Facility:	St. Lucie	Scenario No.:	1	Op Test No.:	HLC 20A
Examiners:	_____	Operators:	SRO:		
	_____		RO:		
	_____		BOP:		

Initial Conditions: 100% power MOL. Reduce power to 45% to remove the 2A Main Feedwater pump from service due to a oil leak.

Turnover: 2A High Pressure safety injection pump is out of service to repair a motor oil leak. Taken out of service 12 hours ago. B train protected, OLRM: Yellow

Critical Tasks:

- Close 2B Diesel Generator output breaker
- Start 2B HPSI pump

Event No.	Malf. No.	Event Type*	Event Description
1		R/RO, N/BOP	Reduce power to 45% to remove the 2A Main Feedwater pump.
2	1	C/~~BOP~~ RO	2A MFRV fails to respond to downpower.
3	2	~~C/RO~~ NA	~~Pressurizer level channel LT-1110X fails as is.~~
4	3	~~C/RO~~ NA	~~Letdown isolation valves fails closed which results in letdown line rupture in Containment.~~
5	4	M/ALL	Small Break LOCA, manual trip. Loss of offsite power.
6	5	C/BOP	2B Diesel Generator output breaker does not close on LOOP.
7	6	C/RO	2B HPSI pump does not start when 2B Diesel Generator breaker closes after SIAS actuation.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event 3 & 4 were not ran due to a manual Rx trip being inserted by the RO during the attempt to control the SG level with the 2A MFRV in manual.

SCENARIO EVENT DESCRIPTION
SCENARIO 1

Unit will be turned over at 100% power MOL. Directions are to reduce power to approximately 45% to remove the 2A Main Feedwater pump from service due to motor oil leak.

As the downpower progresses the 2A Main feedwater reg. valve (MFRV) is not responding to the reduced steam flow. To control the 2A Steam Generator level the BOP must take manual control of the 2A MFRV.

Pressurizer level channel LT-1110X is failed as is. Because the level setpoint is failed as is and the reference setpoint is lowering, this will result is increasing letdown flow when letdown should be decreasing for the power reduction. The crew should swap to Pressurizer level channel Lt-1110Y to mitigate the failure.

Letdown isolation valve V2515 fails closed. The RO should stop all running Charging pumps. Shortly after the letdown valve fails closed, RCS leakage will increase indicating a ruptured non-isolable letdown line. This will result is a small break LOCA. The crew should manually trip the unit and enter 2-EOP-03, Loss of coolant accident.

On the trip a Loss of offsite power will occur with the 2B Diesel generator output breaker failing to close. The BOP should manually close the 2B Diesel generator output breaker. At this point, RCS pressure is still above SIAS setpoint, however later when SIAS is reached the Diesel output breakers will open and re-close to sequence SIAS loads. The 2B HPSI pump will not start on SIAS and should be manually started by the RO.

Recommended termination is when both Diesel generators are loaded on their busses, the 2B HPSI pump has been started and the crew is performing a controlled cooldown.

Op Test No.: 1	Scenario # 1	Event # 1	Page 3 of 13
Event Description:	Reduce power to remove 2B MFW pump from service.		

Time	Position	Applicant's Actions or Behavior
		Booth Operator Instructions: For setup, place placard for 'B' protected train and OLRM YELLOW. Place clearance tag on 2A HPSI pp. Place Myler over HPSI annunciators.
		NOTE: If surrogate SRO / RO used, brief the SRO / RO on MFRV failure, PZR level channel and HSPI pp fail to start. Stress: do not cue RO / BOP on trends related to these failures.
		Handout 2-GOP-123, 'Turbine Shutdown-Full Load To Zero Load' and 2-GOP-101, 'Reactor Operating Guidelines During Steady State and Scheduled Load Changes' for crew to review in briefing room while simulator is being setup. Make copy for I/F.
		NOTE: The 2A MFRV fail to respond is a manual trigger. Trigger when directed by examiner.
		Control Room Indications Available:
	RO / BOP	Prepare the Unit for load reduction IAW 2-GOP-101 section 6.2 (attached page 4)
	RO	When directed by SRO perform steps 6.3 and 6.4 of 2-GOP-123 for CEA insertion. (attached page 5)
	BOP	When directed by SRO perform section 6.6, attached, of 2-GOP-123, DEH setup for downpower. (attached page 6)
	RO	Place Pressurizer on recirc IAW 2-GOP-101 Appendix A (attached page 7) when directed by SRO.
	RO	Start additional Charging pump IAW 2-NOP-02.02, section 4.3. Charging and Letdown. (attached page 8,9) when directed by SRO.
	RO	When directed, align and commence boration IAW 2-NOP-02.24, Boron Concentration Control, section 6.6, (attached page 10,11)
	BOP	Communicating with RO, hit 'GO' on Turbine control panel.

6.2 Power Level Reductions

1. At or above 50% power:

A. All planned reactivity additions should be made by boration or dilution in accordance with 2-NOP-02.24, Boron Concentration Control.

B. USE CEAs for ASI control, CONSIDER the reactivity effect of CEAs when adjusting boron concentration.

C. REFER to NOP-100.02, Axial Shape Index Control, for specific instructions regarding ASI control during planned or unplanned load reductions.

2. If available, Then ENSURE two Charging Pumps are operating.
If necessary, START an additional Charging Pump in accordance with 2-NOP-02.02, Charging and Letdown.

3. PLACE the Pressurizer on recirculation in accordance with Appendix A, Pressurizer Recirculation Guidelines.

4. UNLOAD the Main Generator in accordance with 2-GOP-123, Turbine Shutdown - Full to Zero Load.

5. SECURE Zinc Injection per 2-NOP-02.26, before reducing power by more than 20%.

END OF SECTION 6.2

6.0 INSTRUCTIONS **INITIAL**

NOTE

Steps in this procedure may be performed out of sequence provided:

- All applicable conditions necessary to perform the step are satisfied and,
- The performance of the out of sequence steps do not change an operational mode and
- Permission is granted from SM/US

6.1 PREPARE the unit for the load reduction in accordance with 2-GOP-101, Reactor Operating Guidelines During Steady State and Scheduled Load Changes. _____

NOTE

The following step is based on a reactor trip being desired, but NOT required based on plant parameters.

6.2 If desired by SM/US to trip the reactor at a different power level then planned, Then BRIEF the crew and GO TO step 6.28

6.3 PREPARE the CEA Control Panel for the load reduction by performing the following:

1. PLACE the Mode Select switch in MS. _____

AND

2. VERIFY the Manual Sequential Reg light is LIT. _____

6.4 If Group 5 CEAs are fully withdrawn, Then VERIFY CEA operability by INSERTING Group 5 just until the upper electrical limit (UEL) lights clear for all the CEAs in that group or until all the CEAs in that group have been inserted approximately one inch. _____

6.5 If CEA motion is unavailable at any time during the load reduction, Then PERFORM the following:

1. STOP the load reduction and refer to 2-AOP-66.01, Dropped or Misaligned CEA Abnormal Operations _____

OR

2. If the load reduction can **NOT** be stopped, Then CONTACT Reactor Engineering for recommendation on ASI control. _____

INITIAL

6.6 If the DEH is **NOT** in Turbine Manual, Then PROGRAM the DEH System for the load reduction by performing the following on the Turbine DEH Cont Panel:

1. DEPRESS the Ref pushbutton. _____

> **NOTE**
> In the event an error is made in depressing a numerical pushbutton, the number in the Demand display can be removed by depressing the Cancel pushbutton.

2. ENTER the desired load by DEPRESSING the numerical pushbuttons on the keyboard. VERIFY the desired number appears in the Demand display. _____
3. DEPRESS the Enter pushbutton. _____
4. VERIFY the Hold pushbutton illuminates. _____
5. DEPRESS the Load Rate MW/Min pushbutton. _____
6. ENTER the desired load rate by DEPRESSING the numerical pushbuttons on the keyboard. VERIFY the desired number appears in the Demand display. _____
7. DEPRESS the Enter pushbutton. VERIFY the desired load rate appears in the Reference display. _____
8. DEPRESS the Ref pushbutton. _____

6.7 If a rapid load reduction is necessary, Then GO TO 2-AOP-22.01, Rapid Down Power.

6.8 If a rapid load reduction is **NOT** required, Then PERFORM the following:

1. BEGIN borating the RCS to reduce RCS temperature in accordance with 2-NOP-02.24, Boron Concentration Control. _____

APPENDIX A
PRESSURIZER RECIRCULATION GUIDELINES
(Page 1 of 2)

NOTE

- The purpose of placing the Pressurizer on recirculation is to keep the Pressurizer and RCS boron concentration within 25 ppm when changing RCS boron concentration.
- From measured data, the estimated time in minutes to correct a greater than or equal to 25 ppm boron mismatch by operating 6 Backup Bank heaters may be determined as follows:

  Time (in minutes) to correct mismatch = [(Pzr ppm - RCS ppm) – 25 ppm] x 3

1. To place the Pressurizer on recirculation:

   A. PLACE all available Backup Bank heater control switches to ON.

   B. Slowly REDUCE the AUTO setpoint on PIC-1100X or PIC-1100Y, the selected "Pressurizer Pressure" controller, to maintain normal operating pressure.

   C. OBSERVE HIC-1100, "Pressurizer Spray" output and PCV-1100E/1100F, "Pressurizer Spray Valve" position indication to verify Main Spray flow.

NOTE

Normally, the required number of Backup Bank heaters in service is dependent upon:

1. The magnitude of thermal losses from the system, including leakage to the Quench Tank.
2. The number of heater elements out of service.

The normal configuration is to have enough Backup Bank heaters in service to keep the Proportional Bank heaters at approximately 50% output.

2. To take the Pressurizer off recirculation:

   A. REMOVE the additional Backup Bank heaters from service one at a time by returning the control switch to AUTO.

   B. ADJUST the AUTO setpoint on PIC-1100X or PIC-1100Y, the selected "Pressurizer Pressure" controller, to maintain normal operating pressure.

4.3 Start Additional Charging Pump(s) to Raise Flow

WARNING

Placing a second or third charging pump in service will increase letdown flow, which may cause general area dose rates in vicinity of letdown line in the 19.5' Pipe Penetration room or 19.5' Letdown Cubicle room to exceed 1000 mr/hr (Locked High Radiation Area limit) due to reduced transport time of short-lived radioactive isotopes.

