lighting Xformer			225 KW	
23 Lighting Xformer	225 KW			
Turbine Aux Oil Pump				112 KW
Station Air Compressor	93 KW			

END OF ATTACHMENT 2

ATTACHMENT 3
PROCEDURE CHANGE SUMMARY/TECHNICAL REVIEW

Procedure No. AOI 4.2.3 Rev 5
Title TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN
RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

STEP	DESCRIPTION OF CHANGE / REASON FOR CHANGE
------	---

<<Reason For Change>>

GENERAL - Made minor formatting corrections per GSAD 9 requirements.

Made the following formatting and typo corrections per CR 200109148:

Step 10.b.2 RNO - Corrected typo (Changed "FCV-1111" to "FCV-1112")

Step 18 RNO - Corrected indent of bulleted items

Step 13.b table - Centered table

The above are administrative changes per SAO-100. A 50.59 screen is not required.

GSAD 13
Rev. 14

PROCEDURE NUMBER	AOI 4.2.3	Rev	5
ANALYST	T.G. Harvey	Date	7/10/03

Y/N

N/A

N/A

N/A

N/A

200109148

Y

Y

N/A

Y

N/A

N/A

* **ALL** items for each of the questions with **s must be incorporated **AND** [†]GSAD 10 requirements met for the revision to be credited as a biennial review.

FIGURE 2
TPC CLEARANCE AUTHORIZATION FORM

PART I **AUTHORIZATION**

TPC # _____

Procedure AOI 4.2.3

Procedure Title TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS
TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

TPC Description _____

Reason for Clearance: Check applicable box.TPC Expired ☐ New Procedure Revision Issued ☐ Conditions no Longer Exist ☐

Other _____ (OM authorization required)

Clearance Authorized _____ Date ____/____/____
(OM / AOM / GSM)

PART II **CLEARANCE**

CCR TPC Log Index Closed Out _____
 TPC Log Copy Removed _____
 CCR Controlled Copy _____

Field Nuclear NPO Office _____
 Conventional NPO Office _____

Operations Staff Office

Staff Controlled Copy _____
TPC Log Index Closed Out _____
Revision Control Book _____
Operations Manager Books _____

Administrative Copies

TSC _____
Training _____
Records Management Center _____

Additional Controlled Copies

ATTACHMENT I

Page 1 of 1

SNSC ITEM SUMMARY SHEET

To: SNSC Secretary Date: _____

From: Mark Miller
(Presenter's Name and Title) (Extension)

Subject: SNSC Agenda Request for SNSC on: _____
(Date)

Department: Generation Support Section: NPG

Document No: AOI 4.2.3 Revision: 5

Document Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN
RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

Brief Summary (description of subject, reason for changes, etc.):

See Reason For Change Summary

List Contents of SNSC Package:

Applicable Reference Documents:

Supervisor's
Name and
Signature:

Date:

Submit Attachment I (as a cover sheet) and the review document* to the SNSC Secretary no less than 3 working days prior to the targeted SNSC meeting (Section 4.8.1). If less than 3 working days, the activity will be treated as a "walk-in" (Section 4.7.3).

* The document should be organized as follows: SAO-460 review package, affected pages of change (if applicable), LAR, TS, or TS Bases changes (entire package), and any other relevant items that would support the review.

ATTACHMENT III

Page 1 of 1

SNSC REVIEW COVER SHEET

Originating Document No.:	AOI 4.2.3	Revision No.:	5
Title: TRANSFER TO COLD LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F			
<p>SNSC has reviewed this item and has determined that it (check as appropriate):</p> <p>SNSC has reviewed this item and has determined that it (check as appropriate):</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Require a License Amendment</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Adversely impact plant nuclear safety</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Adversely impact the health and safety of plant personnel or the public</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Require further review by the Plant Manager, NFSC, or other individual/group:</p> <p style="padding-left: 150px;">Plant Manager <input type="checkbox"/> NFSC <input type="checkbox"/> Other (specify) _____</p> <p>Remarks:</p>			
<p>SNSC recommends this item for:</p> <p>Approval _____ Disapproval _____ Other _____</p>			
<p>Completed by: _____ Date _____ Meeting No. _____</p> <p style="text-align: center;">SNSC Secretary</p>			

Prepared by: <u>T.G. Harvey</u> Reviewer: _____ Reviewer: _____ SNSC Review: _____	Reviewer: _____ Reviewer: _____ Reviewer: _____ Reviewer: _____
Meeting No. / Date	
Approval: _____ / _____ <div style="display: flex; justify-content: space-between; margin-top: 10px;"> Signature Date </div>	
_____ Effective Date	

<hr style="border-top: 3px double black;"/> Reviewer / Date	<hr style="border-top: 3px double black;"/> Reviewer / Date
--	--

CREW "B"

From: James Clifford
To: Marsh, Tad
Date: 7/10/03 2:12PM
Subject: Re: Extension for green ticket G20030384

We are requesting a 30 day extension for green ticket G20030384, which would change the EDO due date from 7/21/03 to 8/22/03. This GT is a letter sent to Chairman Diaz from Debbie Grinnell of the C-10 Research and Education Foundation, Newburyport, MA. Ms. Grinnell's concerns relate to the adequacy of SG tube inspections based on NRC Information Notice 2002-21 and J. Hopenfeld's "Differing Professional Opinion" on the same subject. She is asking very detailed questions about SG tube inspections at Seabrook, requesting that the NRC order the industry to conduct adequate SG inspections, and requesting that the NRC issue a proposed rule to assure SG tube integrity.

Because of the extensive coordination necessary to address potential 2.206 implications, request for rulemaking, and to ensure we provide a response consistent with previous correspondence related to J. Hopenfeld's concerns, we request the EDO due date be extended to 8/22/03.

CC: Boska, John; Holden, Cornelius; Nerses, Victor

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3.0AUTOMATIC ACTIONS		1
4.0IMMEDIATE OPERATOR ACTIONS		1
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ATTACHMENT 2 HIGH-HEAD SI PUMP ISOLATION		12
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Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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1.0 PURPOSE

- 1.1. This procedure provides instruction to the operator during the abnormal operating condition in which transfer to hot leg recirculation is required during a Loss Of Coolant Accident (LOCA), WHEN Reactor Coolant System (RCS) temperature is greater than OR equal to 200°F, AND less than 350°F.

2.0 SYMPTOMS/ENTRY CONDITIONS

- 2.1. Cold leg recirculation has been in progress for 24 hours.

3.0 AUTOMATIC ACTIONS

- 3.1. None

4.0 IMMEDIATE OPERATOR ACTIONS

- 4.1. None

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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5.0 OPERATOR ACTIONS

CAUTION

Since water will be brought out of the Containment on Hot Leg recirculation, the potential for high radiation fields exists.

NOTE

Adverse Containment conditions are in effect IF the Containment radiation levels ever exceed 1E5 R/hr OR the Containment pressure remains above 4 psig.

1. CHECK RHR Heat Exchanger Outlet Stops - CLOSED

- | | |
|--------------|--------------------|
| (a) MOV-889A | (a) CLOSE MOV-889A |
| (b) MOV-889B | (b) CLOSE MOV-889B |

2. CLOSE ONE Loop Cold Leg SI Stop

- MOV- 856A, 21 Loop Cold Leg SI
- MOV-856E, 23 Loop Cold Leg SI

3. OPEN MOV-856B, 23 Loop Hot Leg SI Stop

4. CLOSE ONE Loop Cold Leg SI Stop

- MOV- 856C, 24 Loop Cold Leg SI
- MOV-856D, 22 Loop Cold Leg SI

5. OPEN MOV-856F, 21 Loop Hot Leg SI Stop

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. CHECK 22 SI pump alignment		
(a) CHECK Safety Injection Recirc Switch 1 - OFF		(a) PLACE Safety Injection Recirc Switch 1 in OFF
(b) CHECK MOV-887A - OPEN		(b) OPEN MOV-887A
(c) CHECK MOV-887B - OPEN		(c) OPEN MOV-887A
7. CHECK valve alignment <u>AND</u> prepare to start SI pump		
(a) CHECK RHR Heat Exchanger Outlet to SI Pump Suction Stops - OPEN		(a) OPEN MOV-888A <u>AND</u> MOV-888B
• MOV-888A		
• MOV-888B		
(b) PLACE High Head Low Suction Pressure Alarm Switch to ON (Panel SB-1)		
(c) CHECK Safety Injection Recirc Switch 7 - OFF		(c) PLACE Safety Injection Recirc Switch 7 to OFF
8. CHECK SI pump suction pressure - GREATER THAN 75 PSIG		8. CHECK SI valve alignment
		a. <u>IF</u> adequate suction pressure can <u>NOT</u> be established, CONSULT Operations Manager prior to continuing
9. START SI pumps as necessary		
• 21 SI Pump		
• 22 SI Pump		
• 23 SI Pump		
10. VERIFY adequate recirculation flow		
(a) Core Exit TCs - STABLE <u>OR</u> DECREASING		(a) GO TO Step 1

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	CHECK for Cold Leg recirc conditions	11. GO TO Step 24
(a)	CHECK Hot Leg Recirc has been established - GREATER THAN 24 HOURS	
(b)	CHECK RCS subcooling based on core exit TCs - GREATER THAN 52 °F (83 °F Adverse Containment)	
12.	CHECK Recirculation System Alignment	
(a)	VERIFY the following valves OPEN: <ul style="list-style-type: none"> 822A, 22 RHR Heat Exchanger CCW Outlet Stop 822B, 21 RHR Heat Exchanger CCW Outlet Stop 	(a) PERFORM the following: <ul style="list-style-type: none"> a. <u>IF</u> neither valve can be opened, GO TO Step 24 b. <u>IF</u> 822B is open, VERIFY MOV-747 <u>AND</u> HCV-638 OPEN <ul style="list-style-type: none"> 1. GO TO Step 13 c. <u>IF</u> 822A is open, VERIFY MOV-746 <u>AND</u> HCV-640 OPEN <ul style="list-style-type: none"> 1. GO TO Step 13
(b)	VERIFY the following valves OPEN: <ul style="list-style-type: none"> MOV-746, 22 RHR Heat Exchanger Outlet Stop HCV-640, 22 RHR Heat Exchanger Flow Control Valve 	(b) VERIFY the following valves OPEN <ul style="list-style-type: none"> MOV-747, 21 RHR Heat Exchanger Outlet Stop HCV-638, 21 RHR Heat Exchanger Flow Control Valve

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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**13. CHECK IF low-head cold leg
recirculation has been established**

- (a) DETERMINE required core
cooling flow from table below

No. of 946A-D Flow Indicators Greater Than 400 gpm	Core Flow Rate on Indicators Greater Than 400 gpm
4	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM
3	Lowest of these indicators - GREATER THAN 630 GPM <u>OR</u> Sum of two lowest of these indicators - GREATER THAN 950 GPM
2	EACH GREATER THAN 500 GPM
1 <u>OR</u> None	Required Core Cooling - NOT MET

- (b) Core flow rate required by table -
ESTABLISHED

- (b) ESTABLISH high-head cold leg
recirculation, GO TO Step 27

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. PLACE Safety Injection Recirc Switch 7 to ON		
(a)	CHECK <u>ALL</u> SI Pumps - TRIPPED	(a) TRIP <u>ALL</u> SI Pumps
(b)	CHECK MOV-887A - CLOSED	(b) CLOSE MOV-887A
(c)	CHECK MOV-887B - CLOSED	(c) CLOSE MOV-887B
15. PLACE Safety Injection Recirc Switch 8 to ON		
(a)	CHECK MOV-1810 - CLOSED	(a) CLOSE MOV-1810
16. CHECK <u>ALL</u> 480V AC buses powered from <u>ONE</u> of the following:		
<ul style="list-style-type: none"> Emergency Diesel Generators Off-site power 		
17. PLACE Safety Injection Recirc Switch 5 to ON		
18. CHECK Service Water non-essential header - TWO PUMPS OPERATING		
18.	PERFORM the following:	
a.	<u>IF</u> non-essential header is 1-2-3, START 23 <u>OR</u> 21 SW pump	
b.	<u>IF</u> non-essential header is 4-5-6, START 26 <u>OR</u> 24 SW pump	
c.	<u>IF ONLY</u> one Service Water pump operating <u>AND</u> two recirculation pumps operating, PERFORM the following:	
1.	STOP 21 Recirculation Pump	
2.	CLOSE 804, Spent Fuel Pit Heat Exchanger Outlet Stop	

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. CHECK CCW - TWO PUMPS OPERATING		19. PERFORM the following: (a) START 21 <u>OR</u> 23 CCW Pump (b) <u>IF</u> ONLY one CCW Pump operating <u>AND</u> two recirculation pumps operating, STOP 21 Recirculation Pump
20. VERIFY 22 Recirculation Pump - OPERATING		20. PERFORM the following: (a) START 21 Recirculation Pump (b) <u>IF</u> neither Recirculation Pump can be started, PERFORM Attachment 1, Cold Leg Recirculation Using RHR Pumps
21. CLOSE RHR Minimum Flow Test Line Stops (98 ft PAB)		
<ul style="list-style-type: none"> • MOV-743 • MOV-1870 		
22. CLOSE SI Test Line Stops to RWST		
(a) PLACE interlock switches to OFF <ul style="list-style-type: none"> • MOV-842 • MOV-843 		
(b) CLOSE SI Test Line Stops to RWST <ul style="list-style-type: none"> • MOV-842 • MOV-843 		
23. ISOLATE SI pumps per Attachment 2, High-Head SI Pump Isolation		

