

Facility:	HB ROBINSON		Scenario No.:	1	Op Test No.:	ILC-13
Examiners:	_____		Operators:	CRS -	_____	
	_____			RO -	_____	
	_____			BOP -	_____	
Initial Conditions:	<ul style="list-style-type: none"> • 100% MOL, 9000 MWD/MTU, 848 PPM Boron. • CCW Pump "C" is OOS and breaker is racked out • HVH-4, CV Recirc Fan, is OOS and breaker is racked out • Thunderstorms in the area. High Heat Load has resulted in all planned maintenance being deferred to a later date. 					
Turnover:	<ul style="list-style-type: none"> • Maintain power at current level. 					
Critical Task:	<ul style="list-style-type: none"> • Secure All RCPs due to EOP-E-0 Foldout Criteria. • Start "A" Safety Injection Pump to provide adequate core cooling. • Start "A" CV Spray Pump due to abnormal CV Conditions with reduced CV Spray and Cooling capability. 					
Event No.	Malf. No.	Event Type*	Event Description			
1		(C) BOP, CRS	"A" Circulating Water Pump Trips and Discharge Valve (V6-50A) fails to Auto-Close.			
2		(C) RO, CRS (TS) CRS	PCV-455B fails OPEN while in AUTO			
3		(C) BOP, CRS (TS) CRS	"B" SWBP Trips			
4		(R) RO, CRS (N) BOP, CRS (TS) CRS	Dropped Control Rod resulting in Load Reduction			
5		(I) RO, CRS (TS) CRS	LT-460 Reference Leg / PT-456 Sensing Line Failure			
6		(C) RO, CRS	Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)			
7		(M) ALL	Large Break LOCA on Reactor Trip			
8		BOP	CR HVAC fails to Auto Actuate on SI			
9		RO	"A" SI Pump and "A" RHR Pump fail to Auto-Start on SI			
10		RO	"A" CV Spray Pump fails to Auto-Start and "B" CV Spray Pump Trips			
11		RO	"B" RHR Pump Trips 10 sec. after starting "A" RHR Pump			
12		RO	"A" RHR Pump Trips after entering EOP-E-1			
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor						

ILC-13 NRC SCENARIO 1 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 100% RTP. Maintenance is currently in progress on Component Cooling Water Pump C for pump mechanical seal replacement. HVH-4 is Out of Service due to Excessive Motor Vibrations. Repairs on HVH-4 are on hold awaiting parts. The crew has been directed to maintain current plant conditions. Thunderstorms in the area. High Heat Load has resulting in no planned maintenance being performed.

On cue from the Chief Examiner, "A" CW pump will trip on overcurrent and discharge valve V6-50A will fail to close automatically. The crew will take immediate actions IAW AOP-012, Partial Loss of Condenser Vacuum or Circulating Water Pump Trip. The operator will take manual action to close V6-50A from the RTGB. Condenser Vacuum will be minimally affected by the loss of "A" CW Pump. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, PZR Spray valve PCV-455B will fail open due to a failure of the controller AUTO function and result in an entry into AOP-019, Malfunction of RCS Pressure Control. Immediate actions will be taken to stabilize RCS pressure. Actions in AOP-019 will direct the crew to take manual control of the PZR Spray Valve and close the valve. The Operator will be able to close the valve; however, PC-455B will remain in MANUAL for the remainder of the scenario. Depending on the timeliness of operator actions, ITS 3.4.1, Condition A, One or more RCS DNB parameters not within limits – Restore RCS DNB parameters to within limit within 2 hours, will be entered due to PZR Pressure being reduced to less than 2205 psig. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, Service Water Booster Pump B will trip on overcurrent. APP-002-A8, B8, C8 and D8 will be received when the pump trips and will direct the crew to start the standby SWBP from the RTGB and restore normal flow to the CV HVH units. ITS 3.7.7, Condition A, one Service Water System (SWS) train inoperable – Restore SWS train to operable status within 72 hours, will be entered for the SWBP failure and ITS 3.6.6, Condition D, Two Containment Cooling Trains inoperable – Restore one containment cooling train to operable status within 72 hours, will be entered due to the failure to meet SR 3.6.6.3 (Verify cooling water flow rate to each cooling unit is ≥ 750 gpm) for the CV HVH units. Once the Chief Examiner is satisfied with the Tech Spec compliance, he can cue the next event.

On cue from the Chief Examiner, Control Rod H-10 will drop into the core. The crew will take immediate actions IAW AOP-001, Malfunction of Reactor Control System. Additionally AOP-001 will have the crew verify that only one control rod dropped and transition to Section A of AOP-001. The crew will then take action to reduce reactor and turbine power to less than or equal to 70% within 2 hours using rods and boration to maintain T_{avg} with $\pm 1.5^{\circ}\text{F}$ of T_{ref} . SRO will determine that ITS 3.1.4 Condition B must be entered. ITS 3.1.4 Condition B requires that the rod be restored to within alignment limits within 1 hour OR verify SDM is within limits provided in the COLR within 1 hour AND reduce thermal power to less than $\leq 70\%$ RTP AND verify SDM is within the limits provided in the COLR once per 12 hours AND perform SR 3.2.1.1 AND SR 3.2.2.1 within 72 hours AND re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions within 5 days. If above requirements cannot be achieved then ITS 3.1.4 Condition C will require that the plant be placed in Mode 3 in 6 hours. Due to the rapid reduction of T_{ave} , ITS 3.4.1, Condition A, One or more RCS DNB parameters not within limits – Restore RCS DNB parameters to within limit within 2 hours, will

be entered due to PZR Pressure being reduced to less than 2205 psig. Once the Chief Examiner is satisfied with the crew's actions to perform a controlled reduction in power and demonstrate Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, a leak will develop on PZR instrument tubing inside containment that will result in LT-460 Reference Leg Failure. PT-456 will also be impacted and will actuate OTΔT Bistables and alarms due to a reduction in pressure to approximately 2080 psig as sensed by PT-456. The crew may take actions IAW AOP-025, RTGB Instrument Failure, to address LT-460 failed high; however, this is not necessary since LT-460 is not the controlling channel. OWP-030, PLT-2 and/or AOP-025 will direct the crew to replace LT-460 with LT-461 as a controlling channel and remove LT-460 from service. The crew should determine that the failures are related to a common sensing line on the Pressurizer and determine that a leak has developed and perform the actions of AOP-016, Excessive Primary Plant Leakage and AOP-005, Radiation Monitoring System. Due to the failure of LT-460, ITS Table 3.3.1 Table 3.3.1-1 Item 8 which requires 3 Pressurizer Water Level – High Channel to be operable will not be met and require entry into ITS 3.3.1 Condition M, which requires the channel to be placed in trip with 6 hours OR reduce thermal power to less than P-7 within 12 hours. Due to the failure of PT-456, ITS Table 3.3.1-1, Items 5 and 7 which requires 3 OTΔT Channels and 3 Pressurizer Pressure Channels to be operable will not be met and require entry into ITS 3.3.1 Conditions E and M. Condition E requires that the channel be placed in trip within 6 hours OR be in Mode 3 in 12 hours. Condition M requires that the channel be placed in trip in 6 hours or reduce thermal power to less than P-7 within 13 hours. Also due to the failure of PT-456, ITS Table 3.3.2-1, Items 1.d and 6.a which requires 3 Pressurizer Pressure – Low Safety Injection Channels and 3 Pressurizer Pressure Low ESFAS Interlock Channels to be operable will not be met and require entry into ITS 3.3.2 Conditions D and H. Condition D requires that the channel be placed in trip within 6 hours OR be in Mode 3 in 12 hours and Mode 4 in 18 hours. Condition H requires that the interlock be verified in the required state for existing unit condition within 1 hour OR be in Mode 3 in 7 hours and Mode 4 in 13 hours. Once the Chief Examiner is satisfied with the crew's actions and Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, a seismic event will occur. APP-036-I5, Seismic Monitor, alarm will be received along with a call from the Load Dispatcher reporting seismic events have been noted in the area from the US Geological Department. The crew will take actions IAW AOP-021, Seismic Disturbances. If dispatched, operator(s) will report that the DBE/SSE ALARM on Seismic Monitor "A" and the OBE ALARM on Seismic Monitor "B" are both EXTINGUISHED. TRM 3.17, Seismic Shutdown, requirements are not met and thus entry in TRM 3.17 is not required. The seismic event will cause a RCS leak to develop and degrade to approximately 250 gpm over a 5 ½ minute time period. The crew will enter AOP-016, Excessive Primary Plant Leakage, and take prescribed actions to mitigate the RCS leakage. ITS 3.4.13 RCS Operational Leakage, Condition B, will be entered due to having pressure boundary leakage and require that the plant be placed in Mode 3 in 6 hours and Mode 5 in 36 hours. The crew will ultimately determine that the leak rate is greater than the available charging pump capacity and initiate a reactor trip and safety injection and transition to EOP-E-0, Reactor Trip or Safety Injection.

Immediately upon the initiation of the reactor trip the RCS leak will degrade to a Large Break LOCA. During the performance of EOP-E-0 the crew will determine that both "A" SI Pump and "A" RHR Pump failed to auto-start. The crew will manually start both "A" SI Pump and "A" RHR Pump. Ten seconds after starting "A" RHR Pump the "B" RHR Pump will trip. Additionally, the crew will identify that CR HVAC failed to properly align to Emergency Pressurization Mode and must be manually realigned from the RTGB. When Containment Pressure exceeds 10 psig the "A" CV Spray Pump will fail to Auto-start and the "B" CV Spray Pump will trip 10 seconds after starting. This will ultimately be identified and "A" CV Spray Pump will be manually started from the RTGB.

After completing the required actions of EOP-E-0 the crew will transition to FRP-P.1, Response to Imminent Pressurized Thermal Shock, due to the rapid RCS depressurization and cooldown but exited due to the presence of a Large Break LOCA. The crew will then transition to EOP-E-1, Loss of Reactor or Secondary Coolant, and performs required actions. While performing steps in EOP-E-1 the "A" RHR Pump will trip on over-current. This will cause the crew to ultimately transition to EPP-15, Loss of Emergency Coolant Recirculation, due to not having at least one train of cold leg recirculation capability. EPP-15 will have the crew minimize CV Spray and ECCS flow. After verifying required CV Spray pump operating the crew will be notified that the problem with "B" RHR Pump has been corrected and can be started as needed.

The Chief Examiner may terminate the scenario at any time after "B" RHR Pump has been started and crew transitions back to EOP-E-1 from EPP-15.

Sat / Unsat	Critical Task	Critical Task Criteria
	Secure All RCPs due to EOP-E-0 Foldout RCP Criteria.	STOP ALL RCPs within <u>6 minutes</u> of Reaching the following RCP Trip Criteria: <ul style="list-style-type: none">• Containment Isolation Phase B – Actuated OR• Both of the following satisfied:<ul style="list-style-type: none">○ SI pumps – At least one running and capable of delivering flow AND○ RCS Subcooling based on Core Exit TCs – Less than 30°F [50°F]
	Start “A” Safety Injection Pump to provide adequate core cooling.	Start “A” SI Pump prior to announcing completion of EOP-E-0 Attachment 1.
	Start “A” CV Spray Pump due to abnormal CV Conditions with reduced CV Spray and Cooling capability.	Start “A” CV Spray Pump prior to exiting EOP-E-0.

ILC-13 NRC SCENARIO 1 SIMULATOR SETUP**IC/SETUP:**

- IC-901, SCN 006_ILC_13_NRC_1.
- Status board is provided to crew is IC-13.

PRE-LOADED EVENTS:

The following events should occur on the reactor trip or triggered events following the reactor trip:

- Event 7: Large Break LOCA on Reactor Trip
- Event 8: CR HVAC fails to Auto Actuate on SI
- Event 9: "A" SI Pump and "A" RHR Pump fail to Auto-Start on SI
- Event 10: "A" CV Spray Pump fails to Auto-Start and "B" CV Spray Pump Trips
- Event 11: "B" RHR Pump Trips 10 seconds after manually starting "A" RHR Pump
- Event 12: "A" RHR Pump Trips after entering EOP-E-1

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

- Event 1: "A" CWP Trips and V6-50A fails to Auto-Close
- Event 2: PCV-455B fails open while in AUTO
- Event 3: "B" SWBP trips
- Event 4: Dropped Control Rod resulting in Load Reduction
- Event 5: LT-460 Reference Leg / PT-456 Sensing line Failure
- Event 6: Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- AOP-012
- AOP-019
- APP-002
- AOP-001
- AOP-025, Section B
- OWP-030, PLT-2
- OWP-029, PLT-2
- AOP-021
- AOP-016
- EOP-E-0
- FRP-P.1
- EOP-E-1
- EPP-15

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Event Description: "A" Circulating Water Pump Trips and V6-50A fails to Auto-Close (AOP-012)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed, insert Event 1, "A" Circulating Water Pump Trips and V6-50A fails to Auto-Close

EVENT INDICATIONS:

APP-008—D4, CW PMP A MOTOR/DISCH VLV TRIP/OLVD, is illuminated

"A" CWP RTGB GREEN OFF light illuminated

V6-50A RTGB RED OPEN light illuminated

	BOP	AOP-012, Partial Loss of Condenser Vacuum or Circulating Water Pump Trip Immediate Action Step: Check Circulating Water Pump – ANY TRIPPED (YES)
	BOP	Immediate Action Step: Verify The Tripped Circulating Water Pump Discharge Valve - CLOSED <u>OR</u> CLOSING (BOP takes action to manually close V6-50A from the RTGB.)
	SRO	Enters AOP-012, Partial Loss of Condenser Vacuum or Circulating Water Pump Trip
	SRO	Verifies immediate actions complete.
	BOP	Start any available CWP with its Associated CW PMP SEAL WTR LOST Alarm Extinguished. (All available are running.)
	RO	Make PA Announcement for Procedure Entry.

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Event Description: "A" Circulating Water Pump Trips and V6-50A fails to Auto-Close (AOP-012)

Time	Position	Applicant's Actions or Behavior
	BOP	Check Liquid Waste Batch Release – In Progress (NO)
	BOP	Check Condenser Status – VACUUM PREVIOUSLY ESTABLISHED (YES)
	BOP	Check Status of the tripped CWP Discharge Valves – Completed Closing (YES, V6-50A manually closed from RTGB.)
	BOP	Check Plant Conditions – In Modes 1 <u>OR</u> 2 (YES)
NOTE		
The use of narrow range pressure ERFIS points CDP2500A and CDP2501A and wide range ERFIS points CDP2502A and CDP2503A may aid in observing condenser vacuum conditions. Narrow range pressure ERFIS points have a maximum range of 6" HG backpressure.		
	BOP	Continuous Action Step: Check Condenser Back Pressure On PI-1312 AND PI-1313 – APPROACHES RESTRICTED REGION OF ATTACHMENT 3, CONDENSER BACKPRESSURE LIMIT CURVE (NO, Go to Step 13)
	BOP	Continuous Action Step: Step 13: Check Condenser Vacuum Degrading (NO, Go to Step 15)
	SRO	Step 15: Implement the EALs

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Event Description: "A" Circulating Water Pump Trips and V6-50A fails to Auto-Close (AOP-012)

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>(LOCAL ACTIONS OUTSIDE CONTROL ROOM)</p> <p>Check the Following Water Box Outlet Valves – Throttled to 50% OPEN. (BOP contacts Outside AO or WCC SRO) (Not throttled)</p> <ul style="list-style-type: none"> • CW-5, Water Box "A" Outlet • CW-6, Water Box "B" Outlet • CW-7, Water Box "C" Outlet • CW-8, Water Box "D" Outlet <p>RNO: (BOP directs the Outside AO or WCC SRO)</p> <p>a. At the Condenser Tube Cleaning Control Panel, verify the following Water Box Outlet Screens are in the Circulate Position (red light):</p> <ul style="list-style-type: none"> • System 1A Screen No.2 • System 2A Screen No.2 • System 3A Screen No.2 • System 4A Screen No.2 <p>b. Throttle the following Water Box Outlet Valves to 50%:</p> <ul style="list-style-type: none"> • CW-5 • CW-6 • CW-7 • CW-8 <p>c. <u>WHEN</u> the Water Box Outlet Valves are throttled to 50%, <u>THEN</u> go to Step 17.</p>
BOOTH OPERATOR: As the Outside AO report that the Water Box Outlet Valves are not at 50% OPEN. Once directed to perform step 16 RNO steps, wait 10 minutes and report that the Water Box Outlets are throttled to 50%.		
Examiner Note: Event #2 (PCV-455B fails open in AUTO) may be inserted at this point while field actions are being performed. Field actions will have little effect on the remaining sections of this event and scenario.		

Op Test No.:	ILC-13 NRC	Scenario #	1	Event #	1	Page	10	of	69
Event Description:		"A" Circulating Water Pump Trips and V6-50A fails to Auto-Close (AOP-012)							
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>(LOCAL ACTIONS OUTSIDE CONTROL ROOM)</p> <p>Step 17: Locally Vent the Condenser Water Box Inlets as Follows: (BOP directs the Outside AO to perform)</p> <ol style="list-style-type: none"> Throttle open CW-9, WATER BOX "A" INLET VENT (CHAIN OPERATED) WHEN water appears at the vent, THEN close CW-9. Throttle open CW-10, WATER BOX "B" INLET VENT (CHAIN OPERATED) WHEN water appears at the vent, THEN close CW-10 Throttle open CW-11, WATER BOX "C" INLET VENT (CHAIN OPERATED) WHEN water appears at the vent, THEN close CW-11 Throttle open CW-12, WATER BOX "D" INLET VENT (CHAIN OPERATED) WHEN water appears at the vent, THEN close CW-12.
<p>BOOTH OPERATOR: Once directed to vent the Water Boxes, wait 10 minutes and then report venting complete.</p>		
	BOP	<p>(LOCAL ACTIONS OUTSIDE CONTROL ROOM)</p> <p>Perform The Following:</p> <ol style="list-style-type: none"> Check the following alarms - ANY ILLUMINATED <ul style="list-style-type: none"> APP-008-B8, SCREEN HI ΔP/VALVE PIT HI LEVEL (NO) APP-008-D4, CW PMP A MOTOR/DISCH VLV TRIP/OVLD (YES) APP-008-D5, CW PMP B MOTOR/DISCH VLV TRIP/OVLD (NO) APP-008-D6, CW PMP C MOTOR/DISCH VLV TRIP/OVLD (NO) APP-008-E4, CW PMP A SEAL WTR LOST (NO) APP-008-E5, CW PMP B SEAL WTR LOST (NO) APP-008-E6, CW PMP C SEAL WTR LOST (NO) Perform the required actions of the applicable APP

Op Test No.:	ILC-13 NRC	Scenario #	1	Event #	1	Page	11	of	69
Event Description:		"A" Circulating Water Pump Trips and V6-50A fails to Auto-Close (AOP-012)							
Time	Position	Applicant's Actions or Behavior							

	BOP	Locally Inspect The Tripped Pump's Breaker Compartment: <ul style="list-style-type: none"> BKR 52/2, CIRCULATING WATERPUMP A (4KV BUS 1 CMPT 2)
BOOTH OPERATOR: Once directed to check BKR 52/2, report cause of breaker unknown from visual inspection of breaker.		
	SRO	Check RTGB and Local Action in Steps 16 through 20 – Completed (NO) RNO: WHEN actions are complete, THEN Go to Step 22.
	SRO	Step 22: Check Reason for CWP Trip – KNOWN (NO) RNO: Contact Maintenance for assistance in determining the cause.
BOOTH OPERATOR: As WCC SRO or Maintenance, acknowledge request for assistance in determining the cause of the tripped CWP.		
	SRO	Return to Procedure and Step In Effect.
BOOTH OPERATOR: Insert Event #2 (PCV-455B fails open in AUTO) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 2 Page 12 of 69

Event Description: PCV-455B, "B" PZR Spray Valve, fails open in Auto (**AOP-019**)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: At the discretion of the Examiner, insert Event 2, PCV-455B fails open in AUTO

EVENT INDICATIONS:

APP-003-D8, PZR CONTROL HI/LO PRESS

PC-455B output failing high.

PCV-455B RTGB indication RED open light illuminates.

Pressurizer Pressure lowering.

Pressurizer Control Bank Heaters energize.

	RO	AOP-019, Malfunction of RCS Pressure Control Immediate Action Step Determine If PZR PORVs Should Be Closed: <ul style="list-style-type: none"> • Check PZR pressure - LESS THAN 2335 PSIG (YES) • Verify Both PZR PORVs - CLOSED (YES)
	RO	Immediate Action Step Control The PZR SPRAY VALVES AND PZR Heaters To Restore RCS Pressure To The Desired Control Band <ul style="list-style-type: none"> • Place PCV-455B in Manual and Close
	SRO	Enters AOP-019, Malfunction of RCS Pressure Control
	SRO	Verifies immediate actions complete.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 2 Page 13 of 69Event Description: PCV-455B, "B" PZR Spray Valve, fails open in Auto (**AOP-019**)

Time	Position	Applicant's Actions or Behavior
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	CREW	Make PA Announcement for Procedure Entry
	RO	Continuous Action Step Check PZR Pressure - UNDER OPERATOR CONTROL (YES)
	RO	Check Pressurizer Pressure Transmitter PT-444 <u>OR</u> PT-445 – FAILED (NO, Go to Step 7)
	RO	Step 7: Check PC-444J, PZR PRESS - OPERATING PROPERLY IN AUTO (YES)
	RO	Observe the NOTE prior to Step 11 and Go to Step 11
<p style="text-align: center;">Note</p> <p>The response in the following step needs to be based upon plant conditions at entry into AOP-019 to ensure the correct procedure flowpath is taken.</p>		
	RO	Step 11: Check RCS Pressure - LESS THAN REQUIRED FOR CURRENT PLANT CONDITIONS (YES)
	RO	Continuous Action Step Check PZR Pressure - LESS THAN 2205 PSIG (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 2 Page 14 of 69

Event Description: PCV-455B, "B" PZR Spray Valve, fails open in Auto (AOP-019)

Time	Position	Applicant's Actions or Behavior
	RO	Restore Pressure Within 2 HOURS OR Be In Mode 2 Within 6 HOURS
	RO	<p>Check Both PZR SPRAY VALVES – CLOSED (NO, based on initial event conditions. May answer as YES based on current conditions.)</p> <p>Perform the following:</p> <p>a. Place the affected PZR SPRAY VALVE Controller in MAN AND adjust the output to zero.</p> <p>b. IF the affected valve will NOT close, THEN Go To Step 16. (NO)</p> <p>c. IF the affected valve has closed, THEN observe the CAUTION prior to Step 20 and Go to Step 20. (YES)</p>
	RO	Step 20: Check CVC-311, Aux PZR Spray Valve – Closed (YES)
	RO	<p>Continuous Action Step</p> <p>Check APP-003-F8, PZR LO LVL HTR OFF & LTDN SECURE – EXTINGUISHED (YES)</p>
	SRO/BOP	Contact Maintenance and Engineering to check PZR Heater capacity
BOOTH OPERATOR: If / When contacted as WCC SRO, Maintenance and/or Engineering, wait 5 minutes and then report that there is no reduced PZR heater capacity.		
	RO	Check PZR Heater capacity – REDUCED (NO, Go to Step 23)

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Event Description: PCV-455B, "B" PZR Spray Valve, fails open in Auto (AOP-019)

Time	Position	Applicant's Actions or Behavior
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	RO	Step 23: Check PZR Pressure - STABLE OR TRENDING TO REQUIRED VALUE (YES, Go to Step 29)
	SRO	Step 29: Implement the EALs
	SRO	Contact I&C to Make Repair to the PZR Pressure Control System
	SRO	Refer to ITS for Applicable LCOs ITS 3.4.1, Condition A, One or more RCS DNB parameters not within limits – Restore RCS DNB parameters to within limit within 2 hours, will be entered if PZR Pressure lowered to less than 2205 psig.
	SRO	Return to Procedure and Step in Effect

BOOTH OPERATOR: Insert Event #3 ("B" SWBP Trips) on cue from the Chief Examiner.

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Event Description: "B" SWBP Trips (APP-002-A8, B8, C8, D8)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: At the discretion of the Examiner, insert Event 3, "A" SWBP Trips

EVENT INDICATIONS:

APP-002-A8, B8, C8, D8, HVH-1(-2, -3, -4) WTR OUTLET LO FLOW

"B" SWBP RTGB Indication RED and GREEN lights illuminated.

"A" SWBP RTGB Indication GREEN light illuminated.

	BOP	Recognizes "B" SWBP tripped and "A" SWBP secured.
	RO	Reviews APP-002-A8, B8, C8, D8 Step 1 "IF the operating SWBP has tripped, THEN START Standby SWBP."
	BOP	Announces starting "A" SWBP and then Manually starts the "A" SWBP
	CREW	Dispatches AO to observe SWBP operation and verify proper flow to the CV HVH units.
BOOTH OPERATOR: IF dispatched, report that "B" SWBP breaker indicates tripped on over-current and HVH flows are all within the normal band.		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 3 Page 17 of 69

Event Description: "B" SWBP Trips (APP-002-A8, B8, C8, D8)

Time

Position

Applicant's Actions or Behavior

CRS

Reviews ITS for applicability.

ITS 3.7.7, Condition A, one Service Water System (SWS) train inoperable – Restore SWS train to operable status within 72 hours, will be entered for the SWBP failure.ITS 3.6.6, Condition D, Two Containment Cooling Trains inoperable – Restore one containment cooling train to operable status within 72 hours, will be entered due to the failure to meet SR 3.6.6.3 (Verify cooling water flow rate to each cooling unit is ≥ 750 gpm) for the CV HVH units.

CRS

Notify WCC SRO to initiate Work Request, contact Maintenance and Work Management and notify Operations / Plant Management.

BOOTH OPERATOR: Insert Event #4 (Dropped Control Rod resulting in Load Reduction) on cue from the Chief Examiner.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 18 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 4, Dropped Control Rod resulting in Load Reduction**EVENT INDICATIONS:****APP-005-A3, PR DROP ROD****APP-005-C3, PR CHANNEL DEV****APP-005-F2, ROD BOTTOM ROD DROP****APP-005-F3, PR UPPER CH HI FLUX DEV / AUTO DEFEAT****APP-005-F4, PR LOWER CH HI FLUX DEV / AUTO DEFEAT****Rod H-10 Rod Bottom Light Illuminated and IRPI lowers to zero****APP-003-D8, PZR CONTROL HI/LO PRESS****APP-003-D4, TAVG/TREF DEV**

	RO	AOP-001, Malfunction of Reactor Control System Immediate Action Check Unexpected Rod Motion – IN PROGRESS (NO) Go to Step 7
	SRO	Verifies immediate actions complete.
	SRO	Enters AOP-001, Malfunction of Reactor Control System
	RO	Check Unexpected Rod Motion – IN PROGRESS (NO) Go to Step 7

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 19 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Step 7: Determine If Multiple Rods Have Dropped As Follows:</p> <p>a. Analyze Indications For Multiple Rod Drop</p> <ul style="list-style-type: none"> Prompt Drop – PRESENT (YES) More than 1 Rod Bottom Light – ILLUMINATED (NO) More Than 1 IRPI - INDICATES ON BOTTOM (NO) <p>b. Check Multiple Dropped Rods – PRESENT (NO, Go To Step 10.)</p>
	BOP	Step 10: Make PA Announcement For Procedure Entry
	RO	<p>Check Tavg - TRENDING TO Tref (NO)</p> <p>RNO: Perform Attachment 1, Turbine Load Adjustment, to restore Tavg within +/- 1.5°F</p>

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 20 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
	RO	<p>Determine The Status Of Rods As Follows:</p> <p>a. Analyze the below indications for a dropped rod:</p> <ul style="list-style-type: none"> • APP-005-A3, PR DROP ROD – ILLUMINATED (YES) • APP-005-F2, ROD BOTTOM ROD DROP – ILLUMINATED (YES) • Rod Bottom Light for affected rod – ILLUMINATED (YES) • Indication of Prompt Drop – PRESENT (YES) • Quadrant Power Tilt indications – PRESENT (YES) <ul style="list-style-type: none"> ○ APP-005-F3, PR UPPER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED ○ APP-005-F4, PR LOWER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED ○ APP-005-C3, PR CHANNEL DEV - ILLUMINATED ○ Power Range Drawer Indications <p>b. Check Dropped Rod – PRESENT (YES)</p>
	SRO	Go To Section A, Dropped Rod
	RO	Check Plant Status – Mode 1 (YES)
	RO	Check Dropped Rod Location – In Controlling Bank (NO, Go to Step 4)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 21 of 69

Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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CAUTION

Equipment repairs or manipulations to correct the cause of the dropped rod prior to procedural direction could inadvertently withdraw the dropped rod.

	RO	<p>Step 4: Notify Reactor Engineering AND I&C Personnel to Perform the following:</p> <ul style="list-style-type: none"> a. Verify the status of the dropped rod b. Investigate the cause of the dropped rod. c. Avoid ANY action that could cause inadvertent withdrawal of the affected rod. d. Determine appropriate recovery actions.
BOOTH OPERATOR: Acknowledge the request for Reactor Engineering and/or I&C to investigate, determine cause and determine appropriate recovery actions.		
	RO	Check APP-005-B5, ROD BANKS A/B/C/D LO LIMIT – EXTINGUISHED (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 22 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Establish Stable Conditions At OR Below 70% Reactor Power As follows:</p> <ol style="list-style-type: none"> Check Reactor power – Greater Than 70% (YES) Check APP-005-E2, ROD CONT SYSTEM URGENT FAILURE – EXTINGUISHED (YES) Reduce Reactor AND Turbine power to less than or equal to 70% within 2 hours using rods and boration to maintain Tavg within +/- 1.5°F of Tref using OP-301, CVCS, RCS Boration Quick Checklist, AND Attachment 1, Turbine Load Adjustment <p>(OP-301, Section 8.2.8 Quick Boration Checklist, is included at the end of Event #4)</p>
	BOP	<p>Attachment 1 - Turbine Load Adjustment</p> <ol style="list-style-type: none"> Check Turbine Control Mode – Automatic (YES) Check Turbine Load Adjustment In IMP IN Desired (YES) Depress the IMP IN Pushbutton (IMP IN depressed) Set the Desired Load in the SETTER (REF ▽ to adjust setter) Set the Desired Load Rate (Thumbwheel to set load rate) Depress the GO and HOLD Pushbuttons as necessary (Pushbuttons) <p>(BOP and RO will coordinate the power reduction with boron additions and rods.)</p> <p>(OP-301, Section 8.2.8 Quick Boration Checklist, is included at the end of Event #4 (shaded area))</p>
	CRS	Notify Load Dispatcher of the Unit's Load Capability

Op Test No.:	ILC-13 NRC	Scenario #	1	Event #	4	Page	23	of	69
Event Description:		Dropped Control Rod resulting in Load Reduction (AOP-001)							
Time	Position	Applicant's Actions or Behavior							

	RO	Continuous Action Step Check Total Reactor Power Change – Greater than 15% in any one hour period. (This will eventually be true.)
<p style="text-align: center;">NOTE</p> <p>Quadrant Power Tilt information may be obtained from Group Display QPTR LOG on ERFIS</p> <p>FMP-007, Quadrant Power Tilt provides instruction for manual QPTR calculation if ERFIS is unavailable.</p>		
	RO	Monitor Quadrant Power Tilt AND Axial Flux Difference to Ensure Compliance with ITS LCO 3.2.3 and ITS LCO 3.2.4
	RO	Determine if Axial Flux Difference (AFD) should be Adjusted As Follows: <ul style="list-style-type: none"> a. Check APP-005-E2, Rod Cont System Urgent Failure – Extinguished (YES) b. Check AFD – Within Target Band (YES) c. Check AFD – Within Operating Band (YES) d. Go to Step 13

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 24 of 69

Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time

Position

Applicant's Actions or Behavior

Examiner Note:

It is possible that AFD will approach the Target Band depending on the amount and rate of boric acid addition relative to turbine load reduction. If this is the case then the CRS will direct the following steps to restore AFD. The Operating Bands are as follows:

100%: TV = -0.9 (-5.9 to +4.1) Operating Band (-5.9 to +4.1)

90%: TV = -0.81 (-5.81 to +4.19) Operating Band (-8.81 to +9.19)

80%: TV = -0.72 (-5.72 to +4.28) Operating Band (-12.72 to +14.28)

70%: TV = -0.63 (-5.63 to +4.37) Operating Band (-16.63 to +19.37)

AFD
Control

CRS

IF AFD is below the target band, THEN borate while withdrawing Control Rods to restore AFD to within the target band.

AFD
Control

CRS

IF AFD is above the target band, THEN dilute while **inserting** Control Rods to restore AFD to within the target band.