1. **NOTIFY** RP at least 15 minutes prior to starting a charging pump.
2. **DIRECT** SNPO to perform a local inspection and verify charging pump to be started is ready to operate.
3. IF in MODE 1 or 2, THEN **PLACE** V2520, ION EXCHANGER BYPASS VALVE, in BYPASS RESET to minimize reactivity effects of changing letdown temperature.
4. IF associated charging pump recirculation valve is OPERABLE, THEN **ENSURE** the valve is OPEN prior to starting the pump.
5. **START** charging pump by placing its control switch in START.
6. WHEN 3 minutes has elapsed since pump start, THEN **ENSURE** associated recirc valve is CLOSED.
7. **ADJUST** upper BIAS control knob on HIC-1110, LEVEL, to control letdown flow to maintain actual Pressurizer level to program RRS Pressurizer level for current plant conditions, as required.
8. **VERIFY** proper charging header flow by one of the following methods:
   - IF FIA-2212, CHARGING TO REGEN HX, is in service, THEN **VERIFY** indication raises and stabilizes for number of running charging pumps.
   - IF FIA-2212 is **NOT** in service, THEN **VERIFY** the following:
     - Letdown flow rises
     - Pressurizer level rises in response to starting the additional charging pump

4.3 Start Additional Charging Pump(s) to Raise Flow (continued)

9. **PLACE** CHRG PUMP SEL RUNNING - B/U PP switch in proper position per Attachment 2, Charging Pump Combinations vs. Selector Switch Position.

10. WHEN letdown temperature stabilizes, THEN **ENSURE** V2520, ION EXCHANGER BYPASS VALVE, control switch is returned to AUTO.

6.6 Aligning for MANUAL Boration — CHECK

NOTE

- The Operations Supervisor SHALL be notified and a CR submitted of any unexplained or unplanned Reactivity change (i.e., >.5 deg Tcold change or >.5% power change).
- If a Reactivity management issue occurs, refer to procedure ADM-09.11, Reactivity Management.
- Engineering Assessment of FIC-2210Y Boric Acid Flow, show that there could be an error up to ~± 0.1 GPM. Recommended minimum Boric Acid Flow is 0.75 gpm.

/R25A

1. ENSURE Section 3.0, Prerequisites is completed at least once per shift. _____
2. ENSURE Section 4.0, Precautions / Limitations, has been reviewed at least once per shift. _____
3. DETERMINE the desired volume of boric acid to be added. _____
4. IF necessary to re-zero boric acid totalizer, THEN PRESS STOP / RESET on FQIS-2210Y. _____
5. ENSURE Makeup Mode Selector switch in MANUAL. _____
6. ENSURE FIC-2210X, Reactor Water Flow, in MANUAL and REDUCE the controller output to ZERO. _____
7. ENSURE FCV-2210X, Primary Makeup Water. control switch is in CLOSED. _____
8. ENSURE FIC-2210Y, Boric Acid Flow, in MANUAL and REDUCE the controller output to ZERO. _____
9. ENSURE FCV-2210Y, Boric Acid, control switch is in CLOSED. _____
10. ENSURE one of the Primary Makeup Water Pumps 2A or 2B is running. _____
11. START either BA Pump 2A or 2B. _____
12. PLACE FCV-2210Y control switch in AUTO. _____
13. If borating to the VCT, Then OPEN V-2512, Reactor Makeup Water Stop Vlv. _____

6.6 Aligning for MANUAL Boration (continued) CHECK

14. If borating to the Charging Pump suction, Then OPEN V2525, Boron Load Control Valve. _____

15. ADJUST FIC-2210Y Boric Acid Flow in AUTO or MANUAL to the desired flowrate. _____

NOTE
Ensure a minimum of 10 gpm boric acid flow at all times with the BAM pump recirc valve closed.

16. If desired to maximize the boric acid flow rate CLOSE the running BAM pump recirc valve. _____

17. MAINTAIN VCT pressure less than or equal to 30 psig by opening and closing V2513, VCT Vent, as needed. _____

18. If necessary to maintain the desired VCT level, Then DIVERT the letdown flow to the Waste Management System by placing V2500, VCT Divert Valve, in the WMS position. _____

19. When the desired VCT level is reached, Then PERFORM the following:

A. PLACE V2500 to the AUTO position. _____

B. ENSURE V2500 indicates CLOSED. _____

20. When the desired amount of boric acid has been added, Then OPEN the BAM pump recirc valve if closed previously. _____

21. When the desired amount of boric acid has been added, Then CLOSE FCV-2210Y, Boric Acid. _____

22. If additional Borations are desired, or if the expected changes to Tave, or Boron concentration are NOT achieved, Then REPEAT Steps 6.6.1 through 6.6.20. _____

CAUTION
¶1 Stopping either BAM pump with the Makeup Mode Selector switch in any position other than MANUAL could cause the pump breaker to trip.

23. STOP the running Boric Acid Pump by PLACING the control switch in AUTO. _____

Op Test No.: 1 Scenario # 1 Event # 2 Page 4 of 13

Event Description: 2A MFRV fails to respond to downpower

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger 2A MFRV fails to respond when directed by examiner. **NOTE: When MFRV is in manual and controlled, call as NPO and state Main Feed pump oil leak is getting worse.**		
Control Room Indications Available: 2A SG level rising as downpower progresses. Steam flow Feed flow mismatch. 2A High SG level alarm if not noticed in a timely manner.		
	BOP	IOA from 2-AOP-09.01, Feedwater Control System Abnormal Operations, If SG levels are not between 60-70% NR and not stable, take manual control of feed flow and stabilize SG levels to 60-70% NR.
NOTE: manual trip criteria is ≤ 50% and ≥ 70% narrow range.		
	BOP	Place the 2A MFRV in manual to control 2A SG level to 60-70% NR.
		When directed by SRO operate 2A MFW control system IAW 2-AOP-09.01 steps 4.2.2.2.1 through 2.5. (attached page 13)
	RO/BOP	When 2A SG level in manual control and controlling within band continue with downpower as directed by SRO.
	RO	When directed by SRO begin rapid downpower boration per Operator aid. (attached page 14,15)
	BOP	Program DEH for desired load reduction
	RO	When directed insert CEA lead group 6 inches
	RO	When Tave lowering, notify SRO / BOP to press go on Turbine

INSTRUCTIONS **CONTINGENCY ACTIONS**

4.2.2 S/G Level, Feed Flow, or Steam Flow Anomalies

[*] **1.** **PERFORM** applicable step(s) in any order per Table 2.

Table 2
Level or Feedwater Control Malfunctions

Suspected Malfunction	Step
HPFRV	Section 4.2.2 Step 2
MFW pump recirculation valve	Section 4.2.2 Step 3
FCV-12-1, Condensate Hdr Recirc To Cndsr	Section 4.2.2 Step 4
DCS FW inputs	Section 4.2.2 Step 5
LPFRV	Section 4.2.2 Step 6

NOTE

The HPFRV and its associated LPFRV have flow-compensation logic such that operating one in manual with the other in auto may cause the valve in auto to reposition in an attempt to keep the feed flow rate constant.

[ ] **2.** **VERIFY** HPFRV controllers are controlling S/G levels in normal band:

- FIC-9011, S/G 2A FLOW CNTL (HPFRV 2A)
- FIC-9021, S/G 2B FLOW CNTL (HPFRV 2B)

2.1 **ENSURE** affected LOW PWR M/A STA is in A (auto).

2.2 **PLACE** affected HIGH PWR M/A STA in M (manual).

2.3 **CLOSE** affected HPFRV using HIGH PWR M/A STA until LPFRV is 20% to 50% open.

2.4 **MAINTAIN** S/G level in normal band.

2.5 **MAINTAIN** LPFRV between 20% to 50% open by adjusting HPFRV as required.

ATTACHMENT 1
RCS Boration Guidance
(Page 1 of 2)

NOTE

- Step 1 in this attachment is applicable when the CVCS is normally aligned, with no RCS boration or dilution in progress. If other than normal alignment, use guidance of 2-NOP-02.24, Boron Concentration Control.
- An Operator Aid has been placed at RTGB-205. Any revision to this section of the procedure shall verify the validity of the Operator Aid and, if changes are necessary, a Label Request shall be initiated to incorporate these changes on a new Operator Aid Placard.

1. **BORATE** the RCS by the following:

   A. **START** either Boric Acid Pump 2A or 2B.

   B. **PLACE** FCV-2210Y, BORIC ACID (RTGB-205), control switch in AUTO.

   C. IF borating to the Charging Pump suction, THEN **OPEN** V2525, BORON LOAD CONTROL VALVE (RTGB-205).

   D. IF borating to the VCT, THEN **OPEN** V2512, REACTOR MAKEUP WATER STOP VLV (RTGB-205).

   E. **ADJUST** FIC-2210Y, BORIC ACID, to the desired flowrate.

   F. IF desired to maximize the boric acid flow rate, THEN **CLOSE** the running BAM pump recirc valve.

   - V2650, TANK 2A RECIRC VALVE (RTGB-205)
   - V2651, TANK 2B RECIRC VALVE (RTGB-205)

   G. **CYCLE** V2513, VENT VALVE (RTGB-205) to maintain VCT pressure less than or equal to 30 psig.

   H. **CYCLE** V2500, DIVERT VALVE (RTGB-205) to WMS if necessary to maintain the desired VCT level.

ATTACHMENT 1
RCS Boration Guidance
(Page 2 of 2)

2. **SECURE** boration as follows:

   A. **ENSURE** BAM pump recirc valves, OPEN

   - V2650, TANK 2A RECIRC VALVE (RTGB-205)
   - V2651, TANK 2B RECIRC VALVE (RTGB-205)

   B. **CLOSE** FCV-2210Y, BORIC ACID (RTGB 205).

   C. **ADJUST** FIC-2210Y, BORIC ACID, to zero (RTGB 205).

   D. **STOP** running Boric Acid Pump.

   E. **ENSURE** CLOSED V2512, REACTOR MAKEUP WATER STOP VLV (RTGB-205).

   F. **ENSURE** CLOSED V2525, BORON LOAD CONTROL VALVE (RTGB-205).

   G. **ENSURE** CLOSED V2513, VENT VALVE (RTGB-205)

   H. **ENSURE** V2500, DIVERT VALVE, in AUTO (RTGB 205).

Op Test No.: 1 Scenario # 1 Event # 3 Page 5 of 13

Event Description: Pressurizer Level Channel LT-1110X fails as is

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger LT-1110X fail as is when directed by examiner.		
Control Room Indications Available: Letdown flow not lowering as expected for downpower. Pressurizer level deviation from setpoint as downpower progresses. **Annunciator H-18 'Pzr. Channel Y level High/Low' (if failure not realized in timely manner)** **Examiners note: This is a subtle failure in that the applicant should recognize letdown flow should be substantially lower than charging flow due to the downpower. As the downpower progresses Pressurizer level will deviate low from setpoint.**		
	RO	Recognizes letdown flow is not constant (i.e. to high) for downpower. IOA of 2-AOP-01.10, Pressurizer Pressure and Level. VERIFY selected Pressurizer level control channel LIC-1110X(Y), LEVEL, NORMAL. CONTINGENCY ACTIONS: PLACE LEVEL CONTROL CHANNEL selector switch to non-affected control channel. Swap Pressurizer level channel to LIC-1110Y
		Verifies letdown flow lowering and Pressurizer level recovering to setpoint.
		When Pressurizer level reaches setpoint communicates to SRO.

