TABLE OF CONTENTS

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		b. PRESS <u>BOTH</u> SI Reset pushbuttons (SB-2) • TRAIN A • TRAIN B
	<u>CAUTION</u> • 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.	
4.	**CHECK SI Accumulators - ISOLATED**	4. ISOLATE SI Accumulators as follows a. ENERGIZE SI Accumulator Outlet Stop breakers • MOV-894A • MOV-894B • MOV-894C • MOV-894D b. CLOSE SI Accumulator Outlet Stops • MOV-894A • MOV-894B • MOV-894C • MOV-894D c. DE-ENERGIZE SI Accumulator Outlet Stop breakers • MOV-894A • MOV-894B • MOV-894C • MOV-894D

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		d. IF unable to isolate an SI Accumulator, VENT the affected accumulator 1. VERIFY PCV-863, Accumulator N_2 Supply Line Stop, CLOSED 2. IF unable to close PCV-863, CLOSE Accumulator N_2 Supply Root Stops • 1811A • 1811B 3. OPEN affected Accumulator Gas Stop • 891A • 891B • 891C • 891D 4. OPEN HCV-943, Accumulators N_2 Vent Controller to 100 percent
5. ENERGIZE ALL remaining MOVs • MCC 26A • MCC 26AA • MCC 26B • MCC 26BB		
6. STOP ALL Charging Pumps		
7. VERIFY Auxiliary Component Cooling Pumps - RUNNING		7. START BOTH ACC Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

(a) CHECK 22 SI Pump - STOPPED

(a) IF three SI pumps running, STOP 22 SI Pump

(b) VERIFY 22 SI Pump Suctions - CLOSED

- MOV-887A
- MOV-887B

(b) CLOSE 22 SI Pump Suctions

- MOV-887A
- MOV-887B

9. PLACE Safety Injection Recirc Switch 3 to ON

(a) VERIFY BOTH RHR Pumps - TRIPPED

(a) TRIP BOTH RHR Pumps

(b) VERIFY RHR Pump Suction AND Discharge Stops - CLOSED

- MOV-882
- MOV-744

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(4) CHECK SWN-7, Oil Coolers Supply from Header 1 - CLOSED	(4) CLOSE SWN-7
	(c) CHECK ONE CCW Pump - RUNNING	(c) START 22, 21, or 23 CCW PUMP (preferred order)
	(d) CHECK River Water Temperature - LESS THAN OR 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 BOTH of the following: a. IF containment level increases to greater than 47' 10", immediately RETURN to this step AND 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: a. START 22 Recirculation Pump b. IF no Recirculation Pump will start, PERFORM Attachment 1, Cold Leg Recirculation Using RHR Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(b) CHECK Recirculation Pump Discharge Stops - OPEN • MOV-1802A • MOV-1802B	(b) OPEN Recirculation Pump Discharge Stops • MOV-1802A • MOV-1802B

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 OR Sum of two lowest of these indicators - GREATER THAN 950 GPM
3	Lowest of these indicators - GREATER THAN 630 GPM OR Sum of two lowest of these indicators - GREATER THAN 950 GPM
2	EACH GREATER THAN 500 GPM
1 OR None	Required Core Cooling - NOT MET

	(b) Core cooling flow required by table - ESTABLISHED	(b)	ESTABLISH high-head cold leg recirculation, GO TO Step 24

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	**PLACE Safety Injection Recirc Switch 7 to ON**	
	(a) CHECK ALL SI Pumps - TRIPPED	(a) TRIP ALL 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 • MOV-1810, SI Pump Suction from RWST • SOV-1813, Containment Spray Pump Test Line	(a) Manually CLOSE valves
16.	**CHECK ALL 480V AC buses powered from ONE of the following:** • Emergency Diesel Generators • Off-site power	16. GO TO Step 21

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

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)** • MOV-743 • MOV-1870	
22.	**CLOSE SI Test Line Stops to RWST** (a) PLACE interlock switches to OFF • MOV-842 • MOV-843 (b) CLOSE SI Test Line Stops to RWST • MOV-842 • MOV-843	
23.	**GO TO Step 37**	
24.	**PLACE Safety Injection Recirc Switch 6 to ON**	
	(a) CHECK RHR Heat Exchanger Outlet Stops - CLOSED • MOV-746 • MOV-747	(a) CLOSE RHR Heat Exchanger Outlet Stops • MOV-746 • MOV-747

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25.	**CHECK valve alignment AND prepare to start SI pump**	
	(a) CHECK RHR Heat Exchanger Outlet to SI Pump Suction Stops - OPEN • MOV-888A • MOV-888B	(a) OPEN MOV-888A and MOV-888B
26.	**CLOSE SI Test Line Stops to RWST**	
	(a) PLACE interlock switches to OFF • MOV-842 • MOV-843	
	(b) CLOSE SI Test Line Stops to RWST • MOV-842 • MOV-843	
27.	**PLACE High Head Low Suction Pressure Alarm Switch to ON (Panel SB-1)**	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	**CHECK SI Pumps - AT LEAST 2 RUNNING**	28. PERFORM the following: a. VERIFY Safety Injection Recirc Switch 7 is OFF b. START two SI Pumps • 21 SI Pump • 23 SI Pump c. IF SI Pump 21 OR 23 can NOT be started, PERFORM the following: 1. PLACE Safety Injection Recirc Switch 1 to OFF 2. OPEN 22 SI Pump Suctions • MOV-887A • MOV-887B 3. START 22 SI Pump 4. IF 21 SI Pump NOT running, CLOSE MOV-851B, 22 SI Pump Tie Valve to Outlet of 23 SI Pump 5. IF 23 SI Pump NOT running, CLOSE MOV-851A, 22 SI Pump Tie Valve to Outlet of 21 SI Pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29.	**LOCALLY CLOSE RHR Minimum Flow Test Line Stops (98 ft PAB)** • MOV-743 • MOV-1870	
30.	**PLACE Safety Injection Recirc Switch 8 to ON**	
	(a) CHECK the following valves - CLOSED • MOV-1810, SI Pump Suction from RWST • SOV-1813, Containment Spray Pump Test Line	(a) Manually CLOSE valves
31.	**CHECK ALL 480V AC buses powered from ONE of the following:** • Emergency Diesel Generators • Off-site power	31. GO TO Step 37

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.