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>1</u>	Event #	<u>4</u>	Page	<u>25</u>	of	<u>69</u>
Event Description: <u>Dropped Control Rod resulting in Load Reduction (AOP-001)</u>									
Time	Position	Applicant's Actions or Behavior							

	RO	<p>Step 13: Confirm Dropped Rod as Follows:</p> <p>a. Determine if a dropped rod exists by at least ONE of the following:</p> <ul style="list-style-type: none"> • Quadrant Power Tilt indications – Present <ul style="list-style-type: none"> ○ APP-005-F3 – ILLUMINATED (YES) ○ APP-005-F4 – ILLUMINATED (YES) ○ APP-005-C3 – ILLUMINATED (YES) ○ Power Range Drawer Indications (YES) • Axial Flux Difference indications (YES) • Incore flux map • Reactor Engineering or I&C determination • APP-005-A3 – ILLUMINATED (YES) <p>b. Check dropped rod determination – Complete (YES)</p>
	RO	Check Dropped Rod – Confirmed (YES)

NOTE		
<p>This Continuous Action step is designed to assure compliance with ITS LCO 3.1.4 if the rod can <u>NOT</u> be recovered within 1 hour.</p>		
	RO / CRS	<p>Continuous Action Step</p> <p>Check Rod Recovery Status – Complete (NO)</p> <p>RNO:</p> <p>IF the rod will NOT be restored to within the alignment limits within 1 hour of discovery, THEN perform the following:</p> <p>(ITS 3.1.4 Condition B Actions)</p> <ul style="list-style-type: none"> a. Verify SDM is within the limits specified in the COLR within 1 hour in accordance with FMP-012, Manual Determination of Shutdown Margin Boron Concentration. b. Reduce Thermal Power to less than or equal to 70% within 2 hours c. Verify SDM is within the limits provided in the COLR every 12 hours in accordance with FMP-012, Manual Determination of Shutdown Margin Boron Concentration. d. Notify Reactor Engineering to perform ITS SR 3.2.1.1 AND SR 3.2.2.1 within 72 hours e. IF the rod can NOT be realigned, THEN within 5 days, complete a Safety Analysis for continued operation with the misaligned rod. f. IF the requirements of items a through e can NOT be achieved, THEN be in Mode 3 within 6 hours.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 27 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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	CRS	Notify I&C To Make Repairs As Necessary To Restore Proper Operation Of The Rod Control System
	RO	Check IRPI for the dropped rod – Indicates Rod Fully Inserted (YES)
<p style="text-align: center;">NOTE</p> <p>The rate of rod withdrawal referred to below is in relation to the duration of time over which the rod should be recovered, NOT rod speed.</p>		
	RO	Contact Reactor Engineering to Obtain the Following: <ol style="list-style-type: none"> Power level at which recovery is to be performed. Rate at which rod should be withdrawn
BOOTH OPERATOR: When contacted as Reactor Engineering, state power level of 60 to 65% RTP and rate of withdrawal should be no greater than 10 steps per minute. When contacted as Manager – Operations acknowledge the report and provide approval for rod recovery.		
	CRS	Notify Manager - Operations OR His Designee Of The Following: <ol style="list-style-type: none"> Current plant conditions Power level required for rod alignment Approval for rod alignment is required prior to continuing Check rod recovery - APPROVED

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 28 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time

Position

Applicant's Actions or Behavior

	RO	Check Cause of Dropped Rod – FOUND AND CORRECTED
BOOTH OPERATOR: IF / WHEN contacted as I&C report that the cause of the dropped rod was a blown fuse. Replacement fuse is being delivered from the warehouse.		
BOOTH OPERATOR: After adequate power reduction has been observed and on cue from the Chief Examiner Insert Event #5 (LT-460 Reference Leg / PT-456 Sensing Line Failure).		
NOTE:	OP-301, Section 8.2.8 Quick Boration Checklist (shaded area) is listed at the end of this section.	
NOTE: The crew should determine that approximately 110 to 125 gallons of boric acid is needed to lower power to 60% and 90 to 110 gallons of boric acid is needed to lower power to 65%. (The value given is based on OST-947 data and does not account for reactivity inserted from the dropped rod.)		
Beginning of OP-301, Section 8.2.8 Quick Boration Checklist		
	RO	DETERMINE the amount of Boric Acid to add to the RCS
	RO	OBTAIN an independent check of the volume required.
	RO	OBTAIN permission from the CRS OR the SM to borate.
	RO	PLACE the RCS MAKEUP MODE selector switch to BORATE.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 29 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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	RO	SET YIC-113, BORIC ACID TOTALIZER to desired quantity.
	RO	IF desired, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually ADJUST using the UP and DOWN pushbuttons.
	RO	Momentarily PLACE the RCS MAKEUP SYSTEM switch to START.
	RO	IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: <ul style="list-style-type: none"> • Rod Motion is blocked or in the wrong direction • T_{AVG} goes up • Boric Acid addition exceeds the desired value
	RO	WHEN the desired amount of Boric Acid has been added, THEN verify the following: <ul style="list-style-type: none"> • FCV-113A, BORIC ACID FLOW, closes. • FCV-113B, BLENDED MU TO CHG SUCT, closes. • IF in Auto, THEN the operating Boric Acid Pump stops. • The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 30 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time

Position

Applicant's Actions or Behavior

RO

IF desired, **THEN FLUSH** the Boric Acid flow path as follows:

- **PLACE** the RCS MAKEUP MODE selector switch in the ALT DILUTE position.
- **SET** YIC-114, PRIMARY WTR TOTALIZER to 15-20 gallons.
- **PLACE** FCV-114B, BLENDED MU TO VCT to CLOSE.
- Momentarily **PLACE** RCS MAKEUP SYSTEM switch to START.
- **IF** any of the below conditions occur, **THEN** momentarily place the RCS MAKEUP SYSTEM switch in the STOP position:
 - Unanticipated Rod Motion
 - Primary Water addition reaches the desired value
- **WHEN** the desired amount of Primary Water has been added to the RCS, **THEN** verify the following:
 - FCV-114A PW to Blender closes.
 - FCV-113B Blended MU to CHG Suct. closes.
 - **IF** in Auto, **THEN** the operating Primary Water Pump stops.
 - The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 4 Page 31 of 69Event Description: Dropped Control Rod resulting in Load Reduction (AOP-001)

Time	Position	Applicant's Actions or Behavior
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	RO	<p>RETURN the RCS Makeup System to automatic as follows:</p> <ul style="list-style-type: none"> • VERIFY FCV-114A Primary WTR Flow Dilute Mode is in AUTO. • PLACE FCV-114B Blended MU to VCT to the AUTO position. • PLACE the RCS MAKEUP MODE switch in AUTO. • VERIFY FCV-113A Boric Acid Flow is in AUTO. • Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position.
	RO	RECORD , in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 AND Boric Acid TOTALIZER, YIC-113 the total amount of Primary Water AND Boric Acid added during the boration.
	RO	MONITOR parameters for the expected change in reactivity AND inform the CRS OR the SM of the results of the boration.
End of OP-301, Section 8.2.8 Quick Boration Checklist		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 32 of 69

Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: After adequate power reduction has been observed and on cue from the Chief Examiner Insert Event #5 (LT-460 Reference Leg / PT-456 Sensing Line Failure).

EVENT INDICATIONS:

APP-003-C8, PZR PROT HI LEVEL

Bistable LC460A1 illuminated

APP-002-E2, HVH CONDENSATE COLL

CRS

AOP-025, RTGB Instrument Failure, may be entered for guidance due to LT-460 failure IAW APP-003-C8, however, not required since LT-460 is not the controlling channel. Determines OWP-029 will be utilized for removal of PT-456 from service.

NOTE: Crew will enter AOP-016 once the determination has been made that the failures are due to a sensing line leak. AOP-016 actions are listed following the AOP-025 actions. AOP-005, Radiation Monitoring System, will be entered once R-11 and/or R-12 are in alarm. AOP-005 follows AOP-016 in this Guide.

AOP-025

RO

Check LCV-460A&B, LTDN LINE STOP – Closed (NO, go to step 4)

AOP-025

BOP

Make PA Announcement for Procedure Entry

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 33 of 69Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time

Position

Applicant's Actions or Behavior

AOP-025	RO	Restore PZR Level to between 22% and 53% by Performing One of the Following: <ul style="list-style-type: none">Adjust operating Charging Pump speed in Manual OR <ul style="list-style-type: none">Level Controller LC-459G in Manual (Neither action is required since PZR level is being controlled by LT-459.)					
AOP-025	RO	Check RCP Seal Injection Flow – Between 8 GPM and 13 GPM (YES, not impacted by failures.)					
AOP-025	RO	Check Number of Operable PZR Level Channels – Greater than one (YES)					
AOP-025	RO	Place LM-459, PZR LEVEL, In the Switch Position for the Alternate Channel Below: <table><tr><td>Failed Channel</td><td>Switch Position</td></tr><tr><td>LT-460</td><td>461 REPL 460</td></tr></table>		Failed Channel	Switch Position	LT-460	461 REPL 460
Failed Channel	Switch Position						
LT-460	461 REPL 460						
AOP-025	RO	Verify Selector Switch LR-459 – Selected to the Controlling Channel <ul style="list-style-type: none">REC 459					

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 34 of 69

Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time	Position	Applicant's Actions or Behavior
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AOP-025	RO	Continuous Action Step Restore PZR Level Control To Automatic As Follows: <ul style="list-style-type: none"> • Check Normal Letdown – Isolated (NO) • Start additional Charging Pump as desired. (N/A) • Check PZR level – Within +/- 1% of Programmed Reference Level (YES) • Restore PZR Level control to Automatic (No action required.)
AOP-025	RO	Check affected PZR Level – FAILED LOW (NO)
AOP-025	RO	Check RCP Seal Injection Flow – Between 8 GPM and 13 GPM (YES, not impacted by failures.)
AOP-025	BOP	Remove the affected Transmitter from Service IAW OWP-030, PLT-2.
AOP-025	CRS	Contact WCC SRO for assistance with OWPs for LT-460 and PT-456. Also, requests W/R initiation and Maintenance contacted.
AOP-025	CRS	Briefs the crew on removal of LT-460 from service IAW OWP-030 and PT-456 from service IAW OWP-029.
EXAMINER'S NOTE: It is NOT necessary to have the Crew implement the OWPs since the next event will lead to the Major Event. It is recommended to insert Event 6 after applicable Tech Specs have been identified.		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 35 of 69Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: IF requested, implement OWP-030 and OWP-029 IAW SCN file.

CRS

Determines the following ITS implications for failure:

LT-460 / PT-456: ITS 3.3.1 Condition A will not be met due to one or more Functions with one or more required channels inoperable. Condition A requires entry into the Condition referenced in Table 3.3.1-1 for the channel(s) Immediately.

LT-460: ITS Table 3.3.1 Table 3.3.1-1 Item 8 which requires 3 Pressurizer Water Level – High Channel to be operable will not be met and require entry into **ITS 3.3.1 Condition M**, which requires the channel to be placed in trip with 6 hours OR reduce thermal power to less than P-7 within 12 hours.

PT-456: ITS Table 3.3.1-1, Items 5 and 7 which requires 3 OTΔT Channels and 3 Pressurizer Pressure Channels to be operable will not be met and require entry into **ITS 3.3.1 Conditions E and M**.
Condition E: Channel be placed in trip within 6 hours OR be in Mode 3 in 12 hours.

Condition M: Channel be placed in trip in 6 hours or reduce thermal power to less than P-7 within 13 hours.

ITS Table 3.3.2-1, Items 1.d and 6.a which requires 3 Pressurizer Pressure – Low Safety Injection Channels and 3 Pressurizer Pressure Low ESFAS Interlock Channels to be operable will not be met and require entry into **ITS 3.3.2 Conditions D and H**.

Condition D: Channel be placed in trip within 6 hours OR be in Mode 3 in 12 hours and Mode 4 in 18 hours.

Condition H: Interlock verified in the required state for existing unit condition within 1 hour OR be in Mode 3 in 7 hours and Mode 4 in 13 hours.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 36 of 69Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time	Position	Applicant's Actions or Behavior
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AOP-016 – Excessive Primary Plant Leakage**AOP-016**

RO

Continuous Action Step

Check RCS Pressure – Greater than 1000 psig. (YES)

Check the following:

PZR Level – Less than 14% AND lowering in an uncontrolled manner (NO)OR

RCS Subcooling – Less than 35°F (NO)

IF PZR Level can NOT be maintained greater than 14% OR Subcooling can NOT be maintained greater than 35°F, THEN trip the Reactor and Go to EOP-E-0.**CAUTION**

Charging Pump Discharge Pressure must be maintained less than 2500 psig to prevent lifting the Charging Pump Discharge Relief.

AOP-016

RO

Control Charging Flow to Maintain Desired RCS Level

AOP-016

Crew

Make PA Announcement for Procedure Entry

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 37 of 69

Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time	Position	Applicant's Actions or Behavior
AOP-016	RO	Continuous Action Step Check VCT Level - LESS THAN 12.5 INCHES (NO) <ul style="list-style-type: none"> IF VCT level lowers to less than 12.5 inches, THEN perform Step 5. Go To Step 6
AOP-016	RO	Step 6: Check Charging Pump Status –LESS THAN TWO RUNNING (NO) <ul style="list-style-type: none"> Go To Step 11.
AOP-016	RO	Step 11: Place running Charging Pump Speed Controllers in MAN AND adjust output to maximum
AOP-016	RO	Check RCS Level - LOWERING IN AN UNCONTROLLED MANNER (NO) <ul style="list-style-type: none"> Go to Step 20
AOP-016	RO	Step 20: Control Charging Flow To Maintain Desired RCS Level
AOP-016	RO	Continuous Action Step Monitor RCS Level – Lowering In An Uncontrolled Manner (NO) <ul style="list-style-type: none"> Go to Step 22

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>1</u>	Event #	<u>5</u>	Page	<u>38</u>	of	<u>69</u>
Event Description:		LT-460 Fails High / PT-456 Fails Lower than Normal due to <u>Sensing Line Leak</u> (AOP-025 / AOP-016 / AOP-005)							
Time	Position	Applicant's Actions or Behavior							

AOP-016	SRO	Step 22: Implement ITS LCO 3.4.13. ITS 3.4.13 Condition A is entered due to RCS Operational leakage not with limits for reasons other than pressure boundary leakage or primary to secondary leakage. Condition A requires that the plant reduce leakage to within limits within 4 hours or be in mode 3 in 6 hours and mode 5 in 36 hours.
AOP-016	BOP	Check for Primary-to-Secondary Leakage as Indicated by One or More of the Following: (NO, go to step 25) <ul style="list-style-type: none"> R-15, R-19A/B/C, R-31A/B/C, Secondary Chemistry Sample Results.
AOP-016	RO	Step 25: Initiate Leak Rate Determination Using One or More of the following Methods: <ul style="list-style-type: none"> OST-051, OST-901, Charging vs Letdown Flow Balance (Leak Rate Calculation Job Aide will be utilized.) (Calculated leak rate will range from 7 gpm to 30 gpm depending on how stable the plant is when the leak rate is performed. The actual leakage input into the simulator is 7 gpm.)
AOP-016	SRO	Implement EALs

Op Test No.: ILC-13 NRC Scenario # 1 Event # 5 Page 39 of 69Event Description: LT-460 Fails High / PT-456 Fails Lower than Normal due to Sensing Line Leak (AOP-025 / AOP-016 / AOP-005)

Time	Position	Applicant's Actions or Behavior
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AOP-005 – Radiation Monitoring System**Attachment Number 12**

AOP-005	BOP	Check R-11/R-12 Selector Switch – Selected to CV (YES)
AOP-005	BOP	Check RCS Temperature – Greater than 200°F (YES)
AOP-005	BOP	Check Channel R-11/R-12 Low Flow Alarm – Illuminated (NO, Go to Step 5.)
AOP-005	BOP	Step 5: Check EOP Network Procedures – Implemented (NO, Go to Step 7)
AOP-005	BOP	Step 7: Check Personnel – IN CV (NO, Go to Step 13)
AOP-005	BOP	Step 13: Check Containment Ventilation Isolation Valves – Closed (YES)
AOP-005	BOP	Place the Following CV Iodine Removal Fan Control Switches to Prepurge Position: <ul style="list-style-type: none"> HVE-3 / 4 (BOP places control switches for HVE-3 and HVE4 to the Prepurge Position.)

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>1</u>	Event #	<u>5</u>	Page	<u>40</u> of	<u>69</u>
Event Description:		LT-460 Fails High / PT-456 Fails Lower than Normal due to <u>Sensing Line Leak</u> (AOP-025 / AOP-016 / AOP-005)						
Time	Position	Applicant's Actions or Behavior						

AOP-005	BOP	Request RC to perform a background radiation check at Radiation Monitors R-11 and R-12.
AOP-005	BOP	Determine if Primary System Leakage is Occurring (YES)
AOP-005	BOP	Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure.
AOP-005	BOP	<p>Refer to ITS 3.3.6 and ODCM Table 3.10-1.</p> <p>ITS 3.3.6: Containment Ventilation Isolation Instrumentation <u>is met</u> since both R-11 and R-12 are operable.</p> <p>ODCM Table 3.10.1: Radioactive Gasesou Effluent Monitoring Instrumentation <u>is met</u> since both R-11 and R-12 are operable.</p>
BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)).		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 6 Page 41 of 69Event Description: Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)
(AOP-021 and AOP-016)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)).

EVENT INDICATIONS:

APP-036-I5, SEISMIC ALARM

APP-003-F4, CHG PMP HI SPEED

CV SUMP LEVEL RISE

BOOTH OPERATOR: After 1 minute contact the control room as the Load Dispatcher and report that seismic events have been noted in the area from the US Geological Department.

(NO VIBRATIONS FELT IN CONTROL ROOM.)

AOP-021	CRS	Enters AOP-021 for Seismic Disturbances.
AOP-021	BOP	Dispatch an Operator to the Seismic Monitors to check local alarms.
AOP-021	BOP	Make PA Announcement
AOP-021	RO / BOP	Compare Current RTGB Indications with the Operating Logs to Detect any abnormal trends.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 6 Page 42 of 69Event Description: **Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)
(AOP-021 and AOP-016)**

Time	Position	Applicant's Actions or Behavior
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AOP-021	CRS	Check Either Event Below – Has Occurred <ul style="list-style-type: none"> • Noticeable Tremors or Vibrations (NO) OR <ul style="list-style-type: none"> • Report by Outside Agency (YES)
AOP-021	CREW	Check For Changes From Pre-earthquake Conditions That May Impair Safety-related Function <ul style="list-style-type: none"> • CRDM operation • Nuclear Instrumentation • RCS radiation levels • Process Radiation Monitors • Area Radiation Monitors • RCS flow, temperature and pressure • Loose Parts Monitor System • RCS Chemistry sample and results • Secondary System Chemistry sample and results • Electrical power sources • Fire Protection System leaks • Spurious relay actuations
AOP-021	CRS	Notify the Manager – Operations of the following: <ul style="list-style-type: none"> • A Seismic event has occurred. • Any abnormal plant conditions that have been identified.
AOP-021	CRS	Implement the EALs

Op Test No.:	ILC-13 NRC	Scenario #	1	Event #	6	Page	43	of	69
Event Description:		Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes) (AOP-021 and AOP-016)							
Time	Position	Applicant's Actions or Behavior							

AOP-021	CRS	Implement Applicable Technical Specification LCOs. TRM 3.17 Seismic Shutdown Limits , should be referenced. TRM 3.17 will be met since the strong-motion recorder has not indicated that the operating basis earthquake of 0.10g horizontal acceleration and 0.067g vertical acceleration has been exceeded.
BOOTH OPERATOR: After 2 minutes report that the DBE/SSE ALARM on Seismic Monitor "A" is EXTINGUISHED. After 5 minutes report that the OBE ALARM on Seismic Monitor "B" is EXTINGUISHED.		
AOP-021	CRS	Check Local Monitors – Observed (YES, once report is received for both monitors)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 6 Page 44 of 69Event Description: Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)
(AOP-021 and AOP-016)

Time	Position	Applicant's Actions or Behavior
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EXAMINER'S NOTE: By this time the crew will identify the RCS leak and either enter AOP-016 or conservatively decide to trip the reactor based on the number of failures that have occurred.

AOP-016	CRS	Enters AOP-016 , Excessive Primary Plant Leakage
AOP-016	RO	<p>Continuous Action Step</p> <p>Check RCS Pressure – Greater than 1000 psig. (YES)</p> <p>Check the following:</p> <p>PZR Level – Less than 14% <u>AND</u> lowering in an uncontrolled manner (NO)</p> <p>OR</p> <p>RCS Subcooling – Less than 35°F (NO)</p> <p>IF PZR Level can <u>NOT</u> be maintained greater than 14% <u>OR</u> Subcooling can <u>NOT</u> be maintained greater than 35°F, <u>THEN</u> trip the Reactor and Go to EOP-E-0.</p>
AOP-016	BOP	Make PA Announcement for Procedure Entry
<u>CAUTION</u>		
Charging Pump Discharge Pressure must be maintained less than 2500 psig to prevent lifting the Charging Pump Discharge Relief.		
AOP-016	RO	Control Charging Flow to Maintain Desired RCS Level

Op Test No.: ILC-13 NRC Scenario # 1 Event # 6 Page 45 of 69Event Description: Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)
(AOP-021 and AOP-016)

Time	Position	Applicant's Actions or Behavior
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AOP-016	RO	Continuous Action Step Check VCT Level – Less than 12.5 inches (NO, go to Step 6)
AOP-016	RO	Step 6: Check Charging Pump Status –LESS THAN TWO RUNNING (NO, go to Step 11)
AOP-016	RO	Step 11: Place running Charging Pump Speed Controllers in MAN AND adjust output to maximum
AOP-016	RO	Check RCS Level - LOWERING IN AN UNCONTROLLED MANNER (YES) (If answered as NO, depending on scenario timeline, the crew will control charging flow and ultimately determine that RCS level is lowering in an uncontrolled manner and return to step 1 of AOP-016. This question will eventually be answered as YES.)
AOP-016	RO	Check Any Letdown - IN SERVICE (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 6 Page 46 of 69Event Description: Seismic Event and RCS Leak (250 gpm ramped in over 5 ½ minutes)
(AOP-021 and AOP-016)

Time

Position

Applicant's Actions or Behavior

AOP-016	RO	Verify All Letdown Flowpaths Isolated As Follows: <ul style="list-style-type: none"> • LCV-460A & B, LTDN LINE STOP Valves - CLOSED • HIC-142, PURIFICATION FLOW Controller - ADJUSTED TO 0% • HIC-137, EXCESS LTDN FLOW Controller - ADJUSTED TO 0% • CVC-387, EXCESS LTDN STOP - CLOSED
AOP-016	RO	Check RCS Level - LOWERING IN AN UNCONTROLLED MANNER (YES)
AOP-016	RO	Check RCS Pressure – GREATER THAN 1000 PSIG (YES)
AOP-016	CRS	Directs the RO to the Trip the reactor, initiate safety injection and go to EOP-E-0.
EXAMINER'S NOTE: A Large Break LOCA will be inserted when the Reactor Trip pushbutton is depressed.		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 47 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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EOP-E-0, Reactor Trip or Safety Injection		
EOP-E-0	RO	Immediate Action Steps Check Reactor tripped (YES)
EOP-E-0	BOP	Immediate Action Steps Check Turbine Trip: <ul style="list-style-type: none"> a. Both turbine stop valves - Closed (YES) b. Close MSR purge and shutoff valves (Manual action required by BOP)
EOP-E-0	BOP	Immediate Action Steps Check Power to AC Emergency Busses: <ul style="list-style-type: none"> a. E1 or E2 – At least one energized (YES) b. E1 and E2 – Both energized (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 48 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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EOP-E-0	RO	Immediate Action Steps Check SI Status: a) Check if SI is actuated: <ul style="list-style-type: none"> • SI annunciators – ANY ILLUMINATED (YES) • SI equipment – AUTO STARTED (YES) b) Check BOTH trains of SI – ACTUATED <ul style="list-style-type: none"> • SI pumps – BOTH RUNNING (NO) • RHR pumps – BOTH RUNNING (NO) RNO: Manually actuate BOTH trains of SI (Candidate may start both "A" SI Pump and "A" RHR Pump at this time or wait until Att. 1.)
EOP-E-0	CRS	Verifies all immediate actions for EOP-E-0. Announce <u>Adverse numbers</u> are in effect due to CV Pressure Greater than 4 psig .

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 49 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time

Position

Applicant's Actions or Behavior

Critical Task	CRS	<p>FOLDOUT for EOP-E-0 is in effect</p> <p><u>RCP Trip Criteria</u></p> <p>IF either condition listed below occurs, THEN trip all RCPs: (YES)</p> <ul style="list-style-type: none"> Containment Isolation Phase B – ACTUATED (YES) <p>OR</p> <ul style="list-style-type: none"> BOTH of the following satisfied: <ul style="list-style-type: none"> SI pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW (YES, "B" SI Pump is running) <p>AND</p> <ul style="list-style-type: none"> RCS subcooling based on core exit TCs - LESS THAN 30°F [50°F] (YES)
<p>CRITICAL TASK – STOP ALL RCPs within 6 minutes of Reaching the RCP Trip Criteria of less than 50°F subcooling.</p>		
<p>EXAMINER'S NOTE: Crew may take early actions at this time to address items that did not function or operate as designed.</p> <ul style="list-style-type: none"> Manually start "A" SI Pump and "A" RHR Pump Place CR HVAC in Emergency Pressurization Mode Manually start "A" CV Spray Pump 		
EOP-E-0	CRS	<p>Perform Attachment 1, Auto Action Verification, While continuing with this procedure. (Should be assigned to BOP.) (Att. 1 steps are presented next followed by the remainder of EOP-E-0.)</p>

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 50 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Beginning of EOP-E-0 Attachment 1 (Remainder of EOP-E-0 Follows this Section)		
<u>CAUTION</u> If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.		
Att. 1 Critical Task	BOP	Check ECCS Pumps Running: <ul style="list-style-type: none"> • SI pumps - BOTH RUNNING (NO, Starts "A" SI Pump) • RHR pumps - BOTH RUNNING (NO, Starts "B" RHR Pump)
CRITICAL TASK – START "A" SI PUMP PRIOR TO ANNOUNCING COMPLETION OF EOP-E-0 ATTACHMENT 1		
EXAMINER'S NOTE: "B" RHR Pump will trip 10 seconds after starting "A" RHR Pump.		
Att. 1	BOP	Check ECCS Valves - PROPER EMERGENCY ALIGNMENT (YES)
Att. 1	BOP	Check CCW Pumps - AT LEAST ONE RUNNING (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 51 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Att. 1	BOP	<p>Check Containment Isolation Phase A</p> <ul style="list-style-type: none"> a. Phase A – Actuated (YES) b. Phase A valves – Closed (YES) c. Excess letdown – Isolated (YES) <ul style="list-style-type: none"> • CVC-387 – Closed (YES) • HIC-137 – at 0% DEMAND (YES)
Att. 1	BOP	<p>Check Feedwater Isolation:</p> <ul style="list-style-type: none"> a) Main feed pumps – BOTH TRIPPED (YES) b) Main feedwater – ISOLATED <ul style="list-style-type: none"> • FRVs – Closed (YES) • Feedwater reg bypass valves – Closed (YES) • Feedwater header section valves – Closed (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 52 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Att. 1	BOP	<p>Check if Main Steamlines Should Be Isolated:</p> <ul style="list-style-type: none"> a) Main steamline isolation – REQUIRED (YES) <ul style="list-style-type: none"> • Containment pressure – Greater than 10 psig (YES) <p>OR</p> • High steam flow with: (NO) <ul style="list-style-type: none"> ○ S/G pressure – less than 614 psig <p>OR</p> ○ Tavg – less than 543°F b) Check MSIVs and MSIV bypass valves – CLOSED (YES)
Att. 1	BOP	<p>Check Proper Service Water System Operation:</p> <ul style="list-style-type: none"> a. SW pumps – All running (YES) b. SW booster pumps – Both running (YES) c. Both SW header low pressure alarms (APP-008-F7/F8) – Extinguished (YES)
Att. 1	BOP	Check Both EDGs – Running (YES)
Att. 1	BOP	<p>Check ECCS Flow:</p> <ul style="list-style-type: none"> a. RCS pressure – less than 1700 psig (YES) b. SI pumps- Flow Indicated (YES) c. RCS pressure – less than 350 psig. (YES) d. RHR – Flow Indicated (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 53 of 69Event Description: **Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)**

Time	Position	Applicant's Actions or Behavior
Att. 1	BOP	Check CV Recirculation Fans – All Running (YES, all available)
Att. 1	BOP	Check IVSW - Actuated (YES) <ul style="list-style-type: none"> • PCV-1922A – Open (YES) • PCV-1922B – Open (YES)
Att. 1	BOP	Check CV ventilation isolation (YES) <ul style="list-style-type: none"> a. CV ventilation isolation valves – CLOSED (YES)
Att. 1	BOP	Check control room ventilation - aligned for pressurization mode (YES) <ul style="list-style-type: none"> • HVA-1A or HVA-1B – Running (YES) • HVE-16 – Stopped (YES) • HVE-19A or HVE-19B – Running (NO, starts HVE-19A or HVE-19B) • Control Room HVAC outside air damper A or B – Open (YES) • CR-D1A-SA – Closed (YES) • CR-D1B-SB – Closed (YES)
Att. 1	BOP	Check DS Bus – Energized (YES)
Att. 1	BOP	Check Battery Chargers – Energized (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 54 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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		APP-036-D1 – Extinguished (YES) APP-036-D2 – Extinguished (YES)
Att. 1	BOP	Stop R-11/12 Sample Pump
Att. 1	BOP	Locally Reset and Load IACs as necessary (N/A)
Att. 1	BOP	Perform Crew Update to include the following: <ul style="list-style-type: none"> • Attachment Completion • Manual Actions Taken (Started “A” SI, RHR and CV Spray Pumps, Placed CR HVAC in Emergency Pressurization Mode) • Failed Equipment status (“B” RHR Pump and “B” CV Spray Pump have tripped.) • SW status (All operating with exception of “B” SWBP)
End of EOP-E-0 Attachment 1		

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 55 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Continuation of EOP-E-0

EOP-E-0	RO	Check AFW Pumps – Running (ALL running)
EOP-E-0	RO	Check AFW Valves – Proper Emergency Alignment (YES) <ul style="list-style-type: none"> • AFW header discharge valves – Full Open (YES) • AFW header section valves – Full Open (YES) • Steam driven AFW pump discharge valves – Full open if pump is running. (YES)
EOP-E-0	RO	Check Total AFW Flow: <ul style="list-style-type: none"> • Reset SI • Control feed flow to maintain NON-faulted S/Gs narrow range level – Between 18% and 50%. • Check total AFW flow- Greater than 300 gpm (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 56 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Critical Task	RO	<p>Check CV Spray NOT Required:</p> <p>a. CV pressure – Has remained less than 10 psig. (NO)</p> <p>RNO: Perform the following</p> <p>1) Check CV spray actuated. (YES, all actuated except "A" CV Spray Pump)</p> <p style="padding-left: 40px;">IF CV spray is NOT actuated, THEN manually actuate BOTH trains of CV spray.</p> <p>2) Verify the following:</p> <p>a) Both CV spray pumps are running. (NO, manually starts "A" CV Spray Pump, "B" CV Spray Pump Tripped)</p> <p>b) CV spray pump discharge valves are open: (YES)</p> <ul style="list-style-type: none"> • SI-880A • SI-880B • SI-880C • SI-880D <p>c) CV spray additive tank discharge valves are open: (YES)</p> <ul style="list-style-type: none"> • SI-845A • SI-845B <p>d) Spray additive tank flow is approximately 12 gpm:</p> <ul style="list-style-type: none"> • Adjust SI-845C, SAT throttling valve, as necessary. <p>3) Verify Containment Isolation Phase B valves are closed. (YES)</p> <p>4) Stop all RCPs.</p> <p>5) Observe CAUTION prior to Step 10 and Go To Step 10.</p>
		CRITICAL TASK – START "A" CV SPRAY PUMP PRIOR TO EXITING EOP-E-0

Op Test No.:	ILC-13 NRC	Scenario #	1	Event #	7 - 12	Page	57	of	69
Event Description:		Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-0	RO	<p>Check RCP Seal Cooling:</p> <ul style="list-style-type: none"> • CCW flow to RCP thermal barriers – Normal (NO) <ul style="list-style-type: none"> ○ APP-001-C1 / D1 – Extinguished (NO) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Seal injection flow – Normal (YES) <ul style="list-style-type: none"> ○ Seal injection flow – Greater than 6 gpm per RCP <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> ○ Thermal barrier ΔPs – Greater than 5 inches water.
BOOTH OPERATOR: As requested, adjust CVC-297A,B,C as necessary to control RCP seal injection flow using the P&ID function.		
EOP-E-0	RO	<p>Check RCS Temperature</p> <p>With NO RCPs running, RCS cold leg temperatures – Stable at or trending to 547°F (NO)</p> <p>RNO: IF temperature is less then 547°F AND lowering then perform the following: (YES)</p> <ol style="list-style-type: none"> a. Stop dumping steam b. IF cooldown continues, THEN reduce total feed flow to minimum for decay heat removal: <ul style="list-style-type: none"> ○ Maintain total feed flow greater than 300 gpm until narrow range level is greater than 18% in at least one S/G. c. IF cooldown continues, THEN close MSIVs and MSIV bypass valves. (MSIVs automatically closed due to Large Break LOCA)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 58 of 69Event Description: **Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)**

Time	Position	Applicant's Actions or Behavior
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EOP-E-0	RO	Check PZR PORVs and Spray Valves: <ul style="list-style-type: none"> a. PORVs – Closed (YES) b. Normal PZR spray valves – Closed (YES) c. Aux spray valve – Closed (YES)
EOP-E-0	RO	Check If RCPs should be stopped: <ul style="list-style-type: none"> a. RCPs – Any Running (NO, stopped per FOLDOUT) RNO: Go to Step 14
EOP-E-0	BOP	Step 14: Check if S/G Secondary Pressure Boundaries are Intact: <ul style="list-style-type: none"> a. Check pressures in all S/Gs <ul style="list-style-type: none"> ○ None lowering in an uncontrolled manner (YES) ○ None Completely depressurized (YES)
EOP-E-0	BOP	Check if S/G Tubes are Intact: <ul style="list-style-type: none"> • Secondary radiation monitors – Have Remained Normal (YES) <ul style="list-style-type: none"> • R-15 • R-19s • R-31s • S/G levels – None Rising in an Uncontrolled Manner. (YES)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 59 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
EOP-E-0	RO	<p>Check if RCS is Intact: (NO)</p> <ul style="list-style-type: none"> • CV radiation – Normal (NO) <ul style="list-style-type: none"> ○ R-2 ○ R-32A/B • CV pressure – Normal (NO) • CV sump level – Normal (NO) <p>RNO: Reset SPDS and initiate monitoring of CSFSTs. Go to EOP-E-1, Loss of Reactor or Secondary Coolant, Step 1. (Crew will identify that a RED Terminus exists for RCS Integrity and transition to FRP-P.1)</p>
FRP-P.1	CRS	Determines that FRP-P.1, Response to Imminent Pressurized Thermal Shock , must be entered.
FRP-P.1	BOP	Check CST Level – Less than 10%
FRP-P.1	RO	<p>Determine if RCS cooldown is due to a Large Break LOCA as follows:</p> <ol style="list-style-type: none"> a. Check both of the following conditions exist: <ul style="list-style-type: none"> • RCS pressure – LESS THAN 350 PSIG (YES) <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • RHR flow on FI-605 – GREATER THAN 1200 GPM (YES) b. Reset SPDS and return to procedure and step in effect. (Returns to EOP-E-0)

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 60 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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EOP-E-0	CRS	Determines that entry into EOP-E-1 is now warranted.
Beginning of EOP-E-1, Loss of Reactor or Secondary Coolant		
EOP-E-1	CRS	NOTE FOLDOUT for EOP-E-1 is in effect. (None applicable.)
EOP-E-1	RO	Check If RCPs should be stopped: a. RCPs – Any Running (NO, stopped per EOP-E-0 FOLDOUT) RNO: Go to Step 2
EOP-E-1	BOP	Check if S/G Secondary Pressure Boundaries are Intact: a. Check pressures in all S/Gs o None lowering in an uncontrolled manner (YES) o None Completely depressurized (YES)
EOP-E-1	BOP	Continuous Action Step Check Intact S/G Levels: a. Narrow range levels – Greater than 18% (YES) b. Control feed flow to maintain narrow range levels – between 18% AND 50%

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 61 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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CAUTION

If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-1	RO	Reset SI
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EOP-E-1	RO	Reset Containment Isolation Phase A
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EXAMINER'S NOTE: "A" RHR Pump will trip ten seconds after resetting Containment Isolation Phase A

BOOTH OPERATOR: If dispatched to investigate cause of RHR Pump trips, wait 5 minutes and rack out the "B" RHR Pump Breaker IAW SCN File. If "A" RHR pump is requested state that the breaker would not rack out and are attempting to restore "B" RHR Pump.