Op Test No.: 1 Scenario # 1 Event # 4 Page 6 of 13

Event Description: Letdown Isolation valve V2515 fails closed. Letdown line leak.

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger Letdown Isolation valve V2515 fail closed when directed.		
Control Room Indications Available: M-5 Letdown Press High/Low. No letdown flow indication. **Examiners Note: One minute after Letdown valve fails closed a letdown line break in Containment occurs resulting in approximately 200 gpm non-isolable leak.**		
	RO	Recognize and communicate letdown valve V2515 failed closed. Stops all running Charging pumps and places control switches in AUTO. IOA's from 2-AOP-02.03, Charging and Letdown.
		Recognize and communicate RCS leakage alarm. RCS leak rate recorder indicates full scale. Pressurizer level and pressure lowering.
		When directed by SRO, start all available Charging Pumps.
		Recognize and communicate Pressurizer level lowering and cannot be maintained on setpoint with all charging pumps running. Recommend tripping the Reactor.
	RO	When Pressure reaches DNB T.S. setpoint (2225 psia) communicate to SRO 'entered DNB T.S.'
	SRO	May elect to perform a quick T.S. brief on RCS T.S. leakage.
	RO/BOP	When directed by SRO trip the Reactor.

Op Test No.: 1	Scenario # 1	Event # 5,6	Page 7 of 13
Event Description:	SBLOCA manual trip, Loss of Offsite Power, 2B Diesel Breaker fails to close on LOOP		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: LOOP. 2B Diesel Generator Breaker does not close. **Examiners note: due to small break SIAS will probably not occur while crew is in EOP-01**		
	RO	Manually trips reactor prior to auto trip. Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal.
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify all CEAs are fully inserted.
		Inventory Control • Verify Pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%.
		Pressure Control • Verifies RCS pressure is between 1800-2300 psia. • Verifies RCS pressure is trending 2225-2275 psia. • Verifies RCS subcooling is ≥20°F.
		Core Heat Removal • Verifies at least one RCP running with CCW. (no RCP's running due to LOOP) • Verifies loop delta T is <10°F. (loop delta T will be higher than 10°F due to nat. circ. Developing)

Op Test No.: 1	Scenario # 1	Event # 5,6	Page 8 of 13
Event Description:	SBLOCA manual trip, Loss of Offsite Power, 2B Diesel Breaker fails to close on LOOP		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Verifies turbine trip on reactor trip. Performs EOP-01 Safety functions as directed for: Vital Auxiliaries, RCS Heat Removal, Containment Conditions.
	BOP **Critical Task**	Recognize and communicate 2B Diesel output breaker did not close. Insert Sync. Plug into 2B Diesel breaker and close Diesel Output breaker. Monitor and verify load sequencing on the 2B Diesel.
		Closes MSR reheat Block TCV's due to loss of power to MSR block valves.
		Notifies NPO to perform Appendix X section 1 of EOP-99. (outside CR actions)
		Notify SNPO to check SFP inventory and temperature.
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed. • Verifies GEN Brk open (East breaker, Mid Breaker and Exciter Breaker.) • Verifies all vital and non vital AC Buses energized. • Verifies all vital and non vital DC Buses energized.
		RCS Heat Removal • Verify at least one SG has BOTH: SG Level 20-83% NR Feedwater available, level being restored to 60-70% NR • Verify RCS Tavg is between 525 and 535° F • SG pressure between 850-930 psia via ADV's

Op Test No.: 1	Scenario # 1	Event # 5,6	Page 9	of 13
Event Description:	SBLOCA manual trip, Loss of Offsite Power, 2B Diesel Breaker fails to close on LOOP			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Place ADV's in AUTO/AUTO to maintain 900 psia SG pressures.
	BOP	Containment Conditions • Verifies Containment pressure <2 psig. (Pressure is increasing ensures 4 Containment Cooling fans on.) • Verifies NO Containment radiation monitors in alarm. • Verifies Containment temperature is less than 120°F. (Temperature is increasing) • Verifies NO secondary plant radiation alarms.
SRO should exit 2-EOP-01, Standard Post Trip Actions to 2-EOP-03, Loss of Coolant Accident. STA should perform Safety Function Status Check Sheets for 2-EOP-03.		
NOTE: on AFAS, AFAS -1 may lockout due to 2A Diesel breaker closing before the manual closure of 2B Diesel breaker. (2B AFW pump start delay). The BOP should recognize this condition and recommend to SRO that AFAS-1 should be manually actuated.		

Op Test No.: 1 Scenario # 1 Event # 7 Page 10 of 13

Event Description: 2B HPSI fails to automatically start

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger Appendix H when directed.		
Control Room Indications Available:		
	BOP	Perform Appendix A, (step 4) Sampling Steam generators when directed (attached page 22) NOTE: CCW cannot be restored to the 'N' header for SG blowdown sample cooling. As a result HP will need to be called for local surveys. (step 4 of Appendix A)
	BOP	When directed place the four CCW valves to/from the RCP's to CLOSE. Place the two RCP Bleedoff valves to CLOSE. (step 8.A.3)
	BOP	When SIAS received, verify ESFAS pumps and valves actuate as designed. (step 6)
	RO **Critical Step**	Recognize 2B HPSI did not start on SIAS. Communicates and starts the 2B HPSI pump.
EXAMINER NOTE: The above Critical Task is applicable if RCS pressure lowers to <HPSI shutoff head (~1200 psia) and the 2B HPSI pump has not been started.		
	BOP	Close the MISV's and SGBD valves when directed. (step 13)
		Perform Appendix X section 2 when directed (step 13B). (attached page 23-26)
	BOP	When directed, coordinate with NPO to restore Instrument Air (step 14) IAW Appendix H. When NPO called stating alignment complete, BOP should reset the 2A and or 2B Instrument air compressors from the control board.

APPENDIX A
SAMPLING STEAM GENERATORS
(Page 2 of 2)

2. (continued)

☐ **B.** If CIAS or high radiation has closed the SGBD Sample Valves, Then OPEN FCV-23-7 and FCV-23-9 by PLACING the control switch to CLOSE / OVERRIDE and then to OPEN.

☐ **3.** If S/Gs can be sampled, Then:

A. **ENSURE OPEN** FCV-23-7 and FCV-23-9, SGBD Sample Valves.

B. DIRECT Chemistry to perform S/G samples for activity and boron.

☐ **4.** If S/Gs cannot be sampled, Then DIRECT Health Physics to conduct secondary plant local area radiation surveys.

END OF APPENDIX A

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 5 of 8)

Section 2: CONTROL ROOM ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **1.** ENSURE **ONLY ONE** MFW Pump is RUNNING, with the control switch in RECIRC.	
☐ **2.** ENSURE **ONLY ONE** Condensate Pump is RUNNING.	
☐ **3.** If AFAS has actuated, and use of Main Feedwater is desired, Then PERFORM **ALL** of the following:	
☐ **A.** ENSURE AFAS is RESET.	
☐ **B.** ENSURE **BOTH** S/G [Main FRV] Block valves CLOSED.	
1. MV-09-5	
2. MV-09-6	
☐ **C.** ENSURE **BOTH** Low Power M/A Stations in MANUAL.	
☐ **D.** For **EACH** MFW header to be placed in service, ENSURE the associated MFIVs are OPEN.	
☐ **E.** DEPRESS **BOTH** pushbuttons to RESET the Low Power Feedwater Valves.	
☐ **F.** ADJUST the Low Power M/A Stations **AS NECESSARY** to control S/G levels.	
☐ **G.** RESTORE AFW to the standby alignment.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 6 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **4.** If AFAS has **NOT** actuated and use of Main Feedwater is desired, Then PERFORM **ALL** of the following:	
☐ **A.** ENSURE **BOTH** S/G [Main FRV] Block valves CLOSED.	
☐ **B.** For **EACH** MFW header to be placed in service, ENSURE the associated MFIVs are OPEN.	
☐ **C.** ENSURE **BOTH** Low Power M/A Stations in MANUAL.	
☐ **D.** DEPRESS **BOTH** pushbuttons to RESET the Low Power Feedwater Valves.	
☐ **E.** ADJUST the Low Power M/A Stations **AS NECESSARY** to control S/G levels.	
☐ **5.** ENSURE **BOTH** Heater Drain Pumps are STOPPED.	
☐ **6.** ENSURE **BOTH** of the following:	
☐ **A.** Bearing Oil Pump and Seal Oil Backup Pump RUNNING.	☐ **A.1** ENSURE Emergency Bearing Oil Pump RUNNING.
☐ **B.** When the turbine reaches 600 rpm, Then Bearing Oil Lift Pump RUNNING.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 7 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **7.** ENSURE the Turbine Drain Valves are OPEN.	
☐ **8.** ENSURE **ONLY ONE** Turbine Cooling Water Pump is RUNNING.	
☐ **9.** VERIFY Turbine Generator Bearing Oil temperature between 110 to 120°F.	☐ **9.1** DIRECT a field operator to adjust TCW to the in-service TLO Cooler to maintain outlet Oil temperature between 110 to 120°F.
☐ **10.** When Turbine speed reaches ZERO rpm, Then VERIFY the turning gear automatically ENGAGES.	☐ **10.1** PERFORM **ALL** of the following: ☐ **A.** PLACE Turning Gear in MANUAL. ☐ **B.** VERIFY the Turning Gear Permissive Light is ON. ☐ **C.** Locally ENSURE the Turning Gear is ENGAGED. ☐ **D.** Locally START the Turning Gear.
☐ **11.** If Reactor power history is low, Then CONSIDER reducing steam generator blowdown flow to maintain RCS temperature.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 8 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **12. Place Boron Dilution Alarm System in Operation.** When indicated Reactor power is less than 10^{-5}%, Then PERFORM **BOTH** of the following: ☐ **A.** ENERGIZE **BOTH** channels of Startup Nuclear Instrumentation to place the Boron Dilution Alarm System in operation. ☐ **B.** VERIFY **BOTH** Boron Dilution Alarm System Channels are operating.	☐ **12.1** If **BOTH** Boron Dilution Alarm System channels are NOT operating, Then PERFORM applicable actions of 2-AOP-02.01, Boron Concentration Control System (BCCS) Abnormal Operations.