32.	**PLACE Safety Injection Recirc Switch 5 to ON**	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33.	**CHECK Service Water non-essential header - TWO PUMPS OPERATING**	33. 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
34.	**CHECK CCW - TWO PUMPS OPERATING**	34. 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
35.	**VERIFY 22 Recirculation Pump - OPERATING**	35. START 21 Recirculation Pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36.	**CLOSE SI Test Line Stops to RWST**	
	(a) PLACE interlock switches to OFF • MOV-842 • MOV-843	
	(b) CLOSE SI Test Line Stops to RWST • MOV-842 • MOV-843	
37.	**CHECK adequate CCW system performance**	
	(a) CHECK CCW System temperature - LESS THAN 150 °F	(a) CLOSE ONE RHR Heat Exchanger Flow Control Valve • HCV -638 • HCV-640
	(b) CHECK CCW System temperature - LESS THAN 130 °F	(b) ESTABLISH backup cooling to SI AND RHR pumps per SOP 4.1.2, Component Cooling System Operation
	(c) CHECK CCW System temperature - STABLE OR DECREASING	(c) VERIFY maximum available service water flow through CCW heat exchangers

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 • 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	(b) Do NOT dump steam from any SG with high radiation
	(c) DUMP steam to condenser from intact SGs UNTIL SG pressure less than RCS pressure	(c) DUMP steam using intact SGs atmospheric steam dumps UNTIL SG pressure less than RCS pressure
39.	**DETERMINE IF Reactor Vessel Head should be vented**	
	(a) CONSULT Technical Support Center	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40.	**CHECK IF EDGs should be stopped**	
	(a) CHECK AC 480V buses - ENERGIZED FROM OFFSITE SOURCES	
	(b) CHECK lighting - RESET	(b) RESET lighting
	(c) CHECK ALL MCCs EXCEPT MCC 28 AND 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**	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
43.	**CHECK Recirculation Sump water pH - BETWEEN 7.0 and 9.5**	43. PERFORM the following: a. IF pH is less than 7.0, CONSULT Technical Support Center (TSC) for methods of raising pH 1. INCREASE Recirculation Sump pH as directed by TSC 2. GO TO Step 42 to determine effect of pH adjustment AND CONCURRENTLY GO TO Step 44 b. IF pH is greater than 9.5, ADD boric acid from the BAST to RCS through normal OR alternate charging path 1. GO TO Step 42 to determine effect of pH adjustment AND CONCURRENTLY GO TO Step 44
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** (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	45. GO TO Step 37

END

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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 path

(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

(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:

- 21 RHR Pump
- 22 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

(c) RETURN TO Step 13

END OF ATTACHMENT 1

ATTACHMENT 2

480V BUS EQUIPMENT LOAD RATINGS

LOAD	21 EDG	22 EDG			23 EDG
	BUS 5A	BUS 2A		BUS 3A	BUS 6A
21 Service water pump	277 KW				
22 Service water pump		277 KW	OR	277 KW	
23 Service water pump					277 KW
24 Service water pump	277 KW				
25 Service water pump		277 KW	OR	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	OR	327 KW	
23 SI Pump					327 KW
21 CS Pump	348 KW				
22 CS Pump					348 KW

ATTACHMENT 2
480V BUS EQUIPMENT LOAD RATINGS (Continued)

LOAD	21 EDG	22 EDG		23 EDG
	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.

ATTACHMENT 1
REVISION CHECKLIST

PROCEDURE NUMBER AOI 4.2.3 Rev 5

ANALYST T.G. Harvey Date 7/10/03

Procedure Revision Type, Circle One: LIMITED SCOPE BIENNIAL*†

	Y/N
ALL TPCs incorporated into this revision *	N/A
TPC Cancellation forms completed for each TPC (List TPCs incorporated)	N/A
Non-permanent TPCs re-issued or canceled.	N/A
ALL Communications to Staff incorporated.* (List CTSs incorporated)	N/A
List Operator Aids OR Corrective Actions incorporated. 200109148	
Interfacing Document Reference List checked/updated.	Y
UFSAR section of the procedure checked/updated	Y
Procedure Commitments section checked/updated AND associated steps marked *	N/A
Cross-references in procedure checked/updated (i.e. go to step x, per SOP X.X)	Y
ALL Plant Modifications incorporated AND procedure nomenclature agrees with field *	N/A
IF instrument is added to OR deleted from a log, I&C OR T&P notified **{COMMITMENT: 5.2.1}**	N/A
ALL review recommendations resolved *	
PROCEDURE COORDINATOR	[redacted]
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	[redacted]
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.

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

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 ____ Does not ____ Require a License Amendment
Does ____ Does not ____ Adversely impact plant nuclear safety
Does ____ Does not ____ Adversely impact the health and safety of plant personnel or the public
Does ____ Does not ____ Require further review by the Plant Manager, NFSC, or other individual/group:
Plant Manager ____ NFSC ___ Other (specify) _____

Remarks:

SNSC recommends this item for:
Approval _____ Disapproval _____ Other _____

Completed by: _____ Date _____ Meeting No. _____
SNSC Secretary

TRANSFER TO COLD 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"

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 Professionial 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

TABLE OF CONTENTS

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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**

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 AND prepare to start SI pump**	
	(a) CHECK RHR Heat Exchanger Outlet to SI Pump Suction Stops - OPEN • MOV-888A • MOV-888B	(a) OPEN MOV-888A AND 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. IF adequate suction pressure can NOT 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 OR DECREASING	(a) GO TO Step 1

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	**CHECK for Cold Leg recirc conditions** (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)	11. GO TO Step 24
12.	**CHECK Recirculation System Alignment**	
	(a) VERIFY the following valves OPEN: • 822A, 22 RHR Heat Exchanger CCW Outlet Stop • 822B, 21 RHR Heat Exchanger CCW Outlet Stop	(a) PERFORM the following: a. IF neither valve can be opened, GO TO Step 24 b. IF 822B is open, VERIFY MOV-747 AND HCV-638 OPEN 1. GO TO Step 13 c. IF 822A is open, VERIFY MOV-746 AND HCV-640 OPEN 1. GO TO Step 13
	(b) VERIFY the following valves OPEN: • MOV-746, 22 RHR Heat Exchanger Outlet Stop • HCV-640, 22 RHR Heat Exchanger Flow Control Valve	(b) VERIFY the following valves OPEN • MOV-747, 21 RHR Heat Exchanger Outlet Stop • HCV-638, 21 RHR Heat Exchanger Flow Control Valve