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. ALIGN Seal Gas System		
(a)	CHECK 1442, PCV-1090 N ₂ Pressure Regulator Inlet Stop - CLOSED	(a) CLOSE 1442
(b)	CHECK 1444, PCV-1090, N ₂ Pressure Regulator BYPASS Stop - CLOSED	(b) CLOSE 1444
(c)	CHECK N ₂ Header Pressure - GREATER THAN 250 PSIG (PI-1075)	(c) RESTORE N ₂ Header Pressure per SOP 10.4.1, Isolation Valve Seal Water System Operations
(d)	OPEN 1442, PCV-1090 N ₂ Pressure Regulator Inlet Stop	
(e)	ADJUST PCV-1090 to maintain 250 psig (PI-1089)	

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>25. CLOSE Containment manual Isolation valves</p> <p>(a) CONSULT SM to determine necessary valves on Attachment 3, Isolations For Long Term Recirculation, to be closed</p> <p>(b) DIRECT NPO to close the necessary valves with Health Physics assistance</p>		
26. CHECK Hot Leg Recirculation - TERMINATED		26. GO TO Step 11
<p>(a) GO TO Step 31</p>		
27. CLOSE MOV-856B, 23 Loop Hot Leg SI Stop		
28. OPEN <u>ONE</u> of the following:		
<ul style="list-style-type: none"> • MOV-856A, 21 Loop Cold Leg SI Stop • MOV-856E, 23 Loop Cold Leg SI Stop 		
29. CLOSE MOV-856F, 21 Loop Hot Leg SI Stop		
30. OPEN <u>ONE</u> of the following:		
<ul style="list-style-type: none"> • MOV-856C, 24 Loop Cold Leg SI Stop • MOV-856D, 22 Loop Cold Leg SI Stop 		
31. EVALUATE long term plant status		
<p>(a) CONSULT Technical Support Center</p>		
END		

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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6.0 REFERENCES

6.1 DEVELOPMENT DOCUMENTS

ES-1.4 Transfer to Hot Leg Recirculation

AOI 4.2.3 Transfer to Cold Leg Recirculation During LOCA When RCS Temperature
At Least 200 °F and Less Than 350 °F

6.2 INTERFACING DOCUMENTS

6.2.1 PROCEDURES

AOI 4.2.5 Loss of Emergency Coolant Recirculation During LOCA When RCS
Temperature At Least 200 °F and Less Than 350 °F

SOP 10.4.1 Isolation Valve Seal Water System Operations

6.2.2 TECHNICAL SPECIFICATIONS

None

6.3 COMMITMENTS

None

6.4 UFSAR

None

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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ATTACHMENT 2
HIGH-HEAD SI PUMP ISOLATION

	<u>Valve Operation</u>	<u>Location</u>	<u>Valving ① Completed</u>
IF on low-head recirculation,	ISOLATE SI Pumps:		
	1) CLOSE MOV-1810	CCR (2)	_____
	2) CLOSE MOV-850A	1 (2)	_____
	3) CLOSE MOV-850B	1 (2)	_____
	4) CLOSE MOV-851A	CCR (2)	_____
	5) CLOSE MOV-851B	CCR (2)	_____
	6) CLOSE MOV-888A	CCR (3)	_____
	7) CLOSE MOV-888B	CCR (3)	_____
	8) OPEN SOV-3502 (IVSW to MOV-850B)	4 (2)	_____
	9) OPEN SOV-3503 (IVSSW to MOV-851B)	4 (2)	_____
	10) OPEN SOV-3512 (IVSW to MOV-851A)	4 (2)	_____
	11) OPEN SOV-3513 (IVSW to MOV-850A)	4 (2)	_____
	12) OPEN SOV-3507 (N ₂ Gas to MOV-888A)	4 (2)	_____
	13) OPEN SOV-3508 (N ₂ Gas to MOV-888B)	4 (2)	_____
Location:	1 MCC 26AA <u>AND</u> MCC 26BB PAB 98 ft. EL (Remote) 2 SI Pump Room PAB 59 ft. EL (Local) 3 Piping Penetration Area PAB 51 ft. EL (Local) 4 IVSW Control Panel PAB 98 ft. EL (Remote) 5 Piping Penetration Area Mezzanine (Local) 6 PAB 15 ft. EL (Local)		
①	The NPO should initial each valving completed space as he properly positions each stop. The Control Room Supervisor (CRS) can remotely position some MOVs; IF he does so, he should initial the valving completed space.		

END OF ATTACHMENT 2

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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ATTACHMENT 3

ISOLATIONS FOR LONG TERM RECIRCULATION

Permission ② Granted	Valve Operation	Location	Valving ① Completed
I	ISOLATE charging line:		
	1) CLOSE MOV-205	1 (3)	_____
	2) CLOSE MOV-226	1 (3)	_____
	3) CLOSE Mov-227	1 (3)	_____
	4) OPEN SOV-3501 (IVSW between MOV-226 AND MOV-225)	4 (3)	_____
II	ISOLATE 21 RCP seal injection:		
	1) CLOSE MOV-4925	1 (3)	_____
	2) CLOSE MOV_250A	1 (3)	_____
	3) OPEN SOV-3514 (IVSW between MOV-4925 AND MOV-250A)	4 (3)	_____
III	ISOLATE 22 RCP seal injection:		
	1) CLOSE Mov-4926	1 (3)	_____
	2) CLOSE MOV-250B	1 (3)	_____
	3) OPEN SOV-3515 (IVSW between MOV-4926 AND MOV-250B)	4 (3)	_____
IV	ISOLATE 23 RCP seal injection:		
	1) CLOSE MOV-4927	1 (3)	_____
	2) CLOSE MOV-250C	1 (3)	_____
	3) OPEN SOV-3516 (IVSW between MOV-4927 AND MOV-250C)	4 (3)	_____
Location:	1 MCC 26AA AND MCC 26BB PAB 98 ft. EL (Remote) 2 SI Pump Room PAB 59 ft. EL (Local) 3 Piping Penetration Area PAB 51 ft. EL (Local) 4 IVSW Control Panel PAB 98 ft. EL (Remote) 5 Piping Penetration Area Mezzanine (Local) 6 PAB 15 ft. EL (Local)		
① The NPO should initial each valving completed space as he properly positions each stop. The Control Room Supervisor (CRS) can remotely position some MOVs; <u>IF</u> he does so, he should initial the valving completed space.			
② SM should initial those lines which he authorizes to be isolated.			

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
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ATTACHMENT 3
ISOLATIONS FOR LONG TERM RECIRCULATION (Continued)

Permission ^② Granted	Valve Operation	Location	Valving ^① Completed
V	ISOLATE 24 RCP seal injection		
	1) CLOSE MOV-4928	1 (3)	
	2) CLOSE MOV-250D	1 (3)	
	3) OPEN SOV-3517 (IVSW between MOV-4928 <u>AND</u> MOV-250D)		
		4 (3)	
VI	ISOLATE RCP seal return:		
	1) CLOSE MOV-222	CCR (3)	
VII	ISOLATE RCP component cooling water:		
	1) CLOSE MOV-769		
	2) CLOSE MOV-797	CCR (3)	
	3) CLOSE MOV-786	CCR (3)	
	4) CLOSE MOV-784	CCR (3)	
	2) CLOSE MOV-789	CCR (3)	
	3) CLOSE FCV-625	CCR (3)	
		CCR (3)	
VIII	ISOLATE Containment spray headers:		
	1) CLOSE MOV-869A		
	2) CLOSE MOV-869B	1 (3)	
	3) OPEN SOV-3504 (IVSW to MOV-869B)	1 (3)	
	4) OPEN SOV-3511 (IVSW to MOV-869A)		
		4 (5)	
		4 (5)	
Location:	1 MCC 26AA <u>AND</u> MCC 26BB PAB 98 ft. EL (Remote)		
	2 SI Pump Room PAB 59 ft. EL (Local)		
	3 Piping Penetration Area PAB 51 ft. EL (Local)		
	4 IVSW Control Panel PAB 98 ft. EL (Remote)		
	5 Piping Penetration Area Mezzanine (Local)		
	6 PAB 15 ft. EL (Local)		
<p>① The NPO should initial each valving completed space as he properly positions each stop. The Control Room Supervisor (CRS) can remotely position some MOVs; <u>IF</u> he does so, he should initial the valving completed space.</p> <p>② SM should initial those lines which he authorizes to be isolated.</p>			

Number: AOI 4.2.4	Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision: REV. 5
----------------------	--	---------------------

ATTACHMENT 3
ISOLATIONS FOR LONG TERM RECIRCULATION (Continued)

Permission ^② Granted	Valve Operation	Location	Valving ^① Completed
IX	ISOLATE RHR system:		
	1) CLOSE MOV-882	CCR (6)	_____
	2) CLOSE MOV-744	(3)	_____
	3) CLOSE 732	CCR (3)	_____
	4) CLOSE MOV 743	1 (3)	_____
	5) CLOSE MOV-1870	1 (3)	_____
	6) CLOSE MOV-958 (Sample)	1 (5)	_____
	7) OPEN SOV-3500		_____
	(N ₂ Gas to 732)	4 (3)	_____
	8) OPEN SOV-3506		_____
	(N ₂ Gas to MOV-744)	4 (3)	_____
	9) OPEN SOV-3509		_____
	(N ₂ to Gas to sample line)	4 (5)	_____
	10) OPEN SOV-3510		_____
	(N ₂ Gas between MOV-743 <u>AND</u> MOV-1870)	4 (3)	_____
X	ISOLATE recirculation sample line:		
	1) CLOSE MOV-990A	1 (5)	_____
	2) CLOSE MOV-990B	1 (5)	_____
	3) OPEN SOV-3505		_____
	(N ₂ Gas to sample line)	4 (5)	_____
XI	ISOLATE N ₂ to PRT and RCDT:		
	1) CLOSE SOV-3418 and SOV-3419		_____
	(N ₂ to PRT)	4 (3)	_____
	2) CLOSE SOV-3415 and SOV-3417		_____
	(N ₂ to RCDT)	4 (3)	_____
Location:			
	1	MCC 26AA <u>AND</u> MCC 26BB PAB 98 ft. EL (Remote)	
	2	SI Pump Room PAB 59 ft. EL (Local)	
	3	Piping Penetration Area PAB 51 ft. EL (Local)	
	4	IVSW Control Panel PAB 98 ft. EL (Remote)	
	5	Piping Penetration Area Mezzanine (Local)	
	6	PAB 15 ft. EL (Local)	
<p>① The NPO should initial each valving completed space as he properly positions each stop. The Control Room Supervisor (CRS) can remotely position some MOVs; <u>IF</u> he does so, he should initial the valving completed space.</p> <p>② SM should initial those lines which he authorizes to be isolated.</p>			

END OF ATTACHMENT 3

Indian Point 2 Improved Technical Specification Conversion Project

M.1 3.5.3: ECCS - Shutdown

Rev. 3 Category More Restrictive:

DOC Summary:

Establishes new requirement for two 50% capacity ECCS high head safety injection pumps and one 100% capacity ECCS RHR subsystem (low head) pumps to be OPERABLE to be Operable in Mode 4 to ensure ECCS flow is available to the core following a DBA in Mode 4.

Description of Change

CTS 3.3.A.1 establishes requirements for ECCS train (pump) Operability only when the reactor is critical. These requirements are maintained in IP2 ITS LCO 3.5.2 which is applicable in Modes 1, 2 and 3.

IP2 ITS 3.5.3 establishes new requirement for ECCS in Mode 4. IP2 ITS 3.5.3 requires Operability of two 50% capacity ECCS high head safety injection (HHSI) pumps and one 100% capacity ECCS RHR subsystem (low head) pumps in Mode 4 to ensure ECCS flow is available to the core following a LOCA in Mode 4.

IP2 ITS 3.5.3 establishes allowable out of service times for ECCS equipment when in Mode 4 as follows: With one of the two required ECCS HHSI subsystems inoperable, the remaining HHSI subsystem and the RHR subsystem maintain substantial capability for the mitigation of a large spectrum of both large and small break LOCAs in Mode 4. Therefore, a Completion Time of 48 hours for restoration of the inoperable subsystem is warranted.

With both of the required ECCS HHSI subsystems inoperable when in Mode 4, the plants capability to respond to a small break LOCA is significantly degraded. Therefore, a Completion Time of 1 hour for restoration ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS subsystem is not required.

With the required ECCS RHR subsystem inoperable when in Mode 4, the plant is not prepared to respond to a loss of coolant accident or to continue a cooldown using the RHR pumps and heat exchangers. The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required plant cooling capacity.

This LCO is modified by a Note that specifies that an ECCS RHR subsystem may be considered Operable when during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4. The ITS Bases for this LCO also clarify that an HHSI subsystem may be considered OPERABLE when injection capability is blocked to meet requirements of LCO 3.4.12 if capable of being manually realigned to the ECCS mode of operation.

Justification for Change:

This change is needed to ensure the availability of ECCS injection capability and long term decay heat removal capability in Mode 4 because the potential for a LOCA still exists at reduced temperatures and pressures.

This change is acceptable because single failures are not considered during Mode 4 operation, core cooling requirements lower than those following a DBA initiated from 100% RTP, and there is reduced potential for a LOCA event in Mode 4. Therefore, two 50% capacity ECCS high head safety injection pumps and one 100% capacity ECCS RHR subsystem (low head) pumps will ensure ECCS flow is available to the core following a DBA in Mode 4 even when the pumps are not aligned for automatic injection. This is true because the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence of a Design Basis Accident (DBA) allows the ECCS operational

Indian Point 2 Improved Technical Specification Conversion Project

requirements to be reduced.