NOTE
Excessive moisture can build up in CEDMC's room, and impact equipment reliability if 15 KW heaters are not energized after plant shutdown.

☐ **13.** NOTIFY SNPO to energize 15 KW heater located in the CEDMC's room to minimize humidity build-up per 2-NOP-25.10, CEDMCS Air Conditioning System Operation.

☐ **14.** CONSIDER contacting the Division Load Dispatcher for a switching order to OPEN the Main Generator disconnects.

END OF APPENDIX X

Op Test No.: 1	Scenario # 1	Event # 7	Page 11 of 13
Event Description:	2B HPSI fails to automatically start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger Appendix H when directed.		
Control Room Indications Available:		
	RO	When directed, cooldown (step 18) the RCS using the ADV's not to exceed 50°F in any one hour period. Up to 100°F in any one hour period is allowed to regain or maintain subcooling.
	RO	When directed depressurize the RCS using Aux. Spray (step 19) to maintain subcooling at the lower limits of Figure 1A.
Suggested termination point is when the 2B HPSI pump has been started, Instrument air has been restored and a controlled cooldown and depressurization is in progress.		

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0** **Unit 2 Unidentified RCS Leakage: 0.012**

Unit 2 Scheduled Activities per the OSP: Reduce power to 45% to remove the 2A Main feedwater pump from service due to oil leak on oil cooler.

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement: 2A HPSI Pump Out of Service for motor oil leak.

OPS 513's:

Locked in Annunciators:

Current Status: 100% power MOC

Equipment Problems: 2A Main Feedwater pump motor oil leak.

Applicable Procedures

- 2-GOP-123, 'Turbine Shutdown-Full Load To Zero Load'
- 2-GOP-101, 'Reactor Operating Guidelines During Steady State and Scheduled Load Changes'
- 2-AOP-09.01, 'Feedwater Control System Abnormal Operations'
- 2-AOP-01.10, 'Pressurizer Pressure and Level'
- 2-AOP-02.03, 'Charging and Letdown'
- 2-EOP-01, 'Standard Post Trip Actions'
- 2-EOP-03, 'Loss of Coolant Accident'

Facility:	St. Lucie		Scenario No.:	2	Op Test No.: HLC 20A
Examiners:			Operators:	SRO:	
				RO:	
				BOP:	

Initial Conditions: 45% power, Xenon building in, 16 gpm dilution rate I/C #3, MOC.

Turnover: Unit was down powered to remove the 2A Main feedwater pump to repair a motor oil leak. Repairs have been made and both Main Feedwater pumps are running. 2A High Pressure safety injection pump is out of service to repair a motor oil leak. Taken out of service 12 hours ago. B train protected, OLRM: Yellow

Critical Tasks:

- Direct to locally close 2B MSIV
- Stop all RCP's within 10 minutes of loss of CCW

Event No.	Malf. No.	Event Type*	Event Description
1		R/RO, ~~R~~/BOP/N	Raise power to 100%
2	1	C/BOP	CEDM Fan 21A sheared shaft
3	2	C/~~RO~~ BOP	Letdown flow controller HIC-1110 goes to maximum flow.
4	3	C/BOP	2B Intake cooling water pump failed motor bearing, increasing AMPS.
5	4	N/BOP	2B Steam Generator 10 GPM SGTL.
6	5	M/All	2B Steam Generator tube rupture 200 GPM
7	6	C/BOP	2B Main Steam isolation valve (MSIV) fails to close on isolation of 2B Steam Generator. Locally close 2B MSIV.
8	7	C/RO	Auxiliary spray valve SE-02-3 fails to close after opening to lower subcooling.
9			Cooldown and isolate the 2B Steam Generator

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO EVENT DESCRIPTION
SCENARIO 2

The Unit will be turned over at 45% power with directions to raise power to 100%.

During the up-power CEDM cooling fan 21A experiences a sheared shaft. The Standby fan HVE-21B will not automatically start and should be manually started. Failure to have one fan running requires a plant shutdown.

Letdown flow controller HIC-1110 will fail causing maximum letdown flow. Actions should be taken to manually control letdown to match charging flow and maintain Pressurizer level at setpoint.

The 2B Intake Cooling water pump will experience a failed motor bearing resulting in increasing motor amps. If not identified within a few minutes, the pump will trip on overcurrent. This will require the 2C Intake cooling water pump to be electrically and mechanically aligned to replace the 2B

A Steam Generator tube leak of approximately 10 gallons per minute will occur on the 2B Steam Generator. Secondary radiation should cue the crew into the proper diagnoses. Because letdown flow control is in manual, a mis-match between charging and letdown will not occur. Manual reduction of letdown should be performed to maintain Pressurization level on setpoint. The up power should be terminated and a rapid downpower should be started. As the downpower progresses, the tube leak will ramp to a 200 gallon per minute tube rupture. The crew should manually trip the plant and enter 2-EOP-01, Standard Post Trip actions.

After 2-EOP-01 is complete the crew should enter 2-EOP-04, Steam Generator Tube Rupture. Major mitigating actions are to cooldown and isolate the 2B Steam Generator. Subcooling should be controlled at the minimum values to limit leak flow. Because all RCP's will be turned off due to procedure requirements, lowering RCS pressure will be accomplished by cycling the Auxiliary spray valves and closing the charging loop isolation valves. When SE-02-3 is opened and attempted to be closed, the valve will not close. Proper actions are to re-open the charging loop isolation valves. This will limit the spray flow through the failed open Aux. spray valve to a controllable level and subcooling will be maintained.

When isolation criteria is met for the 2B Steam Generator the crew should isolate the Steam Generator. When attempting to close the 2B MSIV, the valve will not close from the control room. 2-EOP-99 Appendix I should be implemented to locally close the 2B MSIV.

Suggested termination point is when the crew has isolated the 2B Steam Generator and controlled cooldown and RCS depressurization is occurring.

Op Test No.: 1	Scenario # 2	Event # 1	Page 3 of 16
Event Description:	Raise power to 100%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Place placard for 'B' protected train and OLRM YELLOW. Place clearance tag on 2A HPSI pp. Place Myler over HPSI annunciators. Start the 2B Main Feedwater pump. With crew in briefing room hand out 2-GOP-101 and 2-GOP-201 signed off up to 6.136. Crew to perform a brief while simulator is being setup. Also sign off 6.136 step 4 as RE, Nuc. Delta T not required and N/A steps 5 and 6. **NOTE: If surrogate SRO / RO used, brief the SRO / RO on HIC-1110 failure and 2B ICW pp failure. Do not cue RO / BOP on observed trends related to these failures.**		
Control Room Indications Available:		
	RO	Raise dilution rate for power increase IAW 2-NOP-02.24, Boron Concentration Control, step 6.5.13 (attached page 4)
		Withdraw CEA's to control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached page 5) • CEA Withdrawal, select MS on the CEDMCS Control Switch • Move the IN/HOLD/OUT Switch to the OUT direction
		Divert letdown to WMS by placing V2500 to WMS to maintain VCT level within normal band.
	BOP	Program DEH for power increase • Set reference by ensuring REF selected and then depress desired MW endpoint, select ENTER • Depress LOAD RATE type in desired load rate and select ENTER • Depress GO pushbutton

6.5 Aligning for MANUAL Dilution (continued)

12. ☐☐☐☐ If diluting to the Charging Pump suction, Then OPEN V-2525, Boron Load Control Valve.

CAUTION
To preclude lifting the VCT relief valve while using V-2525, do NOT allow PMW flowrate to exceed the running Charging pump(s) capacity.

13. ☐☐☐☐ ADJUST FIC-2210X PMW Flow in AUTO or MANUAL to desired flowrate (and if using V-2525 do NOT exceed the flowrate for the number of running Charging Pumps).

14. ☐☐☐☐ MAINTAIN VCT pressure less than or equal to 30 psig by opening and closing V2513, VCT Vent, as needed.

15. ☐☐☐☐ If necessary to maintain the desired VCT level, Then DIVERT the letdown flow to the Waste Management System by placing V2500, VCT Divert Valve, in the WMS position:

A. ☐☐☐☐ ENSURE V2500 VCT Divert Valve indicates OPEN.

B. ☐☐☐☐ When the desired VCT level is reached, PLACE V2500 in AUTO.

C. ☐☐☐☐ ENSURE V2500 indicates CLOSED.

16. ☐☐☐☐ When the desired amount of primary water has been added, Then CLOSE FCV-2210X, Primary Makeup Water.

17. ☐☐☐☐ If V-2512 Reactor Makeup Water Stop Vlv was opened, Then PLACE V-2512 in CLOSE and ENSURE it indicates CLOSED.

18. ☐☐☐☐ If V-2525 Boron Load Control Valve was opened, Then PLACE V-2525 in CLOSE and ENSURE it indicates CLOSED.

19. ☐☐☐☐ ENSURE FIC-2210X, PMW Flow controller is in MANUAL and RECUCE output to MINIMUM.

20. ☐☐☐☐ MONITOR for any abnormal change in T_{ave}.

21. ☐☐☐☐ §1 RECORD on Data Sheet 1, Boration / Dilution Log, the number of gallons of Primary Makeup Water added as indicated on FQI-2210X, PMW Flow Totalizer.

22. ☐☐☐☐ If additional dilutions are desired, or if the expected changes to T_{ave} or Boron concentration are NOT achieved, Then REPEAT Steps 6.5.1 through 6.5.20.

6.0 INSTRUCTIONS

NOTE

Steps in this procedure may be performed out of sequence provided:

- All applicable conditions necessary to perform the step are satisfied and,
- The performance of the out of sequence steps do not change an operational mode and
- Permission is granted from SM/US

6.1 Power Level Escalations

NOTE

CEAs should be above the Long-term Steady State Insertion Limit (102 inches withdrawn on Group 5) before reaching 20% core power and at a position to begin controlling ASI at the ESI between 20% and 50% power. Refer to NOP-100.02, Axial Shape Index Control, for further guidance.

1. As Main Generator loading commences, MAINTAIN T-avg at T-ref by:

   A. CEA withdrawal in Manual Sequential.

   AND / OR

   B. Boron concentration changes in accordance with 2-NOP-02.24, Boron Concentration Control.

NOTE

Contact Reactor Engineering if further assistance is required when using Appendix B.