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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 OR Sum of two lowest of these indicators - GREATER THAN 950 GPM
3	Lowest of these indicators - GREATER THAN 630 GPM OR Sum of two lowest of these indicators - GREATER THAN 950 GPM
2	EACH GREATER THAN 500 GPM
1 OR 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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	**PLACE Safety Injection Recirc Switch 7 to ON**	
(a)	CHECK ALL SI Pumps - TRIPPED	(a) TRIP ALL 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 ALL 480V AC buses powered from ONE of the following:** • Emergency Diesel Generators • Off-site power	16. GO TO Step 20
17.	**PLACE Safety Injection Recirc Switch 5 to ON**	
18.	**CHECK Service Water non-essential header - TWO PUMPS OPERATING**	18. PERFORM the following: a. IF non-essential header is 1-2-3, START 23 OR 21 SW pump b. IF non-essential header is 4-5-6, START 26 OR 24 SW pump c. IF ONLY one Service Water pump operating AND two recirculation pumps operating, PERFORM the following: 1. STOP 21 Recirculation Pump 2. CLOSE 804, Spent Fuel Pit Heat Exchanger Outlet Stop

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	**CHECK CCW - TWO PUMPS OPERATING**	19. PERFORM the following: (a) START 21 OR 23 CCW Pump (b) IF ONLY one CCW Pump operating AND two recirculation pumps operating, STOP 21 Recirculation Pump
20.	**VERIFY 22 Recirculation Pump - OPERATING**	20. PERFORM the following: (a) START 21 Recirculation Pump (b) IF 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)** • MOV-743 • MOV-1870	
22.	**CLOSE SI Test Line Stops to RWST** (a) PLACE interlock switches to OFF • MOV-842 • MOV-843 (b) CLOSE SI Test Line Stops to RWST • MOV-842 • MOV-843	
23.	**ISOLATE SI pumps per Attachment 2,** High-Head SI Pump Isolation	

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)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. CLOSE Containment manual isolation valves

(a) CONSULT SM to determine necessary valves on Attachment 3, Isolations For Long Term Recirculation, to be closed

(b) DIRECT NPO to close the necessary valves with Health Physics assistance

26. CHECK Hot Leg Recirculation - TERMINATED

26. GO TO Step 11

(a) GO TO Step 31

27. CLOSE MOV-856B, 23 Loop Hot Leg SI Stop

28. OPEN ONE of the following:

- 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 ONE of the following:

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

31. EVALUATE long term plant status

(a) CONSULT Technical Support Center

END

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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 path

(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

(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

  OR

- 22 RHR Pump

(c) RETURN TO Step 21

END OF ATTACHMENT 1

ATTACHMENT 2

HIGH-HEAD SI PUMP ISOLATION

	Valve Operation	Location		Valving ① Completed
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 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; IF he does so, he should initial the valving completed space.

END OF ATTACHMENT 2

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; IF he does so, he should initial the valving completed space.

② SM should initial those lines which he authorizes to be isolated.

ATTACHMENT 3
ISOLATIONS FOR LONG TERM RECIRCULATION (Continued)

Permission② 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 AND 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 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; IF he does so, he should initial the valving completed space.

② SM should initial those lines which he authorizes to be isolated.

ATTACHMENT 3
ISOLATIONS FOR LONG TERM RECIRCULATION (Continued)

Permission② 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 AND 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 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; IF he does so, he should initial the valving completed space.
② SM should initial those lines which he authorizes to be isolated.

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 brak 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

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 he 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/pr 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

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 be 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.

ATTACHMENT 1
REVISION CHECKLIST

PROCEDURE NUMBER AOI 4.2.4 Rev 5

ANALYST T.G. Harvey Date 7/10/03

Procedure Revision Type, Circle One: LIMITED SCOPE BIENNIAL*†

	Y/N
ALL TPCs incorporated into this revision *	N/A
TPC Cancellation forms completed for each TPC (List TPCs incorporated)	N/A
Non-permanent TPCs re-issued or canceled.	N/A
ALL Communications to Staff incorporated.* (List CTSs incorporated)	N/A
List Operator Aids OR Corrective Actions incorporated. 200109147	
Interfacing Document Reference List checked/updated.	Y
UFSAR section of the procedure checked/updated	Y
Procedure 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)	N
ALL Plant Modifications incorporated AND procedure nomenclature agrees with field *	N/A
IF instrument is added to OR deleted from a log, I&C OR T&P notified **{COMMITMENT: 5.2.1}**	N/A
ALL review recommendations resolved *	
PROCEDURE COORDINATOR	[redacted]
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	[redacted]
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.

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	_____
	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 4.2.4 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 ____ Does not ____ Require a License Amendment
Does ____ Does not ____ Adversely impact plant nuclear safety
Does ____ Does not ____ Adversely impact the health and safety of plant personnel or the public
Does ____ Does not ____ Require further review by the Plant Manager, NFSC, or other individual/group:
Plant Manager ___ NFSC ___ 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"

REVISION PROCESS

GSAD 13
Rev. 14

ATTACHMENT 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*†

	Y/N
ALL TPCs incorporated into this revision *	NA
TPC Cancellation forms completed for each TPC (List TPCs incorporated)	NA
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	Y
Procedure 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)	Y
ALL Plant Modifications incorporated AND procedure nomenclature agrees with field *	NA
IF instrument is added to OR deleted from a log, I&C OR T&P notified **{COMMITMENT: 5.2.1}**	NA
ALL review recommendations resolved *	Y
PROCEDURE 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.

TEMPORARY PROCEDURE CHANGE

OAD
27
Rev.
20

FIGURE 2
TPC CLEARANCE AUTHORIZATION FORM

PART I AUTHORIZATION

TPC # _____ Procedure AOI 4.2.2

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

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 _____
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- Revision Control Book _____
- Operations Manager Books _____

Administrative Copies
- TSC _____
- Training _____
- Records Management Center _____

Additional Controlled Copies

SAO-404
Rev.
11

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 NPG
Section: _____

Document No: AOI 4.2.2 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		

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 ____ Does not ____ Require a License Amendment
Does ____ Does not ____ Adversely impact plant nuclear safety
Does ____ Does not ____ Adversely impact the health and safety of plant personnel or the public
Does ____ Does not ____ Require further review by the Plant Manager, NFSC, or other individual/group:

	NFSC	Other (specify)
Plant Manager ____	____	_____

Remarks:

SNSC recommends this item for:
Approval Disapproval Other _____

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

INDIAN POINT 2
OPERATIONS

AOI 4.2.2
Revision 6

LOCA WHEN RCS TEMPERATURE AT LEAST 200°F AND LESS THAN 350°F

Prepared by: K. BRAGG 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:

_____ _____
Qualified Operator Date / Time

24 Hr Extension: _____ _____
Control Room Supervisor Date / Time

24 Hr Extension: _____ _____
Control Room Supervisor Date / Time

CONTINUOUS USE

20022221019

AOI 04-02-02 Rev 06.wpd

TABLE OF CONTENTS

1. PURPOSE

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

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.