EOP-E-1	BOP	<p>Check Secondary Radiation:</p> <ul style="list-style-type: none"> a. Secondary radiation monitors – Have remained normal (YES) <ul style="list-style-type: none"> o R-15, R-19s, R-31s b. Perform the following: <ul style="list-style-type: none"> 1) Request periodic activity samples of all S/Gs 2) Secondary sample results – Normal (When results available)
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Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 62 of 69Event Description: **Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)**

Time	Position	Applicant's Actions or Behavior
EOP-E-1	RO	Check PZR PORVs and Block Valves: <ul style="list-style-type: none"> a. Power to block valves – Available (YES) b. PORVs – Closed (YES) c. Block valves – At least one open. (YES)
EOP-E-1	RO	Establish Instrument Air to CV: <ul style="list-style-type: none"> a. Check APP-002-F7 – Extinguished (YES) b. Reset IA PCV-1716 c. Check IA PCV-1716 – OPEN (YES)
EOP-E-1	RO	Check Power Supply to Charging Pumps – Offsite power available (YES)
EOP-E-1	RO	Check if Charging Flow has been established: <ul style="list-style-type: none"> a. Charging pumps – At least one running. (YES) b. Establish desired charging flow: <ul style="list-style-type: none"> ○ Start additional pump(s) as necessary ○ Adjust charging pump speed controllers as necessary to establish desired charging flow. ○ Adjust HIC-121 as necessary to establish desired charging flow: <ul style="list-style-type: none"> ○ Maintain seal injection flow – Between 6 gpm and 20 gpm per RCP unless seal injection isolated.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 63 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time

Position

Applicant's Actions or Behavior

EOP-E-1	RO	<p>Check if SI flow should be terminated:</p> <p>a. RCS subcooling base on core exit TCs – Greater than 55°F (NO, Go to Step 12.)</p>
EOP-E-1	RO	<p>Continuous Action Step</p> <p>Step 12: Check if Containment Spray should be stopped:</p> <p>a. Spray pump – Any running (YES)</p> <p>b. Containment pressure – Less than 4 psig (NO, depending on scenario timeline and how quickly "A" CV Spray pump is started.)</p> <p>RNO: Perform the following: (for NO response to step 12.b above)</p> <p>1) When containment pressure is less than 4 psig, then do steps 12.c through 12.g.</p> <p>2) Observe Caution prior to Step 13 and Continue with Step 13.</p> <p>The following steps are for when/if Containment pressure lowers below 4 psig.</p> <p>c. Reset containment spray signal: Place Containment Spray key switch to OVRD/RESET and return to NORMAL</p> <p>d. Reset containment isolation Phase B</p> <p>e. Stop containment spray pumps</p> <p>f. Close CV Spray Pump Discharge Valves: SI-880A / B / C / D</p> <p>g. Close CV Spray Additive Tank Discharge Valves: SI-845A / B</p>

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 64 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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CAUTION

If RCS pressure lowers in an uncontrolled manner to less than 275 psig [350 psig], the RHR pumps must be manually restarted to supply water to the RCS.

EOP-E-1	RO	Continuous Action Step Step 13: Check if RHR Pumps Should be Stopped: <ul style="list-style-type: none"> a. Check RCS pressure: <ul style="list-style-type: none"> o Pressure – Greater than 350 psig (NO, go to step 15)
EOP-E-1	BOP	Step 15: Check if Diesel Generators should be Stopped: <ul style="list-style-type: none"> a. AC emergency busses – Energized by Offsite Power (YES) <ul style="list-style-type: none"> o E-1 o E-2 b. EDG starting air annunciators – Extinguished (YES) <ul style="list-style-type: none"> o APP-010-B2 / B3 c. Stop unloaded EDGs
EOP-E-1	RO	Initiate Evaluation of Plant Status: <ul style="list-style-type: none"> a. Check Cold leg recirculation capability: <ul style="list-style-type: none"> • Train A and Train B: <p>Crew determines that neither “A” or “B” RHR Pumps are AVAILABLE</p>

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 65 of 69Event Description: Large Break LOCA on Reactor Trip (**EOP-E-0, EOP-E-1, EPP-15**)

Time	Position	Applicant's Actions or Behavior
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EOP-E-1	CRS	Crew determines that at least ONE train of cold leg recirculation capability can NOT be verified, and resets SPDS and transitions to EPP-15, Loss of Emergency Coolant Recirculation , Step 1.

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 66 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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Beginning of EPP-15, Loss of Emergency Coolant Recirculation

EPP-15	BOP	Continuous Action Step Check Emergency Coolant Recirculation Capability – Restored (NO) RNO: If Emergency Coolant Recirculation is restored, THEN perform Step 2. Go to Step 3.
EPP-15	RO	Reset SPDS and Initiate Monitoring of CSFSTs.
EPP-15	CREW	Foldout Pages are not applicable during performance of this procedure.
EPP-15	RO	Continuous Action Step Check Suction Source to Any of The following Pumps – Lost (NO, go to step 7) SI Pumps, RHR Pumps, CV Spray Pumps
EPP-15	BOP	Step 7: Check Emergency Recirculation Equipment – Available Using Supplement D (NO) RNO: Try to restore at least one train while continuing with this procedure.
EPP-15	RO	Verify the following CV Recirc Fans – Running (NO, HVH-4 is OOS) HVH-1, 2, 3, 4

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 67 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
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EPP-15	RO	Continuous Action Step Check RWST Level – Less than 9%. (NO, go to step 11)																		
EPP-15	RO	Step 11: Place the Containment Spray Key Switch to the OVRD/REST Position																		
EPP-15	RO	Determine CV Spray Pump Requirements																		
		Determine Number of CV Spray Pumps Required using the following Table:																		
		<table><tr><th>RWST</th><th>Containment Pressure</th><th>Fan Coolers Running</th><th>Spray Pumps Required</th></tr><tr><td rowspan="5">Greater than 27%</td><td>Greater than 42 psig</td><td>--</td><td>2</td></tr><tr><td rowspan="3">Between 4 psig and 42 psig</td><td>0 or 1</td><td>2</td></tr><tr><td>2 or 3</td><td>1</td></tr><tr><td>4</td><td>0</td></tr><tr><td>Less than 4 psig</td><td>--</td><td>0</td></tr></table>	RWST	Containment Pressure	Fan Coolers Running	Spray Pumps Required	Greater than 27%	Greater than 42 psig	--	2	Between 4 psig and 42 psig	0 or 1	2	2 or 3	1	4	0	Less than 4 psig	--	0
		RWST	Containment Pressure	Fan Coolers Running	Spray Pumps Required															
		Greater than 27%	Greater than 42 psig	--	2															
			Between 4 psig and 42 psig	0 or 1	2															
				2 or 3	1															
				4	0															
			Less than 4 psig	--	0															
		Determines that 1 CV Spray Pump is required.																		
Examiner’s Note: Depending on scenario timeline and how quickly “A” CV Spray pump was started Containment pressure could be less than 4 psig. IF this is the case then the crew would determine that 0 Spray Pumps are required.																				

Op Test No.: ILC-13 NRC Scenario # 1 Event # 7 - 12 Page 68 of 69Event Description: Large Break LOCA on Reactor Trip (EOP-E-0, EOP-E-1, EPP-15)

Time	Position	Applicant's Actions or Behavior
EPP-15	RO	<p>Check CV Spray Pumps Running – Equal to Number Required</p> <p>(Depends on scenario timeline and timeliness of operator actions. If Containment pressure is between 4 psig and 42 psig then no actions will be taken. If Containment pressure is less than 4 psig then the following actions will be taken, if not previously performed in EOP-E-1.)</p> <p>RNO: <u>IF</u> a CV Spray Pump is required to be stopped, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Stop CV Spray Pump to equal number required. (Stops "A" CV Spray Pump.) 2) Close the discharge valves of any stopped CV Spray Pump(s): <ul style="list-style-type: none"> • CV Spray Pump A: SI-880A / B • CV Spray Pump B: SI-880C / D
BOOTH OPERATOR: Remove the Malfunction for "B" RHR pump and Rack In "B" RHR pump breaker IAW SCN file and notify the Control Room that Electrical Maintenance personnel have replaced the "B" RHR Pump breaker with a spare breaker. "B" RHR Pump breaker had a failed amptector. Request that the control room reset the breaker and attempt to restart "B" RHR Pump.		
EPP-15	RO	Starts "B" RHR Pump.
EPP-15	CRS	Determines that transition to EOP-E-1 Step 16 is warranted.
The Chief Examiner may terminate the scenario at his discretion or once it has been identified that transition out of EPP-15 is allowed.		

ILC-13 NRC SCENARIO 1 TURNOVER SHEET

1. INITIAL CONDITIONS

- a) Time in Core Life: MOL
- b) Reactor Power: 100%
- c) Turbine Load: 778.5 MWe
- d) Boron Concentration: 848 ppm
- e) Rod Height: 218 CBD
- f) RCS Pressure: 2235 psig
- g) RCS Level: 53.2 %
- h) Xenon: Equilibrium

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
3.7.6 Cond. A	Restore required CCW train to Operable status within 72 hours.
3.6.6 Cond. C	Restore containment cooling train to Operable status within 7 days AND 10 days from discovery of failure to meet the LCO.

3. CLEARANCES IN EFFECT

- a) "C" CCW OOS for mechanical seal repair. OOS for 6 hours with estimated RTS in 24 hours.
- b) HVH-4 OOS for abnormal motor vibrations. OOS for 24 hours. Available for emergency use only.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" and "B" CCW Pumps, "A" and "B" CCW Pump RTGB Control Switches, "A" CCW Pump Breaker 480V-DS 52/34B and "B" CCW Pump Breaker 480V-E1 52/22C.

6. DEGRADED EQUIPMENT

- a) None

7. SWITCHYARD ACCESS

- a) Unrestricted

8. PLANNED EVOLUTIONS

- a) Maintain current power level

9. TURNOVER INFORMATION

- a) Thunderstorms in the area. High heat load has resulted in all planned maintenance being deferred to a later date.

10. REACTIVITY INFORMATION

- a) Review the OST-947 MOL charts for BA and PW additions

11. RISK

- a) GREEN

Facility:	HB ROBINSON		Scenario No.:	2	Op Test No.:	ILC-13
Examiners:	_____		Operators:	CRS -	_____	
	_____			RO -	_____	
	_____			BOP -	_____	
Initial Conditions:	<ul style="list-style-type: none"> • 68% EOL, 15,697 MWD/MTU, 139 PPM Boron. • CCW Pump "C" is OOS and breaker is racked out • HVH-4, CV Recirc Fan, is OOS and breaker is racked out • Thunderstorms in the area. High Heat Load has resulted in all planned maintenance being deferred to a later date. 					
Turnover:	<ul style="list-style-type: none"> • Maintain power at current level while RES is monitoring "A" MFP. 					
Critical Task:	<ul style="list-style-type: none"> • Open either SI-870A or SI-870B to establish SI flow. • Isolate Auxiliary Feedwater to "C" S/G. • Isolate Ruptured / Faulted "C" S/G • Terminate SI flow to control Ruptured S/G Level and Pressure 					
Event No.	Malf. No.	Event Type*	Event Description			
1		(C) BOP, CRS	HVH-9A Trips with HVH-9B failure to Auto-Start			
2		(R) RO, CRS (N) BOP, CRS	"A" MFP Trips / Load Reduction			
3		(TS) CRS	Clogged RCP Seal Injection Strainer			
4		(I) RO, CRS	PT-145 fails Low / Place Excess Letdown in Service			
5		(I) BOP, CRS (TS) CRS	PT-495 fails Low			
6		(M) ALL	72 inch Main Steam Header Fault			
7		ALL	"C" S/G Tube Rupture once S/G has dried out			
8		BOP	Main Turbine fails to Auto-Trip on Reactor Trip			
9		RO	SI-870A/B fail to Auto-Open			
10		BOP	"A" and "B" MSIV fail to Auto-Close and "C" MSIV has failed open			
11		BOP	Feed Header Section Isolation Valves fail to Auto-Close			
12		BOP	"A" MDAFW Pump fails to Auto-Start			
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor						

ILC-13 NRC SCENARIO 2 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 68% RTP. Engineering has requested that power be held at 68% while monitoring the recently replaced motor on "A" MFP. Additionally, Maintenance is currently in progress on Component Cooling Water Pump C for pump mechanical seal replacement. HVH-4 is Out of Service due to Excessive Motor Vibrations. Repairs on HVH-4 are on hold awaiting parts. Thunderstorms in the area. High Heat Load has resulting in no planned maintenance being performed.

On cue from the Chief Examiner, HVH-9A, CV Concrete Shield Cooling Fan, trips and HVH-9B fails to Auto-Start. The operator will verify the standby fan starts by manually starting HVH-9B from the RTGB in accordance with APP-010-A7, HVH-9A/B AIR FLOW LOST/OVLD. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, "A" Main Feed Pump will trip. The crew will perform the immediate actions of AOP-010, Main Feedwater / Condensate Malfunction. While performing the remaining actions of AOP-010 the crew will determine that Reactor Power is required to be lowered to less than 60% Reactor Power. The crew will perform the load reduction in accordance with AOP-010 and OP-301, RCS Boration Quick Checklist. Once the Chief Examiner is satisfied with the crew's actions to perform a controlled reduction in power and stabilize the plant, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, the RCP Seal Injection Strainer will become clogged. The crew will determine the strainer is clogged by observing a reduction in RCP seal injection flow to zero flow along with receiving APP-001-A2, Seal Water Injection Filter High ΔP , APP-001-B4, RCP Seal Injection HI/LO Flow, and APP-001-B3, RCP A Bearing HI Temperature. APP-001-A2 will direct the crew to dispatch an auxiliary operator to check Seal Water Injection Filter ΔP and will ultimately direct the crew to have the auxiliary operator shift seal injection filters using OP-301. The CRS will enter AOP-018, Reactor Coolant Pump Abnormal Conditions, and enter Section C, Loss of Seal Injection. AOP-018 will also diagnose the event as a clogged strainer and direct the crew to shift seal injection filters. Once the seal injection filters are shifted the RCP seal injection flows will return to normal. While seal injection flow is less than 6 gpm to any RCP the CRS will determine that ITS LCO 3.4.17, Condition E, is applicable since seal injection to any RCP is not within limit with at least one charging pump operable. The required action is to initiate action to restore seal injection to affected RCPs immediately and be in Mode 3 in 6 hours and Mode 5 in 36 hours. Once the Chief Examiner is satisfied with the crew's actions to restore seal injection flow and demonstrate Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, Pressure Transmitter PT-145 for Letdown Line Pressure will fail LOW, causing PCV-145 to close and isolate letdown flow. AOP-025, RTGB Instrument Failure, Section A will be implemented to isolate the letdown line, reduce charging flow and place Excess Letdown in service. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, PT-495, Main Steam Line "C" Pressure Transmitter, will fail low. The BOP will perform immediate actions of AOP-025, RTGB Instrument Failure, Section G, and take manual control of FCV-498, "C" S/G Feed Regulating Valve, and restore "C" S/G level to the normal band. The crew will then take action to swap to the alternate channel, place the "C" FRV back in Automatic and remove PT-495 from service in accordance with OWP-025,

SGP-11. Due to the failure of PT-495, ITS Table 3.3.1 Table 3.3.1-1 Item 14 which requires 2 Steam Flow / Feedwater Flow Mismatch Channels to be operable will not be met and require entry into ITS 3.3.1 Condition E, which requires the channel to be placed in trip with 6 hours OR be in Mode 3 in 12 hours. Due to the failure of PT-495, ITS Table 3.3.2-1, Items 1.e which requires 3 Steam Line High Differential Pressure between Steam header and Steam Lines Channels to be operable will not be met and require entry into ITS 3.3.2 Condition D. Also due to the failure of PT-495, ITS Table 3.3.3-1, Item 20 which requires 2 Steam Generator Pressure Channels per S/G to be operable will be reviewed and determined to be met. ITS Table 3.3.6.1 Item 4 will also be reviewed and determined to be applicable due to affecting Safety Injection ESFAS Instrumentation associated with Containment Ventilation Isolation Instrumentation. Once the Chief Examiner is satisfied with the crew's actions and Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, the plant will experience a fault on the 72 inch Main Steam Header. The crew will determine that a reactor trip is required and transition to EOP-E-0, Reactor Trip or Safety Injection. An automatic safety injection signal will be initiated due to high steam line flow with low Tav_g. During the immediate actions of EOP-E-0 it will be determined that the Turbine failed to automatically trip and manual actions will be taken to trip the turbine from the RTGB. During further actions of EOP-E-0 it will be discovered that SI-870A and B, BIT Outlets, fail to automatically open and have to be manually opened from the RTGB in order to provide safety injection flow. All Main Steam Isolation Valves will fail to automatically close and manual actions will be taken to close them from the RTGB. "C" MSIV will remain failed in the open position. V2-6A, B, and C, Feedwater Header Section Valves, will fail to automatically close and will have to be manually closed from the RTGB. "A" Motor Driven Auxiliary Feedwater Pump will fail to automatically start and will be manually started from the RTGB. Once "C" S/G has dried out a 400 gpm tube rupture will ramp in over 60 seconds on "C" S/G. The crew will complete EOP-E-0 and transition to EOP-E-2, Faulted Steam Generator Isolation, and perform the actions to isolate "C" S/G. The crew may choose to perform Supplement G to isolate "C" S/G prior to transitioning to EOP-E-2. Supplement G will direct performance of Supplement N. Once "C" S/G is isolated the crew will then transition to EOP-E-3, Steam Generator Tube Rupture, due to elevated readings on R-31C, Main Steam Line Channel, and continued steam flow from "C" S/G. Since "C" MSIV cannot be closed the crew will direct local isolation of "C" S/G. Ultimately the crew will transition to EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery, and secure all but one RCP and both Safety Injection pumps.

The Chief Examiner may terminate the scenario at any time after one safety injection pump has been secured in accordance with EPP-17.

Sat / Unsat	Critical Task	Critical Task Criteria
	Open either SI-870A or SI-870B to establish SI flow.	Open SI-870A OR SI-870B Prior to Completing EOP-E-0 Attachment 1.
	Isolate Auxiliary Feedwater to "C" S/G.	Isolate Auxiliary Feedwater to "C" S/G within 10 minutes of entering EOP-E-0.
	Isolate Ruptured / Faulted "C" S/G	Isolate "C" S/G Prior to Transition from EOP-E-3 at Step 5 of EOP-E-3.
	Terminate SI flow to control Ruptured S/G Level and Pressure	Terminate SI Flow in Accordance with EPP-17 Step 38.

ILC-13 NRC SCENARIO 2 SIMULATOR SETUP**IC/SETUP:**

- IC-902, SCN 006_ILC_13_NRC_2.
- Status board is provided to crew is IC-17.

PRE-LOADED EVENTS:

The following events should occur on the reactor trip or triggered events following the reactor trip:

- Event 7: "C" S/G Tube Rupture once S/G has dried out
- Event 8: Main Turbine fails to Auto-Trip on Reactor Trip
- Event 9: SI-870A/B fail to Auto-Open
- Event 10: "A" and "B" MSIV fail to Auto-Close and "C" MSIV has failed open
- Event 11: Feed Header Section Isolation Valves fail to Auto-Close
- Event 12: "A" MDAFW Pump fails to Auto-Start

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

- Event 1: HVH-9A Trips with HVH-9B failure to Auto-Start
- Event 2: "A" MFP Trips / Load Reduction
- Event 3: Clogged RCP Seal Injection Strainer
- Event 4: PT-145 fails Low / Place Excess Letdown in Service
- Event 5: PT-495 fails low
- Event 6: 72 inch Main Steam Header Fault

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- APP-010
- AOP-010
- APP-001
- AOP-018
- AOP-025, Section A
- AOP-025, Section G
- OWP-025, SGP-11
- EOP-E-0
- Supplement G (Optional)
- Supplement N (Optional)
- EOP-E-2
- EOP-E-3
- EPP-17

Op Test No.: ILC-13 NRC Scenario # 2 Event # 1 Page 6 of 59

Event Description: HVH-9A, Concrete Cooling Fan, Trips with HVH-9B, Concrete Cooling Fan, failure to Auto Start (**APP-010-A7**)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed, insert Event 1, HVH-9A Trips with HVH-9B failure to Auto Start

EVENT INDICATIONS:

APP-010-A7, HVH-9A/B AIR FLOW LOST/OVLD, is illuminated

HVH-9A RTGB GREEN OFF and RED ON light illuminated

	BOP / RO	Acknowledges alarm and references APP-010-A7 .
	BOP	IF the operating fan has tripped, THEN VERIFY the standby fan starts. Starts HVH-9B
	BOP	IF the operating fan has NOT tripped, THEN PERFORM the following: (The operating fan DID trip, therefore this step is not applicable.)
	BOP	IF the annunciator is NOT clear, THEN PERFORM the following: <ol style="list-style-type: none"> 1) DISPATCH an I&C Technician to measure RMS AMPs for the operating fan. 2) IF RMS AMPs are significantly less than nominal current (24-26 AMPs), THEN ASSUME that air flow has been lost. 3) IF the fan continues to run with nominal current, THEN INITIATE hourly monitoring of current.
	BOP	IF air flow from at least one fan can NOT be restored, THEN perform the following: (HVH-9B was started , therefore step not applicable.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 1 Page 7 of 59

Event Description: HVH-9A, Concrete Cooling Fan, Trips with HVH-9B, Concrete Cooling Fan, failure to Auto Start (**APP-010-A7**)

Time	Position	Applicant's Actions or Behavior
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	BOP	IF a single-phase open circuit condition is suspected THEN ENTER AOP-026, Grid Instability. (Per Step 2 under Observations the BOP should: Monitor the following ERFIS Points for BOTH Emergency Bus Voltages, ELV3020A for E-1 and ELV3021A for E-2 (Voltage less than 440 Volts may indicate a single-phase open circuit condition.)
BOOTH OPERATOR: If contacted to determine is a single-phase open circuit condition is suspected, acknowledge the request. Wait 10 minutes and report that with Engineering assistance you have determined that a single-phase open circuit condition is not suspected.		
	CRS	Notifies WCC SRO of HVH-9A trip. Direct Work Request initiated and I&C contacted to begin troubleshooting.
	CRS	Notifies Operations Management.
BOOTH OPERATOR: Insert Event #2 (MFP A Trips) on cue from the Chief Examiner.		

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	2	Page	8	of	59
Event Description:		MFP A Trips / Load Reduction (AOP-010)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 2, MFP A Trips.

EVENT INDICATIONS:

Feed Flow and S/G Level Transients on all S/Gs.

APP-007-A3, FW PMP A MOTOR OVLD/TRIP, illuminated

MFP A indicates OFF

Multiple APP-006, S/G Systems, alarms

	BOP	AOP-010 MAIN FEEDWATER/CONDENSATE MALFUNCTION Immediate Action Step Check Feedwater Regulating Valves - OPERATING PROPERLY (MANUAL OR AUTO): (YES) <ul style="list-style-type: none"> FCV-478 FCV-488 FCV-498
	RO	Continuous Action Step Check Reactor Trip Setpoint - BEING APPROACHED (NO) <ul style="list-style-type: none"> IF a Reactor Trip Setpoint is approached, THEN trip the Reactor and Go to EOP-E-0. Go to Step 4.
	SRO	Enters AOP-010, Main Feedwater / Condensate Malfunction
	SRO	Verifies immediate actions complete.

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	2	Page	9	of	59
Event Description:		MFP A Trips / Load Reduction (AOP-010)							
Time	Position	Applicant's Actions or Behavior							

	CREW	Step 4: Make PA Announcement for Procedure Entry
APP-007-A3	RO	APP-007-A3, Step 4: At 4KV Bus 1, Cube #9, CHECK all three phases of bus voltage for indication of a single-phase open circuit. (RO will dispatch an AO to the 4 KV room to make this check.)
BOOTH OPERATOR: IF / WHEN dispatched to the 4 KV room, wait 5 minutes and then report that all three phases on MFP "A" indicate tripped.		
	BOP	Go to the appropriate Step from the Table Below: <ul style="list-style-type: none"> Main Feed Pump Trip – Step 6
	RO	Step 6: Check Reactor Power – Less than 70% (YES)
	RO	Check Reactor Power – Greater than 60% (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 10 of 59Event Description: MFP A Trips / Load Reduction (AOP-010)

Time

Position

Applicant's Actions or Behavior

NOTE

Rapid power reductions may result in the axial flux difference exceeding the operating band values and require a power reduction to less than 50% to comply with ITS 3.2.3 Condition C.

	CREW	<p>Reduce Turbine Load At 1%/MIN To 5%/MIN To Achieve Less Than 60% Reactor Power as follows:</p> <ol style="list-style-type: none"> Verify Rods in AUTOMATIC. (YES) Check Turbine Control Mode – AUTOMATIC <ol style="list-style-type: none"> Depress the IMP IN Pushbutton Set the Desired Load in the SETTER. Set the Desired Load Rate. Depress the GO Pushbutton or the HOLD Pushbutton as Necessary to Reduce Turbine Load Borate Per OP-301, RCS Quick Boration Checklist as necessary to maintain AFD within the operating band. Boration steps listed at the end of this section.
	SRO	Go To Step 13
	BOP	Step 13: Check Main Feed Pumps – At Least One Running (YES)
	SRO	Observe the NOTE prior to Step 38 and go to Step 38.
	BOP	Step 38: Check S/G Level – At OR Trending to Program (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 11 of 59Event Description: MFP A Trips / Load Reduction (**AOP-010**)

Time

Position

Applicant's Actions or Behavior

	BOP	Check Tavg – At or Trending to Tref (YES)						
	CREW	Contact Maintenance to Troubleshoot and Correct the Feedwater Problem.						
	SRO	Implement the EALs.						
	BOP	Check current loading for the following pumps - LESS THAN MAXIMUM (YES) <ul style="list-style-type: none">• Main Feedwater Pump - 0.715 KAMPS• Condensate Pumps - 370 AMPS• Heater Drain Pumps - 90 AMPS						
BOOTH OPERATOR: Report the following AMPS as the current readings: <table><tr><td>Main Feedwater Pump</td><td>560 AMPS</td></tr><tr><td>Condensate Pumps</td><td>310 AMPS</td></tr><tr><td>Heater Drain Pumps</td><td>75 AMPS</td></tr></table>			Main Feedwater Pump	560 AMPS	Condensate Pumps	310 AMPS	Heater Drain Pumps	75 AMPS
Main Feedwater Pump	560 AMPS							
Condensate Pumps	310 AMPS							
Heater Drain Pumps	75 AMPS							

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 12 of 59Event Description: MFP A Trips / Load Reduction (AOP-010)

Time	Position	Applicant's Actions or Behavior
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	SRO	Continuous Action Step Determine Iodine Sampling Requirements As Follows: (NO) <ul style="list-style-type: none"> a. Check Power Change - GREATER THAN 15% IN ONE HOUR <ul style="list-style-type: none"> • Go To Step 44 • IF YES, then implement SR 3.4.16.2 (Iodine Sample)
	RO	Continuous Action Step Step 44: Check APP-005-B5, ROD BANKS A/B/C/D LO LIMIT – EXTINGUISHED (YES)
	RO	Monitor Axial Flux Difference To Ensure Compliance With ITS 3.2.3 (YES)
	CREW	Notify Load Dispatcher Of The Unit's Load Capability
	SRO	Return To Procedure And Step In Effect

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page	<u>13</u>	of	<u>59</u>
Event Description:		MFP A Trips / Load Reduction (AOP-010)							
Time	Position	Applicant's Actions or Behavior							

NOTE:

OP-301, Section 8.2.8 Quick Boration Checklist (shaded area) is included in the following steps, but may be used following the commencement of the plant down power.

Expect about 35 - 45 gallons of Boric Acid to be added.

	RO	DETERMINE the amount of Boric Acid to add to the RCS and OBTAIN an independent check of the volume required
	RO	OBTAIN permission from the CRS OR the SM to add the amount of boric acid previously determined.
	RO	PLACE the RCS MAKEUP MODE selector switch in the BORATE position.
	RO	SET YIC-113, BORIC ACID TOTALIZER to the desired quantity.
	RO	IF desired, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually ADJUST controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons.
	RO	Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 14 of 59Event Description: MFP A Trips / Load Reduction (**AOP-010**)

Time	Position	Applicant's Actions or Behavior
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	RO	<p>IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position:</p> <ul style="list-style-type: none"> • Rod Motion is blocked OR is in the wrong direction • T_{AVG} goes up • Boric Acid addition exceeds the desired value
	RO	<p>WHEN the desired amount of Boric Acid has been added to the RCS, THEN verify the following:</p> <ul style="list-style-type: none"> • FCV-113A, BORIC ACID FLOW, closes. • FCV-113B, BLENDED MU TO CHG SUCT, closes. • IF in Auto, THEN the operating Boric Acid Pump stops. • The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 15 of 59Event Description: **MFP A Trips / Load Reduction (AOP-010)**

Time	Position	Applicant's Actions or Behavior
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	RO	<p>IF desired, THEN FLUSH the Boric Acid flow as follows:</p> <ul style="list-style-type: none"> • PLACE the RCS MAKEUP MODE selector switch in the ALT DILUTE position. • SET YIC-114, PRIMARY WTR TOTALIZER to 15-20 gallons. • PLACE FCV-114B, BLENDED MU TO VCT to the CLOSE position. • Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position. • IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: <ul style="list-style-type: none"> ○ Unanticipated Rod Motion ○ Primary Water addition reaches the desired value • WHEN the desired amount of Primary Water has been added to the RCS, THEN verify the following: <ul style="list-style-type: none"> ○ FCV-114A, PW TO BLENDER, closes. ○ FCV-113B, BLENDED MU TO CHG SUCT, closes. ○ IF in Auto, THEN the operating Primary Water Pump stops. ○ The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 16 of 59Event Description: **MFP A Trips / Load Reduction (AOP-010)**

Time

Position

Applicant's Actions or Behavior

	RO	<p>RETURN the RCS Makeup System to automatic as follows:</p> <ul style="list-style-type: none"> • VERIFY FCV-114A, PW TO BLENDER, is in AUTO. • PLACE FCV-114B, BLENDED MU TO VCT to the AUTO position. • PLACE the RCS MAKEUP MODE switch in AUTO. • VERIFY FCV-113A, BORIC ACID FLOW, is in AUTO. • Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position.
	RO	<p>RECORD, in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 AND Boric Acid TOTALIZER, YIC-113 the total amount of Primary Water AND Boric Acid added during the boration.</p>
	RO	<p>MONITOR parameters for the expected change in reactivity AND inform the CRS OR the SM the results of the boration.</p> <p>(END OP-301 Section 8.2.8)</p>
BOOTH OPERATOR: Insert Event #3 (Clogged RCP Seal Injection Strainer) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 17 of 59

Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 3, Clogged RCP Seal Injection Strainer

EVENT INDICATIONS:

Reduction in RCP seal injection flows to zero.

APP-001-A2, SEAL WATER INJECTON FILTER HIGH ΔP

APP-001-B4, RCP SEAL NJECTION HI/LO FLOW

APP-001-B2, RCP LABYRTH SEAL LO ΔP

NOTE: If more than 15 minutes elapses without RCP Seal Cooling, then Seal Cooling must be isolated before starting CCW OR Charging to prevent Seal damage.

Normal Seal Injection flow should be maintained at 8 to 13 gpm, however the minimum Seal Injection flow is 6 gpm and the maximum Seal Injection flow is 20 gpm. (ACR 94-01811) ITS LCO 3.4.17 requires seal injection flow of greater than or equal to 6 gpm to each RCP when in MODES 1, 2, 3, and 4.

	RO / BOP	APP-001-A2 – IF Seal Injection is lost to any RCP, THEN REFER TO AOP-018 (Informs SRO of AOP-018 entry requirement.)
	RO / BOP	APP-001-A2 – IF RCP Seal Injection flow can NOT be maintained greater than 6 gpm to each RCP, THEN REFER TO AOP-018 AND ITS SR 3.4.17.1. (Informs SRO of ITS SR 3.4.17.1 implication.)
	RO / BOP	APP-001-A2 – DETERMINE if alarm is due to high seal injection flow condition. (NO, determined to be due to LOW seal injection flow condition.)
	RO / BOP	APP-001-A2 – DISPATCH an operator to check Seal Water Injection Filter ΔP . (Dispatches IAO to CCP Room.)

BOOTH OPERATOR: WHEN dispatched, wait 2 minutes and then report that "A" Seal Water Injection Filter indicates pegged high at > 25 psid.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 18 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time

Position

Applicant's Actions or Behavior

	RO / BOP	APP-001-A2 - IF RCP Seal Injection Filter ΔP is high AND is NOT caused by high flow, THEN SHIFT filters using OP-301. (Requests permission from SRO and then directs the IAO to shift filters.)
BOOTH OPERATOR: WHEN dispatched, wait 7 minutes and then shift RCP Seal Injection Filters IAW SCN File.		
	RO / BOP	APP-001-A2 - IF RCP Seal Injection Filters are shifted due to high ΔP , THEN INITIATE action to replace the affected filter cartridge.
	SRO	Enters <u>AOP-018, RCP Abnormal Conditions</u>
AOP-018	CREW	Make PA Announcement for Procedure Entry
AOP-018	SRO	Determines that Section C, Loss of Seal Injection, is the appropriate section.
AOP-018	RO	Check APP-001-D1, RCP THERM BAR COOL WTR LO FLOW alarm – ILLUMINATED (NO, go to step 11)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 19 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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NOTE

- A rupture is a leak of sufficient magnitude to require stopping the Charging Pumps or reduces Charging Pump Discharge Pressure to less than RCS Pressure.
- Charging System piping is any piping where a leak prevents the Charging Pumps from delivering flow to the Charging Line OR Seal Injection Line.