2. At or above 50% power (or 30% if a shape annealing factor test is performed), refer to Appendix B for power escalation rates.

3. At or above 50% power:

   A. All planned reactivity additions should be made by boration or dilution in accordance with 2-NOP-02.24, Boron Concentration Control.

   B. USE CEAs for ASI control, CONSIDER the reactivity effect of CEAs when adjusting ASI.

   C. REFER to NOP-100.02, Axial Shape Index Control, for specific instructions regarding ASI control during power escalations.

/R11

Op Test No.: 1	Scenario # 2	Event # 2	Page 4 of 16
Event Description:	CEDM Fan 21A sheared shaft		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: As soon as turnover is complete, trigger CEDM 21A sheared shaft.		
Control Room Indications Available: HVE-21A AMP meter (AM-507) indicating low. **Annunciator X-8 CEDM Fan Flow / Low. Five minutes later X-2, CEDM Air Cooler Temp. Hi.**		
	BOP	Recognize annunciator X-8 and identifies no CEDM cooling fans are running. (low amps on HVE-21B)
		Recognize TR-25-3 PT07 increasing temperature
		Places HVE-21A to STOP
		Start HVE-21B when directed. (Note: procedure requires a 10 minute delay to start backup fan after stopping running fan) Step 4.2.2.1, 2-AOP-25.01, Loss of RCB Cooling Fans (attached page 7) If not started within 45 minutes of loss of HVE-21A, a Reactor trip must be manually initiated.

INSTRUCTIONS	CONTINGENCY ACTIONS

4.2.2 Loss of CEDM Cooling Fan

CAUTION

- At least one CEDM Cooling Fan must be operating to maintain the reactor vessel support structure within its design basis. Operator action is required within 45 minutes to restore a CEDM Cooling Fan OR initiate reactor trip and cooldown to at least Hot Shutdown. The total time allowed from the loss of a CEDM Cooling Fan to Hot Shutdown is 5 hours. (Section 6.2 Commitment 1, Section 6.2 Commitment 2)
- To ensure motor is **NOT** started while rotating in reverse, a time delay of approximately 10 minutes shall be observed before starting a CEDM Cooling Fan to limit starting current.

☐ **1.** WHEN 10 minutes from time of CEDM Cooling Fan trip has elapsed,
THEN **START** standby CEDM Cooling Fan.

- HVE-21A
- HVE-21B

1.1 **PERFORM** Attachment 1, CEDM Cooling Fan Local Breaker Operations.

1.2 **PERFORM** one start attempt of any available CEDM Cooling Fan.

1.3 IF **NO** CEDM Cooling Fan is running,
THEN **PERFORM** the following:

A. **IMPLEMENT** 2-AOP-22.01, Rapid Downpower.

B. **NOTIFY** EM.

1.4 IF **NO** CEDM Cooling Fan is running at 45 minutes from fan trip,
THEN **PERFORM** the following (Section 6.2 Commitment 1, Section 6.2 Commitment 2):

A. **TRIP** reactor.

B. **IMPLEMENT** 2-EOP-01, Standard Post Trip Actions.

Op Test No.: 1	Scenario # 2	Event # 3	Page 5 of 16
Event Description:	Letdown flow controller HIC-1110 goes to maximum flow		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger HIC-1110 maximum flow		
Control Room Indications Available: Annunciator M-5 Letdown Press High/Low **Letdown flow indicates full scale high**		
	RO	Recognize and communicate letdown flow >128 gpm and HIC-1110 controller output to full scale high. Perform step 4.2.6.1.A.1 through A.3 of 2-AOP-02.03, Charging and Letdown, to control letdown (attached page 9) NOTE: due to the nature of this failure, previewing manual (step A.1.1 in procedure) will show the same output as automatic. Matching manual to auto cannot be accomplished.

INSTRUCTIONS	CONTINGENCY ACTIONS
4.2.6 Letdown Level Control Malfunction	
☐ **1.** IF letdown level control is malfunctioning, THEN **PERFORM** the following:	
A. **VERIFY** the output of HIC-1110, LEVEL, (Letdown Level Controller) is responding as expected to current plant conditions.	**A.1** **PLACE** HIC-1110, LEVEL, (Letdown Level Controller) in MANUAL by performing the following: **1.** **BALANCE** HIC-1110 MANUAL to AUTO controller output signals by previewing and using the MANUAL control knob to match the manual and auto controller output signals. **2.** **PLACE** HIC-1110 in MANUAL. **3.** **ADJUST** letdown flow to a value consistent with the current plant conditions. **4.** **PERFORM** a system walkdown observing for leaks or lifting relief valves.
B. **VERIFY** the selected level control valve is responding as expected to HIC-1110 output.	**B.1** **PLACE** the alternate level control valve in service per 2-NOP-02.02, Charging and Letdown.

Op Test No.: 1 Scenario # 2 Event # 4 Page 6 of 16

Event Description: 2B Intake cooling water pump motor bearing failure

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger 2B ICW pp motor failure when directed. **Trigger align 2C ICW to 2B header when called from Control room.** **Call as NPO five minutes after notified to align 2C to 2B header, 2C ICW pump is ready to start. Three minutes after pump has started, inform the control room 2C ICW pump discharge valve is fully opened.**		
Control Room Indications Available: Increasing amps on AM-833. When pumps trips annunciator E-30 ICW Headers Press low		
	BOP	Recognize increasing amps on 2B ICW pump. Recommends tripping pump prior to overcurrent trip.
		Perform section 4.2.2 contingency actions 1.1 and 1.2.B of 2-AOP-21.03B 2B Intake Cooling Water System Header (attached page 11) as directed
		Monitor Main Generator cold gas temperatures. Step 6 of Attachment 1.
		Performs Attachment 1 section 2.0 (attached page 12-14) to align and start 2C ICW pump on the 2B header as directed
	RO	Bypass CVCS Ion Exchanger by placing V2520 to BYPASS when directed. (Attachment 1 step 2.0.5)
Note: crew will probably stop up power at this time until two ICW pumps are in service.		
	BOP	When directed place turbine on hold.
	RO	When directed stop dilution IAW 2-NOP-02.24, Boron Concentration Control, step 6.5.16 through 6.5.20 (attached page 4)
	RO	When 2C ICW pump alignment and venting complete, place CVCS Ion Exchanger V2520 back to Ion Exchanger.

INSTRUCTIONS	CONTINGENCY ACTIONS
4.2.2 2B ICW Pump Ovrld/Trip	
☐ **1.** **VERIFY** 2B ICW pump amps normal.	**1.1** IF 2B ICW pump indicates abnormally high amps, THEN **PERFORM** the following: **A.** **PLACE** 2B ICW pump control switch to PULL TO LOCK position. **B.** **PERFORM** Attachment 1 Section 2.0.
	1.2 IF 2B ICW pump TRIPPED, THEN **PERFORM** the following: **A.** IF health and safety of the public is in jeopardy, THEN **ATTEMPT** <u>one</u> restart only. (Section 6.1.3 Management Directive 1) **B.** IF 2B ICW pump was **NOT** restarted, THEN **PERFORM** Attachment 1 Section 2.0.

ATTACHMENT 1
Start Standby Pump On 2B ICW Header With Header Depressurized
(Page 3 of 5)

2.0 STARTING 2C ICW PUMP FROM STANDBY CONDITION

1. **ENSURE** 2B ICW Pump Control Switch in PULL TO LOCK position.

2. **ENSURE** 2C ICW Pump control switch in PULL TO LOCK position.

3. **ENSURE** 2C ICW Pump aligned to 2B ICW header.

   A. **LOCK CLOSED** SB21165, 2C ICW PUMP X-TIE DISCH TO 'A' TRAIN ISOL. (INTK/9/N-4/W-C)

   B. **LOCK OPEN** SB21211, 2C ICW PUMP X-TIE DISCH TO 'B' TRAIN ISOL. (INTK/9/N-4/W-C)

4. **THROTTLE** 2C ICW PUMP DISCH ISOL, approximately 10 turns OPEN, SB21206. (INTK/18/N-3/W-C)

5. **BYPASS** CVCS Ion Exchangers by placing V2520, ION EXCHANGER BYPASS VALVE, to BYPASS.
   (RTGB-205)

6. **MONITOR** Generator Average Cold Gas temperature.

   - IF Average Cold Gas Temperature rises to 47°C, THEN **REDUCE** MVARS to minimum, but **NOT** less than (unity) 0 MVARS.
     (Section 6.1.3 Management Directive 2)

   - IF Average Cold Gas Temperature rises to 50.7°C, THEN **IMPLEMENT** 2-AOP-22.01, Rapid Downpower to **REDUCE** power as necessary to stabilize main generator cold gas temperature.

7. IF 2C COMPONENT COOLING WATER Pump is **NOT** running, THEN **ENSURE** AB 4.16kv bus ALIGNED to B side.

   A. **ENSURE** 2C COMPONENT COOLING WATER Pump control switch in PULL TO LOCK position.

   B. **OPEN** Bkr 2-20505, 4.16KV BUS TIE 2AB - 2A3. (RTGB-201)

   C. **OPEN** Bkr 2-20208, 4.16KV BUS TIE 2A3 - 2AB. (RTGB-201)

   D. **CLOSE** Bkr 2-20409, 4.16KV BUS TIE 2B3 - 2AB. (RTGB-201)

   E. **CLOSE** Bkr 2-20504, 4.16KV BUS TIE 2AB - 2B3. (RTGB-201)

ATTACHMENT 1
Start Standby Pump On 2B ICW Header With Header Depressurized
(Page 4 of 5)

2.0 STARTING 2C ICW PUMP FROM STANDBY CONDITION (continued)

8. WHEN 2C ICW Pump alignment is complete, THEN **START** 2C ICW Pump.

9. IF 2C ICW pump start was **NOT** successful, THEN **GO TO** Attachment 2, Contingency Action With 2B ICW Header Depressurized.

10. As pressure begins to rise in 2B ICW Header as indicated by PI-21-5C, 2C ICW PUMP DISCH PRESS (INTK/26/N-3/E-B), SLOWLY **OPEN**, SB21206, 2C ICW PUMP DISCH ISOL, until valve is fully OPEN.

11. **LOCK OPEN**, SB21206, 2C ICW PUMP DISCH ISOL.

12. IF 2C COMPONENT COOLING WATER Pump OR 2C ICW Pump are operating and supplying the applicable header, THEN **ENSURE** Tech Spec requirements of Section 3.7.3 and 3.7.4 are satisfied.