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

CAUTION

- Prior to dispatching personnel to perform local actions, an evaluation of the local environmental conditions including radiation shall be performed.
- IF conditions to cause an automatic SI exist, BUT an automatic SI has NOT occurred, a manual SI shall NOT be initiated.

NOTE

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

1. CHECK IF RHR Pumps Should Be Stopped:

   a. CHECK the following:

      - PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT]

      - OR -

      - RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED IN TABLE BELOW

   a. IF none of the conditions satisfied, GO TO Step 2.

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)

      - OR -

      - Any SI pump - RUNNING

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. STOP RHR pumps AND place switches in PULL OUT	
	c. CLOSE RHR Hot Leg Suction Stops o MOV-730 - AND - o MOV-731	
	d. CONSULT Shift Manager (SM) to DETERMINE IF valve 732, Inlet Line CIV should be closed	d. GO TO Step 2
	e. CLOSE valve 732	
2.	ISOLATE RCS Letdown:	
	a. CHECK CVCS letdown valves - CLOSED o 200A o 200B o 200C o LCV-459 o 213	a. Manually CLOSE valves
	b. CHECK HCV-133, RHR letdown valve - CLOSED	b. Manually CLOSE HCV-133

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

      b. Go to Step 4.

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

      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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

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).

4. VERIFY Proper SI System Alignment

a. SI pump cold leg injection valves - OPEN

- o 856A
- o 856E
- o 856C
- o 856D

a. Manually OPEN valves

b. 22 SI pump suction stops - OPEN

- o 887A
- o 887B

b. Manually OPEN valves

c. 22 SI pump discharge isolations - OPEN

- o 851A
- o 851B

c. Manually OPEN valves

d. RHR hot leg suction stops - CLOSED

- o MOV-730
- o MOV-731

d. PERFORM the following

1) VERIFY RHR pumps are secured AND in PULL OUT

- o 21 RHR Pump
- o 22 RHR Pump

2) CLOSE 730 AND 731

3) CONSULT SM to determine IF valve 732, Inlet Line CIV should be closed —

a) IF directed by SM, CLOSE valve 732

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	e. SI pumps - NONE RUNNING	e. GO TO Step 4i
	f. CHECK the following: o PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT] - OR - o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:	f. IF neither condition satisfied, GO TO Step 5

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)

	g. START 21 SI pump	g. PERFORM the following: 1) VERIFY MOV-851B, 22 SI Pump Tie Valve To Outlet of 23 SI Pump is CLOSED 2) START 22 SI Pump a) IF 22 SI Pump will NOT start, START 23 SI Pump

This Step continued on the next page.

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

All of the normal requirements for trip of an RCP are applicable throughout this procedure. Step 7 lists those that are most likely to occur in this procedure.

7. CHECK IF RCPs Must Be Stopped:

   a. CHECK the following:

      o Number 1 seal differential pressure - LESS THAN 200 PSID

      - OR -

      o Number 1 seal leakoff flow - LESS THAN 0.2 gpm AND seal temperatures - INCREASING

   a. IF neither condition satisfied, GO TO Step 8.

   b. STOP affected RCP(s)

8. DISPATCH Personnel To Locally Restore Power To selected Equipment

   a. RESET Lighting

   b. RESET ALL MCCs except MCC 28 AND MCC 28A

   c. CHECK MCC 28 AND MCC 28A - TRIPPED

   c. IF Containment Sump level is greater than 44 feet 3 inches, TRIP MCC 28 AND MCC 28A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	CHECK IF RHR Pump Aligned In SI Mode:	CONTINUE with Step 12 while PERFORMING the following:
	a. MOV-882, RHR Pump Suction From RWST - OPEN	a. ALIGN RHR pump suction to RWST as follows: 1) IF RCS hot leg temperature less than 250°F, OPEN MOV-882, RHR Pump Suction From RWST. 2) IF 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) WHEN 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.

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 o 745A o 745B o 746 o 747	c. Manually OPEN valves
	d. RHR heat exchanger Flow Control Valves - OPEN o 638 o 640	d. Manually OPEN valves
10.	CHECK IF CCW Pumps Aligned In SI Mode:	
	a. VERIFY at least one CCW Pump - RUNNING	a. VERIFY Auxiliary Component Cooling - RUNNING 1) WHEN CCW pump becomes available, START one CCW Pump
	b. OPEN RHR Heat Exchanger CCW Outlet Valves: o 822A o 822B	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

11. CHECK IF RHR Flow Required:

a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:

a. GO TO Step 12.

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

b. RHR Pump suction temperature - LESS THAN OR EQUAL TO 250°F

b. GO TO Step 12

c. START one RHR pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

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.

12. VERIFY Adequate SI Flow: ____

a. CHECK RVLIS indication - GREATER THAN VALUE OBTAINED FROM TABLE BELOW:

AND either 21 OR 23 SI Pump

NO. OF RCPS RUNNING	RVLIS NATURAL CIRCULATION RANGE	RVLIS RCP RUNNING RANGE
0	62%	[illegible]
1	[illegible]	24%
2	[illegible]	31%
3	[illegible]	44%
4	[illegible]	63%

a. START one additional SI pump (23 preferred).