The equipment required to be Operable by ITS 3.5.3 is sufficient to respond to a LOCA in Mode 4 based assumptions used in the development of the following IP2 procedures:

Abnormal Operating Instruction (AOI) 4.2.2, "LOCA when RCS Temperature is at Least 200 F and Less Than 350 F;"

AOI 4.2.3, "Transfer to Cold Leg Recirculation During LOCA when RCS Temperature is at Least 200 F and Less Than 350 F;" and,

AOI 4.2.4, "Transfer to Hot Leg Recirculation During LOCA when RCS Temperature is at Least 200 F and Less Than 350 F."

These procedures are based on Westinghouse Abnormal Response Guideline (ARG)-2, "Shutdown LOCA," which implements the conclusions identified in WCAP-12476, "Evacuation of LOCA During Mode 3 and Mode 4 Operation for Westinghouse NSSS," dated November 1991. WCAP-12476 used conservative assumptions and was determined to be applicable to all Westinghouse PWRs.

ARG-2 and WCAP-12476 address a LOCA that occurs in Mode 3 after the accumulators are isolated or a LOCA in Mode 4. These evaluations concluded that "establishing safety injection from one high head SI pump within 10 minutes and flow from a second high head safety injection pump within 30 minutes will successfully mitigate a small break LOCA (less than 6 inches in diameter)." The need for the second high head SI pump is limited to the case where the LOCA occurs when the RHR system is aligned for decay heat removal. In this case, there is a potential that RHR pumps are unavailable for safety injection because of void formation in the RHR inlet line due to the temperature of the water in the RHR suction line resulting in a saturation pressure that is less than the NPSH provided by the RWST. ARG-2 and WCAP-12476 conservatively assumed that the total injection flow from the charging pumps and/or high head safety injection pumps is 200 gpm. (This conservatism was selected so that the analysis would apply to plants such as IP2 that are designated as "low head" plants because they do not credit the charging pumps for safety injection.) WCAP-12476, Table 4-8, "Small Break LOCA Analysis without RHR Pumps," identifies the minimum safety injection flow for a 4-Loop plant with HHSI pumps as 610 gpm at a back pressure of between 100 and 300 psig.

IP2 has 3 High Head Safety Injection Pumps. UFSAR Figure 6.2-6 shows the pump performance curve for these pumps which indicate that the following flow rates:

650 gpm per pump at 635 psig (1500 ft (water) head)
400 gpm per pump at 1170 psig (2750 ft (water) head)
200 gpm per pump at 1370 psig (1370 ft (water) head)

Therefore, IP2 meets WCAP-12476, Table 4-8 assumptions with only 1 HHSI pump; however, IP2 ITS 3.5.3 conservatively requires two HHSI pumps available consistent with AOI 4.2.2. Additionally, for the small break LOCA with RHR, WCAP-12476 assumes that Mode 4 LOCAs are initiated at a pressure less than 1000 PSIG which is consistent with typical Mode 4 conditions. Therefore, one HHSI pump will provide greater than 400 gpm (the amount assumed for two pumps in WCAP-12476). Additionally, the IP2 RHR system relief valve is set at approximately 450 psig. Therefore, if the LOCA occurs when IP2 has RHR in decay heat removal mode, RCS pressure will be less than 450 psig and one HHSI pump will supply at least 650 gpm which is more than the volume assumed to be supplied by two pumps in the WCAP-12476 analysis. Additionally, following ITS conversion, IP2 Technical Requirements Manual (TRM) 3.1.B will require at least one Operable charging pump when in Mode 4 which will ensure the availability of an additional 80 gpm of high pressure injection capability.

Post accident recirculation requirements for a Mode 4 LOCA are ensured by ITS 3.5.3 by requirements for the Operability of 1 RHR subsystem. Although the required RHR subsystem may be aligned for decay heat removal when in Mode 4, availability of the RHR pump for post LOCA recirculation is assured following both a large and a small break LOCA. As discussed above, IP2 HHSI injection capacity is

Indian Point 2 Improved Technical Specification Conversion Project

significantly above the minimum needed to prevent flashing in the RHR pump suction during a small break LOCA. Additionally, Step 1 of IP2 AOI 4.2.2 requires that the RHR pump is stopped immediately to prevent damage if there is any indication of loss of flow to the RHR pump suction during a large break LOCA. Finally, as discussed in the IP2 ITS LCO 3.5.2 Bases, IP2 post LOCA recirculation requirements can be satisfied by either of the two RHR pumps or either of the two Recirculation pumps. Although not specifically required to be Operable in Mode 4, the redundant RHR pump and the two recirculation pumps would typically be available for recirculation if the required RHR pump was unable to perform the recirculation function.

ATTACHMENT 3
PROCEDURE CHANGE SUMMARY/TECHNICAL REVIEW

Procedure No. AOI 4.2.4 Rev 5
Title TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN
RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

STEP	DESCRIPTION OF CHANGE / REASON FOR CHANGE
-------------	--

<<Reason For Change>>

Step 13.b - Centered table per CR 200109147

GENERAL - Made minor formatting adjustments per GSAD 9 requirements.

The above are administrative changes per SAO-100. A 50.59 screen is not required.

GSAD 13
Rev. 14

PROCEDURE NUMBER	<u>AOI 4.2.4</u>	Rev	<u>5</u>
ANALYST	<u>T.G. Harvey</u>	Date	<u>7/10/03</u>

Y/N

N/A

N/A

N/A

N/A

200109147

Y

Y

Y

N

N/A

N/A



CONCLUSIONS



* **ALL** items for each of the questions with **s must be incorporated **AND** [†]GSAD 10 requirements met for the revision to be credited as a biennial review.

FIGURE 2
TPC CLEARANCE AUTHORIZATION FORM

PART I **AUTHORIZATION**

TPC # _____ Procedure AOI 4.2.4

Procedure Title TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

TPC Description _____

Reason for Clearance: Check applicable box.

TPC Expired ☐ New Procedure Revision Issued ☐ Conditions no Longer Exist ☐

Other _____ (OM authorization required)

Clearance Authorized _____ Date ____/____/____
(OM / AOM / GSM)

PART II **CLEARANCE**

CCR TPC Log Index Closed Out _____
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Training _____
Records Management Center _____

Additional Controlled Copies

ATTACHMENT I
Page 1 of 1

SNSC ITEM SUMMARY SHEET

To: SNSC Secretary Date: _____

From: Mark Miller
(Presenter's Name and Title) (Extension)

Subject: SNSC Agenda Request for SNSC on: _____
(Date)

Department: Generation Support Section: NPG

Document No: AOI 4.2.4 Revision: 5

Document Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN
RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F

Brief Summary (description of subject, reason for changes, etc.):

See Reason For Change Summary

List Contents of SNSC Package:

Applicable Reference Documents:

Supervisor's
Name and
Signature:

Date:

Submit Attachment I (as a cover sheet) and the review document* to the SNSC Secretary no less than 3 working days prior to the targeted SNSC meeting (Section 4.8.1). If less than 3 working days, the activity will be treated as a "walk-in" (Section 4.7.3).

* The document should be organized as follows: SAO-460 review package, affected pages of change (if applicable), LAR, TS, or TS Bases changes (entire package), and any other relevant items that would support the review.

ATTACHMENT III
Page 1 of 1

SNSC REVIEW COVER SHEET

Originating Document No.:	AOI 4.2.4	Revision No.:	5
Title: TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F			
SNSC has reviewed this item and has determined that it (check as appropriate):			
SNSC has reviewed this item and has determined that it (check as appropriate):			
Does <input type="checkbox"/>	Does <u>not</u> <input type="checkbox"/>	Require a License Amendment	
Does <input type="checkbox"/>	Does <u>not</u> <input type="checkbox"/>	Adversely impact plant nuclear safety	
Does <input type="checkbox"/>	Does <u>not</u> <input type="checkbox"/>	Adversely impact the health and safety of plant personnel or the public	
Does <input type="checkbox"/>	Does <u>not</u> <input type="checkbox"/>	Require further review by the Plant Manager, NFSC, or other individual/group:	
		Plant Manager <input type="checkbox"/> NFSC <input type="checkbox"/> Other (specify) _____	
Remarks:			
SNSC recommends this item for:			
Approval _____ Disapproval _____ Other _____			
Completed by: _____ Date _____ Meeting No. _____			
SNSC Secretary			

TRANSFER TO HOT LEG RECIRCULATION DURING LOCA WHEN RCS TEMPERATURE
AT LEAST 200 °F AND LESS THAN 350 °F

Prepared by:	T.G. Harvey	Reviewer:	
Reviewer:		Reviewer:	
Reviewer:		Reviewer:	
SNSC Review:		Reviewer:	

Meeting No. / Date

Approval: _____ / _____

Signature	Date
-----------	------

Effective Date

BIENNIAL REVIEW

Reviewer / Date

Reviewer / Date

For use as field copy. Valid for 24 hours: _____

Control Room Supervisor	Date / Time
-------------------------	-------------

CONTINUOUS USE

CREW "B"

20011128959

AOI 04-02-04 Rev 5.wpd

REVISION PROCESSGSAD 13
Rev. 14ATTACHMENT 3
PROCEDURE CHANGE SUMMARY/TECHNICAL REVIEW

Procedure No.	AOI 4.2.2	Rev	6
Title	LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F		

STEP	DESCRIPTION OF CHANGE / REASON FOR CHANGE
------	---

20.b and 23.c - Changed cold overpressure limit margin from 64 psig to 25 psig, refer to calculation FIX-00056 Rev 2

23.a changed condition for checking OPS in service to referring to TS figure 3.1.A-1, refer to calculation FIX-00087 Rev 2

The above changes are covered by Regulatory Evaluation of NET-177-01 (CR 200104118). No 50.59 Screening is required for these changes.

REVISION PROCESS

GSAD 13

Rev. 14

ATTACHMENT 1
REVISION CHECKLIST

PROCEDURE NUMBER AOI 4.2.2

Rev 6

ANALYST K. BRAGG

Date 2/22/02

Procedure Revision Type, Circle One:

LIMITED SCOPE

BIENNIAL*†

ALL TPCs incorporated into this revision *

Y/N

TPC Cancellation forms completed for each TPC (List TPCs incorporated)

NANA

Non-permanent TPCs re-issued or canceled.

NA

ALL Communications to Staff incorporated.* (List CTSs incorporated)List Operator Aids OR Corrective Actions incorporated.

Interfacing Document Reference List checked/updated.

Y

UFSAR section of the procedure checked/updated

YProcedure Commitments section checked/updated AND associated steps marked *Y

Cross-references in procedure checked/updated (i.e. go to step x, per SOP X.X)

YALL Plant Modifications incorporated AND procedure nomenclature agrees with field *NAIF instrument is added to OR deleted from a log, I&C OR T&P notifiedNA

{COMMITMENT: 5.2.1}

ALL review recommendations resolved *YPROCEDURE COORDINATOR

Incorporated items checked as Approved in Generation Support Database

Procedure meets requirements for Biennial review per GSAD 10 †

SAO 404 and 460 Checklists complete as applicable

PROCEDURE ADMINISTRATOR

Procedure No. Title, and Rev No. Entered/Updated in Generation Support Database

* ALL items for each of the questions with **s must be incorporated AND †GSAD 10 requirements met for the revision to be credited as a biennial review.

OAD
27
Rev.
20

PART I AUTHORIZATION

Procedure AOI 4.2.2

TPC Description

TPC Expired ☐ New Procedure Revision Issued ☐

Conditions no Longer Exist ☐

Other _____ (OM authorization required)

Clearance Authorized _____ Date ____/____/____
(OM / AOM / GSM)

PART II CLEARANCE

CCR	TPC Log Index Closed Out	_____
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	CCR Controlled Copy	_____

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2. Address		
3. Phone Number		
4. Fax Number		
5. E-mail Address		
6. Website		
7. Description of the NPO's activities		
8. Date of the report		

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SAO-404
Rev..
11ATTACHMENT I
Page 1 of 1

SNSC ITEM SUMMARY SHEET

To: SNSC Secretary

Date: _____

From: Mark Miller

(Presenter's Name and Title)

(Extension)

Subject: SNSC Agenda Request for SNSC on:

(Date)

Department: Generation Support

NPG

Document No: AOI 4.2.2

Section: _____

6

Revision: _____

Document Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 AND LESS THAN 350

Brief Summary (description of subject, reason for changes, etc.):

See Reason For Change Summary

List Contents of SNSC Package:

Applicable Reference Documents:

Supervisor's
Name and
Signature:

Date:

Submit Attachment I (as a cover sheet) and the review document* to the SNSC Secretary no less than 3 working days prior to the targeted SNSC meeting (Section 4.8.1). If less than 3 working days, the activity will be treated as a "walk-in" (Section 4.7.3).

SAO-404

Rev.

11

- * The document should be organized as follows: SAO-460 review package, affected pages of change (if applicable), LAR, TS, or TS Bases changes (entire package), and any other relevant items that would support the review.

SAO-404
Rev.
11

ATTACHMENT III
Page 1 of 1

SNSC REVIEW COVER SHEET

Originating Document No.:	AOI 4.2.2	Revision No.:	6
Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 AND LESS THAN 350			
<p>SNSC has reviewed this item and has determined that it (check as appropriate):</p> <p>SNSC has reviewed this item and has determined that it (check as appropriate):</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Require a License Amendment</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Adversely impact plant nuclear safety</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Adversely impact the health and safety of plant personnel or the public</p> <p>Does <input type="checkbox"/> Does <u>not</u> <input type="checkbox"/> Require further review by the Plant Manager, NFSC, or other individual/group:</p> <p style="text-align: center;">NFSC Other (specify)</p> <p style="text-align: center;">Plant Manager <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Remarks:</p>			
<p>SNSC recommends this item for:</p> <p>Approval Disapproval Other <input type="checkbox"/></p>			

SAO-404

Rev.