AOP-018	RO	Step 11: Determine If a Charging Pump Can Be Started: a. Check Charging System Piping – Ruptured (NO, go to Step 12)
AOP-018	RO	Step 12: Check SI – Initiated (NO, go to Step 14.)
AOP-018	RO	Step 14: Verify at Least ONE Charging Pump – RUNNING (YES)
AOP-018	RO	Check Seal Injection to RCPs: <ul style="list-style-type: none"> • ANY Seal Injection flow – LESS THAN 6 GPM (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • ANY Thermal Barrier ΔP – LESS THAN 5 inches (YES)
AOP-018	RO	Check Seal Injection – Aligned (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 20 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time

Position

Applicant's Actions or Behavior

AOP-018	RO	<p>Adjust any OR all of the following to restore seal injection flow.</p> <ul style="list-style-type: none"> • HIC-121 • CCP Speed • CVC-297A/B/C <p>(Depending on timeline, all OR none of these actions may be taken. Crew may determine that clogged strainer is cause and wait to see impact of swapping seal injection strainers.)</p>
AOP-018	RO	<p>Check Seal Injection to RCPs:</p> <ul style="list-style-type: none"> • ANY Seal Injection flow – LESS THAN 6 GPM (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • ANY Thermal Barrier ΔP – LESS THAN 5 inches (YES) <p>(May be answered as NO depending on status of swapping RCP seal injection filters.)</p>
AOP-018	RO	Check PI-121, CHARGING PUMPS DISCH PRESS Indicator – LESS THAN RCS PRESSURE (NO, go to Step 41.)
AOP-018	RO	Step 41: Check APP-001-A2, SEAL WTR INJ FILTER HI ΔP Alarm – ILLUMINATED (YES, if filters have not been swapped)
AOP-018	RO	Shift Seal Injection Filters Using OP-301. (Dispatch IAO to perform if not already dispatched.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 21 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time

Position

Applicant's Actions or Behavior

AOP-018	RO	Check Alternate Seal Injection Filter – IN SERVICE (When YES, then go to Step 47.)
AOP-018	RO	Step 47: Establish Charging Flow on FI-122A, Charging Line Flow – Greater than 35 gpm (YES)
AOP-018	RO	Check Normal Letdown – In Service (YES)
AOP-018	RO	Control Charging and Letdown Flow to Maintain Pressurizer Level as follows: <ul style="list-style-type: none"> • Within +/- 5% of Reference Level <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • PZR level between 30% and 40% with RCP C stopped.
AOP-018	RO	Establish Normal Seal Injection <ul style="list-style-type: none"> a. Check RCP Seal Injection – Aligned (YES) b. Check RCP Seal Injection Flow – Between 8 gpm and 13 gpm (YES)
AOP-018	RO	Check Seal Injection Flow – Established To All RCPs (YES)
AOP-018	SRO	Implement the EALs

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 22 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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AOP-018	SRO	<p>Refer to Technical Specifications for any applicable LCOs:</p> <p>Determines that ITS LCO 3.4.17, Condition E, was applicable during the time that seal injection flow was less than 6 gpm to any RCP. Condition D requires that you initiate action to restore seal injection to affected RCPs Immediately and be in Mode 3 in 6 hours and Mode 5 in 36 hours.</p>
AOP-018	SRO	<p>Check RCP Seal Cooling ISOLATED (NO)</p> <p>RNO: Observe the NOTE prior to Step 2 and go to Main Body, Step 2 of this procedure.</p>
AOP-018	CRS	Notify WCC SRO to initiate Work Request to replace clogged filter.
BOOTH OPERATOR: Insert Event #4 (PT-145, Letdown Pressure Transmitter, fails low) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 23 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 4, PT-145, Letdown Pressure Transmitter, fails low resulting in placing excess letdown in service.

EVENT INDICATIONS:**APP-001-E6 – LP LTDN RELIEF HI TEMP****APP-003-C3 – PRT HI PRESS**

	BOP	References APP-001 and informs SRO of need to refer to AOP-025, RTGB Instrument Failure.
	SRO	Enters <u>AOP-025, RTGB Instrument Failure</u>
	RO	Place LCV-460A&B In The CLOSE Position
	RO	Verify ONLY ONE Charging Pump is Running. (Lowers the speed on the Charging Pump in Manual and stops the pump.)
	BOP	Place Excess Letdown in Service Using Attachment 2.
Att. 2	BOP	Verify Closed the following valves: <ul style="list-style-type: none"> • LCV-460A&B • CVC-200A/B/C • CVC-204A/B

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 24 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time

Position

Applicant's Actions or Behavior

Att. 2	BOP	Verify Open CC-739
Att. 2	BOP	Position CVC-389 to the RCDT Position
Att. 2	BOP	Open CVC-387, Excess Ltdn Stop
Att. 2	BOP	Slowly Open HCV-137, Excess Ltdn Flow, not to exceed 195°F as indicated on TI-139, Excess Ltdn HX Outlet Temp.
Att. 2	BOP	Notify the CRS that Excess Letdown is in service.
Att. 2	BOP	Update the ERFS Calorimetric program to reflect Excess Letdown is in service.
Att. 2	BOP	IF required to control Pzr Level, THEN contact Chemistry to perform the alignment for purging the PZR Liquid sample line with full flow to the VCT iaw CP-003.
BOOTH OPERATOR: IF requested to align sample line for purge, wait 5 minutes and implement IAW SCN File.		
Att. 2	BOP/SRO	IF PZR Liquid sample line is used to control PZR Level, THEN remove the calorimetric calculation from service and enter TRM 3.25

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 25 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time

Position

Applicant's Actions or Behavior

Att. 2	BOP	<p>IF desired to align Excess Letdown to the VCT, THEN perform the following:</p> <ol style="list-style-type: none"> Position CVC-389 to the VCT. Notify Rad. Control that Excess Letdown is in service through the Seal Water Filters and Heat Exchanger, which will result in RAISED radiation levels in those areas.
	RO	Step 4: Make PA Announcement for Procedure Entry.
	RO	<p>Check RCP Seal Injection Flow – Between 8 and 13 gpm. (NO)</p> <ul style="list-style-type: none"> Locally throttle CVC-297A/B/C to obtain 8 to 13 gpm. If required to maintain minimum flow, then throttle HIC-121 while maintaining Charging Pump Discharge pressure less than 2500 psig. If the normal Seal Injection Range can NOT be maintained, then an expanded range of between 6 to 20 gpm may be used. Check ITS LCO 3.4.17 for applicability. (ITS 3.4.17 SR 3.4.17.1 requires that seal injection flow remain ≥ 6 gpm to each RCP)
BOOTH OPERATOR: IF / WHEN requested, throttle CVC-297A/B/C as necessary using the P&ID function to obtain requested seal injection flows.		
	SRO	Contact Plant Operations Staff to Expedite Repair of PT-145.
BOOTH OPERATOR: Insert Event #5 (PT-495 fails low) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 5 Page 26 of 59Event Description: PT-495, "A" S/G Steam Pressure Transmitter, fails low (**AOP-025**)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #5 (PT-495, "A" S/G Steam Pressure Transmitter, fails low).**EVENT INDICATIONS:****APP-006-A4 – STM LINE HI Δ P****APP-006-C2 – S/G C STM > FW FLOW****Steam Flow / Feed Flow Transient on S/G C**

	BOP	<u>AOP-025, RTBG INSTRUMENT FAILURE (Section G)</u> Immediate Action Step Verify the Affected FRV in MAN <ul style="list-style-type: none"> FCV-498 (FRV "C")
	BOP	Immediate Action Step Restore Affected S/G Level to between 39% and 52%
	RO	Provides Peer Check for Failure Identification and actions to control S/G Level.
	BOP	Check Reactor Trip Setpoint – Being Approached (NO, go to Step 5. IF YES, trip the Reactor and go to EOP-E-0.)
	BOP	Make PA Announcement For <u>AOP-025, RTBG INSTRUMENT FAILURE</u> , entry.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 5 Page 27 of 59
 Event Description: PT-495, "A" S/G Steam Pressure Transmitter, fails low (AOP-025)

Time	Position	Applicant's Actions or Behavior						
	BOP	Place the affected S/G Steam Flow Selector Switch to the alternate channel: S/G "A" Steam Flow – FR-478						
		<table border="1"> <thead> <tr> <th>Failed Channel</th> <th>Affected Channel</th> <th>Selected Position</th> </tr> </thead> <tbody> <tr> <td>PT-495</td> <td>FI-494</td> <td>CH 495</td> </tr> </tbody> </table>	Failed Channel	Affected Channel	Selected Position	PT-495	FI-494	CH 495
Failed Channel	Affected Channel	Selected Position						
PT-495	FI-494	CH 495						
BOOTH OPERATOR: If requested to check for instrument steam leaks wait 5 minutes and report no indication of steam leaks.								
	BOP	Continuous Action Step Restore Affected Controller to Automatic as Follows: a. Check S/G Level – Within +/- 1% of Programmed Level b. Place the affected Controller in AUTO (when within +/-1% of programmed level)						
	BOP	Remove the Affected Transmitter from Service using OWP-025, SGP-11.						
	SRO	Contact WCC SRO for assistance with OWP and W/R initiation. Contact Maintenance.						
BOOTH OPERATOR: Implement OWP-025, SGP-11, as requested, IAW SCN File.								

Op Test No.: ILC-13 NRC Scenario # 2 Event # 5 Page 28 of 59
 Event Description: PT-495, "A" S/G Steam Pressure Transmitter, fails low (**AOP-025**)

Time

Position

Applicant's Actions or Behavior

SRO

- **ITS 3.3.1 Condition A** will not be met due to one or more Functions with one or more required channels inoperable. Condition A requires entry into the Condition referenced in Table 3.3.1-1 for the channel Immediately.
- **ITS Table 3.3.1 Table 3.3.1-1 Item 14** which requires 2 Steam Flow / Feedwater Flow Mismatch Channels to be operable will not be met and require entry into **ITS 3.3.1 Condition E**, which requires the channel to be placed in trip with 6 hours OR be in Mode 3 in 12 hours.
- **ITS Table 3.3.2-1, Items 1.e** which requires 3 Steam Line High Differential Pressure between Steam header and Steam Lines Channels to be operable will not be met and require entry into **ITS 3.3.2 Condition D**.
- **ITS Table 3.3.3-1, Item 20** which requires 2 Steam Generator Pressure Channels per S/G to be operable will be reviewed and determined to be met.
- **ITS Table 3.3.6.1 Item 4** will also be reviewed and determined to be applicable due to affecting Safety Injection ESFAS Instrumentation associated with Containment Ventilation Isolation Instrumentation.

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 29 of 59

Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture)

EVENT INDICATIONS:

Audible Steam Noise

Steam Flow Rising on all Channels

Reactor Power Rising on FWUFM and NIs

Multiple alarms on APP-004 and APP-006

	CREW	Determines that a Reactor Trip is prudent.
	CREW	Enters EOP-E-0, Reactor Trip or Safety Injection
EOP-E-0	RO	Check Reactor tripped (YES)
EOP-E-0	BOP	Check Turbine Trip: <ul style="list-style-type: none"> a. Both turbine stop valves - Closed (NO) RNO: Manually trip turbine. (Depresses THINK and Turbine Trip Pushbutton) b. Close MSR purge and shutoff valves (Manual action required by BOP)
EOP-E-0	BOP	Check Power to AC Emergency Busses: <ul style="list-style-type: none"> a. E1 or E2 – At least one energized (YES) b. E1 and E2 – Both energized (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 30 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	<p>Check SI Status:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • SI annunciators – ANY ILLUMINATED (YES) • SI equipment – AUTO STARTED (YES) <p>b) Check BOTH trains of SI – ACTUATED</p> <ul style="list-style-type: none"> • SI pumps – BOTH RUNNING (YES) • RHR pumps – BOTH RUNNING (YES) <p>(Automatic SI from High Steam Line Flow with Low Tavg)</p>
EOP-E-0	CRS	Verifies all immediate actions for EOP-E-0.
Critical Task	CRS	<p>FOLDOUT for EOP-E-0 is in effect</p> <p>(IF crew takes an early action to close the MSIVs then "C" S/G will be identified as Faulted.)</p> <p>Faulted S/G AFW Isolation Criteria</p> <ol style="list-style-type: none"> Reset SI Close V2-14C, SDAFW Pump Discharge Valve to "C" S/G Close V2-16C, AFW Header Discharge Valve to "C" S/G Perform Att. 2, Deenergizing AFW Valves for Faulted S/Gs Maintain total feed flow greater than 300 gpm until narrow range level is greater than 8% in at least one S/G.
BOOTH OPERATOR: When requested, wait 3 minutes and perform EOP-E-0, Att. 2 IAW SCN File.		
CRITICAL TASK – ISOLATE FEED TO "C" S/G WITHIN <u>10 MINUTES</u> OF ENTERING EOP-E-0.		

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	6 - 12	Page	31	of	59
Event Description:		72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)							
Time	Position	Applicant's Actions or Behavior							

EXAMINER'S NOTE: Crew may take early actions at this time to address items that did not function or operate as designed. <ul style="list-style-type: none"> Manually open SI-870A and/or SI-870B Manually close all MSIVs ("C" MSIV fails remains failed open) Manually start "A" MDAFW Pump Manually close Feedwater Section Isolation Valves 		
EOP-E-0	CRS	Perform Attachment 1, Auto Action Verification, While continuing with this procedure. (Should be assigned to BOP.) (Att. 1 steps are presented next followed by the remainder of EOP-E-0.)
Beginning of EOP-E-0 Attachment 1 (Remainder of EOP-E-0 Follows this Section)		
Att. 1	BOP	Check ECCS Pumps Running: <ul style="list-style-type: none"> SI pumps - BOTH RUNNING (YES) RHR pumps - BOTH RUNNING (YES)
Att. 1 Critical Task	BOP	Check ECCS Valves - PROPER EMERGENCY ALIGNMENT (NO) <ul style="list-style-type: none"> Manually Opens SI-870A and/or SI-870B
CRITICAL TASK – OPEN SI-870A OR SI-870B PRIOR TO COMPLETING EOP-E-0 ATTACHMENT 1		
Att. 1	BOP	Check CCW Pumps - AT LEAST ONE RUNNING (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 32 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	<p>Check Containment Isolation Phase A</p> <ul style="list-style-type: none"> a. Phase A – Actuated (YES) b. Phase A valves – Closed (YES) c. Excess letdown – Isolated (NO) <ul style="list-style-type: none"> • CVC-387 – Closed (NO, Manually close CVC-387 from RTGB) • HIC-137 – at 0% DEMAND (NO, Manually adjust HIC-137 controller to 0%)
Att. 1	BOP	<p>Check Feedwater Isolation:</p> <ul style="list-style-type: none"> a) Main feed pumps – BOTH TRIPPED (YES) b) Main feedwater – ISOLATED <ul style="list-style-type: none"> • FRVs – Closed (YES) • Feedwater reg bypass valves – Closed (YES) • Feedwater header section valves – Closed (NO, Manually closes all Feedwater Header Section Valves.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 33 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	<p>Check if Main Steamlines Should Be Isolated:</p> <p>a) Main steamline isolation – REQUIRED (YES)</p> <ul style="list-style-type: none"> Containment pressure – Greater than 10 psig (NO) <p>OR</p> <ul style="list-style-type: none"> High steam flow with: (YES) <ul style="list-style-type: none"> S/G pressure – less than 614 psig <p>OR</p> <ul style="list-style-type: none"> Tavg – less than 543°F <p>b) Check MSIVs and MSIV bypass valves – CLOSED (NO, Manually closes "A" and "B" MSIVs. "C" MSIV is failed open.)</p>
Att. 1	BOP	<p>Check Proper Service Water System Operation:</p> <p>a. SW pumps – All running (YES)</p> <p>b. SW booster pumps – Both running (YES)</p> <p>c. Both SW header low pressure alarms (APP-008-F7/F8) – Extinguished (YES)</p>
Att. 1	BOP	Check Both EDGs – Running (YES)
Att. 1	BOP	<p>Check ECCS Flow:</p> <p>a. RCS pressure – less than 1650 psig (YES)</p> <p>b. SI pumps- Flow Indicated (YES)</p> <p>c. RCS pressure – less than 275 psig. (NO, Go to Step 10)</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 34 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	Step 10: Check CV Recirculation Fans – All Running (YES, all available)
Att. 1	BOP	Check IVSW - Actuated (YES) <ul style="list-style-type: none"> • PCV-1922A – Open (YES) • PCV-1922B – Open (YES)
Att. 1	BOP	Check CV ventilation isolation (YES) <ul style="list-style-type: none"> a. CV ventilation isolation valves – CLOSED (YES)
Att. 1	BOP	Check control room ventilation - aligned for pressurization mode (YES) <ul style="list-style-type: none"> • HVA-1A or HVA-1B – Running (YES) • HVE-16 – Stopped (YES) • HVE-19A or HVE-19B – Running (YES) • Control Room HVAC outside air damper A or B – Open (YES) • CR-D1A-SA – Closed (YES) • CR-D1B-SB – Closed (YES)
Att. 1	BOP	Check DS Bus – Energized (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 35 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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Att. 1	BOP	Check Battery Chargers – Energized (YES) APP-036-D1 – Extinguished (YES) APP-036-D2 – Extinguished (YES)
Att. 1	BOP	Stop R-11/12 Sample Pump
Att. 1	BOP	Locally Reset and Load IACs as necessary (N/A)
Att. 1	BOP	Perform Crew Update to include the following: <ul style="list-style-type: none"> • Attachment Completion • Manual Actions Taken (Opened SI-870A/B, Closed FW Header Section Valves (V2-6A, B, C), Closed "A" and "B" MSIVs) • Failed Equipment status ("C" MSIV did not close.) • SW status (All operating)
End of EOP-E-0 Attachment 1		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 36 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

Continuation of EOP-E-0

EXAMINER NOTE:	SRO MAY DECIDE TO TAKE A PROMPT AND PRUDENT ACTION AND DIRECT THE BOP TO BEGIN ISOLATING "C" S/G IAW SUPPLEMENT G and N. CREW MAY HAVE DETERMINED THAT "C" S/G HAS A TUBE RUPTURE BY THIS POINT IN THE SCENARIO.
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EOP-E-0	RO	Check AFW Pumps – Running (NO, "A" MDAPFW Pump must be manually started.)
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EOP-E-0	RO	Check AFW Valves – Proper Emergency Alignment (YES) <ul style="list-style-type: none"> • AFW header discharge valves – Full Open (YES) • AFW header section valves – Full Open (YES) • Steam driven AFW pump discharge valves – Full open if pump is running. (YES)
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CAUTION

If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 37 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	<p>Check Total AFW Flow:</p> <ul style="list-style-type: none"> • Reset SI • Control feed flow to maintain NON-faulted S/Gs narrow range level – Between 8% and 50%. • Check total AFW flow- Greater than 300 gpm (YES)
EOP-E-0	RO	<p>Continuous Action Step</p> <p>Check CV Spray NOT required:</p> <ul style="list-style-type: none"> a. CV pressure – Has Remained Less than 10 psig. (YES) b. CV spray – <u>NOT</u> Actuated (YES)
EOP-E-0	RO	<p>Check RCP Seal Cooling:</p> <ul style="list-style-type: none"> • CCW flow to RCP thermal barriers – Normal (YES) <ul style="list-style-type: none"> ○ APP-001-C1 / D1 – Extinguished (YES) OR • Seal injection flow – Normal (YES) <ul style="list-style-type: none"> ○ Seal injection flow – Greater than 6 gpm per RCP OR ○ Thermal barrier ΔPs – Greater than 5 inches water.
<p>BOOTH OPERATOR: As requested, adjust CVC-297A,B,C as necessary to control RCP seal injection flow using the P&ID function.</p>		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 38 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

EOP-E-0	RO	<p>Continuous Action Step</p> <p>Check RCS Temperature</p> <p>With any RCPs running, RCS average temperature – Stable at or trending to 547°F (NO)</p> <p>RNO: IF temperature is less then 547°F AND lowering then perform the following: (YES)</p> <ol style="list-style-type: none"> Stop dumping steam IF cooldown continues, THEN reduce total feed flow to minimum for decay heat removal: <ul style="list-style-type: none"> Maintain total feed flow greater than 300 gpm until narrow range level is greater than 8% in at least one S/G. IF cooldown continues, THEN close MSIVs and MSIV bypass valves.
EOP-E-0	RO	<p>Check PZR PORVs and Spray Valves:</p> <ol style="list-style-type: none"> PORVs – Closed (YES) Normal PZR spray valves – Closed (YES) Aux spray valve – Closed (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 39 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	<p>Check If RCPs should be stopped:</p> <ul style="list-style-type: none"> a. RCPs – Any Running (YES) b. SI pumps – At least one running and capable of delivering flow. c. RCS subcooling based on core exit TCs – Less than 30°F (NO, go to step 14)
EOP-E-0	BOP	<p>Step 14: Check if S/G Secondary Pressure Boundaries are Intact:</p> <ul style="list-style-type: none"> a. Check pressures in all S/Gs <ul style="list-style-type: none"> ○ None lowering in an uncontrolled manner (NO) ○ None Completely depressurized (NO) <p>RNO: Reset SPDS and initiate monitoring of CSFSTs.</p> <p>Go to EOP-E-2, Faulted Steam Generator Isolation, Step 1.</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 40 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Beginning of EOP-E-2, Faulted Steam Generator IsoaltionCAUTION

- At least one S/G must be maintained available for RCS Cooldown
- Any faulted S/G or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.

EOP-E-2

BOP

Check MSIVs and MSIV Bypass Valves for faulted S/G – CLOSED
("A" and "B" MSIVs manually closed. "C" MSIV failed open)**EOP-E-2**

BOP

Check IF ANY S/G Secondary Pressure Boundary is Intact:
a. Check pressure in all S/G – ANY STABLE OR RISING (YES)**EOP-E-2**

BOP

Identify Faulted S/Gs: ("C" S/G is faulted)

a. Check pressures in all S/Gs:

- Any S/G pressure lowering in an uncontrolled manner (YES)

OR

- Any S/G Completely depressurized. (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 41 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

CAUTION

- If the steam driven AFW pump is the only available source of feed flow, steam supply to the steam driven AFW pump should be maintained from at least one S/G.
- If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-2**BOP**

Isolate Faulted S/G:

- Check main feedwater to faulted S/G – Isolated (FCV-498, FCV-499, V2-6C) (YES)
- Reset SI (Depresses SI Reset)
- Isolate AFW flow to faulted S/G – Close V2-14C and V2-16C
- Check faulted S/G steam line PORV – Closed (RV-3) (YES)
- Close steam driven AFW pump steam shutoff valve for faulted S/G: V1-8C (S/G C)
- Perform Att. 1 to De-energize AFW Valves for Faulted S/G (Field Operation by AO)
- Locally close MS-38, S/G "C" Bypass Drain and Warm-up Line to AFW Pump (Field Operation by AO)
- Check S/G Blowdown and Blowdown sample valves from faulted S/G – Closed (FCV-1932A/B and FCV-1935A/B) (YES)

BOOTH OPERATOR: As directed de-energize AFW valves iaw EOP-E-2, Att. 1 and close MS-38 IAW SCN File. These are AO Field Actions.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 42 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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EOP-E-2	BOP	Check CST level >10% (YES)
EOP-E-2	BOP	Check Secondary Radiation: <ul style="list-style-type: none"> a. Request periodic activity samples of all S/Gs b. Unisolated secondary radiation monitors – have remained normal (NO, R-31C is elevated) RNO: Reset SPDS and Go to EOP-E-3, Steam Generator Tube Rupture, Step 1.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 43 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

BEGINNING OF EOP-E-3NOTE

- FOLDOUT for EOP-E-3 is in effect.
- Chemistry should be available for sampling during this procedure.
- Step 1 RCP trip criteria applies until an operator controlled RCS cooldown is initiated.

CONTINUOUS ACTION STEP

Check If RCPs Should Be Stopped:

- RCPs - ANY RUNNING (YES)
- SI pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW (YES)
- RCS subcooling based on core exit TCs - LESS THAN 30°F [50°F] (NO)

RNO: Go to Step 2

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 44 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-3

BOP

Step 2: Identify Ruptured S/G(s): ("C" S/G is ruptured)

- Unexpected rise in any S/G narrow range level

OR

- High radiation from any SG steamline (R-31s)

OR

- High radiation from any SG blowdown line (R-19s)

OR

- High radiation from any S/G sample:
 - Contact Chemistry to sample all S/Gs for activity as necessary

CAUTION

- If the steam driven AFW pump is the only available source of feed flow, steam supply to the steam driven AFW pump should be maintained from at least one S/G.
- At least one S/G must be maintained available for RCS cooldown.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 45 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Critical Task

BOP

Isolate Flow From Ruptured S/G(s):

- a. Adjust ruptured S/G(s) steam line PORV controller setpoint to 1060 psig (Value obtained from Plant Status Sheet)
- b. Check ruptured S/G steam line PORV – (RV1-3) CLOSED (YES)
- c. Close steam driven AFW pump steam shutoff valve for ruptured S/G: (V1-8C)
- d. Locally close the following valve for ruptured S/G(s) while continuing with this procedure:
 - MS-38, SG "C" BYPASS DRN & WARM-UP LINE TO AFW PUMP (pipe jungle above/right of V1-8C)
- e. Check S/G blow down and blow down sample valves from ruptured S/G(s) – Closed
 - FCV-1932 A & B
 - FCV-1935 A & B SHUT
- f. Check MSIV above and below seat drain valves for ruptured S/G – CLOSED (YES)
- g. Close ruptured S/G MSIV and MSIV bypass valve – V1-3C and MS-353C. (NO, V1-3C is failed open.)

RNO:

- 1) Close all remaining MSIVs and MSIV bypass valves. (YES)
- 2) Verify the following valves are closed
 - Turbine stop and governor valves
 - MSR purge and shutoff valves
 - Condenser steam dump valves
- 3) Perform Att. 5, Local Isolation of Ruptured S/G with Failed MSIV or Bypass Valve, while continuing with this procedure. (Local AO Field Actions)
- 4) Use intact S/Gs steam line PORVs for steam dump.

IF any ruptured S/G can NOT be isolated from at least one intact S/G, THEN reset SPDS and Go To EPP-17, SGTR With Loss Of Reactor Coolant Subcooled Recovery, Step 1. (Not applicable)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 46 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: Acknowledge direction to perform Att. 5. Wait 5 minutes and close GS-3 IAW SCN File and then report Att. 5 complete. All other valves are not modeled.

CRITICAL TASK – ISOLATION OF "C" S/G PRIOR TO TRANSITION FROM EOP-E-3 at STEP 5 OF EOP-E-3

CAUTION

- If any ruptured S/G is faulted, feed flow to that S/G should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
- If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-3

BOP

Continuous Action Step

Check Ruptured S/G Level:

- a. Narrow range level – Greater than 8%. (NO, per caution feed flow will remain isolated. Observe CAUTION prior to Step 5 and continue with Step 5.)

CAUTION

Major steam flow paths from the ruptured S/G(s) should be isolated before initiating RCS cooldown. This includes MSIVs and MSIV bypass valves, steam line PORV, and AFW pump steam shutoff valve.

EOP-E-3

BOP /
SRO

Step 5: Check Ruptured S/G Pressure – Greater than 370 psig. (NO)
RNO: Reset SPDS and **Go to EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery, Step 1.**

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 47 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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Beginning of EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery

EPP-17	SRO	Open Foldout E (None applicable)
EPP-17	RO	Reset SAFETY INJECTION (Depresses SI Reset pushbutton)
EPP-17	RO	Reset CONTAINMENT ISOLATION PHASE A <u>AND</u> PHASE B (Depresses both Phase A and Phase B pushbuttons)
EPP-17	BOP	Continuous Action Step Check Loss Of Offsite Power – IN PROGRESS (NO, go to step 8)
EPP-17	RO	Continuous Action Step Step 8: Establish Instrument Air To CV As Follows: <ul style="list-style-type: none"> • Check APP-002-F7, INSTR AIR HDR LO PRESS – EXTINGUISHED (YES) • Momentarily place IA PCV-1716, INSTRUMENT AIR ISO TO CV Switch, to RESET • Check INST AIR VALVE TO CV PCV-1716 – OPEN (YES)
EPP-17	RO	Continuous Action Step Determine If CV Spray Should Be Stopped As Follows: <ul style="list-style-type: none"> • Check CV Spray Pumps – RUNNING (NO, go to step 11)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 48 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	BOP	Continuous Action Step Step 11: Control Ruptured S/G Level As Follows : <ul style="list-style-type: none"> a. Check ruptured S/G level - LESS THAN 8% [18%] (YES) b. Check ruptured S/G(s) – Also Faulted (YES) c. Check ruptured-faulted S/G(s) needed for RCS Cooldown RNO: Stop feed flow to ruptured-faulted S/G(s) and go to Step 12.
EPP-17	RO	Continuous Action Step Step 12: Determine If RHR Pumps Should Be Stopped <ul style="list-style-type: none"> a. Check RCS pressure: <ul style="list-style-type: none"> • GREATER THAN 275 PSIG [400 PSIG] (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • STABLE <u>OR</u> INCREASING b. Verify RHR Pumps – Stopped c. Check RCS pressure – Less than 275 psig [400 PSIG] (NO, go to Step 13)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 49 of 59

Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17

RO

Step 13: Initiate Evaluation Of Plant Status :

a. Check Auxiliary Building radiation monitors – NORMAL (YES)

b. Contact Chemistry to obtain the following periodic samples :

- RCS for boron and activity
- Ruptured S/G(s) for boron
- Pressurizer for boron

c. Contact Plant Operations Staff to determine additional actions to evaluate plant status, while continuing with this procedure

EPP-17

RO

Establish Charging Flow As Follows :

- Check Charging Pumps – ALL STOPPED (NO, go to step 14.h.)
- Step 14.h: Verify charging flow on FI-122A – Greater than 35 GPM

(YES, however, may be NO depending on previous plant conditions.

IF answered as NO, then RO will need to **Re-Open HCV-121** as necessary while maintaining RCP Seal Injection Flows greater than 6 gpm.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 50 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	<p>Align Charging Pump Suction To RWST as follows:</p> <ol style="list-style-type: none"> From the RTGB, verify LCV-115B, EMERG MU TO CHG SUCT - OPEN Verify LCV-115C, VCT OUTLET - CLOSED Start all available Charging Pumps. (Starts any secured Charging Pump.) Increase running Charging Pumps speed to maximum. (Takes Manual Control of Charging Pumps and raises to 100% output.) Verify maximum charging flow on FI-122A (YES)
EPP-17	BOP	<p>Identify Faulted S/Gs As Follows:</p> <ol style="list-style-type: none"> Check pressure in all S/Gs: <ul style="list-style-type: none"> ANY S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER (YES) <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> ANY S/G COMPLETELY DEPRESSURIZED (NO)
EPP-17	BOP	Check Faulted S/Gs – PREVIOUSLY ISOLATED (YES)
EPP-17	BOP	<p>Control Intact S/G Levels As Follows :</p> <ol style="list-style-type: none"> Check intact S/G levels – ANY GREATER THAN 8% (YES) Control feed flow to maintain intact S/G levels between 8% and 50% Check <u>intact</u> S/G levels – ANY INCREASING IN AN UNCONTROLLED MANNER (NO, go to step 19)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 51 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	<p>Continuous Action Step</p> <p>Step 19: Ensure Adequate Shutdown Margin Exists As Follows:</p> <p>a. Check boron sample results – AVAILABLE (NO) RNO: WHEN sample results available, THEN Check boron concentration – At Cold Shutdown Boron Concentration.</p> <p>Observe the NOTE prior to Step 20 and Go to Step 20.</p>
<p style="text-align: center;"><u>NOTE</u></p> <ul style="list-style-type: none"> • A differential pressure of 210 psid across the RCP number 1 seals is necessary for continued RCP operation. • RCS cooldown should be completed as quickly as possible since ruptured S/Gs may continue to depressurize to a value that may not support differential pressure across the RCP number 1 seals. 		
EPP-17	BOP	<p>Initiate RCS Cooldown To Cold Shutdown As Follows:</p> <p>a. Maintain cooldown rate in RCS cold legs less than 100°F in the last 60 minute (Cooldown rate already exceeded to Ruptured-Faulted S/G.)</p> <p>b. Maintain RCS temperature and pressure within limits of Curve 3.4, Reactor Coolant System Pressure – Temperature Limitations For Cooldown</p> <p>c. Check intact S/Gs - AT LEAST ONE AVAILABLE FOR RCS COOLDOWN (YES)</p> <p>d. Check steam dump to Condenser – Available (NO)</p> <p>RNO: Dump steam using Steam Line PORVs and go to step 21. (Target temp. specified in next step will already be met.)</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 52 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	Step 21: Check RCS Hot Leg Temperatures – Less than 543°F (YES)
EPP-17	BOP	Restore Steam Dumps as follows: Check steam dump to condenser – Available (NO, continue RCS cooldown using Steam Line PORVs. Observe the NOTE prior to Step 23 and Go to step 23.)
<u>NOTE</u>		
Low Tav _g SI initiation circuits will automatically unblock if Tav _g increases to greater than 543°F.		
EPP-17	RO	Step 23: Defeat Low Tav _g Safety Injection Signal as follows: a. Momentarily place Safety Injection Tav _g Selector Switch to BLOCK position. b. Verify LO TEMP SAFETY INJECTION BLOCKED status light – Illuminated. (YES)
<u>NOTE</u>		
Supplement K is available for optimizing Auxiliary Spray below.		
EPP-17	RO	Check RCS Pressure – Less than 1950 psig (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 53 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

NOTE

Low Pressure SI initiation circuits will automatically unblock if PZR pressure increases to greater than 2000 psig.

EPP-17

RO

Defeat Low Pressure Safety Injection Signal as Follows:

- a. Momentarily place PZR PRESS/HI STM LINE DP Switch to BLOCK position.
- b. Verify LO PRESS SAFETY INJECTION BLOCKED status light – ILLUMINATED (YES)

EPP-17

RO

Continuous Action Step

Determine if subcooled recovery is appropriate as follows:

Check RWST level – Greater than 56% (YES)

Check ruptured S/G Level – Less than 84% (YES)

EPP-17

RO

Check RCS Subcooling – Greater than 35°F (YES)

EPP-17

RO

Check SI and RHR Pump Status:

- SI Pumps – Any running (YES)
- OR
- RHR Pumps – Any running in LO Head Injection Mode (NO)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 54 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	Continuous Action Step Check PZR Level – Greater than 73% (YES)
EPP-17	RO	Energize PZR Heaters to Maintain Steam Bubble (Places all PZR Heaters to ON.)
<u>CAUTION</u>		
The upper head region may void during RCS depressurization if RCPs are not running. This may result in a rapidly increasing PZR level.		
EPP-17	RO	Continuous Action Step Depressurize RCS to Refill PZR as follows: Check PZR Level – Less than 27%. (NO, go to step 32)
EPP-17	RO	Step 32: Check RCP Status – All Stopped (NO, go to step 37)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 55 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17

RO

Step 37: Establish Normal PZR Spray as Follows:

- a. Check RCP Status – Only One Running (NO, Stop all but one RCP)
- b. Check RCP C – Running (YES, unless stopped in step above) (IF NO, then place PCV-455B, PZR Spray Valve Controller, in MAN AND adjust controller output to ZERO.)
- c. Check RCP B – Running (NO, unless maintained running) RNO: (IF secured, Place PCV-455A, PZR Spray Valve Controller, in MAN and adjust output to ZERO. Go to Step 38.
- d. (IF "B" RCP maintained running) Maintain PZR level between 30% and 40%.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 56 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

NOTE

The table values below are based on stable conditions.