1) IF 22 SI Pump is running ___

is NOT running, VERIFY the appropriate Outlet Tie valve is CLOSED

- o 21 Pump running - 851A

- OR -

- o 23 Pump running - 851B

b. CHECK core exit TCs - STABLE OR DECREASING

b. START one additional SI Pump (23 preferred)

13. CHECK RCS Hot Leg Temperatures - STABLE

CONTROL steam dump AND total feed flow as necessary to stabilize RCS temperatures.

a. IF condenser steam dumps NOT available, OPERATE atmospheric steam dumps ___

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	INITIATE Evaluation Of Plant Status:	
	a. CHECK Plant Vent Particulate AND Gaseous Activity Monitors - IN SERVICE o R-43 o R-44	a. START R-43 AND R-44 per SOP 12.3.2, Digital Radiation Monitoring System Operation (Local Or SRD)
	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	c. ISOLATE CVCS OR RHR breaker in PAB 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications
	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	d. ISOLATE RCS, CVCS OR RHR break in Containment 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications
	e. CHECK Steam Generator status - NORMAL o R-45 o R-49 o R-28, R-29, R-30 OR R-31 o Steam Generator level - CONTROLLABLE	e. ISOLATE affected Steam Generator per ATTACHMENT 1 (Isolation of Steam Generator Tube Leak/Rupture)

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
f.	Evaluate and operate plant equipment as necessary:	
	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 VERIFY FCV-1176 AND___ FCV-1176A OPEN
	o Containment Fan Cooler Units - ALL RUNNING IN INCIDENT MODE	o PERFORM the following 1) START ALL available Fan Cooler Units per SOP 10.3 (Containment Cooling System Operation)
	o CHECK DC Bus Trouble Alarms - CLEAR	o VERIFY MCCs energized o MCC 24A o MCC 26C o MCC 27A o MCC 29A
	o CHECK Battery Bus voltage - NORMAL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF offsite power is lost after the SI is RESET, manual action may be required to restart safeguards equipment.

15. RESET SI

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 Train B - 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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. RESET Containment Isolation Phase A

a. PLACE IVSW switches to OPEN (Panel SN)

- 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

- o CI Phase A Train A
- o CI Phase A Train B

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	f. VERIFY Phase A Train A AND Train B - RESET ___	f. PERFORM the following 1) VERIFY correct switch positions per steps 16a through 16d 2) One at a time, DEPRESS Phase A reset buttons o CI Phase A Train A o CI Phase A Train B 3) IF signal does NOT reset, PERFORM the following: a) PLACE keyed switches to BYPASS b) One at a time, DEPRESS Phase A reset buttons o CI Phase A Train A o CI Phase A Train B 4) IF signal can NOT be reset, RESET relays on top of Safeguards Initiation Racks 1-2 AND 2-2 o CA1 o CA2
17.	ESTABLISH Instrument Air To Containment: ___	
	a. OPEN PCV-1228	a. VERIFY relays on top of Safeguards Initiation Racks 1-2 AND 2-2 - RESET o CA1 o CA2

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

18. CHECK IF RHR Flow Required:

a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:

a. GO TO Step 19

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

b. RHR pump suction temperature - LESS THAN OR EQUAL TO 250 °F

b. PERFORM the following:

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) WHEN RHR pump suction temperature is 250 °F OR less, PERFORM the following:

a) CLOSE the following valves:

- o HCV-133
- o 201
- o 202

b) PLACE LCV-112A Normal/Divert VCT Tank Inlet to AUTO

c) START one RHR pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19.	CHECK PRZR PORV Block Valves:	
	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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF any PRZR PORV opens because of high pressure. Step 20 should be repeated after pressure decreases to less than the PORV setpoint.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20.	CHECK IF PRZR PORVs Should Be Closed:	
	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 WHEN 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 WHEN 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 320 psig psig [340 psig psig for adverse containment], the RHR pumps must be manually restarted to supply water to the RCS.

21.	CHECK IF RHR Pumps Should Be Stopped:	
	a. CHECK RCS pressure: o Pressure - GREATER THAN 320 PSIG PSIG [340 PSIG PSIG FOR ADVERSE CONTAINMENT] - AND - o Pressure - STABLE OR INCREASING	a. Go to Step 22.
	b. STOP RHR pumps AND place in AUTO	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

Alternate water sources for AFW pumps will be necessary if CST level decreases to less than 2 ft.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22.	CHECK SG Levels:	
	a. CHECK Narrow range level - GREATER THAN 10% [27% FOR ADVERSE CONTAINMENT]	a. MAINTAIN total feed flow greater than 400 gpm until narrow range level greater than 10% [27% for adverse containment] in at least one SG.
	b. CONTROL feed flow to maintain narrow range level between 10% [27% for adverse containment] and 50%	b. IF narrow range level in any SG continues to increase, STOP feed flow to that SG.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF 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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23.	CHECK IF OPS Should Be Placed In Service:	
	a. RCS temperature - LESS THAN LIMITS OF TECHNICAL SPECIFICATION FIGURE 3.1.A-1. PORV OPEN PRESSURE	a. IF RCS pressure less than 2335 psig, VERIFY PORVs CLOSED ¤
	b. VERIFY OPS armed light - ILLUMINATED	b. GO TO Step 24.
	c. CHECK RCS pressure - AT LEAST 25 PSIG BELOW CALCULATED OPS PRESSURE (Panel SF)	c. PERFORM the following: ¤ 1) ENSURE both PORVs - OPEN 2) WHEN RCS pressure less than setpoint, GO TO Step 23d
	d. VERIFY both PORVs - CLOSED	d. IF either PORV will NOT close, CLOSE associated PORV block valve
24.	PERFORM sampling of RCS, SGs AND Containment	
	a. OBTAIN the following samples: o RCS boron concentration o RCS activity o Containment Atmosphere (H_2/O_2) o Containment Sump boron concentration o Activity of all Steam Generators	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

MOV-894A, MOV-894B, MOV-894C OR MOV-894D breakers shall NOT be energized UNLESS specifically directed to reposition associated valves.

25. ISOLATE SI Accumulators

a. CHECK SI Accumulators - UNISOLATED

RESPONSE NOT OBTAINED: a. GO TO Step 26.

b. ENERGIZE the following breakers:

- o MOV-894A
- o MOV-894B
- o MOV-894C
- o MOV-894D

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
c.	CLOSE SI Accumulator Outlet Stops: o MOV-894A o MOV-894B o MOV-894C o MOV-894D	c. IF unable to isolate an SI Accumulator, VENT the affect accumulator as follows: 1) VERIFY PCV-863, Accumulator N_2 Supply Line Stop - CLOSED a) IF unable to close PCV-863, CLOSE the following valves: o 1809, Accumulator N_2 Truck Fill Stop o 1811A, Accumulator N_2 Supply Root Stop (North Bank) o 1811B, Accumulator N_2 Supply Root Stop (South Bank) b) OPEN gas stop for affected accumulator: o 891A, 21 Accumulator Gas Stop o 891B, 22 Accumulator Gas Stop o 891C, 23 Accumulator Gas Stop o 891D, 24 Accumulator Gas Stop c) OPEN HCV-943 Accumulators N_2 Vent Controller to 100 percent
d.	DE-ENERGIZE the following breakers o MOV-894A o MOV-894B o MOV-894C o MOV-894D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF no Charging Pumps are running, starting a Charging Pump with the RWST level less than 15 feet may result in air-binding of the pump.