NOTE

The following step will require a ladder at CCW platform for access to HX vent valves and a pipe wrench to remove vent caps.

13. **VENT** 2B ICW Header until a steady stream of water issues by opening and closing each of the following valves individually:

   A. SH21337, SS-21-1B VENT (CCW/28/N-E/W-4)

   B. SH212050, SS-21-1B BACKWASH OUTLET VENT (CCW/31/N-E/W-4)

   C. SH21244, 2B CCW HX TUBE SIDE INLET HEAD VENT (CCW/32/S-D/W-4)

   D. SH21245, 2B CCW HX ICW OUTLET VENT (CCW/38/N-E/W-2)

   E. SH21363, SS-21-4B VENT (GB/26/S-21/W-G)

   F. SH21218, 2B TCW HX TUBE SIDE OUTLET HEAD VENT (TGB/26/N-22/E-K)

   G. SH21219, 2B TCW HX TUBE SIDE INLET HEAD VENT (TGB/26/N-22/W-D)

ATTACHMENT 1
Start Standby Pump On 2B ICW Header With Header Depressurized
(Page 5 of 5)

2.0 STARTING 2C ICW PUMP FROM STANDBY CONDITION (continued)

14. **ENSURE** SH40077, 2C ICW HYPO HDR ACID RETURN ISOL, OPEN (INTK/17/N-3/E-C).

15. **ENSURE** SH40078, 2B ICW HYPO HDR ACID RETURN ISOL, CLOSED (INTK/18/S-3/E-C).

Op Test No.: 1	Scenario # 2	Event # 5	Page 7 of 16
Event Description:	2B SG tube leak 10 GPM		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger 2B SGTL, when directed		
Control Room Indications Available: Five minutes after trigger, SJAE radiation alarm on PC-11.		
NOTE: due to letdown flow control in manual, Charging and letdown mismatch will not be evident until letdown is manually reduced due to SG tube leakage.		
	RO	Recognize Pressurizer level lowering. Carry out actions as directed by SRO IAW 2-AOP-08.02, Steam Generator Tube Leak' (attached page 17-24)
		When recognized SGTL >75 GPD, commence a rapid down power at 10 MW/min per 2-AOP-22.01, Rapid Downpower, to attain the following: (attached page 25-28) · Power equal to or less than 50% in 1 hour · Mode 3 within next 2 hours
		Manually control letdown to maintain Pressurizer level. When letdown controlled to maintain Pressurizer level, estimate leak rate of approximately 10 gpm.
	BOP	Acknowledge and communicate PC-11 SJAE radiation alarm. Carry out actions as directed by SRO IAW 2-AOP-08.02, Steam Generator Tube Leak' (attached page 17-24)
		Recognize SG blowdown radiation trending up.
		Program DEH for rapid downpower IAW 2-AOP-22.01, Rapid Downpower. When T_{ave} lowering depress 'GO' on DEH.

Op Test No.: 1	Scenario # 2	Event # 5	Page 8 of 16
Event Description:	2B SG tube leak 10 GPM		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	When directed commence Turbine downpower at 10 MW/min
		When directed, notify field operator to verify: • SGBTF truck bay door closed • HVS- 10A or B running • HVE-41A or B running • SGBD Ventilation Process monitor in service

INSTRUCTIONS	CONTINGENCY ACTIONS
4.0 OPERATOR ACTIONS	
4.1 Immediate Operator Actions	
None	
4.2 Subsequent Operator Actions	
4.2.1 General Actions	
[*] 1. **VERIFY** pressurizer level stable or rising and pressure normal.	**1.1** **OPERATE** charging pumps per Attachment 7, Charging Pump Guidance, as required to stabilize or raise pressurizer level.
	1.2 IF pressurizer heaters are **NOT** operating automatically, THEN manually **OPERATE** pressurizer heaters to maintain pressure at 2250 psia (2225 to 2275 psia) or as directed by US.
	1.3 IF all available charging pumps are running AND pressurizer level is still dropping, THEN **ISOLATE** letdown as follows:
	A. **CLOSE** V2516, CONTAINMENT ISOL VALVE - IC.
	B. **CLOSE** V2522, CONTAINMENT ISOL VALVE - OC.
	C. **CLOSE** V2515, STOP VALVE - IC.

INSTRUCTIONS

CONTINGENCY ACTIONS

4.2.1 General Actions (continued)

1. (continued)

1.4 IF the following conditions are met,

- All available charging pumps are running
- Letdown is isolated
- Pressurizer level is lowering

THEN **PERFORM** one of the following:

A. IF in Mode 1 or 2,
THEN **TRIP** reactor and **GO TO** 2-EOP-01, Standard Post Trip Actions.

B. IF in Mode 3, SIAS NOT blocked
THEN **GO TO** 2-EOP-04, Steam Generator Tube Rupture.

C. IF in Mode 3, SIAS blocked,
THEN **IMPLEMENT** Low Mode AOP for current plant conditions.

INSTRUCTIONS	CONTINGENCY ACTIONS

4.2.1 General Actions (continued)

NOTE

A full isotopic analysis of steam generator water activity could take up to an hour. If an expeditious indication of gross activity is required, a frisk in the Secondary Lab or a quick count gamma analysis in the Hot Lab will yield the necessary information to determine the gross magnitude and source of leak.

[*]	2.	**NOTIFY** Chemistry of probable S/G tube leakage and to begin sampling for activity.		
[*]	3.	**REQUEST** Radiation Protection conduct secondary area radiation surveys.		
[*]	4.	IF Air Ejector or Steam Generator Blowdown monitor is **NOT** spiking, THEN **ESTIMATE** leakage by comparing Air Ejector Monitor or Steam Generator Blowdown Monitor reading with Daily Chemistry Report.	4.1	IF Air Ejector or Steam Generator Blowdown monitor is spiking, THEN **USE** the maximum monitor readings and **ANNOTATE** estimated leakage as "spiking".
			4.2	**REFER TO** Attachment 1, General Information for discussion of spiking characteristics.
[*]	5.	IF unable to estimate primary to secondary leakage or the radiation monitors are out of service, THEN **ESTIMATE** leak rate from Chemistry sample.		

INSTRUCTIONS **CONTINGENCY ACTIONS**

4.2.1 General Actions (continued)

NOTE

A prompt determination of the leak rate takes precedence over fulfilling the 2-hour time requirement of 2-OSP-01.03, Reactor Coolant System Inventory Balance.

[*] 6. **DETERMINE** primary to secondary leak rate by one of the following methods:

- Charging / letdown mismatch
- 2-OSP-01.03, Reactor Coolant System Inventory Balance

NOTE

A time delay may exist between an increase in SJAE Monitor reading and Steam Generator Blowdown Monitor readings.

[*] 7. IF sample flow is available to the radiation monitors, THEN **LOG** Air Ejector monitor or Steam Generator Blowdown Radiation Monitor readings every 15 minutes on Attachment 6, Steam Jet Air Ejector/Steam Generator Blowdown Monitoring.

INSTRUCTIONS **CONTINGENCY ACTIONS**

4.2.1 General Actions (continued)

NOTE

- Quick diagnosis of a tube leak and subsequent rapid isolation of the affected S/G will minimize secondary contamination and radiation exposure. (Section 6.1.3 Management Directive 1)
- All available radiation monitors should be monitored to confirm and quantify leakage. (Section 6.1.3 Management Directive 1)
- Prior to confirmation of a tube leak, planning and preparation for unit shutdown and mitigating the affects should commence by performing notifications, procedure reviews, crew briefings, and ensuring resources are available to support unit conditions. (Section 6.1.3 Management Directive 1)

[*] **8.** **CONFIRM** S/G tube leakage using any of the following:

- Plant response (pressurizer level dropping, letdown lowering, lower Feedwater flow to affected S/G, etc.)
- Secondary radiation monitors rising
- High activity or rising trends on any of the following radiation monitors:
  - S/G liquid sample
  - Main steam line
  - S/G blowdown
- Chemistry analysis
- Rising S/G water level

8.1 IF radiation monitor is determined to be failed AND **NO** S/G tube leakage exists,
THEN **PERFORM** the following:

A. **NOTIFY** RP.

B. **NOTIFY** Chemistry.

C. **EXIT** this procedure.

INSTRUCTIONS	CONTINGENCY ACTIONS
4.2.1 General Actions (continued)	
[*] **9.** IF at any time S/G blowdown sample flow isolates on high radiation, THEN **PERFORM** the following as necessary to support S/G sampling by Chemistry: • **PLACE** FCV-23-7, 9, SAMPLE, in CLOSE / OVRD • **OPEN** FCV-23-7, 9, SAMPLE	
[ ] **10.** **DISPATCH** a field operator to the SGBTF to perform the following:	
A. **VERIFY** SGBTF Truck Bay (roll-up) door is CLOSED.	**A.1** **CLOSE** SGBTF Truck Bay (roll up) door.
B. **VERIFY** the following SGBTF ventilation systems are in operation: • Supply Fans HVS 10A or HVS-10B • Exhaust Fans HVE 41A or HVE-41B • SGBTF Ventilation Process Monitor	**B.1** **PLACE** SGBTF ventilation systems in service per NOP-25.01, SGBTF Ventilation System.

INSTRUCTIONS		CONTINGENCY ACTIONS
4.2.1	**General Actions (continued)**	
☐	**11.** **EVALUATE** isolating blowdown and vacuum drag on Unit 1.	
☐	**12.** **VERIFY** steam generator blowdown aligned to Monitor Storage Tanks.	**12.1** **ALIGN** steam generator blowdown to the Monitor Storage Tanks per 2-NOP-23.02, Steam Generator Blowdown System Operations.

NOTE

- If conditions or steam generator tube leakage change, rediagnosis of shutdown conditions is required to ensure compliance with EPRI guidelines and Technical Specifications.
- Leak rate changes should be evaluated over a minimum of 30 minutes.
- Attachment 1, General Information, provides a basic summary of EPRI Action Levels and recommendations for minimizing the likelihood of tube rupture.

☐ **13.** IF in MODE 1 through 3 and SIAS is **NOT** blocked,
THEN **GO TO** Section 4.2.2.

☐ **14.** IF in MODE 3 through 6 and SIAS is blocked,
THEN **GO TO** Section 4.2.3.