If RCS pressure is continuing to decrease slowly due to RCS temperature reduction, as long as subcooling is increasing, the values may be considered stable.

Critical Task	RO	Step 38: Determine if one SI Pump should be stopped: a. Check SI Pumps – Any running (YES) b. Determine required RCS subcooling from table:																	
		<table><tr><td rowspan="2">Charging Pump Status</td><td colspan="2">Any RCP Running</td></tr><tr><td>One SI Pump Running</td><td>Two SI Pumps Running</td></tr><tr><td>None Running</td><td>Do NOT stop SI Pump</td><td>72°F</td></tr><tr><td>One Running</td><td>197°F</td><td>68°F</td></tr><tr><td>Two Running</td><td>176°F</td><td>65°F</td></tr><tr><td>Three Running</td><td>158°F</td><td>62°F</td></tr></table>	Charging Pump Status	Any RCP Running		One SI Pump Running	Two SI Pumps Running	None Running	Do NOT stop SI Pump	72°F	One Running	197°F	68°F	Two Running	176°F	65°F	Three Running	158°F	62°F
		Charging Pump Status		Any RCP Running															
			One SI Pump Running	Two SI Pumps Running															
		None Running	Do NOT stop SI Pump	72°F															
		One Running	197°F	68°F															
		Two Running	176°F	65°F															
		Three Running	158°F	62°F															
		c. Check RCS subcooling – Less than required subcooling (NO, go to step 38.f.)																	
		f. Check PZR level – Greater than 27% (YES)																	
g. Stop one SI Pump (Critical Task)																			
h. Check RCS Pressure – Stable or increasing (YES)																			
Go to Step 38.a.																			

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 57 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Critical Task

RO

Step 38: Determine if one SI Pump should be stopped:

- a. Check SI Pumps – Any running (YES)
- b. Determine required RCS subcooling from table:

Charging Pump Status	Any RCP Running	
	One SI Pump Running	Two SI Pumps Running
None Running	Do NOT stop SI Pump	72°F
One Running	197°F	68°F
Two Running	176°F	65°F
Three Running	158°F	62°F

- d. Check RCS subcooling – Less than required subcooling (NO, go to step 38.f.)
- f. Check PZR level – Greater than 27% (YES)
- g. Stop one SI Pump (**Critical Task**)
- h. Check RCS Pressure – Stable or increasing (YES)
- i. Go to Step 38.a.
- a. Check SI Pumps – Any running (NO, go to step 39)

CRITICAL TASK – TERMINATE SI FLOW IN ACCORDANCE WITH EPP-17 STEP 38**NOTE:** Controlling PZR level low in the allowable band will aid with the RCS depressurization to minimize RCS leakage.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 58 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17

RO

Determine if Charging Flow Should be controlled to maintain PZR Level:

- a. Check RHR Pumps – ANY RUNNING IN LO HEAD INJECTION MODE (NO)
RNO: Control Charging flow to maintain PZR level
Observe the CAUTION prior to Step 40 and Go to Step 40.

The Chief Examiner may terminate the scenario at his discretion or once one safety injection pump has been secured in accordance with EPP-17.

ILC-13 NRC SCENARIO 2 TURNOVER SHEET

1. INITIAL CONDITIONS

- a) Time in Core Life: EOL
- b) Reactor Power: 68%
- c) Turbine Load: 485 MWe
- d) Boron Concentration: 139 ppm
- e) Rod Height: 165 CBD
- f) RCS Pressure: 2235 psig
- g) RCS Level: 41.9 %
- h) Xenon: Equilibrium

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
3.7.6 Cond. A	Restore required CCW train to Operable status within 72 hours.
3.6.6 Cond. C	Restore containment cooling train to Operable status within 7 days AND 10 days from discovery of failure to meet the LCO.

3. CLEARANCES IN EFFECT

- a) "C" CCW OOS for mechanical seal repair. OOS for 6 hours with estimated RTS in 24 hours.
- b) HVH-4 OOS for abnormal motor vibrations. OOS for 24 hours. Available for emergency use only.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" and "B" CCW Pumps, "A" and "B" CCW Pump RTGB Control Switches, "A" CCW Pump Breaker 480V-DS 52/34B and "B" CCW Pump Breaker 480V-E1 52/22C.

6. DEGRADED EQUIPMENT

- a) None

7. SWITCHYARD ACCESS

- a) Unrestricted

8. PLANNED EVOLUTIONS

- a) Maintain current power level

9. TURNOVER INFORMATION

- a) Maintain current power level while RES is monitoring the recently replaced motor on "A" MFP.
- b) Thunderstorms in the area. High heat load has resulted in all planned maintenance being deferred to a later date.

10. REACTIVITY INFORMATION

- a) Review the OST-947 EOL charts for BA and PW additions

11. RISK

- a) GREEN

Facility:	HB ROBINSON		Scenario No.:	2	Op Test No.:	ILC-13
Examiners:	_____		Operators:	CRS -	_____	
	_____			RO -	_____	
	_____			BOP -	_____	
Initial Conditions:	<ul style="list-style-type: none"> • 68% EOL, 15,697 MWD/MTU, 139 PPM Boron. • CCW Pump "C" is OOS and breaker is racked out • HVH-4, CV Recirc Fan, is OOS and breaker is racked out • Thunderstorms in the area. High Heat Load has resulted in all planned maintenance being deferred to a later date. 					
Turnover:	<ul style="list-style-type: none"> • Maintain power at current level while RES is monitoring "A" MFP. 					
Critical Task:	<ul style="list-style-type: none"> • Open either SI-870A or SI-870B to establish SI flow. • Isolate Auxiliary Feedwater to "C" S/G. • Isolate Ruptured / Faulted "C" S/G • Terminate SI flow to control Ruptured S/G Level and Pressure 					
Event No.	Malf. No.	Event Type*	Event Description			
1		(C) BOP, CRS	HVH-9A Trips with HVH-9B failure to Auto-Start			
2		(R) RO, CRS (N) BOP, CRS	"A" MFP Trips / Load Reduction			
3		(TS) CRS	Clogged RCP Seal Injection Strainer			
4		(I) RO, CRS	PT-145 fails Low / Place Excess Letdown in Service			
5		(I) BOP, CRS (TS) CRS	PT-495 fails Low			
6		(M) ALL	72 inch Main Steam Header Fault			
7		ALL	"C" S/G Tube Rupture once S/G has dried out			
8		BOP	Main Turbine fails to Auto-Trip on Reactor Trip			
9		RO	SI-870A/B fail to Auto-Open			
10		BOP	"A" and "B" MSIV fail to Auto-Close and "C" MSIV has failed open			
11		BOP	Feed Header Section Isolation Valves fail to Auto-Close			
12		BOP	"A" MDAFW Pump fails to Auto-Start			
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor						

ILC-13 NRC SCENARIO 2 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 68% RTP. Engineering has requested that power be held at 68% while monitoring the recently replaced motor on "A" MFP. Additionally, Maintenance is currently in progress on Component Cooling Water Pump C for pump mechanical seal replacement. HVH-4 is Out of Service due to Excessive Motor Vibrations. Repairs on HVH-4 are on hold awaiting parts. Thunderstorms in the area. High Heat Load has resulting in no planned maintenance being performed.

On cue from the Chief Examiner, HVH-9A, CV Concrete Shield Cooling Fan, trips and HVH-9B fails to Auto-Start. The operator will verify the standby fan starts by manually starting HVH-9B from the RTGB in accordance with APP-010-A7, HVH-9A/B AIR FLOW LOST/OVLD. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, "A" Main Feed Pump will trip. The crew will perform the immediate actions of AOP-010, Main Feedwater / Condensate Malfunction. While performing the remaining actions of AOP-010 the crew will determine that Reactor Power is required to be lowered to less than 60% Reactor Power. The crew will perform the load reduction in accordance with AOP-010 and OP-301, RCS Boration Quick Checklist. Once the Chief Examiner is satisfied with the crew's actions to perform a controlled reduction in power and stabilize the plant, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, the RCP Seal Injection Strainer will become clogged. The crew will determine the strainer is clogged by observing a reduction in RCP seal injection flow to zero flow along with receiving APP-001-A2, Seal Water Injection Filter High ΔP , APP-001-B4, RCP Seal Injection HI/LO Flow, and APP-001-B3, RCP A Bearing HI Temperature. APP-001-A2 will direct the crew to dispatch an auxiliary operator to check Seal Water Injection Filter ΔP and will ultimately direct the crew to have the auxiliary operator shift seal injection filters using OP-301. The CRS will enter AOP-018, Reactor Coolant Pump Abnormal Conditions, and enter Section C, Loss of Seal Injection. AOP-018 will also diagnose the event as a clogged strainer and direct the crew to shift seal injection filters. Once the seal injection filters are shifted the RCP seal injection flows will return to normal. While seal injection flow is less than 6 gpm to any RCP the CRS will determine that ITS LCO 3.4.17, Condition E, is applicable since seal injection to any RCP is not within limit with at least one charging pump operable. The required action is to initiate action to restore seal injection to affected RCPs immediately and be in Mode 3 in 6 hours and Mode 5 in 36 hours. Once the Chief Examiner is satisfied with the crew's actions to restore seal injection flow and demonstrate Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, Pressure Transmitter PT-145 for Letdown Line Pressure will fail LOW, causing PCV-145 to close and isolate letdown flow. AOP-025, RTGB Instrument Failure, Section A will be implemented to isolate the letdown line, reduce charging flow and place Excess Letdown in service. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, PT-495, Main Steam Line "C" Pressure Transmitter, will fail low. The BOP will perform immediate actions of AOP-025, RTGB Instrument Failure, Section G, and take manual control of FCV-498, "C" S/G Feed Regulating Valve, and restore "C" S/G level to the normal band. The crew will then take action to swap to the alternate channel, place the "C" FRV back in Automatic and remove PT-495 from service in accordance with OWP-025,

SGP-11. Due to the failure of PT-495, ITS Table 3.3.1 Table 3.3.1-1 Item 14 which requires 2 Steam Flow / Feedwater Flow Mismatch Channels to be operable will not be met and require entry into ITS 3.3.1 Condition E, which requires the channel to be placed in trip with 6 hours OR be in Mode 3 in 12 hours. Due to the failure of PT-495, ITS Table 3.3.2-1, Items 1.e which requires 3 Steam Line High Differential Pressure between Steam header and Steam Lines Channels to be operable will not be met and require entry into ITS 3.3.2 Condition D. Also due to the failure of PT-495, ITS Table 3.3.3-1, Item 20 which requires 2 Steam Generator Pressure Channels per S/G to be operable will be reviewed and determined to be met. ITS Table 3.3.6.1 Item 4 will also be reviewed and determined to be applicable due to affecting Safety Injection ESFAS Instrumentation associated with Containment Ventilation Isolation Instrumentation. Once the Chief Examiner is satisfied with the crew's actions and Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, the plant will experience a fault on the 72 inch Main Steam Header. The crew will determine that a reactor trip is required and transition to EOP-E-0, Reactor Trip or Safety Injection. An automatic safety injection signal will be initiated due to high steam line flow with low Tavg. During the immediate actions of EOP-E-0 it will be determined that the Turbine failed to automatically trip and manual actions will be taken to trip the turbine from the RTGB. During further actions of EOP-E-0 it will be discovered that SI-870A and B, BIT Outlets, fail to automatically open and have to be manually opened from the RTGB in order to provide safety injection flow. All Main Steam Isolation Valves will fail to automatically close and manual actions will be taken to close them from the RTGB. "C" MSIV will remain failed in the open position. V2-6A, B, and C, Feedwater Header Section Valves, will fail to automatically close and will have to be manually closed from the RTGB. "A" Motor Driven Auxiliary Feedwater Pump will fail to automatically start and will be manually started from the RTGB. Once "C" S/G has dried out a 400 gpm tube rupture will ramp in over 60 seconds on "C" S/G. The crew will complete EOP-E-0 and transition to EOP-E-2, Faulted Steam Generator Isolation, and perform the actions to isolate "C" S/G. The crew may choose to perform Supplement G to isolate "C" S/G prior to transitioning to EOP-E-2. Supplement G will direct performance of Supplement N. Once "C" S/G is isolated the crew will then transition to EOP-E-3, Steam Generator Tube Rupture, due to elevated readings on R-31C, Main Steam Line Channel, and continued steam flow from "C" S/G. Since "C" MSIV cannot be closed the crew will direct local isolation of "C" S/G. Ultimately the crew will transition to EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery, and secure all but one RCP and both Safety Injection pumps.

The Chief Examiner may terminate the scenario at any time after one safety injection pump has been secured in accordance with EPP-17.

Sat / Unsat	Critical Task	Critical Task Criteria
	Open either SI-870A or SI-870B to establish SI flow.	Open SI-870A OR SI-870B Prior to Completing EOP-E-0 Attachment 1.
	Isolate Auxiliary Feedwater to "C" S/G.	Isolate Auxiliary Feedwater to "C" S/G within 10 minutes of entering EOP-E-0.
	Isolate Ruptured / Faulted "C" S/G	Isolate "C" S/G Prior to Transition from EOP-E-3 at Step 5 of EOP-E-3.
	Terminate SI flow to control Ruptured S/G Level and Pressure	Terminate SI Flow in Accordance with EPP-17 Step 38.

ILC-13 NRC SCENARIO 2 SIMULATOR SETUP**IC/SETUP:**

- IC-902, SCN 006_ILC_13_NRC_2.
- Status board is provided to crew is IC-17.

PRE-LOADED EVENTS:

The following events should occur on the reactor trip or triggered events following the reactor trip:

- Event 7: "C" S/G Tube Rupture once S/G has dried out
- Event 8: Main Turbine fails to Auto-Trip on Reactor Trip
- Event 9: SI-870A/B fail to Auto-Open
- Event 10: "A" and "B" MSIV fail to Auto-Close and "C" MSIV has failed open
- Event 11: Feed Header Section Isolation Valves fail to Auto-Close
- Event 12: "A" MDAFW Pump fails to Auto-Start

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

- Event 1: HVH-9A Trips with HVH-9B failure to Auto-Start
- Event 2: "A" MFP Trips / Load Reduction
- Event 3: Clogged RCP Seal Injection Strainer
- Event 4: PT-145 fails Low / Place Excess Letdown in Service
- Event 5: PT-495 fails low
- Event 6: 72 inch Main Steam Header Fault

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- APP-010
- AOP-010
- APP-001
- AOP-018
- AOP-025, Section A
- AOP-025, Section G
- OWP-025, SGP-11
- EOP-E-0
- Supplement G (Optional)
- Supplement N (Optional)
- EOP-E-2
- EOP-E-3
- EPP-17

Op Test No.: ILC-13 NRC Scenario # 2 Event # 1 Page 6 of 59

Event Description: HVH-9A, Concrete Cooling Fan, Trips with HVH-9B, Concrete Cooling Fan, failure to Auto Start (**APP-010-A7**)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed, insert Event 1, HVH-9A Trips with HVH-9B failure to Auto Start

EVENT INDICATIONS:

APP-010-A7, HVH-9A/B AIR FLOW LOST/OVLD, is illuminated

HVH-9A RTGB GREEN OFF and RED ON light illuminated

	BOP / RO	Acknowledges alarm and references APP-010-A7 .
	BOP	IF the operating fan has tripped, THEN VERIFY the standby fan starts. Starts HVH-9B
	BOP	IF the operating fan has NOT tripped, THEN PERFORM the following: (The operating fan DID trip, therefore this step is not applicable.)
	BOP	IF the annunciator is NOT clear, THEN PERFORM the following: 1) DISPATCH an I&C Technician to measure RMS AMPs for the operating fan. 2) IF RMS AMPs are significantly less than nominal current (24-26 AMPs), THEN ASSUME that air flow has been lost. 3) IF the fan continues to run with nominal current, THEN INITIATE hourly monitoring of current.
	BOP	IF air flow from at least one fan can NOT be restored, THEN perform the following: (HVH-9B was started , therefore step not applicable.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 1 Page 7 of 59

Event Description: HVH-9A, Concrete Cooling Fan, Trips with HVH-9B, Concrete Cooling Fan, failure to Auto Start (APP-010-A7)

Time

Position

Applicant's Actions or Behavior

BOP

IF a single-phase open circuit condition is suspected THEN ENTER AOP-026, Grid Instability. (Per Step 2 under Observations the BOP should: Monitor the following ERFIS Points for BOTH Emergency Bus Voltages, ELV3020A for E-1 and ELV3021A for E-2 (Voltage less than 440 Volts may indicate a single-phase open circuit condition.)

BOOTH OPERATOR: If contacted to determine is a single-phase open circuit condition is suspected, acknowledge the request. Wait 10 minutes and report that with Engineering assistance you have determined that a single-phase open circuit condition is not suspected.

CRS

Notifies WCC SRO of HVH-9A trip. Direct Work Request initiated and I&C contacted to begin troubleshooting.

CRS

Notifies Operations Management.

BOOTH OPERATOR: Insert Event #2 (MFP A Trips) on cue from the Chief Examiner.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 8 of 59Event Description: **MFP A Trips / Load Reduction (AOP-010)**

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: At the discretion of the Examiner, insert Event 2, MFP A Trips.**EVENT INDICATIONS:****Feed Flow and S/G Level Transients on all S/Gs.****APP-007-A3, FW PMP A MOTOR OVLD/TRIP, illuminated****MFP A indicates OFF****Multiple APP-006, S/G Systems, alarms**

	BOP	AOP-010 MAIN FEEDWATER/CONDENSATE MALFUNCTION Immediate Action Step Check Feedwater Regulating Valves - OPERATING PROPERLY (MANUAL OR AUTO): (YES) <ul style="list-style-type: none"> • FCV-478 • FCV-488 • FCV-498
	RO	Continuous Action Step Check Reactor Trip Setpoint - BEING APPROACHED (NO) <ul style="list-style-type: none"> • IF a Reactor Trip Setpoint is approached, THEN trip the Reactor and Go to EOP-E-0. • Go to Step 4.
	SRO	Enters AOP-010, Main Feedwater / Condensate Malfunction
	SRO	Verifies immediate actions complete.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 9 of 59

Event Description: MFP A Trips / Load Reduction (AOP-010)

Time	Position	Applicant's Actions or Behavior
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	CREW	Step 4: Make PA Announcement for Procedure Entry
APP-007-A3	RO	APP-007-A3, Step 4: At 4KV Bus 1, Cube #9, CHECK all three phases of bus voltage for indication of a single-phase open circuit. (RO will dispatch an AO to the 4 KV room to make this check.)
BOOTH OPERATOR: IF / WHEN dispatched to the 4 KV room, wait 5 minutes and then report that all three phases on MFP "A" indicate tripped.		
	BOP	Go to the appropriate Step from the Table Below: <ul style="list-style-type: none"> • Main Feed Pump Trip – Step 6
	RO	Step 6: Check Reactor Power – Less than 70% (YES)
	RO	Check Reactor Power – Greater than 60% (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 10 of 59Event Description: MFP A Trips / Load Reduction (AOP-010)

Time	Position	Applicant's Actions or Behavior
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NOTE

Rapid power reductions may result in the axial flux difference exceeding the operating band values and require a power reduction to less than 50% to comply with ITS 3.2.3 Condition C.

	CREW	<p>Reduce Turbine Load At 1%/MIN To 5%/MIN To Achieve Less Than 60% Reactor Power as follows:</p> <ol style="list-style-type: none"> Verify Rods in AUTOMATIC. (YES) Check Turbine Control Mode – AUTOMATIC <ol style="list-style-type: none"> Depress the IMP IN Pushbutton Set the Desired Load in the SETTER. Set the Desired Load Rate. Depress the GO Pushbutton or the HOLD Pushbutton as Necessary to Reduce Turbine Load Borate Per OP-301, RCS Quick Boration Checklist as necessary to maintain AFD within the operating band. Boration steps listed at the end of this section.
	SRO	Go To Step 13
	BOP	Step 13: Check Main Feed Pumps – At Least One Running (YES)
	SRO	Observe the NOTE prior to Step 38 and go to Step 38.
	BOP	Step 38: Check S/G Level – At OR Trending to Program (YES)

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page	<u>11</u>	of	<u>59</u>
Event Description:		MFP A Trips / Load Reduction (AOP-010)							
Time	Position	Applicant's Actions or Behavior							

	BOP	Check Tavg – At or Trending to Tref (YES)						
	CREW	Contact Maintenance to Troubleshoot and Correct the Feedwater Problem.						
	SRO	Implement the EALs.						
	BOP	Check current loading for the following pumps - LESS THAN MAXIMUM (YES) <ul style="list-style-type: none"> • Main Feedwater Pump - 0.715 KAMPS • Condensate Pumps - 370 AMPS • Heater Drain Pumps - 90 AMPS 						
BOOTH OPERATOR: Report the following AMPS as the current readings: <table border="0" style="margin-left: 100px;"> <tr> <td>Main Feedwater Pump</td> <td>560 AMPS</td> </tr> <tr> <td>Condensate Pumps</td> <td>310 AMPS</td> </tr> <tr> <td>Heater Drain Pumps</td> <td>75 AMPS</td> </tr> </table>			Main Feedwater Pump	560 AMPS	Condensate Pumps	310 AMPS	Heater Drain Pumps	75 AMPS
Main Feedwater Pump	560 AMPS							
Condensate Pumps	310 AMPS							
Heater Drain Pumps	75 AMPS							

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 12 of 59Event Description: **MFP A Trips / Load Reduction (AOP-010)**

Time

Position

Applicant's Actions or Behavior

	SRO	Continuous Action Step Determine Iodine Sampling Requirements As Follows: (NO) <ul style="list-style-type: none"> a. Check Power Change - GREATER THAN 15% IN ONE HOUR <ul style="list-style-type: none"> • Go To Step 44 • IF YES, then implement SR 3.4.16.2 (Iodine Sample)
	RO	Continuous Action Step Step 44: Check APP-005-B5, ROD BANKS A/B/C/D LO LIMIT – EXTINGUISHED (YES)
	RO	Monitor Axial Flux Difference To Ensure Compliance With ITS 3.2.3 (YES)
	CREW	Notify Load Dispatcher Of The Unit's Load Capability
	SRO	Return To Procedure And Step In Effect

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 13 of 59Event Description: MFP A Trips / Load Reduction (**AOP-010**)

Time	Position	Applicant's Actions or Behavior
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NOTE:

OP-301, Section 8.2.8 Quick Boration Checklist (shaded area) is included in the following steps, but may be used following the commencement of the plant down power.

Expect about 35 - 45 gallons of Boric Acid to be added.

	RO	DETERMINE the amount of Boric Acid to add to the RCS and OBTAIN an independent check of the volume required
	RO	OBTAIN permission from the CRS OR the SM to add the amount of boric acid previously determined.
	RO	PLACE the RCS MAKEUP MODE selector switch in the BORATE position.
	RO	SET YIC-113, BORIC ACID TOTALIZER to the desired quantity.
	RO	IF desired, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually ADJUST controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons.
	RO	Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 14 of 59Event Description: MFP A Trips / Load Reduction (**AOP-010**)

Time

Position

Applicant's Actions or Behavior

	RO	<p>IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position:</p> <ul style="list-style-type: none">• Rod Motion is blocked OR is in the wrong direction• T_{AVG} goes up• Boric Acid addition exceeds the desired value
	RO	<p>WHEN the desired amount of Boric Acid has been added to the RCS, THEN verify the following:</p> <ul style="list-style-type: none">• FCV-113A, BORIC ACID FLOW, closes.• FCV-113B, BLENDED MU TO CHG SUCT, closes.• IF in Auto, THEN the operating Boric Acid Pump stops.• The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 15 of 59Event Description: MFP A Trips / Load Reduction (AOP-010)

Time

Position

Applicant's Actions or Behavior

	RO	<p>IF desired, THEN FLUSH the Boric Acid flow as follows:</p> <ul style="list-style-type: none"> • PLACE the RCS MAKEUP MODE selector switch in the ALT DILUTE position. • SET YIC-114, PRIMARY WTR TOTALIZER to 15-20 gallons. • PLACE FCV-114B, BLENDED MU TO VCT to the CLOSE position. • Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position. • IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: <ul style="list-style-type: none"> ○ Unanticipated Rod Motion ○ Primary Water addition reaches the desired value • WHEN the desired amount of Primary Water has been added to the RCS, THEN verify the following: <ul style="list-style-type: none"> ○ FCV-114A, PW TO BLENDER, closes. ○ FCV-113B, BLENDED MU TO CHG SUCT, closes. ○ IF in Auto, THEN the operating Primary Water Pump stops. ○ The RCS MAKEUP SYSTEM is OFF.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 2 Page 16 of 59Event Description: MFP A Trips / Load Reduction (**AOP-010**)

Time	Position	Applicant's Actions or Behavior
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	RO	<p>RETURN the RCS Makeup System to automatic as follows:</p> <ul style="list-style-type: none"> • VERIFY FCV-114A, PW TO BLENDER, is in AUTO. • PLACE FCV-114B, BLENDED MU TO VCT to the AUTO position. • PLACE the RCS MAKEUP MODE switch in AUTO. • VERIFY FCV-113A, BORIC ACID FLOW, is in AUTO. • Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position.
	RO	<p>RECORD, in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 AND Boric Acid TOTALIZER, YIC-113 the total amount of Primary Water AND Boric Acid added during the boration.</p>
	RO	<p>MONITOR parameters for the expected change in reactivity AND inform the CRS OR the SM the results of the boration.</p> <p>(END OP-301 Section 8.2.8)</p>
<p>BOOTH OPERATOR: Insert Event #3 (Clogged RCP Seal Injection Strainer) on cue from the Chief Examiner.</p>		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 17 of 59

Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: At the discretion of the Examiner, insert Event 3, Clogged RCP Seal Injection Strainer

EVENT INDICATIONS:

Reduction in RCP seal injection flows to zero.

APP-001-A2, SEAL WATER INJECTON FILTER HIGH ΔP

APP-001-B4, RCP SEAL NJECTION HI/LO FLOW

APP-001-B2, RCP LABYRTH SEAL LO ΔP

NOTE: If more than 15 minutes elapses without RCP Seal Cooling, then Seal Cooling must be isolated before starting CCW OR Charging to prevent Seal damage.

Normal Seal Injection flow should be maintained at 8 to 13 gpm, however the minimum Seal Injection flow is 6 gpm and the maximum Seal Injection flow is 20 gpm. (ACR 94-01811) ITS LCO 3.4.17 requires seal injection flow of greater than or equal to 6 gpm to each RCP when in MODES 1, 2, 3, and 4.

	RO / BOP	APP-001-A2 – IF Seal Injection is lost to any RCP, THEN REFER TO AOP-018 (Informs SRO of AOP-018 entry requirement.)
	RO / BOP	APP-001-A2 – IF RCP Seal Injection flow can NOT be maintained greater than 6 gpm to each RCP, THEN REFER TO AOP-018 AND ITS SR 3.4.17.1. (Informs SRO of ITS SR 3.4.17.1 implication.)
	RO / BOP	APP-001-A2 – DETERMINE if alarm is due to high seal injection flow condition. (NO, determined to be due to LOW seal injection flow condition.)
	RO / BOP	APP-001-A2 – DISPATCH an operator to check Seal Water Injection Filter ΔP . (Dispatches IAO to CCP Room.)

BOOTH OPERATOR: WHEN dispatched, wait 2 minutes and then report that "A" Seal Water Injection Filter indicates pegged high at > 25 psid.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 18 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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	RO / BOP	APP-001-A2 - IF RCP Seal Injection Filter ΔP is high AND is NOT caused by high flow, THEN SHIFT filters using OP-301. (Requests permission from SRO and then directs the IAO to shift filters.)
BOOTH OPERATOR: WHEN dispatched, wait 7 minutes and then shift RCP Seal Injection Filters IAW SCN File.		
	RO / BOP	APP-001-A2 - IF RCP Seal Injection Filters are shifted due to high ΔP , THEN INITIATE action to replace the affected filter cartridge.
	SRO	Enters <u>AOP-018, RCP Abnormal Conditions</u>
AOP-018	CREW	Make PA Announcement for Procedure Entry
AOP-018	SRO	Determines that Section C, Loss of Seal Injection, is the appropriate section.
AOP-018	RO	Check APP-001-D1, RCP THERM BAR COOL WTR LO FLOW alarm – ILLUMINATED (NO, go to step 11)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 19 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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NOTE

- A rupture is a leak of sufficient magnitude to require stopping the Charging Pumps or reduces Charging Pump Discharge Pressure to less than RCS Pressure.
- Charging System piping is any piping where a leak prevents the Charging Pumps from delivering flow to the Charging Line OR Seal Injection Line.

AOP-018	RO	Step 11: Determine If a Charging Pump Can Be Started: a. Check Charging System Piping – Ruptured (NO, go to Step 12)
AOP-018	RO	Step 12: Check SI – Initiated (NO, go to Step 14.)
AOP-018	RO	Step 14: Verify at Least ONE Charging Pump – RUNNING (YES)
AOP-018	RO	Check Seal Injection to RCPs: <ul style="list-style-type: none"> • ANY Seal Injection flow – LESS THAN 6 GPM (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • ANY Thermal Barrier ΔP – LESS THAN 5 inches (YES)
AOP-018	RO	Check Seal Injection – Aligned (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 20 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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AOP-018	RO	<p>Adjust any OR all of the following to restore seal injection flow.</p> <ul style="list-style-type: none"> • HIC-121 • CCP Speed • CVC-297A/B/C <p>(Depending on timeline, all OR none of these actions may be taken. Crew may determine that clogged strainer is cause and wait to see impact of swapping seal injection strainers.)</p>
AOP-018	RO	<p>Check Seal Injection to RCPs:</p> <ul style="list-style-type: none"> • ANY Seal Injection flow – LESS THAN 6 GPM (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • ANY Thermal Barrier ΔP – LESS THAN 5 inches (YES) <p>(May be answered as NO depending on status of swapping RCP seal injection filters.)</p>
AOP-018	RO	Check PI-121, CHARGING PUMPS DISCH PRESS Indicator – LESS THAN RCS PRESSURE (NO, go to Step 41.)
AOP-018	RO	Step 41: Check APP-001-A2, SEAL WTR INJ FILTER HI ΔP Alarm – ILLUMINATED (YES, if filters have not been swapped)
AOP-018	RO	Shift Seal Injection Filters Using OP-301. (Dispatch IAO to perform if not already dispatched.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 21 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time

Position

Applicant's Actions or Behavior

AOP-018	RO	Check Alternate Seal Injection Filter – IN SERVICE (When YES, then go to Step 47.)
AOP-018	RO	Step 47: Establish Charging Flow on FI-122A, Charging Line Flow – Greater than 35 gpm (YES)
AOP-018	RO	Check Normal Letdown – In Service (YES)
AOP-018	RO	Control Charging and Letdown Flow to Maintain Pressurizer Level as follows: <ul style="list-style-type: none"> • Within +/- 5% of Reference Level <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • PZR level between 30% and 40% with RCP C stopped.
AOP-018	RO	Establish Normal Seal Injection <ul style="list-style-type: none"> a. Check RCP Seal Injection – Aligned (YES) b. Check RCP Seal Injection Flow – Between 8 gpm and 13 gpm (YES)
AOP-018	RO	Check Seal Injection Flow – Established To All RCPs (YES)
AOP-018	SRO	Implement the EALs

Op Test No.: ILC-13 NRC Scenario # 2 Event # 3 Page 22 of 59Event Description: **Clogged RCP Seal Injection Strainer (APP-001-A2 / AOP-018)**

Time	Position	Applicant's Actions or Behavior
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AOP-018	SRO	<p>Refer to Technical Specifications for any applicable LCOs:</p> <p>Determines that ITS LCO 3.4.17, Condition E, was applicable during the time that seal injection flow was less than 6 gpm to any RCP. Condition D requires that you initiate action to restore seal injection to affected RCPs Immediately and be in Mode 3 in 6 hours and Mode 5 in 36 hours.</p>
AOP-018	SRO	<p>Check RCP Seal Cooling ISOLATED (NO)</p> <p>RNO: Observe the NOTE prior to Step 2 and go to Main Body, Step 2 of this procedure.</p>
AOP-018	CRS	Notify WCC SRO to initiate Work Request to replace clogged filter.
BOOTH OPERATOR: Insert Event #4 (PT-145, Letdown Pressure Transmitter, fails low) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 23 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time

Position

Applicant's Actions or Behavior

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 4, PT-145, Letdown Pressure Transmitter, fails low resulting in placing excess letdown in service.