26. CHECK IF Charging flow is adequate:

a. VERIFY at least one Charging Pump - RUNNING

a. PERFORM the following:

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:

- Locally CLOSE seal injection needle valves:
  - 241A
  - 241B
  - 241C
  - 241D

- OR -

- ENERGIZE AND CLOSE seal injection isolation valves:
  - MOV-250A - MCC 26AA
  - MOV-250B - MCC 26BB
  - MOV-250C - MCC 26AA
  - MOV-250D - MCC 26BB

2) START one Charging Pump

b. VERIFY Pressurizer Level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]

b. PERFORM the following:

1) PLACE all PRZR heater switches in OFF

2) OPEN LCV-112B, Charging Pump Suction From RWST

3) OPEN LCV-112C, Charging Pump Suction Fron VCT

4) START additional Charging Pumps

5) ADJUST Charging Pump speed controllers for maximum flow

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Shutdown margin should be monitored during RCS cooldown. Refer to Graph RCS-4 for minimum shutdown boron concentration.

27. INITIATE RCS Cooldown To Cold Shutdown:

a. MAINTAIN cooldown rate in RCS cold legs - LESS THAN 50°F/HR

b. OPERATE Condenser steam dumps

b. IF condenser steam dumps NOT available, OPERATE atmospheric steam dumps

1) IF controllers are NOT available OR Instrument Air is NOT available to atmospheric steam dumps, REFER TO AOI 27.1.9 for local operation.

28. CHECK RCS Subcooling Based On Core Exit TCs - GREATER THAN VALUE OBTAINED IN TABLE BELOW

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. CHECK IF SI Is In Service:

Go to Step 35.

o SI pumps - ANY RUNNING

- OR -

o RHR pumps - ANY RUNNING WITH SUCTION FROM RWST

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

30. PLACE All PRZR Heater Switches In OFF Position

* *

CAUTION

o Voiding may occur in the RCS during the depressurization. This will result in a rapidly increasing Pressurizer level.

o IF RCS pressure decreases to less than 300 psig during the following depressurization, any running RCPs shall be secured.

* *

31. DEPRESSURIZE RCS To Refill PRZR:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. OPERATE normal PRZR spray	a. PERFORM the following: 1) OPERATE one PRZR PORV 2) IF no PORV available, PERFORM the following to use auxiliary spray: 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: o 204B, Loop 21 Cold Leg Norm o 204A, Loop 22 Hot Leg Alt

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		f) CLOSE PRZR Spray valves: o PCV-455A o PCV-455B g) OPEN 212, Auxiliary Spray Valve h) INITIATE Auxiliary Spray slowly using HCV-142 i) ADJUST charging pump speed to control the depressurization
b.	CHECK PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]	b. Continue with Step 32 AND ___ WHEN PRZR level greater than 28% [47% for adverse containment], PERFORM Step 31c.
c.	STOP RCS depressurization	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

- o IF voids were created in the head due to the RCS depressurization, a rapid drop in Pressurizer level AND pressure may occur due to collapsing of the voids following the RCP start.
- o AN RCP shall NOT be started in a loop that has an identifed SG tube leak.
- o IF RCP seal cooling had been previously lost, the affected RCP(s) shall NOT be started PRIOR to a status evaluation.

NOTE

- o RCPs should be run in the following order to provide normal PRZR spray:
- o 24 RCP (PCV-455A)
- o 23 RCP (PCV-455B)

32.	CHECK IF An RCP Should Be Started:		
	a. All RCPs - STOPPED	a. PERFORM the following: 1) STOP all but one RCP 2) GO TO Step 33	

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE BELOW	b. GO TO Step 42.

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

	c. PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]	c. RETURN TO Step 31.
	d. CHECK MCC 28 AND MCC 28A - ENERGIZED	d. PERFORM the following: 1) IF Containment Sump level less than 44'3" AND Containment conditions NOT adverse, RESET MCC 28 AND MCC 28A 2) IF MCC 28 can NOT be reset, GO TO Step 33
	e. CHECK Containment Sump level - LESS THAN 44'3"	e. TRIP MCC 28 AND MCC 28A
	f. START an RCP per SOP 1.3, Reactor Coolant Pump Startup And Shutdown	
33.	CHECK RCS Cold Leg Temperature - GREATER THAN 295°F	GO TO Step 35.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

PRIOR to making the decision to transition to Step 43, the core exit TCs should be allowed to stabilize at the minimum OR a further increase with one less pump running should be observed.

34. CHECK IF SI Pump Should Be Stopped:

a. Any SI pump - RUNNING — a. GO TO Step 35.

b. DETERMINE required RCS subcooling from table:

SI PUMP I/S	RCS SUBCOOLING (°F) (Adverse Containment)							
	3 CHG Pumps		2 CHG Pumps		1 CHG Pumps		No CHG Pumps	
	Any RCPs ON	No RCPs ON	Any RCPs ON	No RCPs ON	Any RCPs ON	No RCPs ON	Any RCPs ON	No RCPs ON
3 SI Pumps	48 (59)	66 (76)	48 (60)	67 (76)	49 (60)	68 (77)	49 (61)	69 (82)
2 SI Pumps	61 (72)	92 (99)	64 (75)	96 (103)	68 (80)	101 (108)	72 (83)	107 (115)
1 SI Pump	119 (129)	176 (183)	174 (181)	233 (239)	301 (307)	301 (307)	NA	NA

This Step continued on the next page.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF the RCP Seal cooling had been previously lost, the affected RCP(s) shall NOT be started PRIOR to a status evaluation.

NOTE

Normal Pressurizer Spray will be provided by running 24 RCP (PCV-455A) first followed by 23 RCP (PCV-455B).