11

Completed by:

Date _____

Meeting No.

SNSC Secretary

AOI 4.2.2

**Rev.
6**

**LOCA WHEN RCS TEMPERATURE AT LEAST 200 AND
LESS THAN 350**

Preparer: _____ Reviewer: _____

Issue
Date: _____

Validation of Operations Manager Approval for change:

(OM, AOM, SM, GSM) Date

AOI 4.2.2
Revision 6

Prepared by:	K. BRAGG	Reviewer:	_____
Reviewer:	_____	Reviewer:	_____
Reviewer:	_____	Reviewer:	_____
SNSC Review:	_____	Reviewer:	_____
	Meeting No. / Date		
Approval:	_____		/ _____ Date
	Signature		Effective Date

Reviewer / Date		Reviewer / Date	
For use as field copy. Valid for 24 hours:			
	Qualified Operator		Date / Time
24 Hr Extension:	Control Room Supervisor		Date / Time
24 Hr Extension:	Control Room Supervisor		Date / Time

CONTINUOUS USE

AOI 04-02-02 Rev 06.wpd

Number:	Title:	Revision Number:
AOI 4.2.2	LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	REV. 6

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Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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1. PURPOSE

- o This procedure provides instruction to the operator during the abnormal operating condition in which a LOCA occurs when the Reactor Coolant System (RCS) temperature is greater than 200°F, but less than 350°F.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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2. SYMPTOMS/ENTRY CONDITIONS

- a) An uncontrolled Reactor Coolant System (RCS) depressurization.
- b) PRESSURIZER LOW PRESS 2185 PSIG (SAF Window 3-2) alarm.
- c) IF initial RCS pressure was greater than 1940 psig AND the Low Pressure Safety Injection (SI) remains unblocked:
 - 1) PRESSURIZER LOW PRESSURE SI 1840 PSIG alarm (first out).
- d) Uncontrolled decreasing Pressurizer level.
- e) PRESSURIZER LOW LEVEL 18% 5% (SAF Window 3-3) alarm.
- f) PRESSURIZER LO LO LEVEL CHANNEL TRIP 5% (SAF Window 4-3) alarm.
- g) Uncontrolled decreasing margin to saturation.
- h) SATURATION TEMPERATURE MARGIN APPROACHED (FCF Window 4-7) alarm.
- i) Uncontrolled increasing Pressurizer level (vapor space LOCA)
- j) PRESSURIZER HIGH LEVEL 70% 5% (SAF Window 1-3) alarm.
- k) CONTAINMENT HIGH PRESS SI 2 PSIG alarm (first out).
- l) CONTAINMENT SUMP WATER LEVEL HIGH HIGH (SBF-1 Window 1-1) alarm.
- m) Increasing activity on R-41, Containment Particulate Activity OR R-42, Containment Gaseous Activity monitors.
- n) R-41/R-42 CNTMT AIR HI RAD/TROUBLE (SAF Window 2-7) alarm.
- o) Increasing activity on R-43, Plant Vent Particulate Activity OR R-44, Plant Vent Gaseous Activity monitors.
- p) R-43/R-44 PLANT VENT HI RAD/TROUBLE (SAF Window 2-8) alarm.
- q) IF initial RCS pressure was greater than 1000 psig AND accumulators remain unisolated:
 - 1) 2X ACCUMULATOR LEVEL HIGH LO (SBF Windows 1-9, 2-9, 3-9, 4-9) alarm.
 - 2) 2X ACCUMULATOR PRESSURE HIGH LOW (SBF-1 Windows 1-10, 2-10, 3-10, 4-10) alarm.
- r) IF Residual Heat Removal System (RHR) is in service, a reduced OR fluctuating RHR flow which could be indication of pump cavitation OR vortexing.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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3. AUTOMATIC ACTIONS

- a) IF 2185 psig Pressurizer pressure is reached AND Pressurizer level (hot calibrated) is greater than 18 percent, all Pressurizer heaters energize.
- b) IF a pressure of 1840 psig is reached AND Low Pressure Safety Injection (SI) is unblocked OR Containment pressure reaches 2 psig, the following should occur:
 - o Safety Injection is initiated
 - o Containment Phase A Isolation is initiated
 - o Containment Ventilation Isolation is initiated
- c) IF 18 percent Pressurizer level is reached:
 - o LCV-459, Letdown Isolation Stop closes
 - o All Pressurizer heaters de-energize
- d) IF an increasing Pressurizer level of 5 percent above programmed level is reached:
 - o All Pressurizer heaters energize
- e) IF R-41/R-42 CNTMT AIR HI RAD/TROUBLE (high) alarm occurs, Containment Ventilation Isolation is initiated.

4. IMMEDIATE OPERATOR ACTIONS

- o None

Number:	Title:	Revision Number:
AOI 4.2.2	LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	REV. 6

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																		
***** * <u>CAUTION</u> *																				
	<ul style="list-style-type: none"> * o Prior to dispatching personnel to perform local actions, an evaluation of the local environmental conditions including radiation shall be performed. * o <u>IF</u> conditions to cause an automatic SI exist, BUT an <u>automatic</u> SI has <u>NOT</u> occurred, a manual SI shall NOT be <u>initiated</u>. 																			

***** * <u>NOTE</u> * *****																				
	Adverse Containment conditions are in effect IF Containment radiation levels ever exceed 1E5 R/h OR Containment pressure remains above 4 psig.																			

1.	<u>CHECK IF RHR Pumps Should Be Stopped:</u>																			
	a. CHECK the following:	a. <u>IF</u> none of the conditions satisfied, GO TO Step 2.																		
	o PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT]																			
	- OR -																			
	o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED IN TABLE BELOW																			
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; border-bottom: 1px solid black;">WR RCS PRESSURE</td> <td style="width: 30%; border-bottom: 1px solid black;">RCS SUBCOOLING °F</td> <td style="width: 40%;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;">(PSIG)</td> <td style="border-bottom: 1px solid black;">(ADVERSE CONTAINMENT)</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">0 - 400</td> <td style="border-bottom: 1px solid black;">52 (83)</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">401 - 800</td> <td style="border-bottom: 1px solid black;">36 (49)</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">801 - 1200</td> <td style="border-bottom: 1px solid black;">23 (30)</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">1201 - 2500</td> <td style="border-bottom: 1px solid black;">19 (26)</td> <td></td> </tr> </table>	WR RCS PRESSURE	RCS SUBCOOLING °F		(PSIG)	(ADVERSE CONTAINMENT)		0 - 400	52 (83)		401 - 800	36 (49)		801 - 1200	23 (30)		1201 - 2500	19 (26)		
WR RCS PRESSURE	RCS SUBCOOLING °F																			
(PSIG)	(ADVERSE CONTAINMENT)																			
0 - 400	52 (83)																			
401 - 800	36 (49)																			
801 - 1200	23 (30)																			
1201 - 2500	19 (26)																			
	- OR -																			

~~o Any SI pump - RUNNING~~
This Step continued on the next page.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> b. STOP RHR pumps AND <u>place</u> switches in PULL OUT c. CLOSE RHR Hot Leg Suction Stops <ul style="list-style-type: none"> o MOV-730 - AND - o MOV-731 d. CONSULT Shift Manager (SM) to DETERMINE IF <u>valve</u> 732. Inlet Line CIV should be closed e. CLOSE valve 732 	
2.	<u>ISOLATE RCS Letdown:</u>	
	<ul style="list-style-type: none"> a. CHECK CVCS letdown valves - CLOSED <ul style="list-style-type: none"> o 200A o 200B o 200C o LCV-459 o 213 b. CHECK HCV-133, RHR letdown valve - CLOSED 	<ul style="list-style-type: none"> a. Manually CLOSE valves b. Manually CLOSE HCV-133

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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3. CHECK IF Charging Flow Is Adequate:

a. ADJUST charging flow as necessary to maintain pressurizer level

b. CHECK PRZR level:

o GREATER THAN 14% [33% FOR ADVERSE CONTAINMENT

o STABLE OR INCREASING

c. RCS subcooling based on core exit TCs- GREATER THAN VALUE OBTAINED FROM TABLE BELOW

b. Go to Step 4.

c. Go to Step 4.

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)
0 - 400	52 (83)
401 - 800	36 (49)
801 - 1200	23 (30)
1201 - 2500	19 (26)

d. Charging flow - LESS THAN CAPACITY OF TWO CHARGING PUMPS

d. Go to Step 4.

e. RETURN TO POP OR SOP in effect to RESTORE the remainder of the RCS/CVCS/RHR systems to pre-event status

1) REFER TO AOI 1.7. Excessive Reactor Coolant System Leakage. to aid in determining the source of leakage

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>e. SI pumps - NONE RUNNING</p> <p>f. CHECK the following:</p> <ul style="list-style-type: none"> o PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT] <p style="text-align: center;">- OR -</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW: <table border="1"> <tr> <td>WR RCS PRESSURE (PSIG)</td> <td>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</td> </tr> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>e. GO TO Step 4i</p> <p>f. <u>IF</u> neither condition satisfied, GO TO Step 5</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
	<p>g. START 21 SI pump</p>	<p>g. PERFORM the following:</p> <ol style="list-style-type: none"> 1) VERIFY MOV-851B, 22 SI Pump Tie Valve To Outlet of 23 SI Pump is CLOSED 2) START 22 SI Pump <p>a) <u>IF</u> 22 SI Pump will NOT start, START 23 SI Pump</p>										

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	h. CHECK 22 SI pump - OFF	<p>h. <u>IF</u> 22 SI Pump is running due to SI actuation <u>AND</u> <u>either</u> 21 <u>OR</u> 23 SI Pump is <u>NOT</u> <u>running</u>. <u>PERFORM</u> the following:</p> <p>1) <u>IF</u> 21 <u>AND</u> 22 SI Pumps running. <u>PERFORM</u> the following:</p> <p>a) VERIFY MOV-851B - OPEN</p> <p>b) VERIFY MOV-851A - CLOSED</p> <p>c) GO TO Step 4i</p> <p>2) <u>IF</u> 22 <u>AND</u> 23 SI Pumps running. <u>PERFORM</u> the following:</p> <p>a) VERIFY MOV-851A - OPEN</p> <p>b) VERIFY MOV-851B - CLOSED</p> <p>c) GO TO Step 4i</p> <p>3) <u>IF</u> only 22 SI Pump running. <u>PERFORM</u> the following:</p> <p>a) OPEN <u>AND</u> <u>DE-ENERGIZE</u> either MOV-851A OR ____ MOV-851B</p> <p>b) GO TO Step 4i</p>
	i. PLACE <u>NON-RUNNING SI</u> Pumps in PULL OUT	
5.	<u>EVACUATE Non-essential Personnel</u> <u>In Containment</u>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>VERIFY Containment Isolation</u> <u>Phase A:</u>	
	a. Phase A valves - CLOSED PER ATTACHMENT 3	a. Manually ACTUATE Phase A AND manually CLOSE valves.
	b. IVSW valves - OPEN:	b. Manually OPEN valves
	o 1410	
	o 1413	
	o SOV-3518	
	o SOV-3519	
	c. WCP valves - OPEN:	c. Manually OPEN valves
	o PCV 1238	
	o PCV 1239	
	o PCV 1240	
	o PCV 1241	
	d. PLACE personnel AND equipment hatch solenoid control switches on CCR Panel SM to INCIDENT	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	<u>CHECK IF RHR Pump Aligned In SI Mode:</u> a. MOV-882, RHR Pump Suction From RWST - OPEN	CONTINUE with Step 12 while PERFORMING the following: a. ALIGN RHR pump suction to RWST as follows: 1) <u>IF</u> RCS hot leg temperature less than 250°F, OPEN MOV-882, RHR Pump Suction From RWST. 2) <u>IF</u> RCS hot leg temperature greater than 250°F, PERFORM the following: a) OPEN 201 AND 202. Letdown Line Isolation Stops b) PLACE PCV-135, Letdown Backpressure Control in MANUAL AND OPEN fully c) PLACE LCV-112A, Normal/Divert VCT Tank Inlet to DIVERT d) Fully OPEN HCV-133, RHR Letdown Flow Control e) <u>WHEN</u> RHR Pump Suction Temperature is 250°F OR less, PERFORM the following: 1. CLOSE the following valves: o HCV-133 o 201 o 202 2. PLACE LCV-112A, Normal/Divert VCT Tank Inlet to AUTO 3. OPEN MOV-882