EVENT INDICATIONS:**APP-001-E6 – LP LTDN RELIEF HI TEMP****APP-003-C3 – PRT HI PRESS**

	BOP	References APP-001 and informs SRO of need to refer to AOP-025, RTGB Instrument Failure.
	SRO	Enters <u>AOP-025, RTGB Instrument Failure</u>
	RO	Place LCV-460A&B In The CLOSE Position
	RO	Verify ONLY ONE Charging Pump is Running. (Lowers the speed on the Charging Pump in Manual and stops the pump.)
	BOP	Place Excess Letdown in Service Using Attachment 2.
Att. 2	BOP	Verify Closed the following valves: <ul style="list-style-type: none"> • LCV-460A&B • CVC-200A/B/C • CVC-204A/B

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 24 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time	Position	Applicant's Actions or Behavior
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Att. 2	BOP	Verify Open CC-739
Att. 2	BOP	Position CVC-389 to the RCDT Position
Att. 2	BOP	Open CVC-387, Excess Ltdn Stop
Att. 2	BOP	Slowly Open HCV-137, Excess Ltdn Flow, not to exceed 195°F as indicated on TI-139, Excess Ltdn HX Outlet Temp.
Att. 2	BOP	Notify the CRS that Excess Letdown is in service.
Att. 2	BOP	Update the ERFS Calorimetric program to reflect Excess Letdown is in service.
Att. 2	BOP	IF required to control Pzr Level, THEN contact Chemistry to perform the alignment for purging the PZR Liquid sample line with full flow to the VCT iaw CP-003.
BOOTH OPERATOR: IF requested to align sample line for purge, wait 5 minutes and implement IAW SCN File.		
Att. 2	BOP/SRO	IF PZR Liquid sample line is used to control PZR Level, THEN remove the calorimetric calculation from service and enter TRM 3.25

Op Test No.: ILC-13 NRC Scenario # 2 Event # 4 Page 25 of 59

Event Description: PT-145, Letdown Pressure Transmitter, fails low / Place Excess Letdown in Service (AOP-025)

Time

Position

Applicant's Actions or Behavior

Att. 2	BOP	<p>IF desired to align Excess Letdown to the VCT, THEN perform the following:</p> <ol style="list-style-type: none"> Position CVC-389 to the VCT. Notify Rad. Control that Excess Letdown is in service through the Seal Water Filters and Heat Exchanger, which will result in RAISED radiation levels in those areas.
	RO	Step 4: Make PA Announcement for Procedure Entry.
	RO	<p>Check RCP Seal Injection Flow – Between 8 and 13 gpm. (NO)</p> <ul style="list-style-type: none"> Locally throttle CVC-297A/B/C to obtain 8 to 13 gpm. If required to maintain minimum flow, then throttle HIC-121 while maintaining Charging Pump Discharge pressure less than 2500 psig. If the normal Seal Injection Range can NOT be maintained, then an expanded range of between 6 to 20 gpm may be used. Check ITS LCO 3.4.17 for applicability. (ITS 3.4.17 SR 3.4.17.1 requires that seal injection flow remain ≥ 6 gpm to each RCP)
BOOTH OPERATOR: IF / WHEN requested, throttle CVC-297A/B/C as necessary using the P&ID function to obtain requested seal injection flows.		
	SRO	Contact Plant Operations Staff to Expedite Repair of PT-145.
BOOTH OPERATOR: Insert Event #5 (PT-495 fails low) on cue from the Chief Examiner.		

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>2</u>	Event #	<u>5</u>	Page	<u>26</u> of	<u>59</u>
Event Description:		PT-495, "C" S/G Steam Pressure Transmitter, fails low (AOP-025)						
Time	Position	Applicant's Actions or Behavior						

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #5 (PT-495, "C" S/G Steam Pressure Transmitter, fails low).

EVENT INDICATIONS:

APP-006-A4 – STM LINE HI ΔP

APP-006-C2 – S/G C STM > FW FLOW

Steam Flow / Feed Flow Transient on S/G C

	BOP	<u>AOP-025, RTBG INSTRUMENT FAILURE (Section G)</u> Immediate Action Step Verify the Affected FRV in MAN <ul style="list-style-type: none"> FCV-498 (FRV "C")
	BOP	Immediate Action Step Restore Affected S/G Level to between 39% and 52%
	RO	Provides Peer Check for Failure Identification and actions to control S/G Level.
	BOP	Check Reactor Trip Setpoint – Being Approached (NO, go to Step 5. IF YES, trip the Reactor and go to EOP-E-0.)
	BOP	Make PA Announcement For <u>AOP-025, RTBG INSTRUMENT FAILURE</u> , entry.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 5 Page 27 of 59

Event Description: PT-495, "C" S/G Steam Pressure Transmitter, fails low (AOP-025)

Time	Position	Applicant's Actions or Behavior
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	BOP	Place the affected S/G Steam Flow Selector Switch to the alternate channel: S/G "C" Steam Flow – FR-498						
		<table border="1"> <thead> <tr> <th>Failed Channel</th> <th>Affected Channel</th> <th>Selected Position</th> </tr> </thead> <tbody> <tr> <td>PT-495</td> <td>FI-494</td> <td>CH 495</td> </tr> </tbody> </table>	Failed Channel	Affected Channel	Selected Position	PT-495	FI-494	CH 495
Failed Channel	Affected Channel	Selected Position						
PT-495	FI-494	CH 495						
BOOTH OPERATOR: If requested to check for instrument steam leaks wait 5 minutes and report no indication of steam leaks.								
	BOP	Continuous Action Step Restore Affected Controller to Automatic as Follows: a. Check S/G Level – Within +/- 1% of Programmed Level b. Place the affected Controller in AUTO (when within +/-1% of programmed level)						
	BOP	Remove the Affected Transmitter from Service using OWP-025, SGP-11.						
	SRO	Contact WCC SRO for assistance with OWP and W/R initiation. Contact Maintenance.						
BOOTH OPERATOR: Implement OWP-025, SGP-11, as requested, IAW SCN File.								

Op Test No.: ILC-13 NRC Scenario # 2 Event # 5 Page 28 of 59

Event Description: PT-495, "C" S/G Steam Pressure Transmitter, fails low (AOP-025)

Time

Position

Applicant's Actions or Behavior

SRO

- **ITS 3.3.1 Condition A** will not be met due to one or more Functions with one or more required channels inoperable. Condition A requires entry into the Condition referenced in Table 3.3.1-1 for the channel Immediately.
- **ITS Table 3.3.1 Table 3.3.1-1 Item 14** which requires 2 Steam Flow / Feedwater Flow Mismatch Channels to be operable will not be met and require entry into **ITS 3.3.1 Condition E**, which requires the channel to placed in trip with 6 hours OR be in Mode 3 in 12 hours.
- **ITS Table 3.3.2-1, Items 1.e** which requires 3 Steam Line High Differential Pressure between Steam header and Steam Lines Channels to be operable will not be met and require entry into **ITS 3.3.2 Condition D**.
- **ITS Table 3.3.3-1, Item 20** which requires 2 Steam Generator Pressure Channels per S/G to be operable will be reviewed and determined to be met.
- **ITS Table 3.3.6.1 Item 4** will also be reviewed and determined to be applicable due to affecting Safety Injection ESFAS Instrumentation associated with Containment Ventilation Isolation Instrumentation.

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 29 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #6 (72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture)

EVENT INDICATIONS:**Audible Steam Noise****Steam Flow Rising on all Channels****Reactor Power Rising on FWUFM and NIs****Multiple alarms on APP-004 and APP-006**

	CREW	Determines that a Reactor Trip is prudent.
	CREW	Enters EOP-E-0, Reactor Trip or Safety Injection
EOP-E-0	RO	Check Reactor tripped (YES)
EOP-E-0	BOP	Check Turbine Trip: <ul style="list-style-type: none"> a. Both turbine stop valves - Closed (NO) RNO: Manually trip turbine. (Depresses THINK and Turbine Trip Pushbutton) b. Close MSR purge and shutoff valves (Manual action required by BOP)
EOP-E-0	BOP	Check Power to AC Emergency Busses: <ul style="list-style-type: none"> a. E1 or E2 – At least one energized (YES) b. E1 and E2 – Both energized (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 30 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	<p>Check SI Status:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • SI annunciators – ANY ILLUMINATED (YES) • SI equipment – AUTO STARTED (YES) <p>b) Check BOTH trains of SI – ACTUATED</p> <ul style="list-style-type: none"> • SI pumps – BOTH RUNNING (YES) • RHR pumps – BOTH RUNNING (YES) <p>(Automatic SI from High Steam Line Flow with Low Tavg)</p>
EOP-E-0	CRS	Verifies all immediate actions for EOP-E-0.
Critical Task	CRS	<p>FOLDOUT for EOP-E-0 is in effect</p> <p>(IF crew takes an early action to close the MSIVs then "C" S/G will be identified as Faulted.)</p> <p>Faulted S/G AFW Isolation Criteria</p> <p>a. Reset SI</p> <p>b. Close V2-14C, SDAFW Pump Discharge Valve to "C" S/G</p> <p>c. Close V2-16C, AFW Header Discharge Valve to "C" S/G</p> <p>d. Perform Att. 2, Deenergizing AFW Valves for Faulted S/Gs</p> <p>e. Maintain total feed flow greater than 300 gpm until narrow range level is greater than 8% in at least one S/G.</p>
BOOTH OPERATOR: When requested, wait 3 minutes and perform EOP-E-0, Att. 2 IAW SCN File.		
CRITICAL TASK – ISOLATE FEED TO "C" S/G WITHIN <u>10 MINUTES</u> OF ENTERING EOP-E-0.		

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	6 - 12	Page	31	of	59
Event Description:		72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)							
Time	Position	Applicant's Actions or Behavior							

EXAMINER'S NOTE: Crew may take early actions at this time to address items that did not function or operate as designed. <ul style="list-style-type: none"> Manually open SI-870A and/or SI-870B Manually close all MSIVs ("C" MSIV fails remains failed open) Manually start "A" MDAFW Pump Manually close Feedwater Section Isolation Valves 		
EOP-E-0	CRS	Perform Attachment 1, Auto Action Verification, While continuing with this procedure. (Should be assigned to BOP.) (Att. 1 steps are presented next followed by the remainder of EOP-E-0.)
Beginning of EOP-E-0 Attachment 1 (Remainder of EOP-E-0 Follows this Section)		
Att. 1	BOP	Check ECCS Pumps Running: <ul style="list-style-type: none"> SI pumps - BOTH RUNNING (YES) RHR pumps - BOTH RUNNING (YES)
Att. 1 Critical Task	BOP	Check ECCS Valves - PROPER EMERGENCY ALIGNMENT (NO) <ul style="list-style-type: none"> Manually Opens SI-870A and/or SI-870B
CRITICAL TASK – OPEN SI-870A OR SI-870B PRIOR TO COMPLETING EOP-E-0 ATTACHMENT 1		
Att. 1	BOP	Check CCW Pumps - AT LEAST ONE RUNNING (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 32 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	<p>Check Containment Isolation Phase A</p> <ol style="list-style-type: none"> Phase A – Actuated (YES) Phase A valves – Closed (YES) Excess letdown – Isolated (NO) <ul style="list-style-type: none"> CVC-387 – Closed (NO, Manually close CVC-387 from RTGB) HIC-137 – at 0% DEMAND (NO, Manually adjust HIC-137 controller to 0%)
Att. 1	BOP	<p>Check Feedwater Isolation:</p> <ol style="list-style-type: none"> Main feed pumps – BOTH TRIPPED (YES) Main feedwater – ISOLATED <ul style="list-style-type: none"> FRVs – Closed (YES) Feedwater reg bypass valves – Closed (YES) Feedwater header section valves – Closed (NO, Manually closes all Feedwater Header Section Valves.)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 33 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	<p>Check if Main Steamlines Should Be Isolated:</p> <p>a) Main steamline isolation – REQUIRED (YES)</p> <ul style="list-style-type: none"> Containment pressure – Greater than 10 psig (NO) <p>OR</p> <ul style="list-style-type: none"> High steam flow with: (YES) <ul style="list-style-type: none"> S/G pressure – less than 614 psig <p>OR</p> <ul style="list-style-type: none"> Tavg – less than 543°F <p>b) Check MSIVs and MSIV bypass valves – CLOSED (NO, Manually closes "A" and "B" MSIVs. "C" MSIV is failed open.)</p>
Att. 1	BOP	<p>Check Proper Service Water System Operation:</p> <p>a. SW pumps – All running (YES)</p> <p>b. SW booster pumps – Both running (YES)</p> <p>c. Both SW header low pressure alarms (APP-008-F7/F8) – Extinguished (YES)</p>
Att. 1	BOP	Check Both EDGs – Running (YES)
Att. 1	BOP	<p>Check ECCS Flow:</p> <p>a. RCS pressure – less than 1650 psig (YES)</p> <p>b. SI pumps- Flow Indicated (YES)</p> <p>c. RCS pressure – less than 275 psig. (NO, Go to Step 10)</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 34 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time

Position

Applicant's Actions or Behavior

Att. 1	BOP	Step 10: Check CV Recirculation Fans – All Running (YES, all available)
Att. 1	BOP	Check IVSW - Actuated (YES) <ul style="list-style-type: none"> • PCV-1922A – Open (YES) • PCV-1922B – Open (YES)
Att. 1	BOP	Check CV ventilation isolation (YES) <ul style="list-style-type: none"> a. CV ventilation isolation valves – CLOSED (YES)
Att. 1	BOP	Check control room ventilation - aligned for pressurization mode (YES) <ul style="list-style-type: none"> • HVA-1A or HVA-1B – Running (YES) • HVE-16 – Stopped (YES) • HVE-19A or HVE-19B – Running (YES) • Control Room HVAC outside air damper A or B – Open (YES) • CR-D1A-SA – Closed (YES) • CR-D1B-SB – Closed (YES)
Att. 1	BOP	Check DS Bus – Energized (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 35 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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Att. 1	BOP	Check Battery Chargers – Energized (YES) APP-036-D1 – Extinguished (YES) APP-036-D2 – Extinguished (YES)
Att. 1	BOP	Stop R-11/12 Sample Pump
Att. 1	BOP	Locally Reset and Load IACs as necessary (N/A)
Att. 1	BOP	Perform Crew Update to include the following: <ul style="list-style-type: none"> • Attachment Completion • Manual Actions Taken (Opened SI-870A/B, Closed FW Header Section Valves (V2-6A, B, C), Closed "A" and "B" MSIVs) • Failed Equipment status ("C" MSIV did not close.) • SW status (All operating)
End of EOP-E-0 Attachment 1		

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	6 - 12	Page	36	of	59
Event Description:		72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)							
Time	Position	Applicant's Actions or Behavior							

Continuation of EOP-E-0		
EXAMINER NOTE: SRO MAY DECIDE TO TAKE A PROMPT AND PRUDENT ACTION AND DIRECT THE BOP TO BEGIN ISOLATING "C" S/G IAW SUPPLEMENT G and N. CREW MAY HAVE DETERMINED THAT "C" S/G HAS A TUBE RUPTURE BY THIS POINT IN THE SCENARIO.		
EOP-E-0	RO	Check AFW Pumps – Running (NO, "A" MDAFW Pump must be manually started.)
EOP-E-0	RO	Check AFW Valves – Proper Emergency Alignment (YES) <ul style="list-style-type: none"> • AFW header discharge valves – Full Open (YES) • AFW header section valves – Full Open (YES) • Steam driven AFW pump discharge valves – Full open if pump is running. (YES)
<p style="text-align: center;"><u>CAUTION</u></p> <p>If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.</p>		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 37 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	Check Total AFW Flow: <ul style="list-style-type: none"> • Reset SI • Control feed flow to maintain NON-faulted S/Gs narrow range level – Between 8% and 50%. • Check total AFW flow- Greater than 300 gpm (YES)
EOP-E-0	RO	Continuous Action Step Check CV Spray NOT required: <ul style="list-style-type: none"> a. CV pressure – Has Remained Less than 10 psig. (YES) b. CV spray – <u>NOT</u> Actuated (YES)
EOP-E-0	RO	Check RCP Seal Cooling: <ul style="list-style-type: none"> • CCW flow to RCP thermal barriers – Normal (YES) <ul style="list-style-type: none"> ○ APP-001-C1 / D1 – Extinguished (YES) OR • Seal injection flow – Normal (YES) <ul style="list-style-type: none"> ○ Seal injection flow – Greater than 6 gpm per RCP OR ○ Thermal barrier ΔPs – Greater than 5 inches water.
BOOTH OPERATOR: As requested, adjust CVC-297A,B,C as necessary to control RCP seal injection flow using the P&ID function.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 38 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time	Position	Applicant's Actions or Behavior
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EOP-E-0	RO	Continuous Action Step Check RCS Temperature With any RCPs running, RCS average temperature – Stable at or trending to 547°F (NO) RNO: IF temperature is less then 547°F AND lowering then perform the following: (YES) <ol style="list-style-type: none"> Stop dumping steam IF cooldown continues, THEN reduce total feed flow to minimum for decay heat removal: <ul style="list-style-type: none"> Maintain total feed flow greater than 300 gpm until narrow range level is greater than 8% in at least one S/G. IF cooldown continues, THEN close MSIVs and MSIV bypass valves.
EOP-E-0	RO	Check PZR PORVs and Spray Valves: <ol style="list-style-type: none"> PORVs – Closed (YES) Normal PZR spray valves – Closed (YES) Aux spray valve – Closed (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 39 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-0	RO	<p>Check If RCPs should be stopped:</p> <ul style="list-style-type: none"> a. RCPs – Any Running (YES) b. SI pumps – At least one running and capable of delivering flow. c. RCS subcooling based on core exit TCs – Less than 30°F (NO, go to step 14)
EOP-E-0	BOP	<p>Step 14: Check if S/G Secondary Pressure Boundaries are Intact:</p> <ul style="list-style-type: none"> a. Check pressures in all S/Gs <ul style="list-style-type: none"> o None lowering in an uncontrolled manner (NO) o None Completely depressurized (NO) <p>RNO: Reset SPDS and initiate monitoring of CSFSTs.</p> <p>Go to EOP-E-2, Faulted Steam Generator Isolation, Step 1.</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 40 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time

Position

Applicant's Actions or Behavior

Beginning of EOP-E-2, Faulted Steam Generator IsolationCAUTION

- At least one S/G must be maintained available for RCS Cooldown
- Any faulted S/G or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.

EOP-E-2

BOP

Check MSIVs and MSIV Bypass Valves for faulted S/G – CLOSED ("A" and "B" MSIVs manually closed. "C" MSIV failed open)

EOP-E-2

BOP

Check IF ANY S/G Secondary Pressure Boundary is Intact:

a. Check pressure in all S/G – ANY STABLE OR RISING (YES)

EOP-E-2

BOP

Identify Faulted S/Gs: ("C" S/G is faulted)

a. Check pressures in all S/Gs:

- Any S/G pressure lowering in an uncontrolled manner (YES)

OR

- Any S/G Completely depressurized. (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 41 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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CAUTION

- If the steam driven AFW pump is the only available source of feed flow, steam supply to the steam driven AFW pump should be maintained from at least one S/G.
- If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-2	BOP	<p>Isolate Faulted S/G:</p> <ol style="list-style-type: none"> Check main feedwater to faulted S/G – Isolated (FCV-498, FCV-499, V2-6C) (YES) Reset SI (Depresses SI Reset) Isolate AFW flow to faulted S/G – Close V2-14C and V2-16C Check faulted S/G steam line PORV – Closed (RV-3) (YES) Close steam driven AFW pump steam shutoff valve for faulted S/G: V1-8C (S/G C) Perform Att. 1 to De-energize AFW Valves for Faulted S/G (Field Operation by AO) Locally close MS-38, S/G "C" Bypass Drain and Warm-up Line to AFW Pump (Field Operation by AO) Check S/G Blowdown and Blowdown sample valves from faulted S/G – Closed (FCV-1932A/B and FCV-1935A/B) (YES)
BOOTH OPERATOR: As directed de-energize AFW valves iaw EOP-E-2, Att. 1 and close MS-38 IAW SCN File. These are AO Field Actions.		

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 42 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-2	BOP	Check CST level >10% (YES)
EOP-E-2	BOP	Check Secondary Radiation: a. Request periodic activity samples of all S/Gs b. Unisolated secondary radiation monitors – have remained normal (NO, R-31C is elevated) RNO: Reset SPDS and Go to EOP-E-3, Steam Generator Tube Rupture, Step 1.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 43 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

BEGINNING OF EOP-E-3NOTE

- FOLDOUT for EOP-E-3 is in effect.
- Chemistry should be available for sampling during this procedure.
- Step 1 RCP trip criteria applies until an operator controlled RCS cooldown is initiated.

CONTINUOUS ACTION STEP

Check If RCPs Should Be Stopped:

- RCPs - ANY RUNNING (YES)
- SI pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW (YES)
- RCS subcooling based on core exit TCs - LESS THAN 30°F [50°F] (NO)

RNO: Go to Step 2

EOP-E-3**RO**

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 44 of 59

Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EOP-E-3

BOP

Step 2: Identify Ruptured S/G(s): ("C" S/G is ruptured)

- Unexpected rise in any S/G narrow range level

OR

- High radiation from any SG steamline (R-31s)

OR

- High radiation from any SG blowdown line (R-19s)

OR

- High radiation from any S/G sample:
 - Contact Chemistry to sample all S/Gs for activity as necessary

CAUTION

- If the steam driven AFW pump is the only available source of feed flow, steam supply to the steam driven AFW pump should be maintained from at least one S/G.
- At least one S/G must be maintained available for RCS cooldown.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 45 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Critical
Task

BOP

Isolate Flow From Ruptured S/G(s):

- a. Adjust ruptured S/G(s) steam line PORV controller setpoint to 1060 psig (Value obtained from Plant Status Sheet)
- b. Check ruptured S/G steam line PORV – (RV1-3) CLOSED (YES)
- c. Close steam driven AFW pump steam shutoff valve for ruptured S/G: (V1-8C)
- d. Locally close the following valve for ruptured S/G(s) while continuing with this procedure:
 - MS-38, SG "C" BYPASS DRN & WARM-UP LINE TO AFW PUMP (pipe jungle above/right of V1-8C)
- e. Check S/G blow down and blow down sample valves from ruptured S/G(s) – Closed
 - FCV-1932 A & B
 - FCV-1935 A & B SHUT
- f. Check MSIV above and below seat drain valves for ruptured S/G – CLOSED (YES)
- g. Close ruptured S/G MSIV and MSIV bypass valve – V1-3C and MS-353C. (NO, V1-3C is failed open.)

RNO:

- 1) Close all remaining MSIVs and MSIV bypass valves. (YES)
- 2) Verify the following valves are closed
 - Turbine stop and governor valves
 - MSR purge and shutoff valves
 - Condenser steam dump valves
- 3) Perform Att. 5, Local Isolation of Ruptured S/G with Failed MSIV or Bypass Valve, while continuing with this procedure. (Local AO Field Actions)
- 4) Use intact S/Gs steam line PORVs for steam dump.

IF any ruptured S/G can NOT be isolated from at least one intact S/G, THEN reset SPDS and Go To EPP-17, SGTR With Loss Of Reactor Coolant Subcooled Recovery, Step 1. (Not applicable)

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	6 - 12	Page	46	of	59
Event Description:		72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: Acknowledge direction to perform Att. 5. Wait 5 minutes and close GS-3 IAW SCN File and then report Att. 5 complete. All other valves are not modeled.		
CRITICAL TASK – ISOLATION OF "C" S/G PRIOR TO TRANSITION FROM EOP-E-3 at STEP 5 OF EOP-E-3		
<p style="text-align: center;"><u>CAUTION</u></p> <ul style="list-style-type: none"> If any ruptured S/G is faulted, feed flow to that S/G should remain isolated during subsequent recovery actions unless needed for RCS cooldown. If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. 		
EOP-E-3	BOP	Continuous Action Step Check Ruptured S/G Level: a. Narrow range level – Greater than 8%. (NO, per caution feed flow will remain isolated. Observe CAUTION prior to Step 5 and continue with Step 5.)
<p style="text-align: center;"><u>CAUTION</u></p> Major steam flow paths from the ruptured S/G(s) should be isolated before initiating RCS cooldown. This includes MSIVs and MSIV bypass valves, steam line PORV, and AFW pump steam shutoff valve.		
EOP-E-3	BOP / SRO	Step 5: Check Ruptured S/G Pressure – Greater than 370 psig. (NO) RNO: Reset SPDS and Go to EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery, Step 1.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 47 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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Beginning of EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery

EPP-17	SRO	Open Foldout E (None applicable)
EPP-17	RO	Reset SAFETY INJECTION (Depresses SI Reset pushbutton)
EPP-17	RO	Reset CONTAINMENT ISOLATION PHASE A AND PHASE B (Depresses both Phase A and Phase B pushbuttons)
EPP-17	BOP	Continuous Action Step Check Loss Of Offsite Power – IN PROGRESS (NO, go to step 8)
EPP-17	RO	Continuous Action Step Step 8: Establish Instrument Air To CV As Follows: <ul style="list-style-type: none"> • Check APP-002-F7, INSTR AIR HDR LO PRESS – EXTINGUISHED (YES) • Momentarily place IA PCV-1716, INSTRUMENT AIR ISO TO CV Switch, to RESET • Check INST AIR VALVE TO CV PCV-1716 – OPEN (YES)
EPP-17	RO	Continuous Action Step Determine If CV Spray Should Be Stopped As Follows: <ul style="list-style-type: none"> • Check CV Spray Pumps – RUNNING (NO, go to step 11)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 48 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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EPP-17	BOP	Continuous Action Step Step 11: Control Ruptured S/G Level As Follows : <ul style="list-style-type: none"> a. Check ruptured S/G level - LESS THAN 8% [18%] (YES) b. Check ruptured S/G(s) – Also Faulted (YES) c. Check ruptured-faulted S/G(s) needed for RCS Cooldown RNO: Stop feed flow to ruptured-faulted S/G(s) and go to Step 12.
EPP-17	RO	Continuous Action Step Step 12: Determine If RHR Pumps Should Be Stopped <ul style="list-style-type: none"> a. Check RCS pressure: <ul style="list-style-type: none"> • GREATER THAN 275 PSIG [400 PSIG] (YES) <p style="text-align: center;"><u>AND</u></p> <ul style="list-style-type: none"> • STABLE <u>OR</u> INCREASING b. Verify RHR Pumps – Stopped c. Check RCS pressure – Less than 275 psig [400 PSIG] (NO, go to Step 13)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 49 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	<p>Step 13: Initiate Evaluation Of Plant Status :</p> <p>a. Check Auxiliary Building radiation monitors – NORMAL (YES)</p> <p>b. Contact Chemistry to obtain the following periodic samples :</p> <ul style="list-style-type: none"> • RCS for boron and activity • Ruptured S/G(s) for boron • Pressurizer for boron <p>c. Contact Plant Operations Staff to determine additional actions to evaluate plant status, while continuing with this procedure</p>
EPP-17	RO	<p>Establish Charging Flow As Follows :</p> <ul style="list-style-type: none"> • Check Charging Pumps – ALL STOPPED (NO, go to step 14.h.) • Step 14.h: Verify charging flow on FI-122A – Greater than 35 GPM <p>(YES, however, may be NO depending on previous plant conditions.</p> <p>IF answered as NO, then RO will need to Re-Open HCV-121 as necessary while maintaining RCP Seal Injection Flows greater than 6 gpm.)</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 50 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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EPP-17	RO	<p>Align Charging Pump Suction To RWST as follows:</p> <ol style="list-style-type: none"> From the RTGB, verify LCV-115B, EMERG MU TO CHG SUCT - OPEN Verify LCV-115C, VCT OUTLET - CLOSED Start all available Charging Pumps. (Starts any secured Charging Pump.) Increase running Charging Pumps speed to maximum. (Takes Manual Control of Charging Pumps and raises to 100% output.) Verify maximum charging flow on FI-122A (YES)
EPP-17	BOP	<p>Identify Faulted S/Gs As Follows:</p> <ol style="list-style-type: none"> Check pressure in all S/Gs: <ul style="list-style-type: none"> ANY S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER (YES) <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> ANY S/G COMPLETELY DEPRESSURIZED (NO)
EPP-17	BOP	Check Faulted S/Gs – PREVIOUSLY ISOLATED (YES)
EPP-17	BOP	<p>Control Intact S/G Levels As Follows :</p> <ol style="list-style-type: none"> Check intact S/G levels – ANY GREATER THAN 8% (YES) Control feed flow to maintain intact S/G levels between 8% and 50% Check <u>intact</u> S/G levels – ANY INCREASING IN AN UNCONTROLLED MANNER (NO, go to step 19)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 51 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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EPP-17	RO	<p>Continuous Action Step</p> <p>Step 19: Ensure Adequate Shutdown Margin Exists As Follows:</p> <p>a. Check boron sample results – AVAILABLE (NO) RNO: WHEN sample results available, THEN Check boron concentration – At Cold Shutdown Boron Concentration.</p> <p>Observe the NOTE prior to Step 20 and Go to Step 20.</p>
<p style="text-align: center;"><u>NOTE</u></p> <ul style="list-style-type: none"> A differential pressure of 210 psid across the RCP number 1 seals is necessary for continued RCP operation. RCS cooldown should be completed as quickly as possible since ruptured S/Gs may continue to depressurize to a value that may not support differential pressure across the RCP number 1 seals. 		
EPP-17	BOP	<p>Initiate RCS Cooldown To Cold Shutdown As Follows:</p> <p>a. Maintain cooldown rate in RCS cold legs less than 100°F in the last 60 minute (Cooldown rate already exceeded to Ruptured-Faulted S/G.)</p> <p>b. Maintain RCS temperature and pressure within limits of Curve 3.4, Reactor Coolant System Pressure – Temperature Limitations For Cooldown</p> <p>c. Check intact S/Gs - AT LEAST ONE AVAILABLE FOR RCS COOLDOWN (YES)</p> <p>d. Check steam dump to Condenser – Available (NO)</p> <p>RNO: Dump steam using Steam Line PORVs and go to step 21. (Target temp. specified in next step will already be met.)</p>

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 52 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17	RO	Step 21: Check RCS Hot Leg Temperatures – Less than 543°F (YES)
EPP-17	BOP	Restore Steam Dumps as follows: Check steam dump to condenser – Available (NO, continue RCS cooldown using Steam Line PORVs. Observe the NOTE prior to Step 23 and Go to step 23.)
<u>NOTE</u>		
Low Tavg SI initiation circuits will automatically unblock if Tavg increases to greater than 543°F.		
EPP-17	RO	Step 23: Defeat Low Tavg Safety Injection Signal as follows: a. Momentarily place Safety Injection Tavg Selector Switch to BLOCK position. b. Verify LO TEMP SAFETY INJECTION BLOCKED status light – Illuminated. (YES)
<u>NOTE</u>		
Supplement K is available for optimizing Auxiliary Spray below.		
EPP-17	RO	Check RCS Pressure – Less than 1950 psig (YES)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 53 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

NOTE

Low Pressure SI initiation circuits will automatically unblock if PZR pressure increases to greater than 2000 psig.

EPP-17

RO

Defeat Low Pressure Safety Injection Signal as Follows:

- a. Momentarily place PZR PRESS/HI STM LINE DP Switch to BLOCK position.
- b. Verify LO PRESS SAFETY INJECTION BLOCKED status light – ILLUMINATED (YES)

EPP-17

RO

Continuous Action Step

Determine if subcooled recovery is appropriate as follows:

Check RWST level – Greater than 56% (YES)

Check ruptured S/G Level – Less than 84% (YES)

EPP-17

RO

Check RCS Subcooling – Greater than 35°F (YES)

EPP-17

RO

Check SI and RHR Pump Status:

- SI Pumps – Any running (YES)
- OR
- RHR Pumps – Any running in LO Head Injection Mode (NO)

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 54 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time	Position	Applicant's Actions or Behavior
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EPP-17	RO	Continuous Action Step Check PZR Level – Greater than 73% (YES)
EPP-17	RO	Energize PZR Heaters to Maintain Steam Bubble (Places all PZR Heaters to ON.)
<p style="text-align: center;"><u>CAUTION</u></p> <p>The upper head region may void during RCS depressurization if RCPs are not running. This may result in a rapidly increasing PZR level.</p>		
EPP-17	RO	Continuous Action Step Depressurize RCS to Refill PZR as follows: Check PZR Level – Less than 27%. (NO, go to step 32)
EPP-17	RO	Step 32: Check RCP Status – All Stopped (NO, go to step 37)

Op Test No.:	ILC-13 NRC	Scenario #	2	Event #	6 - 12	Page	55	of	59
Event Description:		72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)							
Time	Position	Applicant's Actions or Behavior							

EPP-17	RO	Step 37: Establish Normal PZR Spray as Follows: a. Check RCP Status – Only One Running (NO, Stop all but one RCP) b. Check RCP C – Running (YES, unless stopped in step above) (IF NO, then place PCV-455B, PZR Spray Valve Controller, in MAN <u>AND</u> adjust controller output to ZERO.) c. Check RCP B – Running (NO, unless maintained running) RNO: (IF secured, Place PCV-455A, PZR Spray Valve Controller, in MAN and adjust output to ZERO. Go to Step 38. d. (IF "B" RCP maintained running) Maintain PZR level between 30% and 40%.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 56 of 59Event Description: **72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture (EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)**

Time	Position	Applicant's Actions or Behavior
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NOTE

The table values below are based on stable conditions.

If RCS pressure is continuing to decrease slowly due to RCS temperature reduction, as long as subcooling is increasing, the values may be considered stable.

Critical Task	RO	Step 38: Determine if one SI Pump should be stopped:																	
		a. Check SI Pumps – Any running (YES)																	
		b. Determine required RCS subcooling from table:																	
		<table><tr><td rowspan="2">Charging Pump Status</td><td colspan="2">Any RCP Running</td></tr><tr><td>One SI Pump Running</td><td>Two SI Pumps Running</td></tr><tr><td>None Running</td><td>Do NOT stop SI Pump</td><td>72°F</td></tr><tr><td>One Running</td><td>197°F</td><td>68°F</td></tr><tr><td>Two Running</td><td>176°F</td><td>65°F</td></tr><tr><td>Three Running</td><td>158°F</td><td>62°F</td></tr></table>	Charging Pump Status	Any RCP Running		One SI Pump Running	Two SI Pumps Running	None Running	Do NOT stop SI Pump	72°F	One Running	197°F	68°F	Two Running	176°F	65°F	Three Running	158°F	62°F
		Charging Pump Status		Any RCP Running															
			One SI Pump Running	Two SI Pumps Running															
		None Running	Do NOT stop SI Pump	72°F															
		One Running	197°F	68°F															
		Two Running	176°F	65°F															
		Three Running	158°F	62°F															
c. Check RCS subcooling – Less than required subcooling (NO, go to step 38.f.)																			
f. Check PZR level – Greater than 27% (YES)																			
g. Stop one SI Pump (Critical Task)																			
h. Check RCS Pressure – Stable or increasing (YES)																			
Go to Step 38.a.																			

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 57 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

Critical Task

RO

Step 38: Determine if one SI Pump should be stopped:

- a. Check SI Pumps – Any running (YES)
- b. Determine required RCS subcooling from table:

Charging Pump Status	Any RCP Running	
	One SI Pump Running	Two SI Pumps Running
None Running	Do NOT stop SI Pump	72°F
One Running	197°F	68°F
Two Running	176°F	65°F
Three Running	158°F	62°F

- d. Check RCS subcooling – Less than required subcooling (NO, go to step 38.f.)
- f. Check PZR level – Greater than 27% (YES)
- g. Stop one SI Pump (**Critical Task**)
- h. Check RCS Pressure – Stable or increasing (YES)
- i. Go to Step 38.a.
- a. Check SI Pumps – Any running (NO, go to step 39)

CRITICAL TASK – TERMINATE SI FLOW IN ACCORDANCE WITH EPP-17 STEP 38**NOTE:** Controlling PZR level low in the allowable band will aide with the RCS depressurization to minimize RCS leakage.