36. CHECK RCP Status:

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36.	a. RCPs - AT LEAST ONE RUNNING	a. ATTEMPT to start one RCP: 1) IF MCC 28 OR MCC 28A are energized AND the Containment Sump level is greater than 44'3", ENSURE MCC 28 AND MCC 28A are tripped. 2) IF Containment Sump level less than 44'3" AND Containment conditions NOT adverse, RESET MCC 28 AND MCC 28A. 3) IF MCC 28 can NOT be reset, REFER TO ATTACHMENT 2 to verify natural circulation. 4) Start one RCP per SOP 1.3 (Reactor Coolant Pump Startup and Shutdown) 5) IF an RCP can NOT be started, REFER TO ATTACHMENT 2 to verify natural circulation.
	b. STOP all but one RCP	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

Depressurizing the RCS may result in losing the minimal RCP No. 1 Seal operating conditions. This will require the RCPs to be tripped.

37. DEPRESSURIZE RCS To Minimize RCS Subcooling:

a. OPERATE normal PRZR spray

RESPONSE NOT OBTAINED:

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.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
		h) INTIATE spray slowly using HCV-142. i) ADJUST Charging Pump speed to control depressurization.
	b. CONTROL PRZR heaters as necessary	
	c. DEPRESSURIZE RCS until EITHER of the following conditions satisfied: o PRZR level - GREATER THAN 71% [65% FOR ADVERSE CONTAINMENT] - OR - o RCS subcooling based oncore exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW	

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.	VERIFY Adequate Shutdown Margin:	
	a. DIRECT Chemistry to sample RCS	
	b. Shutdown margin - ADEQUATE	b. Borate as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39.	CHECK IF Letdown Can Be Established:	
	a. PRZR level - GREATER THAN 28% [47% FOR ADVERSE CONTAINMENT]	a. Go to Step 40.
	b. ESTABLISH Letdown: 1) CLOSE Letdown Orifice Stops o 200A o 200B o 200C 2) OPEN Letdown Line Isolation Valves (Panel SN) o 201 o 202 3) PLACE Letdown Flow Control Valves 200A B C Switch to REMOTE 4) OPEN LCV-459, Letdwon 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 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	b. ESTABLISH Excess Letdown: 1) ESTABLISH CCW flow to Excess Letdown Heat Exchanger: a) OPEN CCW to Excess Letdown Heat Exchanger Inlet Valves: o 791 o 798 b) OPEN CCW to Excess Letdwon Heat Exchanger Outlet Valves: 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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
40.	CHECK VCT Makeup Control System:	Adjust controls as necessary.
	a. Makeup controls - SET FOR GREATER THAN RCS BORON CONCENTRATION	
	b. PLACE makeup controls in automatic	
41.	ALIGN Charging Pump Suction To VCT	
	a. OPEN LCV-112C, Charging Pump Suction From VCT	
	b. CLOSE LCV-112B, Charging Pump Suction From RWST	
42.	VERIFY SI Flow Not Required:	
	a. RCS subcooling based on core exit TCs - GREATER THAN VALUE OBTAINED FROM TABLE	a. Manually START SI pumps as necessary. DO NOT EXCEED ONE TRAIN OF SI PUMP OPERATION. GO TO Step 43.

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

	b. PRZR level - GREATER THAN 14% [33% FOR ADVERSE CONTAINMENT]	b. Manually START SI pumps as necessary. DO NOT EXCEED ONE TRAIN OF SI PUMP OPERATION. GO TO Step 43.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
45.	CHECK RCP Cooling - NORMAL	
	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 10 GPM PER RCP	b. ESTABLISH seal injection flow to RCPs per SOP 3.1, Charging, Sealwater And Letdown Control.
46.	CHECK IF RCP Seal Return Flow Should Be Established:	
	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.	CHECK IF RCPs Must Be Stopped:	
	a. CHECK the following: o Number 1 seal differential pressure - LESS THAN 200 PSID - OR - o Number 1 seal leakoff flow - LESS THAN 0.2 gpm AND seal temperatures - INCREASING	
	b. STOP affected RCP(s)	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
48.	CHECK Containment Hydrogen Concentration:	
	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.	CHECK IF RHR System Can Be Placed In Service:	
	a. CHECK the following: o RCS temperatures - LESS THAN 350°F o RCS pressure - LESS THAN 370 PSIG [270 PSIG FOR ADVERSE CONTAINMENT]	a. GO TO Step 51.
	b. CONSULT Technical Support Center to determine if RHR System should be placed in service	
50.	CHECK RCS Temperatures - LESS THAN 200°F	RETURN TO Step 20.
51.	EVALUATE Long Term Plant Status:	
	a. MAINTAIN cold shutdown conditions per POP 3.3, Plant Cooldown	
	b. CONSULT Technical Support Center	

-END-

6.0 REFERENCES

6.1 DEVELOPMENT DOCUMENTS

6.1.1 Westinghouse Abnormal Repsonse 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 Inaccessability 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

ATTACHMENT 1

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

NOTE

The remaining steps are required to limit secondary plant contamination AND should be performed while contiuing to step 14f.

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

ATTACHMENT 1 (Attachment page 2 of 3)
ISOLATION OF STEAM GENERATOR TUBE LEAK/RUPTURE

6. ENSURE the affected SG(s) MSIV upsteam 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)

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-

ATTACHMENT 2 (Attachment page 1 of 1)

NATURAL CIRCULATION VERIFICATION

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

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

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

   - 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-

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 Letdwon Heat Exchanger
- o 798 AND 791, CCW to the Excess Letdwon 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 N_2 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-

TABLE OF CONTENTS

1. PURPOSE

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

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.

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

- Prior to dispatching personnel to perform local actions, an evaluation of the local environmental conditions including radiation shall be performed.
- IF conditions to cause an automatic SI exist, BUT an automatic SI has NOT occurred, a manual SI shall NOT be initiated.

NOTE

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

1. CHECK IF RHR Pumps Should Be Stopped:

   a. CHECK the following:

      - PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT]

      - OR -

      - RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED IN TABLE BELOW

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)

      - OR -

      - Any SI pump - RUNNING

   a. IF none of the conditions satisfied, GO TO Step 2.

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. STOP RHR pumps AND place switches in PULL OUT	
	c. CLOSE RHR Hot Leg Suction Stops o MOV-730 - AND - o MOV-731	
	d. CONSULT Shift Manager (SM) to DETERMINE IF valve 732, Inlet Line CIV should be closed	d. GO TO Step 2
	e. CLOSE valve 732	
2.	ISOLATE RCS Letdown:	
	a. CHECK CVCS letdown valves - CLOSED o 200A o 200B o 200C o LCV-459 o 213	a. Manually CLOSE valves
	b. CHECK HCV-133, RHR letdown valve - CLOSED	b. Manually CLOSE HCV-133

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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

      b. Go to Step 4.