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. MOV-744, RHR Discharge Stop - OPEN c. RHR heat exchanger MOVs - OPEN o 745A o 745B o 746 o 747 d. RHR heat exchanger Flow Control Valves - OPEN o 638 o 640	b. Manually OPEN MOV-744 c. Manually OPEN valves d. Manually OPEN valves
10.	<u>CHECK IF CCW Pumps Aligned In SI Mode:</u> a. VERIFY at least one CCW Pump - RUNNING b. OPEN RHR Heat Exchanger CCW Outlet Valves: o 822A o 822B	a. VERIFY Auxiliary Component Cooling - RUNNING 1) <u>WHEN</u> CCW pump becomes available, START one CCW Pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
11.	<p><u>CHECK IF RHR Flow Required:</u></p> <p>a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:</p> <table border="1"> <tr> <td>WR RCS PRESSURE (PSIG)</td> <td>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</td> </tr> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </table> <p>b. RHR Pump suction temperature - LESS THAN OR EQUAL TO 250°F</p> <p>c. START one RHR pump</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. GO TO Step 12.</p> <p>b. GO TO Step 12</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																		
	<p>NOTE</p> <p>PRIOR to making the decision to start an additional SI pump, the core exit TCs should be allowed to stabilize OR a further increase with the additional pump running should be observed.</p>																			
12.	<p><u>VERIFY Adequate SI Flow:</u></p> <p>a. CHECK RVLIS indication - GREATER THAN VALUE OBTAINED FROM TABLE BELOW:</p> <table border="1"> <thead> <tr> <th>NO. OF RCPS RUNNING</th> <th>RVLIS NATURAL CIRCULATION RANGE</th> <th>RVLIS RCP CIRCULATION RANGE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>62%</td> <td>24%</td> </tr> <tr> <td>1</td> <td>55%</td> <td>31%</td> </tr> <tr> <td>2</td> <td>55%</td> <td>44%</td> </tr> <tr> <td>3</td> <td>55%</td> <td>63%</td> </tr> <tr> <td>4</td> <td>55%</td> <td></td> </tr> </tbody> </table>	NO. OF RCPS RUNNING	RVLIS NATURAL CIRCULATION RANGE	RVLIS RCP CIRCULATION RANGE	0	62%	24%	1	55%	31%	2	55%	44%	3	55%	63%	4	55%		<p>a. START one additional SI pump (23 preferred).</p> <p>1) IF 22 SI Pump is running is NOT running, VERIFY the appropriate Outlet Tie valve is CLOSED</p> <p>o 21 Pump running - 851A</p> <p>- OR -</p> <p>o 23 Pump running - 851B</p>
NO. OF RCPS RUNNING	RVLIS NATURAL CIRCULATION RANGE	RVLIS RCP CIRCULATION RANGE																		
0	62%	24%																		
1	55%	31%																		
2	55%	44%																		
3	55%	63%																		
4	55%																			
13.	<p><u>CHECK RCS Hot Leg Temperatures - STABLE</u></p>	<p>CONTROL steam dump AND total feed flow as necessary to stabilize RCS temperatures.</p> <p>a. IF condenser steam dumps NOT available, OPERATE atmospheric steam dumps</p>																		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<u>INITIATE Evaluation Of Plant Status:</u> a. CHECK Plant Vent Particulate <u>AND</u> Gaseous Activity Monitors - IN SERVICE o R-43 o R-44 b. RESTORE PAB ventilation per SOP 11.1 (Ventilation System Operation) c. CHECK PAB radiation - NORMAL o R-43 o R-44 o R-4 o R-5987 d. CHECK indications in Containment - NORMAL o R-25 OR R26 o R-41 OR R42 traces prior to Phase A and Ventilation Isolation o R-2 OR R-7 o Containment Pressure o Containment Humidity o Containment Sump Level o Recirculation Sump Level o Reactor Cavity Sump Level e. CHECK Steam Generator status - NORMAL o R-45 o R-49 o R-28, R-29, R-30 OR <u>R-31</u> o Steam Generator level - CONTROLLABLE	a. START R-43 <u>AND</u> <u>R-44</u> per SOP 12.3.2, Digital Radiation Monitoring System Operation (Local Or SRD) c. ISOLATE CVCS OR <u>RHR</u> breaker in PAB 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications d. ISOLATE RCS, CVCS OR <u>RHR</u> break in Containment 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications e. ISOLATE affected Steam Generator per ATTACHMENT 1 (Isolation of Steam Generator Tube Leak/Rupture)

This Step continued on the next page.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	f. Evaluate and operate plant equipment as necessary: <ul style="list-style-type: none"> o CCW Pumps - 2 RUNNING o Essential SW Pumps - MAINTAINING 53-125 PSIG o Non-Essential SW Pumps - AT LEAST ONE RUNNING o EDGs - NOT RUNNING o Containment Fan Cooler Units - ALL RUNNING IN INCIDENT MODE o CHECK DC Bus Trouble Alarms - CLEAR o CHECK Battery Bus voltage - NORMAL 	<ul style="list-style-type: none"> o VERIFY FCV-1176 AND _____ FCV-1176A OPEN o PERFORM the following <ul style="list-style-type: none"> 1) START ALL available Fan Cooler Units per SOP 10.3 (Containment Cooling System Operation) o VERIFY MCCs energized <ul style="list-style-type: none"> o MCC 24A o MCC 26C o MCC 27A o MCC 29A

Number:	Title:	Revision Number:
AOI 4.2.2	LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	REV. 6

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p>* <u>CAUTION</u> *</p> <p>* IF offsite power is lost after the SI is RESET, manual action may be required to restart safeguards equipment. *</p> <p>*****</p>	
15.	<u>RESET SI</u>	
	<p>a. CHECK SI - ACTUATED</p> <p>b. VERIFY Automatic Safeguards Actuation key switches in DEFEAT Panel SB-2)</p> <p>o Train A SIA-1</p> <p>- AND -</p> <p>o Train B SIA-2</p> <p>c. One at a time. DEPRESS Safety Injection reset buttons (Panel SB-2)</p> <p>o Train A</p> <p>o Train B</p> <p>d. VERIFY SI Train A AND <u>Train B</u> - RESET</p>	<p>a. GO TO Step 16</p> <p>d. VERIFY relays reset (Top of Safeguards Initiation Tacks 1-1 AND 1-2):</p> <p>o SAI-1</p> <p>o SIM-1</p> <p>o SIA-2</p> <p>o SIM-2</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>RESET Containment Isolation</u> <u>Phase A</u> <ol style="list-style-type: none"> a. PLACE IVSW switches to OPEN (Panel SN) <ol style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. PLACE CNTMT RAD MON WCPS VALVES control switch to OPEN (Panel SN) c. PLACE personnel AND equipment hatch solenoid control switches to INCIDENT (Panel SM) d. PLACE control switches for all remaining Phase A isolation valves to CLOSE (Panel SN) e. One at a time, DEPRESS Phase A reset buttons <ol style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B 	
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	f. VERIFY Phase A Train A AND Train B - RESET	f. PERFORM the following <ul style="list-style-type: none"> 1) VERIFY correct switch positions per steps 16a through 16d 2) One at a time, DEPRESS Phase A reset buttons <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B 3) <u>IF</u> signal does <u>NOT</u> <u>reset</u>, PERFORM the following: <ul style="list-style-type: none"> a) PLACE keyed switches to BYPASS b) One at a time, DEPRESS Phase A reset buttons <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B 4) <u>IF</u> signal can <u>NOT</u> <u>be</u> reset, RESET relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 <ul style="list-style-type: none"> o CA1 o CA2
17.	<u>ESTABLISH Instrument Air To Containment:</u> a. OPEN PCV-1228	a. VERIFY relays on top of Safeguards Initiation Racks 1-2 <u>AND</u> 2-2 - RESET <ul style="list-style-type: none"> o CA1 o CA2

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED																									
18.	<p><u>CHECK IF RHR Flow Required:</u></p> <p>a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:</p> <table border="1"> <tr> <td>✓</td> <td>WR RCS PRESSURE (PSIG)</td> <td>✗</td> <td>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</td> <td>✗</td> </tr> <tr> <td>✗</td> <td>0 - 400</td> <td>✗</td> <td>52 (83)</td> <td>✗</td> </tr> <tr> <td>✗</td> <td>401 - 800</td> <td>✗</td> <td>36 (49)</td> <td>✗</td> </tr> <tr> <td>✗</td> <td>801 - 1200</td> <td>✗</td> <td>23 (30)</td> <td>✗</td> </tr> <tr> <td>✗</td> <td>1201 - 2500</td> <td>✗</td> <td>19 (26)</td> <td>✗</td> </tr> </table> <p>b. RHR pump suction temperature - LESS THAN OR EQUAL TO 250 °F</p>	✓	WR RCS PRESSURE (PSIG)	✗	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	✗	✗	0 - 400	✗	52 (83)	✗	✗	401 - 800	✗	36 (49)	✗	✗	801 - 1200	✗	23 (30)	✗	✗	1201 - 2500	✗	19 (26)	✗	<p>a. GO TO Step 19</p> <p>b. PERFORM the following:</p> <ol style="list-style-type: none"> 1) OPEN 201 AND 202. Letdown Line Isolation Stops 2) PLACE PCV-135. Letdown Backpressure Control in MANUAL AND OPEN fully 3) PLACE LCV-112A Normal/Divert VCT Tank Inlet to DIVERT 4) Fully OPEN HCV-133. RHR Letdown Flow Control 5) <u>WHEN</u> RHR pump suction temperature is 250 °F OR less. PERFORM the following: <ol style="list-style-type: none"> a) CLOSE the following valves: <ol style="list-style-type: none"> o HCV-133 o 201 o 202 b) PLACE LCV-112A Normal/Divert VCT Tank Inlet to AUTO c) START one RHR pump
✓	WR RCS PRESSURE (PSIG)	✗	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	✗																							
✗	0 - 400	✗	52 (83)	✗																							
✗	401 - 800	✗	36 (49)	✗																							
✗	801 - 1200	✗	23 (30)	✗																							
✗	1201 - 2500	✗	19 (26)	✗																							

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	<u>CHECK PRZR PORV Block Valves:</u>	
	a. Power to block valves - AVAILABLE	a. RESTORE power to block valves by closing the following breakers as necessary: o MCC 26B/1H (MOV-535) o MCC 26A/1H (MOV-536)
	b. Block valves - AT LEAST ONE OPEN	b. OPEN one block valve unless it was closed to isolate an open PORV.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* IF any PRZR PORV opens because of high pressure. Step 20 should be repeated after pressure decreases to less than the PORV setpoint. *</p> <p>*****</p>		
20.	<u>CHECK IF PRZR PORVs Should Be Closed:</u>	
a.	CHECK Cold Overpressure Protection System - IN SERVICE	a. Go to Step 20d.
b.	CHECK RCS pressure - AT LEAST 25 PSIG BELOW CALCULATED COLD OVERPRESSURE LIMIT	b. PERFORM the following: 1) VERIFY at least one PRZR PORV OPEN 2) CONTINUE with Step 21 AND <u>WHEN</u> pressure less than setpoint. PERFORM Step 20e.
c.	GO TO Step 20e.	
d.	CHECK PRZR pressure - LESS THAN 2335 PSIG PSIG	d. PERFORM the following: 1) VERIFY at least one PRZR PORV OPEN 2) CONTINUE with Step 21 AND <u>WHEN</u> pressure less than setpoint. PERFORM Step 20e.
e.	CHECK PRZR PORVs - CLOSED	e. PERFORM the following: 1) Manually CLOSE PORV 2) IF any valve can NOT be closed. THEN manually CLOSE associated block valve.

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>***** * <u>CAUTION</u> * * * RCS pressure should be monitored. If RCS pressure decreases in an * uncontrolled manner to less than 320 psig [340 psig for adverse * containment], the RHR pumps must be manually restarted to supply water to * the RCS. * *****</p>	
21.	<p><u>CHECK IF RHR Pumps Should Be Stopped:</u></p> <p>a. CHECK RCS pressure:</p> <p>o Pressure - GREATER THAN 320 PSIG [340 PSIG FOR ADVERSE CONTAINMENT]</p> <p>- AND -</p> <p>o Pressure - STABLE OR INCREASING</p> <p>b. STOP RHR pumps AND <u>place</u> in AUTO</p>	<p>a. Go to Step 22.</p>

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p>CAUTION</p> <p>*****</p> <p>Alternate water sources for AFW pumps will be necessary if CST level decreases to less than 2 ft.</p> <p>*****</p>	
22.	CHECK SG Levels:	
	<p>a. CHECK Narrow range level - GREATER THAN 10% [27% FOR ADVERSE CONTAINMENT]</p> <p>b. CONTROL feed flow to maintain narrow range level between 10% [27% for adverse containment] and 50%</p>	<p>a. MAINTAIN total feed flow greater than 400 gpm until narrow range level greater than 10% [27% for adverse containment] in at least one SG.</p> <p>b. IF narrow range level in any SG continues to increase, STOP feed flow to that SG.</p>