Op Test No.: ILC-13 NRC Scenario # 2 Event # 6 - 12 Page 58 of 59Event Description: 72 inch Main Steam Header Fault followed by "C" S/G Tube Rupture
(EOP-E-0, EOP-E-2, EOP-E-3, EPP-17)

Time

Position

Applicant's Actions or Behavior

EPP-17

RO

Determine if Charging Flow Should be controlled to maintain PZR Level:

- a. Check RHR Pumps – ANY RUNNING IN LO HEAD INJECTION MODE (NO)
RNO: Control Charging flow to maintain PZR level
Observe the CAUTION prior to Step 40 and Go to Step 40.

The Chief Examiner may terminate the scenario at his discretion or once one safety injection pump has been secured in accordance with EPP-17.

ILC-13 NRC SCENARIO 2 TURNOVER SHEET

1. INITIAL CONDITIONS

- a) Time in Core Life: EOL
- b) Reactor Power: 68%
- c) Turbine Load: 485 MWe
- d) Boron Concentration: 139 ppm
- e) Rod Height: 165 CBD
- f) RCS Pressure: 2235 psig
- g) RCS Level: 41.9 %
- h) Xenon: Equilibrium

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
3.7.6 Cond. A	Restore required CCW train to Operable status within 72 hours.
3.6.6 Cond. C	Restore containment cooling train to Operable status within 7 days AND 10 days from discovery of failure to meet the LCO.

3. CLEARANCES IN EFFECT

- a) "C" CCW OOS for mechanical seal repair. OOS for 6 hours with estimated RTS in 24 hours.
- b) HVH-4 OOS for abnormal motor vibrations. OOS for 24 hours. Available for emergency use only.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" and "B" CCW Pumps, "A" and "B" CCW Pump RTGB Control Switches, "A" CCW Pump Breaker 480V-DS 52/34B and "B" CCW Pump Breaker 480V-E1 52/22C.

6. DEGRADED EQUIPMENT

- a) None

7. SWITCHYARD ACCESS

- a) Unrestricted

8. PLANNED EVOLUTIONS

- a) Maintain current power level

9. TURNOVER INFORMATION

- a) Maintain current power level while RES is monitoring the recently replaced motor on "A" MFP.
- b) Thunderstorms in the area. High heat load has resulted in all planned maintenance being deferred to a later date.

10. REACTIVITY INFORMATION

- a) Review the OST-947 EOL charts for BA and PW additions

11. RISK

- a) GREEN

Facility:	HB ROBINSON		Scenario No.:	4	Op Test No.:	ILC-13
Examiners:	_____		Operators:	CRS - _____		
	_____			RO - _____		
	_____			BOP - _____		
Initial Conditions:						
<ul style="list-style-type: none"> • 10E-8 amps, EOL, 15,697 MWD/MTU, 513 PPM Boron. • No equipment out of service. 						
Turnover:						
<ul style="list-style-type: none"> • Startup in progress in accordance with GP-003, Step 8.4. Raise Power to the POAH and stabilize power until relieved by on-coming crew. 						
Critical Task:						
<ul style="list-style-type: none"> • Close RC-535, PZR PORV BLOCK, prior to receiving an SI Signal. • Manually Trip the reactor prior to receiving a PZR Low Pressure Safeguards Trip. • (Potential CT) Secure all RCPs due to a loss of subcooling with SI flow. • Establish Containment Isolation by closing FRV Bypass Valves. • Isolate "A" Steam Generator in accordance with EOP-E-3. • Restart "A" or "B" SI Pump after loss of off-site power. • Restart at least ONE Charging Pump after loss of off-site power to re-establish RCP Seal Cooling • Establish Aux. Feedwater flow to maintain S/G Level for RCS Cooldown. 						
Event No.	Malf. No.	Event Type*	Event Description			
1		(R) RO, CRS	Withdraw Rods to the Point of Adding Heat			
2		(I) RO, CRS (TS) CRS	PT-445, PZR Pressure Control Transmitter, fails High with PCV-456 failing to fully close			
3		(C) BOP, CRS (TS) CRS	SW Break at Suction of "A" SWBP			
4		(C) RO, CRS (TS) CRS	"B" RCP Thermal Barrier leak / FCV-626, Thermal Barrier Flow Control, fail to mid-position.			
5		(C) RO, CRS	"A" S/G Tube Leak			
6		(M) ALL	"A" S/G Tube Rupture			
7		RO	Failure of Automatic Rx Trip and Right Hand Rx Trip Button			
8		(M) ALL	Loss of Startup Transformer			
9		BOP	MDAFW Pump Motor Operated Discharge Valves fail to Auto-Open (V2-16s)			
10		BOP	Feed Regulating Bypass Valves fail to close on Phase A.			
11		BOP	SDAFW Pump Steam Supply Valves (V1-8s) fail to Auto-Open on Loss of Startup Transformer			
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor						

ILC-13 NRC SCENARIO 4 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 10E-8 amps performing a plant startup in accordance with GP-003, Normal Plant Startup from Hot Shutdown to Critical. The crew will continue with GP-003 at Step 8.4, Post Critical Operations, and withdraw control rods to the Point of Adding Heat and then stabilize Reactor Power between 3% and 5%. Once the Chief Examiner is satisfied with the crew's actions to stabilize reactor power, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, PT-445, Pressurizer Pressure Transmitter, fails High. The crew will perform the immediate actions of AOP-025, RTGB Instrument Failure, Section C, and attempt to close PCV-456, PZR PORV. PCV-456 will fail to fully close and the operator will take manual action to close the PORV Block Valve. Once the PORV Block Valve is closed PZR Pressure will automatically recover to normal band. Due to the failure of PCV-456 to fully close the CRS will determine that ITS LCO 3.4.11, Condition B, is applicable due to one PORV inoperable and not capable of being manually cycled. This LCO requires that the block valve be closed within 1 hour and power removed from the associated block valve within 1 hour and restore PORV to operable status within 72 hours. ITS 3.3.4 and ITS 3.4.1 will also be reviewed by the CRS and determined to be not applicable. ITS LCO 3.0.4 will be reviewed and it will be determined that a change in Mode cannot be performed without the performance of a risk assessment. Once the Chief Examiner is satisfied with the crew's actions to control PZR Pressure and Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, a Service Water Break will occur at the Suction of "A" SWBP. The crew will implement AOP-022, Loss of Service Water, Section D, for Leak on South Service Water Header Downstream of Check Valve SW-545. The crew will perform required valve and Service Water Booster Pump manipulations from the RTGB and direct field actions in accordance with AOP-022 attachments to isolate the ruptured section of Service Water piping and restore various components to operable status. The Service Water Break will result in entry into ITS LCO 3.7.5, Condition C, due to Service Water supply to AFW system being inoperable and requires that the plant be in Mode 3 in 6 hours and Mode 4 in 18 hours without reliance on steam generator for heat removal. ITS LCO 3.7.7, Condition A, is also applicable due to one Service Water train inoperable and requires that the train be restored to operable status within 72 hours or be in Mode 3 in 6 hours and Mode 5 in 36 hours. ITS LCO 3.7.4, Condition A, is applicable due to "A" MDAFW pump being inoperable. The LCO requires restoration of the AFW pump to operable status in 7 days and 8 days from discovery of failure to meet the LCO. ITS LCO 3.8.1, Condition B, was applicable for "A" EDG from the time of the SW Break up until the Break was isolated and SW cross-connected with SW-83 open. Once the Chief Examiner is satisfied with the crew's actions and Tech Spec compliance, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, "B" RCP will experience a 40 gpm thermal barrier leak. This will be identified by a rising trend and alarm on R-17, rising CCW surge tank level, and RCP thermal barrier cooling water high flow alarm. FCV-626, Thermal Barrier Flow Control, will receive the signal to auto-close; however the breaker to the MOV will trip leaving the valve in mid-position. The crew will take action to close CC-735, Thermal Barrier Outlet Isolation, from the RTGB due to the FCV-626 failure. ITS LCO 3.6.3, Condition C, will be applicable due to the failure of FCV-626 in the mid-position. Condition C is for one or more penetration flow paths with one containment isolation valve inoperable and is only applicable to penetration flow paths with only one containment isolation valve and a closed system. The required action is to isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 72 hours and verify the affected penetration flow path is isolated once per 31 days for isolation devices outside containment. The required action will be met if FCV-626 is manually closed and de-energized or when CC-735 is closed and de-activated. ITS LCO 3.6.1, Condition A, will be applicable due to the failure of FCV-626 to the mid-position and leak in the "B" RCP Thermal Barrier. The leak in the Thermal Barrier is causes CCW to lose its classification as a Closed System Inside Containment. Therefore, until FCV-626 is manually closed and de-energized or CC-735 closed and de-activated Containment will not be operable. This condition requires that containment be restored to operable status within 1 hours or be in Mode 3 in 6 hours and Mode 5 in 36 hours. Once the Chief Examiner is satisfied with the crew's actions, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, a 300 gpm tube leak on "A" S/G will be ramped over a six minute time period. The crew will enter AOP-035, S/G Tube Leak, and attempt to control pressurizer level. Ultimately the crew will determine that the leak is greater than the capacity of available charging pumps and initiate a reactor trip and safety injection. The reactor will not trip on an automatic signal or by depressing the right hand reactor trip pushbutton. The RO will identify this failure and trip the reactor by depressing the left hand reactor trip pushbutton. On the initiation of the Reactor Trip the S/G tube leak will degrade to 1000 gpm. On initiation of the Safety Injection the Feedwater Regulating Bypass Valves will fail to close on the Phase A signal. The BOP will take manual action to adjust the individual valve's potentiometer on the RTGB to close the valves. Additionally, the Motor Driven Feedwater Pumps Discharge Valves will fail to Auto-Open. This failure will be identified, but the crew may determine it not necessary to open the valves until needed due to adequate S/G levels present at the onset of the major event. The crew will carry out the actions of EOP-E-0, Reactor Trip or Safety Injection, identifying the conditions noted above and stabilizing the plant. The crew will transition from EOP-E-0 to EOP-E-3, Steam Generator Tube Rupture. Once "A" S/G has been isolated and an operator dispatched to de-energize the associated AFW valves the plant will experience a loss of off-site power. On the loss of off-site power, the Main Steam Supply valves to the Steam Driven AFW Pump will fail to open. The crew will take required actions to restart at least one Safety Injection Pump since SI would have been reset at this point in the EOP Network. Additionally the crew will restart at least one Charging Pump started within 15 minutes to re-establish RCP Seal Cooling. Following equipment restarts the crew will perform an RCS cooldown and depressurization to stop the primary to secondary leakage. The crew will be required to either open the MDAFW Pump Motor Operated Discharge Valves (V2-16s) or manually start the SDAFW pump to provide AFW flow during the RCS cooldown. Once the primary to secondary leakage is stopped, both safety injection pumps will be secured.

The Chief Examiner may terminate the scenario at any time after the safety injection pumps have been secured in accordance with EOP-E-3, or at his discretion.

Sat / Unsat	Critical Task	Critical Task Criteria
	Close RC-535, PZR PORV BLOCK	Take Manual Action to Close RC-535, PZR PORV BLOCK, prior to receiving a Safety Injection Signal.
	Manually Trip the Reactor	Manually trip the Reactor from the Control Room prior to receiving a PZR Low Pressure Safeguards Trip.
	(Potential CT) Secure all RCPs due to a loss of subcooling with SI flow.	STOP ALL RCPs with <u>6 minutes</u> of Reaching the following RCP Trip Criteria: Both of the following satisfied: SI pumps – At least one running and capable of delivering flow AND RCS Subcooling Based on Core Exit TCs – Less than 30°F NOTE: Only a Critical Task is RCS Subcooling lowers to below 30°F for greater than 6 minutes.
	Establish Containment Isolation by closing FRV Bypass Valves.	Establish Containment Isolation by closing the Feedwater Regulating Bypass Valves prior to completion of EOP-E-0, Attachment 1.
	Isolate "A" Steam Generator in accordance with EOP-E-3.	Isolate "A" Steam Generator within 30 minutes of initiation of Safety Injection due to the Tube Rupture.
	Restart "A" or "B" SI Pump after loss of off-site power.	Restart of "A" OR "C" SI Pump after Loss of Off-Site Power prior to commencing RCS Cooldown in accordance with EOP-E-3, Step 6.
	Restart at least ONE Charging Pump after loss of off-site power to re-establish RCP Seal Cooling	Restart "A" or "B" or "C" Charging Pump within 15 minutes of Loss of Start-Up Transformer to re-establish RCP Seal Cooling.
	Establish Auxiliary Feedwater flow to maintain S/G Level for RCS Cooldown.	Establish Auxiliary Feedwater prior to the completion of EOP-E-3, Step 7 to ensure Heat Sink is Maintained. Auxiliary Feedwater can be established from either "A" OR "B" MDAFW Pump OR the SDAFW pump to meet this Critical Task.

ILC-13 NRC SCENARIO 4 SIMULATOR SETUP**IC/SETUP:**

- IC-19, SCN 006_ILC_13_NRC_4.
- Status board is provided to crew is IC-19.

PRE-LOADED EVENTS:

The following events should occur on the reactor trip or triggered events following the reactor trip:

- Event 7: Failure of Automatic Rx Trip and Right Hand Rx Trip Button
- Event 8: Loss of Startup Transformer
- Event 9: MDAFW Pump Motor Operated Discharge Valves fail to Auto-Open (V2-16s)
- Event 10: Feed Regulating Bypass Valves fail to close on Phase A.
- Event 11: SDAFW Pump Steam Supply Valves (V1-8s) fail to Auto-Open on Loss of Startup Transformer

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

- Event 1: Withdraw Rods to the Point of Adding Heat
- Event 2: PT-445 fails High with PCV-456 failing to fully close
- Event 3: SW Break at Suction of "A" SWBP
- Event 4: "B" RCP Thermal Barrier leak / FCV-626 failure
- Event 5: "A" S/G Tube Leak
- Event 6: "A" S/G Tube Rupture

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- GP-003
- AOP-025, Section C
- AOP-022
- AOP-014
- AOP-005
- AOP-035
- EOP-E-0
- Supplement M
- EOP-E-3

Op Test No.: ILC-13 NRC Scenario # 4 Event # 1 Page 6 of 6Event Description: Withdraw Rods to the Point of Adding Heat (GP-003)

Time	Position	Applicant's Actions or Behavior
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EXAMINER'S NOTE: The crew will assume the watch with the Reactor at 10E-8 amps performing a plant startup in accordance with GP-003, Normal Plant Startup From Hot Shutdown to Critical. The crew should be given adequate time to brief the evolution prior to entering the simulator. The crew will start at Section 8.4, Step 8.4.7.

	CRS	Performs brief on Identification of reaching the POAH, startup rate limitations and maximum power limit of 5%.

NOTE

The Point of Adding Heat (POAH) is that power level identified by NO control rod motion and:

- IF MTC is negative, then SUR will be lowering
- Onset of RCS temperature rise, Onset of PZR pressure rise, Onset PZR level rise.
- Reduction in AUTO Charging Pump speed demand.
- Rising indication of AUTO Steam Dump demand on PC-464B, Steam Header Pressure, when Steam Dumps are being used for RCS Temperature Control.
- Small rise in Steam Generator Steam Flow.

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CAUTION

Startup Rate shall not exceed 1.0 dpm. Maximum Reactor power is 5%.

The Point of Adding Heat should be approached slowly and cautiously. When the MSIVs are closed, heat removal capability of the Main Steam Line drains is limited.

	RO	Adjust Control Rod position as necessary to establish a positive SUR and raise reactor power to the POAH.
	BOP	Perform Peer Checks on all Control Rod manipulations. Respond to any Annunciator alarms during approach to POAH.

Op Test No.: ILC-13 NRC Scenario # 4 Event # 1 Page 7 of 7Event Description: Withdraw Rods to the Point of Adding Heat (GP-003)

Time	Position	Applicant's Actions or Behavior
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	RO	Adjust control rods as necessary to achieve the following while continuing with this procedure: <ul style="list-style-type: none"> RCS Tavg between 547°F and 551°F Reactor Power 3% to less than or equal to 5%.
NOTE: It may be difficult to maintain the Reactor critical due to rapid changes in Xenon following a large power change. If the Reactor can NOT be stabilized due to operating limitations of the reactivity controlling systems, the Reactor shall be shutdown. Time spent with the Reactor critical and the secondary (turbine) secured should be minimized. If at any time the Reactor cannot be maintained stable and critical, then the Reactor shall be shutdown per GP-006-1. (SOER 07-1, Recommendation #1)		
	CRS	IF 0% Power Activities are required per EST-105, then maintain Reactor Power and Commence EST-105 as recommended by the Reactor Engineer. (Not applicable.)
NOTE: The following step may be performed when conditions permit while continuing with this procedure.		
	CRS	When Reactor power is greater than 1%, then notify Reactor Engineering to commence logging date required by EST-067. (CRS contacts Reactor Engineering.)
	BOP	Controlling S/G levels by adjusting the Feed Regulating Valve Bypass Valves. Control Band to be established by the CRS.

Op Test No.: ILC-13 NRC Scenario # 4 Event # 1 Page 8 of 8

Event Description: Withdraw Rods to the Point of Adding Heat (GP-003)

Time	Position	Applicant's Actions or Behavior
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EXAMINER'S NOTE: If Reactor Power rises above 5% the Crew should declare the plant in Mode 1 and update ERFIS.

BOOTH OPERATOR: Contact the Control Room as the Operations Manager and inform the CRS that the on-coming crew had personnel missing from the Just-in-Time Training. Direct the crew to continue in GP-003 and GP-005 and place the Turbine on-line. (The next event will prevent the crew from changing Modes unless a Risk Assessment per ITS 3.0.4 is performed.)

BOOTH OPERATOR: Insert Event #2 (PT-445 fails HIGH with PCV-456 failing to fully close) on cue from the Chief Examiner.

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	2	Page	9	of	9
Event Description:		PT-445, PZR Pressure Control Transmitter, fails HIGH with PCV-456, PZR PORV, failing to FULLY close (AOP-025)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 2, PT-445, PZR Pressure Control Transmitter, fails HIGH with PCV-456, PZR PORV, failing to FULLY close

EVENT INDICATIONS:

APP-003-C3, PRT HI PRESS

APP-003-D6, PZR PORV / SAFETY VLV OPEN

APP-003-D8, PZR CONTROL HI/LO PRESS

PT-445 indication rising to high limit of gauge.

PCV-456 RTGB indication RED open light illuminates.

Pressurizer Pressure lowering.

Pressurizer Control Bank Heaters energize.

Critical Task	RO	AOP-025, RTGB Instrument Failure Immediate Action Step Determine If PZR PORVs Should Be Closed: <ul style="list-style-type: none">• Check PZR pressure - LESS THAN 2335 PSIG (YES)• Verify Both PZR PORVs - CLOSED (NO, PCP-456, PZR PORV, has failed at mid-position) RNO: IF any PZR PORV can NOT be closed, THEN close its PORV BLOCK Valve. (Closes RC-535, PORV BLOCK) (CT)
CRITICAL TASK - TAKE MANUAL ACTION TO CLOSE RC-535, PZR PORV BLOCK, PRIOR TO RECEIVING A SAFETY INJECTION SIGNAL		

Op Test No.: ILC-13 NRC Scenario # 4 Event # 2 Page 10 of 10Event Description: PT-445, PZR Pressure Control Transmitter, fails HIGH with PCV-456, PZR PORV, failing to FULLY close (**AOP-025**)

Time	Position	Applicant's Actions or Behavior
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	RO	Immediate Action Step Control The PZR SPRAY VALVES AND PZR Heaters To Restore RCS Pressure To The Desired Control Band (RO should allow PC-444J to control pressure in AUTO, unless controller needs to be unsaturated due to possible overshoot while restoring pressure.)
	CRS	Enters AOP-025, RTGB Instrument Failure, Section C , Pressurizer Pressure Transmitter Failure, and verifies immediate actions.
	BOP	Make PA Announcement for Procedure Entry
	RO	Check PT-444 – Failed Transmitter (NO) RNO: IF PT-445 has failed, then go to step 7. (YES)
	BOP	Provide Backup to the RO. Monitor the Reactor and S/G Levels while RO is addressing PT-445 failure.
	RO	Step 7: Verify Selector Switch PM-444 – Selected to the Operable Channel – REC 444 (YES, no action required.)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	2	Page	11	of	11
Event Description:		PT-445, PZR Pressure Control Transmitter, fails HIGH with PCV-456, PZR PORV, failing to FULLY close (AOP-025)							
Time	Position	Applicant's Actions or Behavior							

	CRS	<p>Check the following ITS LCOs for applicability:</p> <p><u>ITS 3.3.4</u> – Not applicable since the required number of channels (1) remain operable.</p> <p><u>ITS 3.4.1</u> – Not applicable since the plant is in Mode 2. However, if reactor power has increased above 5% then ITS 3.4.1 will be applicable and Condition A entered if PZR Pressure is lowered below 2205 psig. One or more RCS DNB parameters not within limits – Restore RCS DNB parameters to within limit within 2 hours, will be entered if PZR Pressure lowered to less than 2205 psig.</p> <p>ITS 3.4.11 – ITS LCO 3.4.11, Condition B will be entered due to one PORV inoperable and not capable of being manually cycled. The LCO requires that the block valve be closed with 1 hour and remove power from associated block valve in 1 hour and restore PORV to operable status within 72 hours.</p> <p>ITS LCO 3.0.4 – (See Examiner's Note Below) When an LCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:</p> <ul style="list-style-type: none"> a. When the associated ACTIONS to be entered permit continued (continued) operation in the MODE or other specified condition in the Applicability for an unlimited period of time, or b. After performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate; exceptions to this specification are stated in the individual Specifications, or c. When an allowance is stated in the individual value, parameter, or other Specification.
<p>EXAMINER'S NOTE: ITS LCO 3.0.4 is listed above to determine if the CRS would change Modes without the performance of Risk Assessment due to the failure of PT-445.</p>		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	2	Page	12	of	12
Event Description:		PT-445, PZR Pressure Control Transmitter, fails HIGH with PCV-456, PZR PORV, failing to FULLY close (AOP-025)							
Time	Position	Applicant's Actions or Behavior							

	CRS	<p>Notifies WCC SRO of the Inoperable PZR PORV and requests a W/R be initiated and Maintenance contacted to be planning for troubleshooting and repair. Directs WCC SRO to dispatch an AO to open the breaker for RC-535 and prepare and install a clearance to maintain power removed.</p>
BOOTH OPERATOR: If / When contacted as WCC SRO, acknowledge the request to initiate a W/R for RC-535, contacting Maintenance and dispatching an AO to open the breaker for RC-535. Wait 5 minutes and then open the breaker for RC-535 IAW SCN file.		
	CRS	Go to Procedure Main Body, Step 2.
	CRS	Implement the EALs
	CRS	Return to Procedure and Step in Effect
BOOTH OPERATOR: Insert Event #3 (Service Water Break at Suction of "A" SWBP) on cue from the Chief Examiner.		

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 13 of 13

Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: At the discretion of the Examiner, insert Event 3, Service Water Break at Suction of "A" SWBP

EVENT INDICATIONS:

APP-035-H1 – WDBRP Trouble

APP-008-F7 – SOUTH SW HDR LO PRESS

APP-008-F8 – NORTH SW HDR LO PRESS

APP-008-F7	BOP	Recognizes no SW Pump has tripped and determines that a rupture in a SW Header has occurred and informs the CRS to refer to AOP-022, Loss of Service Water.
	BOP	AOP-022, Loss of Service Water Immediate Action Step Check the following Alarms Extinguished <ul style="list-style-type: none"> • APP-008-E7, S SW HDR STRAINER PIT HI LEVEL (YES) • APP-008-E8, N SW HDR STRAINER PIT HI LEVEL (YES)
	BOP	Continuous Action Step Check SW – Any Available (YES)
	CREW	Make PA Announcement for AOP-022 Entry

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 14 of 14Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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NOTE

A SW Header leak may be identified by observing the sequence in which SW Header low pressure alarms are received, and evaluating SW Header pressure indications.

	BOP	Continuous Action Step Check Leak Location – Identified (NO, unless determine in Auxiliary Building based on WDBRP Trouble alarm.) RNO: Perform local inspections as necessary to determine leak location. (Dispatches Inside AO to inspect the Auxiliary Building to determine leak location.) WHEN the leak location is identified, THEN observe the NOTE prior to Step 5 and Go to Step 5.
BOOTH OPERATOR: Once dispatched to inspect Auxiliary Building, wait 1 minute and then contact the control room and inform them that a Service Water Break has occurred at the Suction of "A" SWBP. Water level in Auxiliary Building Hallway is approximately one inch.		
NOTE Turbine Building Service Water will automatically isolate following a Turbine Trip coincident with low Service Water pressure after a 60 seconds time delay. Supplement M, Component Alignment For Loss Of SW To Turbine Building is available in the EOP Network for securing components. AOP-022 does not provide guidance for leaks in the common return line in the Auxiliary building with the exception of controlling the flooding with Attachment 4.		
	CRS	Perform appropriate section for leak location: South Service Water Header Downstream of Check Valve SW-545 – Section D

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 15 of 15Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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	BOP	Close V6-12A to isolate the Service Water Header
	BOP	Close V6-16B to isolate the Turbine Building from the affected Service Water Header.
	BOP	Verify the following valves OPEN: (YES) <ul style="list-style-type: none"> • V6-12D, SW NORTH HDR ISO • V6-12B, SW X-CONN • V6-12C, SW X-CONN • V6-16A, SW TURB BLDG SUPPLY • V6-16C, SW TURB BLDG ISO
<p style="text-align: center;"><u>CAUTION</u></p> <p>Containment Fan Cooler Motors may operate for up to fifteen (15) minutes with a COMPLETE LOSS of cooling water flow during non-accident conditions. (Ref. ESR 95-00700)</p>		
	BOP	Continuous Action Step Verify the following SW Booster Pump alignment: SW Booster Pump B – Running (YES) SW Booster Pump A – Stopped (YES)

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 16 of 16

Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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NOTE

Isolation of the South Service Water Header eliminates the backup supply to the AFW system which places the unit in Technical Specification Action Statements 3.7.5.C AND 3.7.7.A.

IF a SW Header is out of service for maintenance, THEN SW-83, DIESEL CROSS-CONNECT, is likely to be open and may need to be closed to isolate a leak in the South Header.

	CRS	Perform Attachment 7 while continuing with this procedure. (Crew dispatches an AO to perform Attachment 7. Field Actions)

BOOTH OPERATOR: When requested Attachment 7 in accordance with the following timeline in minutes from the time contacted:

- T+3 – Perform steps 1 and 2 IAW SCN file and contact Control Room IAW Step 3.
- T+4 – Perform step 4 IAW SCN file
- T+6 – Perform RNO for step 9 IAW SCN file & contact Control Room IAW RNO step 9.
- T+10 – Perform Step 12 IAW SCN file.
- T+11 – Contact the Control Room and inform them that Att. 7 is complete and that SW has been Cross-Connected to supply the following equipment: EDG A, IAC A, SAC, HVH-6A, HVH-8A

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CAUTION

Electrically rated boots and gloves must be worn in the Auxiliary Building where flooding is in progress.

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NOTE

A ruler can be obtained from the AOP/DSP/EOP Equipment Storage Locker.

RHR Pit flooding may occur when Auxiliary Building first floor water level exceeds 6 inches.

Dielectric rubber boots and low voltage electrical gloves are available in the AOP/DSP/EOP Equipment Storage Locker inside the Auxiliary Building.

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 17 of 17Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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	RO	Continuous Action Step Determine if actions for Auxiliary Building Flooding are necessary as follows: Check for any of the following indications of flooding: <ul style="list-style-type: none"> Water level on Auxiliary Building first floor – Greater than 6 inches by local indication (NO) <u>OR</u> <ul style="list-style-type: none"> APP-001-E4 – Illuminated (NO) <u>OR</u> <ul style="list-style-type: none"> APP-001-E5 – Illuminated (NO) RNO: Go to Step 7
BOOTH OPERATOR: If contacted with regard to water level on Auxiliary Building first floor, report that level is still at approximately one inch.		
	BOP	Step 7: Verify the following equipment – Stopped: (YES) <ul style="list-style-type: none"> EDG A MDAFW Pump A

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 18 of 18Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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CAUTION

Confined Space entry requirements must be observed to access the South SW Strainer Pit.

NOTE

SW-187, SOUTH HDR SUPPLY TO SCRIN WASH & CW PMP GLAND SEAL, is located in the South SW Strainer Pit.

SW-851 and SW-857, SOUTH SW HEADER CHEMICAL INJECTION, are located above the South SW Strainer Pit on the South side.

BOP

Verify the following Valves at the Intake Structure – Closed (Field Actions)

- SW-187, SW-851, SW-857

BOOTH OPERATOR: When directed to close the above valves, wait 10 minutes and close valves IAW SCN file and report status to control room.

BOP

Check Circulating Water Pump Status – Any running (YES)

BOP

Check SW-187 – Closed (NO, not until 10 minutes after being dispatched as noted above in BOOTH OPERATOR notes.)

RNO: When SW-187 is closed, then perform step 11. Go to step 12.

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 19 of 19Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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	BOP	Step 11 (To be completed once SW-187 reported as closed.) Determine if adequate seal water is available to circulating water pumps as follows: APP-008-E4 – Extinguished (YES) APP-008-E5 – Extinguished (YES) APP-008-E6 – Extinguished (YES)
	CRS	Step 12: Check Steps 1 and 2 Complete (YES, depending on timeline.)
	BOP	Check N. SW Header Press. on PI-1616 – Greater than 40 psig (YES)
<p style="text-align: center;"><u>CAUTION</u></p> <p>CCW temperature is limited to 105°F when any of the following equipment is in operation: Post Accident Sampling Heat Exchanger, and Excess Letdown Heat Exchanger.</p>		
	RO	Determine Maximum allowable CCW temperature as follows: Check RCS temperature – Less than or equal to 350°F (NO) RNO: Maintain CCW Heat Exchanger outlet temperature indicated on TI-607 less than or equal to 105°F. Go to step 15.
	CRS	Continuous Action Step Step 15: Check Step 11 of Att. 7 – Complete (YES, depending on timeline. Step 11 was not performed in Att. 7 due to leak location.)

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 20 of 20Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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CAUTION

Containment Fan Cooler Motors may operate for up to fifteen (15) minutes with a COMPLETE LOSS of cooling water flow during non-accident conditions. (Ref. ESR 95-00700)

	BOP	Determine if a SW Booster Pump should be started: Check SWBPs – All stopped (NO) RNO: Verify one SWBP is running (YES, go to step 17.)

CAUTION

Operation of the Safety Injection Pumps without adequate cooling water to the thrust bearing could result in pump damage.

	BOP	Step 17: Check Service Water Cooling from SI pumps to drain header – Flow Observed. (YES, once report received from AO.)

BOOTH OPERATOR: When directed to determine if adequate flow is observed from SI pumps to drain header, wait 2 minutes and report that adequate flow was observed.

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Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 21 of 21Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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CAUTION

Normal cooling water supply to MDAFW Pump A is unavailable. Pump operation prior to establishing emergency cooling could result in pump damage.

	BOP	Align Emergency Cooling Water to MDAFW Pump A using Att. 2 while continuing with this procedure.
BOOTH OPERATOR: When directed align emergency cooling water to MDAFW Pump A, wait 15 minutes and contact the control room and request that they start the Motor Driven Fire Pump. Once Fire Pump is started, wait 5 minutes and inform the control room that emergency cooling water has been aligned to the MDAFW Pump A.		
	BOP	Starts the Motor Driven Fire Pump as directed to provide cooling to "A" MDAFW Pump. (References OP-803.)
	CRS	Perform the following: <ul style="list-style-type: none"> • Inspect the area of the leak. • Report findings to the Control Room • Identify and Isolate the source of the SW leak.
BOOTH OPERATOR: When/If dispatched to isolate the leak and remove power from "A" SWBP, wait 5 minutes and isolate the leak and remove power from "A" SWBP, as directed, IAW SCN file.		
	CRS	Continuous Action Step Check Attachment 7 – Completed (YES, depending on timeline.)

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 22 of 22Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check SW to Instrument Air Compressor A and Station Air Compressor – Isolated (NO)</p> <p>RNO: Start the following Air Compressors as needed using OP-905 while continuing with this procedure. (AO Field Actions</p> <ul style="list-style-type: none">• Station Air Compressor• Instrument Air Compressor A <p>Go to Step 22.</p>
BOOTH OPERATOR: When directed, place Station Air Compressor and IAC "A" back in AUTO IAW the SCN File.		

Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 23 of 23

Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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	CRS	<p>Step 22: Refer to ITS LCOs for Applicability. (CRS may desire to contact Operations Management and/or Licensing for assistance with applicable LCOs due to the complexity associated with this event.)</p> <p><u>ITS LCO 3.7.5, Condition C</u>, due to Service Water supply to AFW system being inoperable and requires that the plant be in Mode 3 in 6 hours and Mode 4 in 18 hours without reliance on steam generator for heat removal.</p> <p><u>ITS LCO 3.7.7, Condition A</u>, due to one Service Water train inoperable and requires that the train be restored to operable status within 72 hours or be in Mode 3 in 6 hours and Mode 5 in 36 hours. Also, entered due to failure to meet the requirement of SR 3.7.7.1 due to SW-83 being out of normal position.</p> <p><u>ITS LCO 3.7.4, Condition A</u>, due to one AFW pump ("A" MDAFW Pump) inoperable in MODE 1, 2, or 3. LCO requires restoration of AFW pump to operable status in 7 days and 8 days from discovery of failure to meet the LCO.</p> <p><u>ITS LCO 3.8.1, Condition B</u>, was applicable for "A" EDG from the time of the SW Break up <u>until</u> the Break was isolated and SW cross-connected with SW-83 open. The required actions for this LCO are as follows: (Discussion continues on following page.)</p> <ul style="list-style-type: none"> • Perform SR3.9.1.1 for the offsite circuit within 1 hour and once per 12 hours thereafter. • Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable within 4 hours from discovery of Condition B concurrent with inoperability of redundant required features. • Perform SR 3.8.1.2 for Operable DG within 24 hours. • Restore DG to Operable status within 7 days and 8 days from discovery of failure to meet LCO.
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Op Test No.: ILC-13 NRC Scenario # 4 Event # 3 Page 24 of 24Event Description: Service Water Break at Suction of "A" SWBP (AOP-022)

Time	Position	Applicant's Actions or Behavior
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		<p><i>NOTE: Exert from OWP-017, SW-7, South Header, Precautions:</i></p> <p><i>5) EDG A does not have to be declared inoperable when closing V6-12A since sufficient cooling flow can be supplied through SWS-18 and SW-19, NORTH & SOUTH SUPPLY HDR X-CONN (CHAIN OPERATED) valves. (CR 98-00189)</i></p> <p><i>6) EDG A does not have to be declared inoperable when closing the header isolation valve V6-12A if SW-83 is open. However, opening SW-83 in modes 1, 2, 3, or 4 will place the plant in a Required Action Statement due to failure to meet the requirements of SR 3.7.7.1.</i></p> <p>Based on the information provided in OWP-017, SW-7 the CRS will determine that "A" EDG is OPERABLE once SW is cross-connected in the Auxiliary Building and SW-83 is open.</p>
	CRS	Implement the EALs
	CRS	Return to procedure and step in effect
	CRS	Contact the WCC SRO and direct the initiation of a W/R and Clearance to isolate the SW Break.
BOOTH OPERATOR: Insert Event #4 ("B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position) on cue from the Chief Examiner.		