INSTRUCTIONS	CONTINGENCY ACTIONS
4.2.2 Mode 1 through 3 - SIAS Not Blocked	
[*] 1. **VERIFY** leak rate is less than 75 gpd.	1.1 **IMPLEMENT** a rapid downpower at 10 MW/min per 2-AOP-22.01, Rapid Downpower, to attain the following: • Power equal to or less than 50% in 1 hour • Mode 3 within next 2 hours 1.2 **GO TO** Section 4.2.2 Step 6.
[*] 2. IF leak rate is less than 75 gpd and greater than 30 gpd, THEN **PERFORM** the following:	
A. **ENSURE** RMS monitoring is performed at 15 minute intervals.	
B. IF leak rate has been stable for 1 hour or greater, THEN **REDUCE** sampling interval to 2 hours.	

INSTRUCTIONS **CONTINGENCY ACTIONS**

4.0 OPERATOR ACTIONS

NOTE

OPS-530, Pre-Planned Power Change Guidance, delineates operations department policy for the use of pre-planned downpower profiles provided by the Plant Physics Curve Book.

4.1 Immediate Operator Actions

☐ 1. **BEGIN** boration per operator aid.

☐ 2. **PERFORM** the following:

A. **PROGRAM** the turbine DEH for the desired load reduction rate.

B. **SET** DEMAND to desired power level.

☐ 3. **INSERT** the Lead CEA Group approximately 6 inches to initially lower RCS temperature.

INSTRUCTIONS		CONTINGENCY ACTIONS	
4.2	**Subsequent Operator Actions**		
[*]	**1.** WHEN a Tavg lowering is noted, THEN **PRESS** the GO pushbutton on the turbine DEH control panel.	**1.1**	IF in turbine MANUAL, THEN **PRESS** and **RELEASE** the GV LOWER pushbutton as necessary to reduce / control the load reduction rate.
[ ]	**2.** IF reducing power by more than 20%, THEN **NOTIFY** SNPO to secure Zinc Injection per 2-NOP-02.26, Zinc Addition.		
[ ]	**3.** **NOTIFY** plant personnel using Gai-tronics and boost function as follows: "Attention all personnel, Unit 2 has commenced a Rapid Downpower due to _____." (reason)		
[ ]	**4.** **NOTIFY** System of the rapid downpower load reduction.		
[ ]	**5.** **PLACE** Pressurizer on recirculation per Attachment 5, Pressurizer Recirculation Guidelines.		

INSTRUCTIONS	CONTINGENCY ACTIONS

4.2 Subsequent Operator Actions (continued)

☐ **6.** **START** additional charging pump as required per guidance from Attachment 4, Charging Pump Guidance.

NOTE

- 0-NOP-100.02, Axial Shape Index Control, provides additional guidance on ASI Control.
- US may direct temporary operation outside of ASI limit.

☐* **7.** **MAINTAIN** Axial Shape Index ±0.5 of ESI using CEAs.

7.1 IF operation outside ASI limit is unavoidable,
THEN **PERFORM** the following:

A. **NOTIFY** US.

B. **MAINTAIN** ASI within RPS LPD pre-trip limits.

C. **RESTORE** ASI to within limits as soon as practical.

7.2 IF ASI **CANNOT** be maintained within transient band due to the inoperability of CEA(s),
THEN **CONTACT** Reactor Engineering to assist in determining the load reduction rate to minimize effects of operation outside of transient limits.

INSTRUCTIONS	CONTINGENCY ACTIONS

4.2 Subsequent Operator Actions (continued)

[*]	**8.** **MAINTAIN** T_{ref} and T_{avg} within 6.6°F.	**8.1** **VERIFY** boration flow path to RCS. **8.2** **ESTABLISH** T_{ref} and T_{avg} within 6.6 °F using any of the following: • RCS Boration Rate • CEA Position • Turbine Load **8.3** IF T_{ref} and T_{avg} can NOT be maintained within 6.6 °F, THEN **NOTIFY** US AND: **A.** **TRIP** reactor. **B.** **GO TO** 2-EOP-01, Standard Post Trip Actions.
	9. **VERIFY** boration lineup per Attachment 1, RCS Boration Guidance	

Op Test No.: 1 Scenario # 2 Event # 6 Page 9 of 16

Event Description: SGTR 200 gpm

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger SGTR 2B SG		
Control Room Indications Available: Pressurizer pressure and level lowering.		
	RO	Recognize rapidly lowering Pressurizer level. Recommend isolating Letdown and starting third charging pump.
	BOP	Identifies increasing trends on SJAE, Main Steam monitors and SG Blowdown monitors.
	RO / BOP	Trip the Reactor when directed and carry out 2-EOP-01, Standard Post Trip Actions.

Op Test No.: 1	Scenario # 2	Event # 6	Page 10 of 16
Event Description: SGTR 200 gpm			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Manually trips reactor prior to auto trip. Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
NOTE: due to the size of the SGTR, SIAS will not be received until the crew is in EOP-04		
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify all CEAs are fully inserted.
		Inventory Control • Verify Pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%.
		Pressure Control • Verifies RCS pressure is between 1800-2300 psia. • Verifies RCS pressure is trending 2225-2275 psia. • Verifies RCS subcooling is ≥20°F.
		Core Heat Removal • Verifies at least one RCP running with CCW. (if >10 minutes with no CCW must secure) • Verifies loop delta T is <10°F.

Op Test No.: 1 Scenario # 2 Event # 6 Page 11 of 16

Event Description: SGTR 200 gpm

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Verifies turbine trip on reactor trip. Performs EOP-01 Safety functions as directed for: Vital Auxiliaries, RCS Heat Removal, Containment Conditions.
		Closes MSR reheat Block valves
		Notifies NPO to perform Appendix X section 1 of EOP-99. (outside CR actions) Notify SNPO to check SFP inventory and temperature.
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed. • Verifies GEN Brk open (East breaker, Mid Breaker and Exciter Breaker.) • Verifies all vital and non vital AC Buses energized. • Verifies all vital and non vital DC Buses energized.
		RCS Heat Removal • Verify at least one SG has BOTH: SG Level 20-83% NR Feedwater available, level being restored to 60-70% NR • Verify RCS Tavg is between 525 and 535° F • SG pressure between 850-930 psia via SBCS

Op Test No.: 1	Scenario # 2	Event # 6	Page 12 of 16
Event Description: SGTR 200 gpm			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Containment Conditions • Verifies Containment pressure <2 psig. • Verifies NO Containment radiation monitors in alarm. • Verifies Containment temperature is less than 120°F. • Verifies NO secondary plant radiation alarms. (secondary radiation increasing)
SRO should exit 2-EOP-01, Standard Post Trip Actions to 2-EOP-04, Steam Generator Tube rupture. STA should perform Safety Function Status Check Sheets for 2-EOP-04		

Op Test No.: 1	Scenario # 2	Event # 7,8,9	Page 13 of 16
Event Description:	2B MSIV fails to close, Aux. Spray SE-02-3 fails to close, Cooldown and Isolate the 2B SG		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	When directed perform 2-EOP-99 Appendix A, sampling SG's (attached page 34,35)
	RO **Critical Task**	On SIAS, when CCW has isolated to the RCP's stop ALL RCP's within 10 minutes.
	BOP	On SIAS, verify available HPSI, LPSI pumps start and associated ECCS injection valves open.
	BOP / RO	Place all four CCW valves to/from RCP's to CLOSE when CCW lost for greater than 30 minutes.
	BOP / RO	Place two RCP bleedoff valves to close when CCW lost to RCP's for greater than 30 minutes.
	RO	When directed, cooldown the RCS to a T_{HOT} less than 510°F using SBCS. **NOTE**: the RO should place SBCS 8801 to full 100% open unit T_{HOT} less than 510°F then throttle closed 8801 to obtain a 30°F cooldown in any one hour period. This is the limit if no RCP's are operating.
	RO	When directed depressurize (using Aux. Spray) the RCS to: • Within the limits of Fig. 1A • Less than 930 psia • Approximately equal (within 50 psia) to the 2B SG.
NOTE: Aux. spray is ineffective with the Charging loop isolation valves open. When using Aux. spray, both Charging loop isolation valves should be closed.		
	RO	Recognize Aux. Spray valve SE-02-3 failed to close when switch taken to close. Communicate to SRO and re-open Charging loop isolation valves to control de-pressurization.

APPENDIX A
SAMPLING STEAM GENERATORS
(Page 1 of 2)

A Train (√) B Train (√)

☐ **1.** If a LOOP has occurred,
Then PERFORM **BOTH** of the following:

☐ **A.** ENSURE 2AB 480V Load Center is aligned to an energized bus.

☐ **B.** DISPATCH an operator to restore Instrument Air. **REFER TO** Appendix H, Operation of the 2A and 2B Instrument Air Compressors.

CAUTION
If a **VALID** SIAS occurs, the CCW 'N' header shall **NOT** be aligned to **ANY** essential header. This will maintain train separation while safeguards signals are still present.

NOTE
- HCV-14-9 (HCV-14-10) will open 5 seconds after HCV-14-8A (HCV-14-8B) starts to open
- When SIAS is present, placing the control switches in CLOSE and then OVERRIDE will open the CCW 'N' header valves, until SIAS is reset

☐ **2.** If an **INADVERTENT** SIAS has closed the 'N' Header valves,
Then PERFORM the following:

☐ **A** RESTORE flow from **EITHER** 'A' or 'B' CCW Header by placing the control switches for the desired train to CLOSE and then to OPEN:

- HCV-14-8A ___
- HCV-14-9 ___

OR

- HCV-14-8B ___
- HCV-14-10 ___

APPENDIX A
SAMPLING STEAM GENERATORS
(Page 2 of 2)

2. (continued)

☐ **B.** If CIAS or high radiation has closed the SGBD Sample Valves, Then OPEN FCV-23-7 and FCV-23-9 by PLACING the control switch to CLOSE / OVERRIDE and then to OPEN.

☐ **3.** If S/Gs can be sampled,
Then:

A. **ENSURE OPEN** FCV-23-7 and FCV-23-9, SGBD Sample Valves.

B. DIRECT Chemistry to perform S/G samples for activity and boron.

☐ **4.** If S/Gs cannot be sampled,
Then DIRECT Health Physics to conduct secondary plant local area radiation surveys.