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

      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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

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).

4. VERIFY Proper SI System Alignment

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a. SI pump cold leg injection valves - OPEN o 856A o 856E o 856C o 856D	a. Manually OPEN valves
b. 22 SI pump suction stops - OPEN o 887A o 887B	b. Manually OPEN valves
c. 22 SI pump discharge isolations - OPEN o 851A o 851B	c. Manually OPEN valves
d. RHR hot leg suction stops - CLOSED o MOV-730 o MOV-731	d. PERFORM the following 1) VERIFY RHR pumps are secured AND in PULL OUT o 21 RHR Pump o 22 RHR Pump 2) CLOSE 730 AND 731 3) CONSULT SM to determine IF valve 732, Inlet Line CIV should be closed a) IF directed by SM, CLOSE valve 732

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	e. SI pumps - NONE RUNNING	e. GO TO Step 4i
	f. CHECK the following: o PRZR level -LESS THAN 14% [33% FOR ADVERSE CONTAINMENT] - OR - o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:	f. IF neither condition satisfied, GO TO Step 5

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)

	g. START 21 SI pump	g. PERFORM the following: 1) VERIFY MOV-851B, 22 SI Pump Tie Valve To Outlet of 23 SI Pump is CLOSED 2) START 22 SI Pump a) IF 22 SI Pump will NOT start, START 23 SI Pump

This Step continued on the next page.

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

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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

All of the normal requirements for trip of an RCP are applicable throughout this procedure. Step 7 lists those that are most likely to occur in this procedure.

7. CHECK IF RCPs Must Be Stopped:

   a. CHECK the following:

      o Number 1 seal differential pressure - LESS THAN 200 PSID

      - OR -

      o Number 1 seal leakoff flow - LESS THAN 0.2 gpm AND seal temperatures - INCREASING

   a. IF neither condition satisfied, GO TO Step 8.

   b. STOP affected RCP(s)

8. DISPATCH Personnel To Locally Restore Power To selected Equipment

   a. RESET Lighting

   b. RESET ALL MCCs except MCC 28 AND MCC 28A

   c. CHECK MCC 28 AND MCC 28A - TRIPPED

   c. IF Containment Sump level is greater than 44 feet 3 inches, TRIP MCC 28 AND MCC 28A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	CHECK IF RHR Pump Aligned In SI Mode:	CONTINUE with Step 12 while PERFORMING the following:
	a. MOV-882, RHR Pump Suction From RWST - OPEN	a. ALIGN RHR pump suction to RWST as follows: 1) IF RCS hot leg temperature less than 250°F, OPEN MOV-882, RHR Pump Suction From RWST. 2) IF 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) WHEN 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.

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 o 745A o 745B o 746 o 747	c. Manually OPEN valves
	d. RHR heat exchanger Flow Control Valves - OPEN o 638 o 640	d. Manually OPEN valves
10.	CHECK IF CCW Pumps Aligned In SI Mode:	
	a. VERIFY at least one CCW Pump - RUNNING	a. VERIFY Auxiliary Component Cooling - RUNNING 1) WHEN CCW pump becomes available, START one CCW Pump
	b. OPEN RHR Heat Exchanger CCW Outlet Valves: o 822A o 822B	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

11. CHECK IF RHR Flow Required:

a. RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE BELOW:

a. GO TO Step 12.

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

b. RHR Pump suction temperature - LESS THAN OR EQUAL TO 250°F

b. GO TO Step 12

c. START one RHR pump

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

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.

12. VERIFY Adequate SI Flow: ____

a. CHECK RVLIS indication - GREATER THAN VALUE OBTAINED FROM TABLE BELOW:

NO. OF RCPS RUNNING	RVLIS NATURAL CIRCULATION RANGE	RVLIS RCP RUNNING RANGE
0	62%	
1		24%
2		31%
3		44%
4		63%

a. START one additional SI pump (23 preferred).

1) IF 22 SI Pump is running AND either 21 OR 23 SI Pump is NOT running, VERIFY the appropriate Outlet Tie valve is CLOSED ___

- o 21 Pump running - 851A
- OR -
- o 23 Pump running - 851B

b. CHECK core exit TCs - STABLE OR DECREASING

b. START one additional SI Pump (23 preferred)

13. CHECK RCS Hot Leg Temperatures - STABLE

CONTROL steam dump AND total feed flow as necessary to stabilize RCS temperatures.

a. IF condenser steam dumps NOT available, OPERATE atmospheric steam dumps ___

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	INITIATE Evaluation Of Plant Status:	
	a. CHECK Plant Vent Particulate AND Gaseous Activity Monitors - IN SERVICE o R-43 o R-44	a. START R-43 AND R-44 per SOP 12.3.2, Digital Radiation Monitoring System Operation (Local Or SRD)
	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	c. ISOLATE CVCS OR RHR breaker in PAB 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications
	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	d. ISOLATE RCS, CVCS OR RHR break in Containment 1) REFER TO Emergency Procedures Document Book 1, Emergency Classifications
	e. CHECK Steam Generator status - NORMAL o R-45 o R-49 o R-28, R-29, R-30 OR R-31 o Steam Generator level - CONTROLLABLE	e. ISOLATE affected Steam Generator per ATTACHMENT 1 (Isolation of Steam Generator Tube Leak/Rupture)

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
f.	Evaluate and operate plant equipment as necessary:	
	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 VERIFY FCV-1176 AND FCV-1176A OPEN
	o Containment Fan Cooler Units - ALL RUNNING IN INCIDENT MODE	o PERFORM the following 1) START ALL available Fan Cooler Units per SOP 10.3 (Containment Cooling System Operation)
	o CHECK DC Bus Trouble Alarms - CLEAR	o VERIFY MCCs energized o MCC 24A o MCC 26C o MCC 27A o MCC 29A
	o CHECK Battery Bus voltage - NORMAL	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF offsite power is lost after the SI is RESET, manual action may be required to restart safeguards equipment.

15. RESET SI

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 Train B - 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

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. RESET Containment Isolation Phase A

a. PLACE IVSW switches to OPEN (Panel SN)

- 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

- o CI Phase A Train A
- o CI Phase A Train B

This Step continued on the next page.