Number: AOI 4.2.2	Title: LOCA WHEN RCS TEMPERATURE AT LEAST 200 °F AND LESS THAN 350 °F	Revision Number: REV. 6
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* <u>IF</u> any Pressurizer PORV opens because of high pressure OR is manually opened, Step 23c should be repeated after the pressure decreases to less than the PORV setpoint.</p> <p>*****</p>	
23.	<u>CHECK IF OPS Should Be Placed In Service:</u>	
	<p>a. RCS temperature - LESS THAN LIMITS OF TECHNICAL SPECIFICATION FIGURE 3.1.A-1. PORV OPEN PRESSURE</p> <p>b. VERIFY OPS armed light - ILLUMINATED</p> <p>c. CHECK RCS pressure - AT LEAST 25 PSIG BELOW CALCULATED OPS PRESSURE (Panel SF)</p> <p>d. VERIFY both PORVs - CLOSED</p>	<p>a. <u>IF</u> RCS pressure less than 2335 psig. VERIFY PORVs CLOSED</p> <p>b. GO TO Step 24.</p> <p>c. PERFORM the following:</p> <p>1) ENSURE both PORVs - OPEN</p> <p>2) <u>WHEN</u> RCS pressure less than setpoint. GO TO Step 23d</p> <p>d. <u>IF</u> either PORV will NOT <u>close</u>. CLOSE associated PORV block valve</p>
24.	<u>PERFORM sampling of RCS, SGs AND Containment</u>	
	<p>a. OBTAIN the following samples:</p> <ul style="list-style-type: none"> o RCS boron concentration o RCS activity o Containment Atmosphere (H₂/O₂) o Containment Sump boron concentration o Activity of all Steam Generators 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>MOV-894A, MOV-894B, MOV-894C OR MOV-894D breakers shall NOT be energized</p> <p>UNLESS specifically directed to reposition associated valves.</p> <p>*****</p>	
25.	<p><u>ISOLATE SI Accumulators</u></p> <p>a. CHECK SI Accumulators - UNISOLATED</p> <p>b. ENERGIZE the following breakers:</p> <ul style="list-style-type: none"> o MOV-894A o MOV-894B o MOV-894C o MOV-894D <p>a. GO TO Step 26.</p>	
<p>This Step continued on the next page.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. CLOSE SI Accumulator Outlet Stops:</p> <ul style="list-style-type: none"> o MOV-894A o MOV-894B o MOV-894C o MOV-894D 	<p>c. <u>IF</u> unable to isolate an SI Accumulator, VENT the affect accumulator as follows:</p> <p>1) VERIFY PCV-863. Accumulator N₂ Supply Line Stop - CLOSED</p> <p>a) <u>IF</u> unable to close PCV-863, CLOSE the following valves:</p> <ul style="list-style-type: none"> o 1809. Accumulator N₂ Truck Fill Stop o 1811A. Accumulator N₂ Supply Root Stop (North Bank) o 1811B. Accumulator N₂ Supply Root Stop (South Bank) <p>b) OPEN gas stop for affected accumulator:</p> <ul style="list-style-type: none"> o 891A. 21 Accumulator Gas Stop o 891B. 22 Accumulator Gas Stop o 891C. 23 Accumulator Gas Stop o 891D. 24 Accumulator Gas Stop <p>c) OPEN HCV-943 Accumulators N₂ Vent Controller to 100 percent</p>
	<p>d. DE-ENERGIZE the following breakers</p> <ul style="list-style-type: none"> o MOV-894A o MOV-894B o MOV-894C o MOV-894D 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* IF no Charging Pumps are running, starting a Charging Pump with the RWST</p> <p>* Level less than 15 feet may result in air-binding of the pump.</p> <p>*****</p>	
26.	<p><u>CHECK IF Charging flow is</u></p> <p><u>adequate:</u></p> <p>a. VERIFY at least one Charging Pump - RUNNING</p> <p>b. VERIFY Pressurizer Level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]</p>	<p>a. PERFORM the following:</p> <p>1) IF CCW flow to RCP thermal barrier is lost, ISOLATE seal injection to affected RCP BEFORE starting charging pumps by either of the following:</p> <p>o Locally CLOSE seal injection needle valves:</p> <p>o 241A</p> <p>o 241B</p> <p>o 241C</p> <p>o 241D</p> <p style="text-align: center;">- OR -</p> <p>o ENERGIZE AND CLOSE seal injection isolation valves:</p> <p>o MOV-250A - MCC 26AA</p> <p>o MOV-250B - MCC 26BB</p> <p>o MOV-250C - MCC 26AA</p> <p>o MOV-250D - MCC 26BB</p> <p>2) START one Charging Pump</p> <p>b. PERFORM the following:</p> <p>1) PLACE all PRZR heater switches in OFF</p> <p>2) OPEN LCV-112B, Charging Pump Suction From RWST</p> <p>3) OPEN LCV-112C, Charging Pump Suction From VCT</p> <p>4) START additional Charging Pumps</p> <p>5) ADJUST Charging Pump speed controllers for maximum flow</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED															
<div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p>NOTE</p> <p>Shutdown margin should be monitored during RCS cooldown. Refer to Graph RCS-4 for minimum shutdown boron concentration.</p> </div>																	
27.	<p><u>INITIATE RCS Cooldown To Cold Shutdown:</u></p> <p>a. MAINTAIN cooldown rate in RCS cold legs - LESS THAN 50°F/HR</p> <p>b. OPERATE Condenser steam dumps</p>	<p>b. <u>IF</u> condenser steam dumps NOT available, OPERATE atmospheric steam dumps</p> <p>1) <u>IF</u> controllers are NOT available OR Instrument Air is NOT available to atmospheric steam dumps. REFER TO AOI 27.1.9 for local operation.</p>															
28.	<p><u>CHECK RCS Subcooling Based On Core Exit TCs - GREATER THAN VALUE OBTAINED IN TABLE BELOW</u></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 30%;">WR RCS PRESSURE (PSIG)</th> <th style="width: 40%;">RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> <td></td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> <td></td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> <td></td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> <td></td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)		0 - 400	52 (83)		401 - 800	36 (49)		801 - 1200	23 (30)		1201 - 2500	19 (26)		Go to Step 35.
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)																
0 - 400	52 (83)																
401 - 800	36 (49)																
801 - 1200	23 (30)																
1201 - 2500	19 (26)																
29.	<p><u>CHECK IF SI Is In Service:</u></p> <p>o SI pumps - ANY RUNNING</p> <p style="text-align: center;">- OR -</p> <p>o RHR pumps - ANY</p>	Go to Step 35.															

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30.	<u>PLACE All PRZR Heater Switches</u> <u>In OFF Position</u>	
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o Voiding may occur in the RCS during the depressurization. This will result in a rapidly increasing Pressurizer level.</p> <p>o <u>IF</u> RCS pressure decreases to less than 300 psig during the following depressurization, any running RCPs shall be secured.</p> <p>*****</p>	
31.	<u>DEPRESSURIZE RCS To Refill PRZR:</u>	
	<p>a. OPERATE normal PRZR spray</p>	<p>a. PERFORM the following:</p> <ol style="list-style-type: none"> 1) OPERATE one PRZR PORV 2) <u>IF</u> no PORV available, PERFORM the following to use auxiliary spray: <ol style="list-style-type: none"> a) MAINTAIN RCP seal injection 6 to 10 gpm b) Verify at least one charging pump running. c) REDUCE charging pump speed to minimum flow d) CLOSE HCV-142, Charging Line Flow Control Valve e) CLOSE charging line stops: <ol style="list-style-type: none"> o 204B, Loop 21 Cold Leg Norm o 204A, Loop 22 Hot Leg Alt
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. CHECK PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]</p> <p>c. STOP RCS depressurization</p>	<p>f) CLOSE PRZR Spray valves:</p> <ul style="list-style-type: none"> o PCV-455A o PCV-455B <p>g) OPEN 212. Auxiliary Spray Valve</p> <p>h) INITIATE Auxiliary Spray slowly using HCV-142</p> <p>i) ADJUST charging pump speed to control the depressurization</p> <p>b. Continue with Step 32 AND <u>WHEN</u> PRZR level greater than 28% [47% for adverse containment]. PERFORM Step 31c.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>b. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE BELOW</p> <p>▽ ▣WR RCS PRESSURE ▣ RCS SUBCOOLING °F ▣ ▣ (PSIG) ▣ (ADVERSE CONTAINMENT) ▣ ▣ ▣ 0 - 400 ▣ 52 (83) ▣ ▣ 401 - 800 ▣ 36 (49) ▣ ▣ 801 - 1200 ▣ 23 (30) ▣ ▣ 1201 - 2500 ▣ 19 (26) ▣ ○</p>	<p>b. GO TO Step 42.</p>
	<p>c. PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]</p>	<p>c. RETURN TO Step 31.</p>
	<p>d. CHECK MCC 28 AND <u>MCC 28A</u> - ENERGIZED</p>	<p>d. PERFORM the following:</p> <p>1) IF Containment Sump level less than 44'3" AND _____ Containment conditions NOT _____ adverse, RESET MCC 28 AND _____ MCC 28A</p> <p>2) IF MCC 28 can NOT <u>be</u> reset, GO TO Step 33</p>
	<p>e. CHECK Containment Sump level - LESS THAN 44'3"</p>	<p>e. TRIP MCC 28 AND <u>MCC 28A</u></p>
	<p>f. START an RCP per SOP 1.3, Reactor Coolant Pump Startup And Shutdown</p>	
33.	<p><u>CHECK RCS Cold Leg Temperature - GREATER THAN 295°F</u></p>	<p>GO TO Step 35.</p>

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>c. RCS subcooling based on core exit TCs - GREATER THAN REQUIRED SUBCOOLING</p>	<p>c. PERFORM the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> RCS hot leg temperatures greater than 345°F [335°F for adverse containment]. GO TO Step 43. 2) <u>IF</u> RCS hot leg temperatures less than 345°F [335°F for adverse containment]. START one RHR pump if none running. <ol style="list-style-type: none"> a) <u>IF</u> RHR Letdown has been in service for cooling the RHR suction piping. CLOSE HCV-133 3) <u>IF</u> at least one RHR pump can <u>NOT</u> be started. GO TO Step 43.
	<p>d. PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]</p>	<p>d. GO TO Step 31.</p>
	<p>e. STOP one additional high-head SI pump</p>	
	<p>f. RETURN TO Step 34a</p>	
35.	<p><u>CHECK IF Charging Flow Should Be Controlled To Maintain PRZR Level:</u></p>	
	<p>a. CHECK RHR pumps - NONE RUNNING WITH SUCTION FROM RWST</p>	<p>a. GO TO Step 42.</p>
	<p>b. CONTROL charging flow to maintain PRZR level</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>* Depressurizing the RCS may result in losing the minimal RCP No. 1 Seal operating conditions. This will require the RCPs to be tripped. *</p> <p>*****</p>	
37.	<u>DEPRESSURIZE RCS To Minimize RCS Subcooling:</u> a. OPERATE normal PRZR spray	a. OPERATE one PRZR PORV. 1) IF no PORV available, OPERATE auxiliary spray as follows: a) MAINTAIN RCP Seal Injection flow 6 to 10 GPM b) VERIFY at least one Charging Pump running. c) REDUCE Charging Pump speed to minimum. d) CLOSE HCV-142, Charging Line Flow Control Valve. e) CLOSE Charging Line Stops: o 204B, Loop 21 Cold Leg Norm. o 204A, Loop 22 Hot Leg Alt. f) CLOSE PRZR Spray Valves: o PCV-455A o PCV-455B g) OPEN 212, Auxiliary Spray Valve.
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>b. CONTROL PRZR heaters as necessary</p> <p>c. DEPRESSURIZE RCS until EITHER of the following conditions satisfied:</p> <ul style="list-style-type: none"> o PRZR level - GREATER THAN 71% [65% FOR ADVERSE CONTAINMENT] <p>- OR -</p> <ul style="list-style-type: none"> o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>62 (93)</td> </tr> <tr> <td>401 - 800</td> <td>46 (59)</td> </tr> <tr> <td>801 - 1200</td> <td>33 (40)</td> </tr> <tr> <td>1201 - 2500</td> <td>29 (36)</td> </tr> </tbody> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	62 (93)	401 - 800	46 (59)	801 - 1200	33 (40)	1201 - 2500	29 (36)	<p>h) INTIATE spray slowly using HCV-142.</p> <p>i) ADJUST Charging Pump speed to control depressurization.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	62 (93)											
401 - 800	46 (59)											
801 - 1200	33 (40)											
1201 - 2500	29 (36)											
38.	<p><u>VERIFY Adequate Shutdown Margin:</u></p> <ul style="list-style-type: none"> a. DIRECT Chemistry to sample RCS b. Shutdown margin - ADEQUATE b. Borate as necessary. 											

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39.	<p><u>CHECK IF Letdown Can Be Established:</u></p> <p>a. PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]</p> <p>b. ESTABLISH Letdown:</p> <ol style="list-style-type: none"> 1) CLOSE Letdown Orifice Stops <ul style="list-style-type: none"> o 200A o 200B o 200C 2) OPEN Letdown Line Isolation Valves (Panel SN) <ul style="list-style-type: none"> o 201 o 202 3) PLACE Letdown Flow Control Valves 200A B C Switch to REMOTE 4) OPEN LCV-459, Letdown Stop Valve 5) PLACE PCV-135, Low Pressure Letdown Backpressure Controller in MANUAL AND _____ ADJUST to 75 percent open 6) OPEN Letdown Orifice Stops to establish desired Letdown flow <ul style="list-style-type: none"> o 200A, 75 GPM Letdown Orifice Stop o 200B, 45 GPM Letdown Orifice Stop o 200C, 75 GPM Letdown Orifice Stop 7) ADJUST PCV-135 in MANUAL OR AUTO to ensure adequate backpressure 	<p>a. Go to Step 40.</p> <p>b. ESTABLISH Excess Letdown:</p> <ol style="list-style-type: none"> 1) ESTABLISH CCW flow to Excess Letdown Heat Exchanger: <ol style="list-style-type: none"> a) OPEN CCW to Excess Letdown Heat Exchanger Inlet Valves: <ul style="list-style-type: none"> o 791 o 798 b) OPEN CCW to Excess Letdown Heat Exchanger Outlet Valves: <ul style="list-style-type: none"> o 793 o 796 2) PLACE 215, Excess Letdown Diversion Valve to NORMAL. 3) VERIFY 222, Seal Water Return Containment Isolation Valve OPEN. 4) VERIFY HCV-123, Excess Letdown Flow Control Valve CLOSED. 5) OPEN 213, Excess Letdown Isolation Stop. 6) Slowly OPEN HCV-123 to warmup the Excess Letdown Heat Exchanger. 7) ESTABLISH desired Excess Letdown flow using HCV-123. 8) MAINTAIN Excess Letdown Heat Exchanger outlet temperature less than 195°F