END OF APPENDIX A

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 5 of 8)

Section 2: CONTROL ROOM ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **1.** ENSURE **ONLY ONE** MFW Pump is RUNNING, with the control switch in RECIRC.	
☐ **2.** ENSURE **ONLY ONE** Condensate Pump is RUNNING.	
☐ **3.** If AFAS has actuated, and use of Main Feedwater is desired, Then PERFORM **ALL** of the following:	
☐ **A.** ENSURE AFAS is RESET.	
☐ **B.** ENSURE **BOTH** S/G [Main FRV] Block valves CLOSED.	
1. MV-09-5	
2. MV-09-6	
☐ **C.** ENSURE **BOTH** Low Power M/A Stations in MANUAL.	
☐ **D.** For **EACH** MFW header to be placed in service, ENSURE the associated MFIVs are OPEN.	
☐ **E.** DEPRESS **BOTH** pushbuttons to RESET the Low Power Feedwater Valves.	
☐ **F.** ADJUST the Low Power M/A Stations **AS NECESSARY** to control S/G levels.	
☐ **G.** RESTORE AFW to the standby alignment.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 6 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **4.** If AFAS has **NOT** actuated and use of Main Feedwater is desired, Then PERFORM **ALL** of the following:	
☐ **A.** ENSURE **BOTH** S/G [Main FRV] Block valves CLOSED.	
☐ **B.** For **EACH** MFW header to be placed in service, ENSURE the associated MFIVs are OPEN.	
☐ **C.** ENSURE **BOTH** Low Power M/A Stations in MANUAL.	
☐ **D.** DEPRESS **BOTH** pushbuttons to RESET the Low Power Feedwater Valves.	
☐ **E.** ADJUST the Low Power M/A Stations **AS NECESSARY** to control S/G levels.	
☐ **5.** ENSURE **BOTH** Heater Drain Pumps are STOPPED.	
☐ **6.** ENSURE **BOTH** of the following:	
☐ **A.** Bearing Oil Pump and Seal Oil Backup Pump RUNNING.	☐ **A.1** ENSURE Emergency Bearing Oil Pump RUNNING.
☐ **B.** When the turbine reaches 600 rpm, Then Bearing Oil Lift Pump RUNNING.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 7 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **7.** ENSURE the Turbine Drain Valves are OPEN.	
☐ **8.** ENSURE **ONLY ONE** Turbine Cooling Water Pump is RUNNING.	
☐ **9.** VERIFY Turbine Generator Bearing Oil temperature between 110 to 120°F.	☐ **9.1** DIRECT a field operator to adjust TCW to the in-service TLO Cooler to maintain outlet Oil temperature between 110 to 120°F.
☐ **10.** When Turbine speed reaches ZERO rpm, Then VERIFY the turning gear automatically ENGAGES.	☐ **10.1** PERFORM **ALL** of the following: ☐ **A.** PLACE Turning Gear in MANUAL. ☐ **B.** VERIFY the Turning Gear Permissive Light is ON. ☐ **C.** Locally ENSURE the Turning Gear is ENGAGED. ☐ **D.** Locally START the Turning Gear.
☐ **11.** If Reactor power history is low, Then CONSIDER reducing steam generator blowdown flow to maintain RCS temperature.	

APPENDIX X
SECONDARY POST TRIP ACTIONS
(Page 8 of 8)

Section 2: CONTROL ROOM ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **12. Place Boron Dilution Alarm System in Operation.** When indicated Reactor power is less than 10^{-5}%, Then PERFORM **BOTH** of the following: ☐ **A.** ENERGIZE **BOTH** channels of Startup Nuclear Instrumentation to place the Boron Dilution Alarm System in operation. ☐ **B.** VERIFY **BOTH** Boron Dilution Alarm System Channels are operating.	☐ **12.1** If **BOTH** Boron Dilution Alarm System channels are NOT operating, Then PERFORM applicable actions of 2-AOP-02.01, Boron Concentration Control System (BCCS) Abnormal Operations.

NOTE
Excessive moisture can build up in CEDMC's room, and impact equipment reliability if 15 KW heaters are not energized after plant shutdown.

☐ **13.** NOTIFY SNPO to energize 15 KW heater located in the CEDMC's room to minimize humidity build-up per 2-NOP-25.10, CEDMCS Air Conditioning System Operation.

☐ **14.** CONSIDER contacting the Division Load Dispatcher for a switching order to OPEN the Main Generator disconnects.

END OF APPENDIX X

Op Test No.: 1	Scenario # 2	Event # 7,8,9	Page 14 of 16
Event Description:	2B MSIV fails to close, Aux. Spray SE-02-3 fails to close, Cooldown and Isolate the 2B SG		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	When directed perform Appendix X, section 2 (attached page 36-39)
	BOP	When directed (T_{HOT} less than 510°F) isolate the 2B SG per 2-EOP-99 Appendix R (attached page 41-43)
	BOP **Critical Task**	Recognize and communicate to SRO, the 2B MSIV, HCV-08-1B, failed to close from the Control Room. Recommend to SRO perform EOP-99 Appendix I to locally close HCV-08-1B.
	RO	When 2B SG isolated, cooldown to obtain a 30°F cooldown in any one hour period and depressurization to: • Within the limits of Fig. 1A • Less than 930 psia • Approximately equal (within 50 psia) to the 2B SG.
Suggested termination point; • 2B SG isolated including local closure of 2B MSIV, HCV-08-1B. • Cooldown and depressurization controlled to the above limits.		

APPENDIX R
STEAM GENERATOR ISOLATION
(Page 4 of 6)

Section 2: 2B Steam Generator Isolation

CAUTION
If S/G isolation is due to a SGTR the secondary plant may have higher than normal radiation levels. Contact Health Physics for area accessibility instructions.

☐ **1.** ENSURE HCV-08-1B, Main Steam Header 'B' Isolation Valve (MSIV), is CLOSED.

☐ **2.** If HCV-08-1B did not close remotely,
Then PERFORM local closure.
REFER TO Appendix I, MSIV Local Closure.

☐ **3.** ENSURE MV-08-1B, MSIV Header 'B' Bypass Valve, is CLOSED.

NOTE
Instrument air must be available to close MFIVs using RTGB control switch. If instrument air is NOT available when MFIV closure is required, then manual initiation of MSIS should be considered.

☐ **4.** ENSURE HCV-09-2A, Main Feedwater Header 'B' Isolation Valve, is CLOSED.

☐ **5.** ENSURE HCV-09-2B, Main Feedwater Header 'B' Isolation Valve, is CLOSED.

☐ **6.** If **BOTH** HCV-09-2A and HCV-09-2B, Main Feedwater Isolation Valves to S/G 2B, are NOT CLOSED or suspected of leaking,
Then PERFORM **ANY** of the following **AS NECESSARY**:

- ☐ **A.** ENSURE **ALL** of the following valves are CLOSED:
  - ☐ MV-09-6, Stm Gen 2B Reg Block Valve
  - ☐ LCV-9006, 2B 15% Bypass
  - ☐ MV-09-4, 2B 100% Bypass
- ☐ **B.** STOP **BOTH** Main Feedwater Pumps.

☐ **7.** ENSURE FCV-23-5, 2B SG Blowdown, is CLOSED.

APPENDIX R
STEAM GENERATOR ISOLATION
(Page 5 of 6)

Section 2: 2B Steam Generator Isolation (continued)

☐ **8.** ENSURE FCV-23-6, 2B SG Blowdown, is CLOSED.

☐ **9.** ENSURE MV-08-19B, 2B S/G Atmos Dump Vlv, is CLOSED.

☐ **10.** CLOSE MV-08-17, 2B S/G ADV Isol.

☐ **11.** PLACE the control switch for auxiliary feed, Pump 2B, in STOP.

☐ **12.** ENSURE MV-09-10, Pump 2B Disch to SG 2B Valve, is CLOSED.

☐ **13.** ENSURE MV-09-12, Pump 2C to SG 2B, is CLOSED.

☐ **14.** PLACE MV-08-12, SG 2B Stm to AFW PP 2C, in CLOSE.

☐ **15.** ENSURE MV-08-18B, 2B S/G Atmos Dump Vlv, is CLOSED.

☐ **16.** CLOSE MV-08-16, 2B S/G ADV Isol.

☐ **17.** PERFORM the following LOCAL operations:

- ☐ **A.** UNLOCK and CLOSE V09158, 2C AFW Pump to 2B S/G Isolation.
- ☐ **B.** UNLOCK and CLOSE V09136, 2B AFW Pump to 2B S/G Isolation.
- ☐ **C.** CLOSE SE-08-1, Main Steam to 2C AFW Pump Warm-up Valve Solenoid.
- ☐ **D.** If SE-08-1, Main Steam to 2C AFW Pump Warm-up Valve Solenoid is NOT CLOSED or suspected of leaking,
  Then CLOSE V08883, SE-08-1 Inlet Isolation.

(continued on next page)

APPENDIX R
STEAM GENERATOR ISOLATION
(Page 6 of 6)

Section 2: 2B Steam Generator Isolation (continued)

17.(continued)

☐ **E.** If MV-08-12, S/G 2B Steam to AFW Pump 2C, is NOT CLOSED or suspected of leaking,
Then PERFORM **ANY** of the following **AS NECESSARY**:

☐ **1.** Locally CLOSE MV-08-12 using the handwheel.

☐ **2.** ISOLATE steam to 2C AFW Pump as follows:

☐ **a.** CLOSE MV-08-3, 2C Pump.

☐ **b.** Locally CLOSE the following valves:

☐ V08622, CB #67 Drain

☐ V08618, Drain off MV-08-3 Isol

☐ V08619, Drain off MV-08-3 Isol

End of Section 2

END OF APPENDIX R

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0** **Unit 2 Unidentified RCS Leakage:** 0.012

Unit 2 Scheduled Activities per the OSP: Raise power to 100%

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement: 2A HPSI Pump

OPS 513's:

Locked in Annunciators:

Current Status: Unit was down powered to remove the 2A Main feedwater pump to repair a motor oil leak. Repairs have been made and both Main Feedwater pumps and Heater Drain Pumps are running. 2A High Pressure safety injection pump is out of service to repair a motor oil leak, Taken out of service 12 hours ago. 2-GOP-201 is complete up to step 6.136. Step 6.136 step 4, Nuclear Delta T Power Calibration is NOT required. Step 5 and 6 are N/A.

Equipment Problems:

2A HPSI pump oil leak. Taken out of service 12 hours ago.

Applicable Procedures

- 2-GOP-201, 'Reactor Plant Start-up Mode 2 to Mode 1'
- 2-GOP-101, 'Reactor Operating Guidelines During Steady State and Scheduled Load Changes'
- 2-NOP-02.24, 'Boron Concentration Control'
- 2-AOP-25.01, 'Loss of RCB Cooling Fans'
- 2-AOP-02.03, 'Charging and Letdown'
- 2-AOP-21.03B, '2B Intake Cooling Water System Header'
- 2-AOP-08.02, 'Steam Generator Tube Leak'
- 2-AOP-22.01, 'Rapid Downpower'
- 2-EOP-01, 'Standard Post Trip Actions'
- 2-EOP-04, 'Steam Generator Tube Rupture'