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43.	<p><u>VERIFY Additional SI Flow Not Required:</u></p> <p>a. CHECK RVLIS indication - GREATER THAN VALUE OBTAINED FROM TABLE:</p> <p> 1) IF 22 SI Pump is running AND either 21 OR 23 SI Pump NO. OF RVLIS NATURAL RVLIS RCP RCPS CIRCULATION RUNNING RUNNING RANGE RANGE 0 62% 1 24% 2 31% 3 44% 4 63% </p> <p>b. CHECK core exit TCs - STABLE OR DECREASING</p>	<p>a. START one additional SI pump (23 preferred).</p> <p>1) IF 22 SI Pump is running is NOT running. VERIFY the appropriate Outlet Tie valve is CLOSED</p> <p>o 21 Pump running - 851A</p> <p>- OR -</p> <p>o 23 Pump running - 851B</p> <p>b. START one additional SI Pump (23 preferred)</p>
44.	<p><u>CHECK IF Diesel Generators Should Be Stopped:</u></p> <p>a. VERIFY 480V buses - ENERGIZED BY OFFSITE POWER</p> <p>b. VERIFY the following MCCs - ENERGIZED</p> <p>o MCC 24</p> <p>o MCC 27</p> <p>o MCC 29</p> <p>c. CHECK MCC 28 AND 28A - ENERGIZED</p> <p>d. CHECK Containment sump level - LESS THAN 44'3"</p> <p>e. STOP any unloaded diesel generator and place in standby</p>	<p>a. ATTEMPT to restore offsite power to ac emergency busses.</p> <p>c. IF Containment sump level less than 44'3" AND Containment conditions NOT adverse. RESET MCC 28 AND MCC 28A.</p> <p>d. TRIP MCC 28 AND 28A.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
45.	<u>CHECK RCP Cooling - NORMAL</u>	
	a. CHECK RCP CCW System alarms - CLEAR	a. ESTABLISH CCW flow to RCP Thermal Barriers per SOP 4.1.2. Component Cooling System Operation.
	b. CHECK RCP seal injection flow - BETWEEN 6 GPM AND <u>10</u> GPM PER RCP	b. ESTABLISH seal injection flow to RCPs per SOP 3.1. Charging, Sealwater And Letdown Control.
46.	<u>CHECK IF RCP Seal Return Flow Should Be Established:</u>	
	a. RCP Thermal Barrier ΔP - POSITIVE	a. GO TO Step 47.
	b. CCW Pumps - AT LEAST ONE RUNNING	b. GO TO Step 47.
	c. ESTABLISH Seal Return flow:	c. Manually OPEN valves.
	1) VERIFY No. 1 Seal Return Valves - OPEN	
	2) VERIFY Seal return Containment Isolation Valve - OPEN	
47.	<u>CHECK IF RCPs Must Be Stopped:</u>	
	a. CHECK the following:	
	o Number 1 seal differential pressure - LESS THAN 200 PSID	
	- OR -	
	o Number 1 seal leakoff flow - LESS THAN 0.2 gpm AND <u>seal</u> temperatures - INCREASING	
	b. STOP affected RCP(s)	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
48.	<u>CHECK Containment Hydrogen Concentration:</u> a. OBTAIN a hydrogen concentration measurement: o DISPATCH Chemistry personnel to obtain sample - OR - o OPERATE H ₂ -O ₂ Analyzer on Accident Assessment Panel b. Hydrogen concentration - LESS THAN 0.5% IN DRY AIR	b. CONSULT Technical Support Center.
49.	<u>CHECK IF RHR System Can Be Placed In Service:</u> a. CHECK the following: o RCS temperatures - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG [270 PSIG FOR ADVERSE CONTAINMENT] b. CONSULT Technical Support Center to determine if RHR System should be placed in service	a. GO TO Step 51.
50.	<u>CHECK RCS Temperatures - LESS THAN 200°F</u>	RETURN TO Step 20.
51.	<u>EVALUATE Long Term Plant Status:</u> a. MAINTAIN cold shutdown conditions per POP 3.3, Plant Cooledown b. CONSULT Technical Support Center	

-END-

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6.0 REFERENCES

6.1 DEVELOPMENT DOCUMENTS

- 6.1.1 Westinghouse Abnormal Response Guideline ARG-2, Revision 1
- 6.1.2 Emergency Operating Procedures, Revision 38

6.2 INTERFACING DOCUMENTS

6.2.1 PROCEDURES

- AOI 1.7, Excessive Reactor Coolant System Leakage
- AOI 4.2.3, Transfer To Cold Leg Recirculation During LOCA When RCS Temperature At Least 200°F And Less Than 350°F
- SOP 1.3, Reactor Coolant Pump Startup and Shutdown
- AOI 27.1.9, Control Room Inaccessibility Safe Shutdown Control
- POP 3.3, Plant Cooldown
- SOP 3.1, Charging, Sealwater And Letdown System Control
- SOP 4.1.2, Component Cooling System Operation
- SOP 12.3.2, Digital Radiation Monitoring System Operation (Local Or SRD)

6.3 COMMITMENTS

- None

6.4 UFSAR

- None

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ATTACHMENT 1 (Attachment page 1 of 3)
ISOLATION OF STEAM GENERATOR TUBE LEAK/RUPTURE

1. REFER TO the Emergency Porcedures Document Book 1. Emergency Classifications
2. ENSURE the affected SG(s) atmospheric steam dump controller is in AUTO AND set at 74 percent (1030 psig)

CAUTION

* IF 22 AFW Pump is the only source of feed flow, the steam supply shall be maintained from one SG.
 *

3. DISPATCH an NPO to CLOSE the steam supply header stops from the affected SG(s)
 - o MS-41 (SG 22)
 - o MS-42 (SG 23)
4. ENSURE the affected MSIV(s) are CLOSED

① NOTE ①

① The remaining steps are required to limit secondary plant contamination

① AND should be performed while contiuing to step 14f.

①

5. ENSURE the affected SG (s) MSIV(s) Bypass Stop(s) (MS-55s) are CLOSED

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ATTACHMENT 1
ISOLATION OF STEAM GENERATOR TUBE LEAK/RUPTURE

(Attachment page 2 of 3)

6. ENSURE the affected SG(s) MSIV upstream traps are CLOSED
 - a) IF 21 SG has primary to secondary leakage. CLOSE the following valves:
 - o MS-99-29. MST 8 Root Stop Outlet
 - o MS-99-47. MST 6 Root Stop Outlet
 - o MS-102-8. MST 5 Root Stop Outlet
 - o MS-105-11. MST 1 Root Stop Outlet
 - b) IF 22 SG has primary to secondary leakage. CLOSE the following valves:
 - o MS-99-38. MST 9 Root Stop Outlet
 - o MS-99-35. MST 10 Root Stop Outlet
 - o MS-99-32. MST 12 Root Stop Outlet
 - o MS-105-20. MST 2 Root Stop Outlet
 - c) IF 23 SG has primary to secondary leakage. CLOSE the following valves:
 - o MS-105-14. MST 3 Root Stop Outlet
 - o MS-99-15. MST 16 Root Stop Outlet
 - o MS-99-20. MST 14 Root Stop Outlet
 - o MS-102-3. MST 13 Root Stop Outlet
 - d) IF 23 SG has primary to secondary leakage. CLOSE the following valves:
 - o MS-105-17. MST 4 Root Stop Outlet
 - o MS-99-22. MST 18 Root Stop Outlet
 - o MS-99-26. MST 20 Root Stop Outlet
7. ENSURE the following secondary plant steam valves are CLOSED:
 - o Turbine Stop Valves
 - o Condenser steam Dump Valves
 - o Moisture Separator Reheater Stops (MS-6s)
 - o 21 MBFP Stop (MS-7)
 - o 22 MBFP Stop (MS-7-1)
 - o SJAE Stop (MS-8)
 - o Gland Steam Stop (MS-66)

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ATTACHMENT 1 (Attachment page 3 of 3)
ISOLATION OF STEAM GENERATOR TUBE LEAK/RUPTURE

8. OPERATE the unaffected atmospheric steam dumps as necessary to
control RCS Hot Leg temperature

-END-

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ATTACHMENT 2
NATURAL CIRCULATION VERIFICATION

(Attachment page 1 of 1)

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

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

✓	WR RCS PRESSURE	✕	RCS SUBCOOLING °F	✕
✕	(PSIG)	✕	(ADVERSE CONTAINMENT)	✕
✕	0 - 400	✕	52 (83)	✕
✕	401 - 800	✕	36 (49)	✕
✕	801 - 1200	✕	23 (30)	✕
✕	1201 - 2500	✕	19 (26)	✕

- AND -

- o SG pressures - STABLE OR DECREASING

- AND -

- o RCS Hot Leg temperatures - STABLE OR DECREASING

- AND -

- o Core exit TCs - STABLE OR DECREASING

2. IF natural circulation can NOT be verified, INCREASE steam dump.

-END-

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ATTACHMENT 3

(Attachment page 1 of 1)

PHASE A AND VENTILATION ISOLATION VALVES

1. The following valves will CLOSE on a Containment Isolation Phase A:

- o 796 AND 793, CCW from the Excess Letdown Heat Exchanger
- o 798 AND 791, CCW to the Excess Letdown Heat Exchanger
- o 1786 AND 1787, Vent Header from The RCDT
- o 548 AND 549, Gas Analyzer from the PRT
- o 1788 AND 1789, Gas Analyzer from the RCDT
- o 201 AND 202, Letdown from the Regenerative Heat Exchanger
- o 200A, 200B AND 200C, Letdown Orifice Control Stops
- o 519 AND 552, PW Makeup to the PRT
- o 1723 AND 1728, Containment Sump Pumps to the WHUT
- o PCV-1228, Instrument Air to Containment
- o PCV-863, Accumulator N₂ Supply Line Stop
- o 1702 AND 1705, RCDT to the WHUT
- o PCV-1234, PCV-1235, PCV-1236 AND PCV-1237, R-41/R-42 Supply AND Return from Containment
- o 956G AND 956H, Accumulator Sample
- o 956A AND 956B, Pressurizer Steam Space Sample
- o 956C AND 956D, Pressurizer Liquid Space Sample
- o MOV-956E AND MOV-956F, RCS Hot Leg 21 AND 23 Sample
- o 1229 AND 1230, SJAE to Containment
- o MOV-4399 AND MOV-5132, Hi-Rad Sample System Return to Containment Sump
- o MOV-990A AND MOV-990B, Recirculation Pump Discharge Sample Line

2. The following ventilation isolation valves will CLOSE:

- o FCV-1170 AND FCV-1171, Purge Air to Containment
- o FCV-1172 AND FCV-1173, Purge Air from Containment
- o PCV-1190, PCV-1191 AND PCV-1192, Containment Pressure Relief Valves

-END-

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1. PURPOSE

- o This procedure provides instruction to the operator during the abnormal operating condition in which a LOCA occurs when the Reactor Coolant System (RCS) temperature is greater than 200°F, but less than 350°F.

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2. SYMPTOMS/ENTRY CONDITIONS

- a) An uncontrolled Reactor Coolant System (RCS) depressurization.
- b) PRESSURIZER LOW PRESS 2185 PSIG (SAF Window 3-2) alarm.
- c) IF initial RCS pressure was greater than 1940 psig AND the Low Pressure Safety Injection (SI) remains unblocked:
 - 1) PRESSURIZER LOW PRESSURE SI 1840 PSIG alarm (first out).
- d) Uncontrolled decreasing Pressurizer level.
- e) PRESSURIZER LOW LEVEL 18% 5% (SAF Window 3-3) alarm.
- f) PRESSURIZER LO LO LEVEL CHANNEL TRIP 5% (SAF Window 4-3) alarm.
- g) Uncontrolled decreasing margin to saturation.
- h) SATURATION TEMPERATURE MARGIN APPROACHED (FCF Window 4-7) alarm.
- i) Uncontrolled increasing Pressurizer level (vapor space LOCA)
- j) PRESSURIZER HIGH LEVEL 70% 5% (SAF Window 1-3) alarm.
- k) CONTAINMENT HIGH PRESS SI 2 PSIG alarm (first out).
- l) CONTAINMENT SUMP WATER LEVEL HIGH HIGH (SBF-1 Window 1-1) alarm.
- m) Increasing activity on R-41, Containment Particulate Activity OR R-42, Containment Gaseous Activity monitors.
- n) R-41/R-42 CNTMT AIR HI RAD/TROUBLE (SAF Window 2-7) alarm.
- o) Increasing activity on R-43, Plant Vent Particulate Activity OR R-44, Plant Vent Gaseous Activity monitors.
- p) R-43/R-44 PLANT VENT HI RAD/TROUBLE (SAF Window 2-8) alarm.
- q) IF initial RCS pressure was greater than 1000 psig AND accumulators remain unisolated:
 - 1) 2X ACCUMULATOR LEVEL HIGH LO (SBF Windows 1-9, 2-9, 3-9, 4-9) alarm.
 - 2) 2X ACCUMULATOR PRESSURE HIGH LOW (SBF-1 Windows 1-10, 2-10, 3-10, 4-10) alarm.
- r) IF Residual Heat Removal System (RHR) is in service, a reduced OR fluctuating RHR flow which could be indication of pump cavitation OR vortexing.

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3. AUTOMATIC ACTIONS

- a) IF 2185 psig Pressurizer pressure is reached AND Pressurizer level (hot calibrated) is greater than 18 percent, all Pressurizer heaters energize.
- b) IF a pressure of 1840 psig is reached AND Low Pressure Safety Injection (SI) is unblocked OR Containment pressure reaches 2 psig, the following should occur:
 - o Safety Injection is initiated
 - o Containment Phase A Isolation is initiated
 - o Containment Ventilation Isolation is initiated
- c) IF 18 percent Pressurizer level is reached:
 - o LCV-459, Letdown Isolation Stop closes
 - o All Pressurizer heaters de-energize
- d) IF an increasing Pressurizer level of 5 percent above programmed level is reached:
 - o All Pressurizer heaters energize
- e) IF R-41/R-42 CNTMT AIR HI RAD/TROUBLE (high) alarm occurs, Containment Ventilation Isolation is initiated.

4. IMMEDIATE OPERATOR ACTIONS

- o None

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
	<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <ul style="list-style-type: none"> * o Prior to dispatching personnel to perform local actions, an evaluation of the local environmental conditions including radiation shall be performed. * o <u>IF</u> conditions to cause an automatic SI exist, BUT an <u>automatic</u> SI has <u>NOT</u> occurred, a manual SI shall NOT be <u>initiated</u>. <p>*****</p>											
	<p>*****</p> <p style="text-align: center;"><u>NOTE</u></p> <p>*****</p> <ul style="list-style-type: none"> ① Adverse Containment conditions are in effect IF Containment radiation levels ever exceed 1E5 R/h OR Containment pressure remains above 4 psig. <p>*****</p>											
1.	<p><u>CHECK IF RHR Pumps Should Be Stopped:</u></p> <ul style="list-style-type: none"> a. CHECK the following: <ul style="list-style-type: none"> o PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT] - OR - o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED IN TABLE BELOW a. <u>IF</u> none of the conditions satisfied, GO TO Step 2. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p style="text-align: center;">- OR -</p>		WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

o Any SI pump - RUNNING

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<ul style="list-style-type: none"> b. STOP RHR pumps AND <u>place</u> switches in PULL OUT c. CLOSE RHR Hot Leg Suction Stops <ul style="list-style-type: none"> o MOV-730 - AND - o MOV-731 d. CONSULT Shift Manager (SM) to DETERMINE IF <u>valve</u> 732. Inlet Line CIV should be closed e. CLOSE valve 732 	
2.	<u>ISOLATE RCS Letdown:</u>	
	<ul style="list-style-type: none"> a. CHECK CVCS letdown valves - CLOSED <ul style="list-style-type: none"> o 200A o 200B o 200C o LCV-459 o 213 b. CHECK HCV-133, RHR letdown valve - CLOSED 	<ul style="list-style-type: none"> a. Manually CLOSE valves b. Manually CLOSE HCV-133

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
3.	<p><u>CHECK IF Charging Flow Is Adequate:</u></p> <p>a. ADJUST charging flow as necessary to maintain pressurizer level</p> <p>b. CHECK PRZR level:</p> <ul style="list-style-type: none"> o GREATER THAN 14% [33% FOR ADVERSE CONTAINMENT o STABLE OR INCREASING <p>c. RCS subcooling based on core exit TCs- GREATER THAN VALUE OBTAINED FROM TABLE BELOW</p> <table border="1"> <tr> <td>WR RCS PRESSURE (PSIG)</td> <td>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</td> </tr> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </table>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>b. Go to Step 4.</p> <p>c. Go to Step 4.</p> <p>d. Go to Step 4.</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											
	<p>d. Charging flow - LESS THAN CAPACITY OF TWO CHARGING PUMPS</p> <p>e. RETURN TO POP OR SOP in effect to RESTORE the remainder of the RCS/CVCS/RHR systems to pre-event status</p> <p>1) REFER TO AOI 1.7, Excessive Reactor Coolant System Leakage, to aid in determining the source of leakage</p>											

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>*****</p> <p>IF RWST level decreases to less than 9.24 ft AND SI is aligned to the RWST, the SI System should be aligned for cold leg recirculation per AOI 4.2.3 (Transfer to Cold Leg Recirculation During LOCA When RCS Temperature At Least 200 °F And Less Than 350 °F).</p> <p>*****</p>		
4.	<u>VERIFY Proper SI System Alignment</u>	
	<p>a. SI pump cold leg injection valves - OPEN</p> <p>o 856A</p> <p>o 856E</p> <p>o 856C</p> <p>o 856D</p> <p>b. 22 SI pump suction stops - OPEN</p> <p>o 887A</p> <p>o 887B</p> <p>c. 22 SI pump discharge isolations - OPEN</p> <p>o 851A</p> <p>o 851B</p> <p>d. RHR hot leg suction stops - CLOSED</p> <p>o MOV-730</p> <p>o MOV-731</p>	<p>a. Manually OPEN valves</p> <p>b. Manually OPEN valves</p> <p>c. Manually OPEN valves</p> <p>d. PERFORM the following</p> <p>1) VERIFY RHR pumps are secured <u>AND</u> in PULL OUT</p> <p>o 21 RHR Pump</p> <p>o 22 RHR Pump</p> <p>2) CLOSE 730 AND <u>731</u></p> <p>3) CONSULT SM to determine IF valve 732, Inlet Line CIV should be closed</p> <p>a) IF directed by SM, CLOSE valve 732</p>
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	h. CHECK 22 SI pump - OFF	<p>h. <u>IF</u> 22 SI Pump is running due to SI actuation <u>AND</u> <u>either</u> 21 <u>OR</u> 23 SI Pump is <u>NOT</u> <u>running</u>. <u>PERFORM</u> the following:</p> <p>1) <u>IF</u> 21 <u>AND</u> 22 SI Pumps running. <u>PERFORM</u> the following:</p> <p>a) VERIFY MOV-851B - OPEN</p> <p>b) VERIFY MOV-851A - CLOSED</p> <p>c) GO TO Step 4i</p> <p>2) <u>IF</u> 22 <u>AND</u> 23 SI Pumps running. <u>PERFORM</u> the following:</p> <p>a) VERIFY MOV-851A - OPEN</p> <p>b) VERIFY MOV-851B - CLOSED</p> <p>c) GO TO Step 4i</p> <p>3) <u>IF</u> only 22 SI Pump running. <u>PERFORM</u> the following:</p> <p>a) <u>OPEN</u> <u>AND</u> <u>DE-ENERGIZE</u> either MOV-851A OR ____ MOV-851B</p> <p>b) GO TO Step 4i</p>
	i. PLACE <u>NON-RUNNING SI</u> Pumps in PULL OUT	
5.	<u>EVACUATE Non-essential Personnel In Containment</u>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>VERIFY Containment Isolation</u> <u>Phase A:</u>	
	a. Phase A valves - CLOSED PER ATTACHMENT 3	a. Manually ACTUATE Phase A AND manually CLOSE valves. _____
	b. IVSW valves - OPEN:	b. Manually OPEN valves
	o 1410	
	o 1413	
	o SOV-3518	
	o SOV-3519	
	c. WCP valves - OPEN:	c. Manually OPEN valves
	o PCV 1238	
	o PCV 1239	
	o PCV 1240	
	o PCV 1241	
	d. PLACE personnel AND equipment hatch solenoid control switches on CCR Panel SM to INCIDENT	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	<p><u>CHECK IF RHR Pump Aligned In SI Mode:</u></p> <p>a. MOV-882. RHR Pump Suction From RWST - OPEN</p>	<p>CONTINUE with Step 12 while PERFORMING the following:</p> <p>a. ALIGN RHR pump suction to RWST as follows:</p> <ol style="list-style-type: none"> 1) <u>IF</u> RCS hot leg temperature less than 250°F. OPEN MOV-882. RHR Pump Suction From RWST. 2) <u>IF</u> RCS hot leg temperature greater than 250°F. PERFORM the following: <ol style="list-style-type: none"> a) OPEN 201 AND 202. Letdown Line Isolation Stops b) PLACE PCV-135. Letdown Backpressure Control in MANUAL AND OPEN fully c) PLACE LCV-112A. Normal/Divert VCT Tank Inlet to DIVERT d) Fully OPEN HCV-133. RHR Letdown Flow Control e) <u>WHEN</u> RHR Pump Suction Temperature is 250°F OR less. PERFORM the following: <ol style="list-style-type: none"> 1. CLOSE the following valves: <ol style="list-style-type: none"> o HCV-133 o 201 o 202 2. PLACE LCV-112A. Normal/Divert VCT Tank Inlet to AUTO 3. OPEN MOV-882

This Step continued on the next page.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. MOV-744, RHR Discharge Stop - OPEN	b. Manually OPEN MOV-744
	c. RHR heat exchanger MOVs - OPEN <ul style="list-style-type: none"> o 745A o 745B o 746 o 747 	c. Manually OPEN valves
	d. RHR heat exchanger Flow Control Valves - OPEN <ul style="list-style-type: none"> o 638 o 640 	d. Manually OPEN valves
10.	<u>CHECK IF CCW Pumps Aligned In SI Mode:</u>	
	a. VERIFY at least one CCW Pump - RUNNING	a. VERIFY Auxiliary Component Cooling - RUNNING <ul style="list-style-type: none"> 1) <u>WHEN</u> CCW pump becomes available, START one CCW Pump
	b. OPEN RHR Heat Exchanger CCW Outlet Valves: <ul style="list-style-type: none"> o 822A o 822B 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED										
11.	<p><u>CHECK IF RHR Flow Required:</u></p> <p>a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:</p> <table border="1"> <thead> <tr> <th>WR RCS PRESSURE (PSIG)</th> <th>RCS SUBCOOLING °F (ADVERSE CONTAINMENT)</th> </tr> </thead> <tbody> <tr> <td>0 - 400</td> <td>52 (83)</td> </tr> <tr> <td>401 - 800</td> <td>36 (49)</td> </tr> <tr> <td>801 - 1200</td> <td>23 (30)</td> </tr> <tr> <td>1201 - 2500</td> <td>19 (26)</td> </tr> </tbody> </table> <p>b. RHR Pump suction temperature - LESS THAN OR EQUAL TO 250°F</p> <p>c. START one RHR pump</p>	WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)	0 - 400	52 (83)	401 - 800	36 (49)	801 - 1200	23 (30)	1201 - 2500	19 (26)	<p>a. GO TO Step 12.</p> <p>b. GO TO Step 12</p>
WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F (ADVERSE CONTAINMENT)											
0 - 400	52 (83)											
401 - 800	36 (49)											
801 - 1200	23 (30)											
1201 - 2500	19 (26)											

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	<p><u>INITIATE Evaluation Of Plant Status:</u></p> <ul style="list-style-type: none"> a. CHECK Plant Vent Particulate AND Gaseous Activity Monitors - IN SERVICE <ul style="list-style-type: none"> o R-43 o R-44 b. RESTORE PAB ventilation per SOP 11.1 (Ventilation System Operation) c. CHECK PAB radiation - NORMAL <ul style="list-style-type: none"> o R-43 o R-44 o R-4 o R-5987 d. CHECK indications in Containment - NORMAL <ul style="list-style-type: none"> o R-25 OR R26 o R-41 OR R42 traces prior to Phase A and Ventilation Isolation o R-2 OR R-7 o Containment Pressure o Containment Humidity o Containment Sump Level o Recirculation Sump Level o Reactor Cavity Sump Level e. CHECK Steam Generator status - NORMAL <ul style="list-style-type: none"> o R-45 o R-49 o R-28, R-29, R-30 OR R-31 o Steam Generator level - CONTROLLABLE 	<ul style="list-style-type: none"> a. START R-43 AND R-44 per SOP 12.3.2, Digital Radiation Monitoring System Operation (Local Or SRD) c. ISOLATE CVCS OR <u>RHR</u> breaker in PAB <ul style="list-style-type: none"> 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications d. ISOLATE RCS, CVCS OR <u>RHR</u> break in Containment <ul style="list-style-type: none"> 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications e. ISOLATE affected Steam Generator per ATTACHMENT 1 (Isolation of Steam Generator Tube Leak/Rupture)
This Step continued on the next page.		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>f. Evaluate and operate plant equipment as necessary:</p> <ul style="list-style-type: none"> o CCW Pumps - 2 RUNNING o Essential SW Pumps - MAINTAINING 53-125 PSIG o Non-Essential SW Pumps - AT LEAST ONE RUNNING o EDGs - NOT RUNNING o Containment Fan Cooler Units - ALL RUNNING IN INCIDENT MODE o CHECK DC Bus Trouble Alarms - CLEAR o CHECK Battery Bus voltage - NORMAL 	<ul style="list-style-type: none"> o VERIFY FCV-1176 AND ____ FCV-1176A OPEN o PERFORM the following <ul style="list-style-type: none"> 1) START ALL available Fan Cooler Units per SOP 10.3 (Containment Cooling System Operation) o VERIFY MCCs energized <ul style="list-style-type: none"> o MCC 24A o MCC 26C o MCC 27A o MCC 29A

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>*****</p> <p>CAUTION</p> <p>IF offsite power is lost after the SI is RESET, manual action may be required to restart safeguards equipment.</p> <p>*****</p>	
15.	<u>RESET SI</u>	
	a. CHECK SI - ACTUATED	a. GO TO Step 16
	b. VERIFY Automatic Safeguards Actuation key switches in DEFEAT Panel SB-2)	
	o Train A SIA-1	
	- AND -	
	o Train B SIA-2	
	c. One at a time, DEPRESS Safety Injection reset buttons (Panel SB-2)	
	o Train A	
	o Train B	
	d. VERIFY SI Train A AND <u>Train B</u> - RESET	d. VERIFY relays reset (Top of Safeguards Initiation Tacks 1-1 AND 1-2):
		o SAI-1
		o SIM-1
		o SIA-2
		o SIM-2

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	<u>RESET Containment Isolation Phase A</u> a. PLACE IVSW switches to OPEN (Panel SN) <ul style="list-style-type: none"> o 1410 o 1413 o SOV-3518 o SOV-3519 b. PLACE CNTMT RAD MON WCPS VALVES control switch to OPEN (Panel SN) c. PLACE personnel AND equipment hatch solenoid control switches to INCIDENT (Panel SM) d. PLACE control switches for all remaining Phase A isolation valves to CLOSE (Panel SN) e. One at a time. DEPRESS Phase A reset buttons <ul style="list-style-type: none"> o CI Phase A Train A o CI Phase A Train B 	

This Step continued on the next page.