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>25</u>	of	<u>25</u>
Event Description:		"B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position (AOP-014, AOP-005, APP-036-D8)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: At the discretion of the Examiner, insert Event 4, "B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position

EVENT INDICATIONS:

APP-001-B2, RCP LABYRTH SEAL LO Δ P

APP-001-B4, RCP SEAL INJ HI/LO FLOW

APP-001-C1, RCP THERM BAR COOL WTR HI FLOW

APP-001-D1, RCP THERM BAR COOL WTR LO FLOW

APP-001-E1, RCP THERM BAR COOL WTR HI TEMP

RR-1 for R-17

APP-036-D8, PROCESS MONITOR HI RAD (R-17 in alarm)

FCV-626 indicates both RED and GREEN lights illuminated

CCW Surge Tank slowly rising.

	CRS	Directs entry into AOP-014, Component Cooling Water System Malfunction
	CRS	Implement the EALs
	BOP	Make PA Announcement For AOP-014 Entry

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	4	Page	26	of	26
Event Description:		"B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position (AOP-014, AOP-005, APP-036-D8)							
Time	Position	Applicant's Actions or Behavior							

NOTE

- A loss of inventory may be indicated by a report of leakage or lowering of surge tank level.
- CCW Pump discharge pressure less than 78 psig will cause an alarm.
- CCW low flow is defined as less than 2200 gal per pump
- CCW high temperature is defined as greater than 105°F or greater than 125°F if in Mode 3.

	RO	Go to Appropriate Section for Indicated Malfunction: Rising CCW Inventory OR R-17 Alarming, Section B.
AOP-014	RO	Check FCV-626 – AUTO CLOSED (NO, indicates stuck mid-position) RNO: IF APP-001-C1 is illuminated the perform one of the following: <ul style="list-style-type: none"> • At the RTGB, verify FCV-626 is closed (FCV-626 will not close) <u>OR</u> <ul style="list-style-type: none"> • IF FCV-626 will NOT close, the close CC-735 and go to step 2. (RO will close CC-735)
AOP-014	RO	Check RCP Seal Leakoff – Any greater than 5 gpm (NO, go to step 4)
AOP-014	RO	Continuous Action Step Step 4: Check the following indications of an RCP Thermal Barrier Failure – Both Exist <ul style="list-style-type: none"> • RCP Thermal Barrier Cooling – Isolated due to High Flow (YES) <u>AND</u> <ul style="list-style-type: none"> • R-17 – Rising trend or Alarm. (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	4	Page	27	of	27
Event Description:		"B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position (AOP-014, AOP-005, APP-036-D8)							
Time	Position	Applicant's Actions or Behavior							

APP-036-D8	BOP	Momentarily DEPRESS the ALARM / RESET pushbutton. (Depresses Alarm/Reset pushbutton on R-17 monitor.)
APP-036-D8	BOP	IF the alarm returns, THEN REFER to AOP-005. (The alarm will return and BOP will inform the CRS of AOP-005 entry.)
AOP-005	BOP	Determines that AOP-005, Attachment 16, is the appropriate section for R-17 Alarm.
AOP-005	BOP	Check CCW Surge Tank Level – Rising (YES)
AOP-005	BOP	Go to AOP-014, Component Cooling Water System Malfunction (Informs CRS that AOP-005 references AOP-014 and that AOP-005 for R-17 is complete.)
AOP-014	RO	Check Seal Injection flow to the Affected RCP(s) – LOST (NO, go to step 7.)
AOP-014	BOP	Dispatch Operator to Containment to Perform Att. 6, RCP Thermal Barrier Isolation.
BOOTH OPERATOR: If dispatched to the Containment to perform Att. 6, acknowledge the report and take no additional action. If contacted on status later, state that you are waiting on the HP to perform CV entry brief.		

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>28</u>	of	<u>28</u>
Event Description:		"B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position (AOP-014, AOP-005, APP-036-D8)							
Time	Position	Applicant's Actions or Behavior							

AOP-014	CRS	Directs the WCC SRO to initiate a W/R for "B" RCP Thermal Barrier Leak and FCV-626 failure. Direct the WCC SRO to assist AO in making Containment Entry for RCP Thermal Barrier Isolation.
AOP-014	CRS	Contacts Operations Management and informs them of the "B" RCP Thermal Barrier Leak and Failure of FCV-626 to Fully close.
AOP-014	RO	Check RCP status as follows: <ul style="list-style-type: none"> a. Check RCP B OR C - Running (YES) b. Check RCP B – Running (YES) c. Check RCP C – Running (YES)
<u>NOTE</u>		
The affected RCP should be stopped within 24 hours of a Thermal Barrier failure. The power reduction and securing the affected RCP are done outside this AOP.		
AOP-014	CRS	When Att. 6 is completed, then go to step 23.
AOP-014	CRS	Step 23: Determine CCW Cleanup Requirements as Follows: <ul style="list-style-type: none"> a. Contact Chemistry to sample the CCW System for activity. b. Check CCW System – Cleanup Required c. (IF 23.b is YES) Coordinate with Chemistry to perform a feed and bleed of the CCW System.
AOP-014	CRS	Contact Plant Staff for Guidance on repairs and plant shutdown.

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	4	Page	29	of	29
Event Description:		"B" RCP Thermal Barrier Leak / FCV-626, Thermal Barrier Flow Control, Fails to Mid-Position (AOP-014, AOP-005, APP-036-D8)							
Time	Position	Applicant's Actions or Behavior							

AOP-014	CRS	Initiate Repair of Leaking Heat Exchanger.
AOP-014	CRS	Go to the Main Body, Step 4 of this procedure.
	CRS	<p>Determine ITS Applicability (CRS may desire to contact Operations Management and/or Licensing for assistance with applicable LCOs due to the complexity associated with this event.)</p> <p>ITS LCO 3.6.3, Condition C, will be applicable due to the failure of FCV-626 in the mid-position. Condition C is for one or more penetration flow paths with one containment isolation valve inoperable and is only applicable to penetration flow paths with only one containment isolation valve and a closed system. The required action is to isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange within 72 hours and verify the affected penetration flow path is isolated once per 31 days for isolation devices outside containment. The required action will be met if FCV-626 is manually closed and de-energized or when CC-735 is closed and de-activated.</p> <p>ITS LCO 3.6.1, Condition A, will not be met due to the failure of FCV-626 to the mid-position and leak in the "B" RCP Thermal Barrier. The leak in the Thermal Barrier is causes CCW to lose its classification as a Closed System Inside Containment. Therefore, until FCV-626 is manually closed and de-energized or CC-735 closed and de-activated Containment will not be operable. This condition requires that containment be restored to operable status within 1 hours or be in Mode 3 in 6 hours and Mode 5 in 36 hours.</p>
BOOTH OPERATOR: Insert Event #5 ("A" S/G Tube Leak) on cue from the Chief Examiner.		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	30	of	30
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: On cue from the Chief Examiner Insert Event #5 ("A" S/G Tube Leak)

EVENT INDICATIONS:

Rising Speed on AUTO Charging Pump

PZR Level lowering

APP-003-F4, CHG PMP HI SPEED

RR-1 on R-15

R-24A HIGH Indicates elevated reading

APP-036-D8, PROCESS MONITOR HI RAD (R-15 in Alarm)

	CRS	Determines entry into AOP-035, S/G Tube Leak, is warranted based plant indications.

EXAMINER'S NOTE: The tube leak is ramping in over 6 minutes to 300 gpm.

AOP-035	RO	<p>AOP-035, S/G Tube Leak</p> <p>Continuous Action Step</p> <p>Determine if Reactor Trip needed as follows:</p> <p>a. Check the following</p> <ul style="list-style-type: none"> PZR Level – Less than 7% (NO) <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> RCS Subcooling – Less than 35°F (NO) <p>RNO: IF the conditions above are met then trip the reactor and go to EOP-E-0. Go to Step 2.</p>
AOP-035	BOP	Step 2: Make PA Announcement for Procedure Entry

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5-11</u>	Page	<u>31</u>	of	<u>31</u>
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

APP-036-D8	BOP	<p>Step 5.2: IF the alarm is on R-15, THEN PERFORM the following:</p> <ol style="list-style-type: none"> OBSERVE trends on monitor R-24A, B, & C. (Identifies rising and/or abnormal trend on R-24A and reports indication to CRS.) IF readings from the R-24 monitors indicate primary to secondary leakage, THEN REFER to AOP-035. (Informs CRS of AOP-035 entry.) IF a SGTR is in progress, THEN REFER to the EOP Network. (Not applicable at this point in scenario.)
APP-036-D8	BOP	Momentarily Depress the ALARM/RESET pushbutton. (Depresses the Alarm / Reset pushbutton on R-15 monitor. Alarm will return.)
APP-036-D8	BOP	IF the alarm returns, THEN REFER to AOP-005. (Informs CRS of entering AOP-005.)
AOP-005	BOP	Determines that AOP-005, Attachment 14, is the appropriate section for R-15 Alarm.
AOP-005	BOP	<p>Check SGTR OR AOP-035 – Already in Progress (YES)</p> <p>Return to Procedure and Step in Effect.)</p>

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	32	of	32
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

NOTE

Use of the RWST for RCS Makeup will add negative reactivity.

AOP-035	RO	Continuous Action Step Check VCT Level – Less than 12.5 inches (NO, go to step 5)
AOP-035	RO	Step 5: Check RCS Level – Lowering in an uncontrolled manner (YES)
AOP-035	RO	Adjust Charging Flow as follows: a. Check Charging Pump Status – At least two running (YES) b. Place running Charging Pumps Speed Controllers in MAN <u>AND</u> adjust output to maximum
AOP-035	RO	Check RCS Level – Lowering in an Uncontrolled Manner (YES)
AOP-035	RO	Check Letdown – In Service (YES)
AOP-035	RO	Verify All Letdown Flowpaths Isolated as follows: • LCV-460A &B – CLOSED • HIC-137 – Adjusted to 0% • CVC-387 - CLOSED

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	33	of	33
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

AOP-035	RO	Check RCS Level – Lowering in an uncontrolled manner (YES, if leak has been inserted for more than 3 minutes.)
AOP-035	CRS	Directs the RO to Trip the Reactor and Initiate Safety Injection and go to EOP-E-0
Beginning of EOP-E-0, Reactor Trip or Safety Injection		
Critical Task	RO	Depresses the Right Hand Reactor Trip Pushbutton <ul style="list-style-type: none"> Check Reactor Trip (NO) RNO: Manually trip the reactor. (RO depresses the Left Hand Reactor Trip Pushbutton. Check Reactor Trip (YES)
CRITICAL TASK – MANUALLY TRIPS THE REACTOR FROM THE CONTROL ROOM PRIOR RECEIVING A PZR LOW PRESSURE SAFEGUARDS TRIP.		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	34	of	34
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EXAMINER'S NOTE: Upon tripping the reactor the S/G tube leak will degrade to a 1000 gpm tube rupture.		
EOP-E-0	BOP	Check Turbine Trip: <ul style="list-style-type: none"> a. Both turbine stop valves - Closed (YES) b. Close MSR purge and shutoff valves (Verifies valves closed)
EOP-E-0	BOP	Check Power to AC Emergency Busses: <ul style="list-style-type: none"> a. E1 or E2 – At least one energized (YES) b. E1 and E2 – Both energized (YES)
EOP-E-0	RO	Check SI Status: <ul style="list-style-type: none"> a) Check if SI is actuated: <ul style="list-style-type: none"> • SI annunciators – ANY ILLUMINATED (YES) • SI equipment – AUTO STARTED (YES) b) Check BOTH trains of SI – ACTUATED <ul style="list-style-type: none"> • SI pumps – BOTH RUNNING (YES) • RHR pumps – BOTH RUNNING (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	35	of	35
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-0	CRS	Verifies all immediate actions for EOP-E-0.
EOP-E-0 Potential Critical Task	CRS	<p>Places FOLDOUT for EOP-E-0 in effect</p> <p><u>RCP Trip Criteria (See NOTE below)</u></p> <p>IF either condition listed below occurs, THEN trip all RCPs: (YES)</p> <ul style="list-style-type: none"> • Containment Isolation Phase B – ACTUATED (NO) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • BOTH of the following satisfied: <ul style="list-style-type: none"> ○ SI pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW (YES, Both SI Pumps are running) <p style="text-align: center;">AND</p> ○ RCS subcooling based on core exit TCs - LESS THAN 30°F (Potential) <p>NOTE: Depending on scenario timeline and operator actions, RCS subcooling could lower to less than 30°F. IF identified as LESS than 30°F AND remains below 30°F for greater than 6 minutes then the RO SHALL secure all RCPs within 6 minutes of RCS subcooling lowering below 30°F.</p>
POTENTIAL CRITICAL TASK – SECURE ALL RCPs IF RCS SUBCOOLING LOWERS BELOW 30°F FOR GREATER THAN 6 MINUTES. ALL RCPs SHALL BE SECURED WITHIN 6 MINUTES OF SUBCOOLING LOWERING BELOW 30°F.		
EXAMINER'S NOTE: Crew may take early actions at this time to address items that did not function or operate as designed. <ul style="list-style-type: none"> • Manually open MDAFW Pump Discharge Valves (V2-16s) • Manually close the FRV Bypass Valves 		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	36	of	36
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-0	CRS	Perform Attachment 1, Auto Action Verification, While continuing with this procedure. (Should be assigned to BOP.) (Att. 1 steps are presented next followed by the remainder of EOP-E-0.)
Beginning of EOP-E-0 Attachment 1 (Remainder of EOP-E-0 Follows this Section)		
Att. 1	BOP	Check ECCS Pumps Running: <ul style="list-style-type: none"> SI pumps - BOTH RUNNING (YES) RHR pumps - BOTH RUNNING (YES)
Att. 1	BOP	Check ECCS Valves - PROPER EMERGENCY ALIGNMENT (YES)
Att. 1	BOP	Check CCW Pumps - AT LEAST ONE RUNNING (YES)
Att. 1	BOP	Check Containment Isolation Phase A <ol style="list-style-type: none"> Phase A – Actuated (YES) Phase A valves – Closed (YES) Excess letdown – Isolated (YES) <ul style="list-style-type: none"> CVC-387 – Closed (YES) HIC-137 – at 0% DEMAND (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	37	of	37
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Att. 1 Critical Task	BOP	Check Feedwater Isolation: a) Main feed pumps – BOTH TRIPPED (YES) b) Main feedwater – ISOLATED <ul style="list-style-type: none"> • FRVs – Closed (YES) • Feedwater reg bypass valves – Closed (NO) • Feedwater header section valves – Closed (YES) RNO: Manually close valves as necessary (Closes all three Feedwater reg bypass valves.)
CRITICAL TASK – ESTABLISH CONTAINMENT ISOLATION BY CLOSING THE FEEDWATER REG BYPASS VALVES PRIOR TO COMPLETION OF EOP-E-0, ATTACHMENT 1		
Att. 1	BOP	Check if Main Steamlines Should Be Isolated: a) Main steamline isolation – REQUIRED (NO, Go to Step 7)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	38	of	38
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Att. 1	BOP	<p>Step 7: Check Proper Service Water System Operation:</p> <ol style="list-style-type: none"> SW pumps – All running (YES) SW booster pumps – Both running (NO due to previous leak) Both SW header low pressure alarms (APP-008-F7/F8) – Extinguished (NO) <p>RNO: Perform the following:</p> <ol style="list-style-type: none"> Isolate SW to the Turbine Building: <ul style="list-style-type: none"> Close V6-16C, SW turbine building isolation <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> Close V6-16A and V6-16B, SW turbine building supply WHEN this Attachment is complete, THEN perform Supplement M, Component Alignment for Loss of SW to Turbine Building, as time permits. (Supplement M steps are listed following EOP-E-0, Attachment 1 Steps.)
Att. 1	BOP	Check Both EDGs – Running (YES)
Att. 1	BOP	<p>Check ECCS Flow:</p> <ol style="list-style-type: none"> RCS pressure – less than 1650 psig (NO, depending on scenario timeline, go to step 10) SI pumps- Flow Indicated (YES, if RCS pressure below shutoff head of SI pumps) RCS pressure – less than 350 psig. (NO, go to step 10)
Att. 1	BOP	Step 10: Check CV Recirculation Fans – All Running (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	39	of	39
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Att. 1	BOP	Check IVSW - Actuated (YES) <ul style="list-style-type: none"> PCV-1922A – Open (YES) PCV-1922B – Open (YES)
Att. 1	BOP	Check CV ventilation isolation (YES) <ul style="list-style-type: none"> a. CV ventilation isolation valves – CLOSED (YES)
Att. 1	BOP	Check control room ventilation - aligned for pressurization mode (YES) <ul style="list-style-type: none"> HVA-1A or HVA-1B – Running (YES) HVE-16 – Stopped (YES) HVE-19A or HVE-19B – Running (YES) Control Room HVAC outside air damper A or B – Open (YES) CR-D1A-SA – Closed (YES) CR-D1B-SB – Closed (YES)
Att. 1	BOP	Check DS Bus – Energized (YES)
Att. 1	BOP	Check Battery Chargers – Energized (YES) APP-036-D1 – Extinguished (YES) APP-036-D2 – Extinguished (YES)
Att. 1	BOP	Stop R-11/12 Sample Pump

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5-11</u>	Page	<u>40</u>	of	<u>40</u>
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Att. 1	BOP	Locally Reset and Load IACs as necessary (N/A)
Att. 1	BOP	Perform Crew Update to include the following: <ul style="list-style-type: none">• Attachment Completion• Manual Actions Taken (Closed FRV bypass valves)• Failed Equipment status (None)• SW status (Isolated SW to the Turbine Building and will be performing Supplement M)
End of EOP-E-0 Attachment 1		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	41	of	41
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Beginning of Supplement M, Component Alignment for Loss of SW to Turbine Building		
Supp. M	BOP	<p>1. Shutdown secondary as follows:</p> <ol style="list-style-type: none"> Check S/Gs – Any ruptured (YES) Adjust ruptured Steam Line PORV setpoint to 1060 psig using Status Board Close all MSIVS and MSIV Bypass Valves Break vacuum to the Condenser as follows: <ol style="list-style-type: none"> Depress and hold the THINK Pushbutton Open Vacuum Breaker Valves: MS-70A / B WHEN the valves are open, THEN release the THINK pushbutton. Verify the following equipment stopped: <ul style="list-style-type: none"> FW PMP A / B COND PUMP A / B Heater Drain Pump A / B GOV Fluid Pump A / B (Pull to Lock) Vacuum Pump A / B <p>2. Return to procedure and step in effect.</p>
End of Supplement M		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	42	of	42
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Continuation of EOP-E-0		
EOP-E-0	RO	Check AFW Pumps – Running a. MDAFW Pumps – Both running (YES) b. S/G Levels – Two S/Gs less than 16% (NO continue w/ step 7)
EOP-E-0	RO	Step 7: Check AFW Valves – Proper Emergency Alignment (YES) <ul style="list-style-type: none"> • AFW header discharge valves – Full Open (NO, verifies valves will manually open) • AFW header section valves – Full Open (NO, Manual Actions are required to Open V2-16A/B/C, if desired.) • Steam driven AFW pump discharge valves – Full open if pump is running. (YES)
EXAMINER'S NOTE: Depending on S/G Levels, the candidate may decide not to open the AFW Header Discharge Valves until needed during the RCS cooldown in EOP-E-3.		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	43	of	43
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

CAUTION

If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-0	RO	Check Total AFW Flow: <ul style="list-style-type: none"> • Reset SI • Control feed flow to maintain NON-faulted S/Gs narrow range level – Between 8% and 50%. • Check total AFW flow- Greater than 300 gpm (YES)
EOP-E-0	RO	Continuous Action Step Check CV Spray NOT Required: <ul style="list-style-type: none"> a. CV pressure – Has remained less than 10 psig. (YES) b. CV Spray – NOT ACTUATED (YES)
EOP-E-0	RO	Check RCP Seal Cooling: <ul style="list-style-type: none"> • CCW flow to RCP thermal barriers – Normal (NO) <ul style="list-style-type: none"> ○ APP-001-C1 / D1 – Extinguished (NO) OR • Seal injection flow – Normal (YES) <ul style="list-style-type: none"> ○ Seal injection flow – Greater than 6 gpm per RCP OR ○ Thermal barrier ΔPs – Greater than 5 inches water.

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	44	of	44
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR: As requested, adjust CVC-297A,B,C as necessary to control RCP seal injection flow using the P&ID function.

EOP-E-0	RO	<p>Continuous Action Step</p> <p>Check RCS Temperature</p> <p>With any RCPs running, RCS average temperatures – Stable at or trending to 547°F (NO)</p> <p>OR</p> <p>With NO RCPs running, RCS cold leg temperatures - Stable at or trending to 547°F (NO)</p> <p>RNO: IF temperature is less then 547°F AND lowering then perform the following:</p> <ol style="list-style-type: none"> Stop dumping steam IF cooldown continues, THEN reduce total feed flow to minimum for decay heat removal: <ul style="list-style-type: none"> Maintain total feed flow greater than 300 gpm until narrow range level is greater than 8% in at least one S/G. IF cooldown continues, THEN close MSIVs and MSIV bypass valves. <p>RNO: IF temperature is greater than 547°F and rising, THEN perform the following:</p> <ul style="list-style-type: none"> Dump steam using S/G steam line PORVs

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5-11</u>	Page	<u>45</u>	of	<u>45</u>
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-0	RO	<p>Check PZR PORVs and Spray Valves:</p> <ul style="list-style-type: none"> a. PORVs – Closed (NO, PCV-456 failed at mid-position.) <p>RNO: <u>IF</u> PZR pressure is less than 2335 psig, <u>THEN</u> manually close PORVs.</p> <p>IF any PORV can NOT be closed, THEN manually close its block valve. (YES, RC-535 previously closed.)</p> <ul style="list-style-type: none"> b. Normal PZR spray valves – Closed (YES) c. Aux spray valve – Closed (YES)
EOP-E-0	RO	<p>Check If RCPs should be stopped:</p> <ul style="list-style-type: none"> a. RCPs – Any Running (YES) b. SI pumps – At least one running and capable of delivering flow (YES) c. RCS subcooling based on core exit TCs – Less than 30°F (NO, depending on operator actions and scenario timeline. Go to step 14 if RCS subcooling is greater than 30°F.) d. <u>If</u> RCS Subcooling is less than 30°F <u>then</u> Stop All RCPs. <p>(See EOP-E-0 Foldout Actions for Potential Critical Task to Secure ALL RCPs.)</p>

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	46	of	46
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-0	BOP	Step 14: Check if S/G Secondary Pressure Boundaries are Intact: <ul style="list-style-type: none"> a. Check pressures in all S/Gs <ul style="list-style-type: none"> ○ None lowering in an uncontrolled manner (YES) ○ None Completely depressurized (YES)
EOP-E-0	BOP	Check if S/G Tubes are Intact: <ul style="list-style-type: none"> • Secondary radiation monitors – Have Remained Normal (NO) <ul style="list-style-type: none"> • R-15 • R-19s • R-31s • S/G levels – None Rising in an Uncontrolled Manner. (YES) RNO: Reset SPDS and initiate monitoring of Critical Safety Functions Status Trees. Go to EOP-E-3, S/G Tube Rupture, Step 1.

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	47	of	47
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Beginning of EOP-E-3, Steam Generator Tube Rupture		
<p style="text-align: center;"><u>NOTE</u></p> <ul style="list-style-type: none"> FOLDOUT for EOP-E-3 is in effect. (None applicable.) Chemistry should be available for sampling during this procedure. Step 1 RCP trip criteria applies until an operator controlled RCS cooldown is initiated. 		
EOP-E-3	RO	<p>Continuous Action Step</p> <p>Check If RCPs Should Be Stopped:</p> <ol style="list-style-type: none"> RCPs - ANY RUNNING (YES) SI pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW (YES) RCS subcooling based on core exit TCs - LESS THAN 30°F (NO, depending on operator actions and scenario timeline. Go to step 2 if RCS subcooling is greater than 30°F.) <u>If</u> RCS Subcooling is less than 30°F <u>then</u> Stop All RCPs. <p>(See EOP-E-0 Foldout Actions for Potential Critical Task to Secure ALL RCPs.)</p>

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	48	of	48
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-3	BOP	Identify Ruptured S/G(s): ("A" S/G is ruptured) <ul style="list-style-type: none"> • Unexpected rise in any S/G narrow range level <u>OR</u> • High radiation from any SG steamline (R-31s) <u>OR</u> • High radiation from any SG blowdown line (R-19s) <u>OR</u> • High radiation from any S/G sample: <ul style="list-style-type: none"> ○ Contact Chemistry to sample all S/Gs for activity as necessary
<p style="text-align: center;"><u>CAUTION</u></p> <ul style="list-style-type: none"> • If the steam driven AFW pump is the only available source of feed flow, steam supply to the steam driven AFW pump should be maintained from at least one S/G. • At least one S/G must be maintained available for RCS cooldown. 		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	49	of	49
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-3	BOP	Isolate Flow From Ruptured S/G(s): <ol style="list-style-type: none"> Adjust ruptured S/G(s) steam line PORV controller setpoint to 1060 psig Check ruptured S/G PORV – (RV1-1) CLOSED (YES) Close steam driven AFW pump steam shutoff valve for ruptured S/G: (V1-8A) Locally close the following valve for ruptured S/G(s) while continuing with this procedure: <ul style="list-style-type: none"> MS-20, SG "A" BYPASS DRN & WARM-UP LINE TO AFW PUMP (AO Field Actions) Check S/G blow down and blow down sample valves from ruptured S/G(s) – Closed (YES) <ul style="list-style-type: none"> FCV-1930 A & B FCV-1933 A & B SHUT Check MSIV above and below seat drain valves for ruptured S/G – CLOSED (YES) Close ruptured S/G MSIV and MSIV bypass valve – V1-3A and MS-353A.
BOOTH OPERATOR: When requested, wait 3 minutes and then close MS-20 IAW SCN file.		
<p style="text-align: center;"><u>CAUTION</u></p> <ul style="list-style-type: none"> If any ruptured S/G is faulted, feed flow to that S/G should remain isolated during subsequent recovery actions unless needed for RCS cooldown. If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. 		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	50	of	50
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Critical Task	BOP	Continuous Action Step Check Ruptured S/G Level: <ul style="list-style-type: none"> a. Narrow range level – Greater than 8%. (YES) b. Reset SI c. Stop feed flow to ruptured S/G: <ul style="list-style-type: none"> • Close steam driven AFW pump discharge valve: V2-14A • Close AFW header discharge valve: V2-16A d. Perform Att. 4, Deenergizing AFW Valves For Ruptured S/Gs
		CRITICAL TASK – ISOLATE "A" STEAM GENERATOR WITHIN 30 MINUTES OF INITIATION OF SAFETY INJECTION DUE TO THE TUBE RUPTURE
BOOTH OPERATOR: When dispatched to perform Att. 4, wait 3 minutes and then open the breakers for AFW valves as specified in Att. 4 IAW the SCN file.		
NOTE: A command to cause a loss of the Startup Transformer is built into the SCN steps to open the AFW Valve breakers.		

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	51	of	51
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EXAMINER'S NOTE: A loss of Startup Transformer will occur while the breakers are being opened for the AFW valves IAW EOP-E-3, Att. 4.		
<u>CAUTION</u>		
Major steam flow paths from the ruptured S/G(s) should be isolated before initiating RCS cooldown. This includes MSIVs and MSIV bypass valves, steam line PORV, and AFW pump steam shutoff valve.		
EOP-E-3	BOP	Check Ruptured S/G Pressure – Greater than 370 psig. (YES)
<u>CAUTION</u>		
IF RCPs are not running, the following steps may cause a false CSF-4, Integrity Status Tree, indication for the ruptured loop. Disregard the ruptured loop T-cold indication until after performing Step 28.		
<u>NOTE</u>		
Main steamline isolation may occur if the high steam flow setpoint is exceeded. The cooldown should be continued using the steam line PORV(s) if MSIV closure occurs.		
EOP-E-3	CREW	Identifies the loss of Start-up Transformer. Takes actions per previous notes to restart safeguards equipment after a loss of off-site power.

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	52	of	52
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

Critical Task	RO	Verifies that the SI and RHR pumps are running. (Starting "A" OR "C" SI Pump will satisfy the Critical Task.)
Critical Task	RO	Restarts at least ONE Charging Pump within 15 minutes to re-establish RCP Seal Cooling.
CRITICAL TASK – RESTART "A" OR "C" SI PUMP AFTER LOSS OF OFF-SITE POWER PRIOR TO COMMENCING RCS COOLDOWN IN ACCORDANCE WITH EOP-E-3, STEP 6.		
CRITICAL TASK – RESTART "A" OR "B" OR "C" CHARGING PUMP WITHIN 15 MINUTES OF LOSS OF SUT TO RE-ESTABLISH RCP SEAL COOLING.		
	BOP	Verifies that the MDAFW Pumps and SDAFW Pump are running. Verifies all available SW Pumps and "B" SWBP are running. Verifies that both EDGs are running with appropriate voltage.

Op Test No.: ILC-13 NRC Scenario # 4 Event # 5-11 Page 53 of 53

Event Description: "A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)

Time

Position

Applicant's Actions or Behavior

EOP-E-3	RO / BOP	<p>Step 6: Initiate RCS Cooldown:</p> <p>a. Determine required core exit temperature:</p> <table border="1"> <thead> <tr> <th>Ruptured SG Pressure (PSIG)</th> <th>Required Core Exit Temperature (°F)</th> </tr> </thead> <tbody> <tr><td>1150 and above</td><td>508 [488]</td></tr> <tr><td>1100 to 1149</td><td>503 [483]</td></tr> <tr><td>1050 to 1099</td><td>497 [477]</td></tr> <tr><td>1000 to 1049</td><td>491 [471]</td></tr> <tr><td>950 to 999</td><td>485 [465]</td></tr> <tr><td>900 to 949</td><td>478 [458]</td></tr> <tr><td>850 to 899</td><td>472 [452]</td></tr> <tr><td>800 to 849</td><td>465 [445]</td></tr> <tr><td>750 to 799</td><td>458 [438]</td></tr> <tr><td>700 to 749</td><td>450 [430]</td></tr> <tr><td>650 to 699</td><td>442 [422]</td></tr> <tr><td>600 to 649</td><td>433 [413]</td></tr> <tr><td>550 to 599</td><td>424 [404]</td></tr> <tr><td>500 to 549</td><td>415 [395]</td></tr> <tr><td>450 to 499</td><td>404 [384]</td></tr> <tr><td>400 to 449</td><td>393 [373]</td></tr> <tr><td>370 to 399</td><td>385 [365]</td></tr> </tbody> </table> <p>b. Dump steam to condenser from intact S/G(s) at maximum rate: maximum rate from intact</p> <p>1) Check condenser - AVAILABLE FROM INTACT S/G(s) (NO)</p> <p>RNO: Manually dump steam at maximum rate from intact S/G using steam line PORVs.</p> <p>c. Core exit TCs – Less Than Required Temperature (NO, continue cooldown until less than required temperature. Continue with step 7.)</p> <p>d. Stop RCS cooldown</p> <p>e. Maintain core exit TCs – LESS THAN REQUIRED TEMPERATURE</p>	Ruptured SG Pressure (PSIG)	Required Core Exit Temperature (°F)	1150 and above	508 [488]	1100 to 1149	503 [483]	1050 to 1099	497 [477]	1000 to 1049	491 [471]	950 to 999	485 [465]	900 to 949	478 [458]	850 to 899	472 [452]	800 to 849	465 [445]	750 to 799	458 [438]	700 to 749	450 [430]	650 to 699	442 [422]	600 to 649	433 [413]	550 to 599	424 [404]	500 to 549	415 [395]	450 to 499	404 [384]	400 to 449	393 [373]	370 to 399	385 [365]
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Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	54	of	54
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-3	RO	Continuous Action Step Step 7: Check Intact S/G Levels a. Narrow range levels – Greater than 8% (YES) b. Control feed flow to maintain narrow range levels – BETWEEN 21% and 50%.
CRITICAL TASK – ESTABLISH AUXILIARY FEEDWATER PRIOR TO THE COMPLETION OF EOP-E-3, STEP 7 TO ENSURE HEAT SINK IS MAINTAINED. ("A" OR "B" MDAFW PUMP OR THE SDAFW CAN BE UTILIZED TO MEET THIS CRITICAL TASK)		
<p style="text-align: center;">CAUTION</p> If any PZR PORV opens because of high PZR pressure, Step 8.b should be repeated after pressure lowers to less than 2335 psig.		
EOP-E-3	RO	Continuous Action Step Step 8: Check PZR PORVs And Block Valves: a. Power to block valves – AVAILABLE (NO, Power removed from RC-535 due to failure of PCV-456 to mid-position. Crew will determine that it is not prudent to restore power to RC-535.) b. PORVs – CLOSED (NO, PCV-456 failed to a mid-position.) RNO: IF any PORV can NOT be closed, THEN manually close its block valve. (RC-535 previously closed and de-energized.) c. Block valves – AT LEAST ON OPEN (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	55	of	55
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

CAUTION

If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.

EOP-E-3	RO	Reset SI
EOP-E-3	RO	Reset Containment Isolation Phase A
EOP-E-3	RO	Establish Instrument Air To CV: <ul style="list-style-type: none"> a. Check APP-002-F7 – EXTINGUISHED (YES) b. Reset IA PCV-1716, instrument air isolation to CV c. Check IA PCV-1716 – OPEN (YES)

CAUTION

If RCS pressure lowers in an uncontrolled manner to less than 275 psig, the RHR pumps must be manually restarted to supply water to the RCS.

EOP-E-3	RO	Check If RHR Pumps Should Be Stopped: <ul style="list-style-type: none"> a. RCS pressure - GREATER THAN 275 PSIG (YES) b. Stop RHR pumps c. Monitor RCS pressure

Op Test No.:	<u>ILC-13 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5-11</u>	Page	<u>56</u>	of	<u>56</u>
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-3	RO	<p>Establish Charging Flow:</p> <ol style="list-style-type: none"> Charging pumps- AT LEAST ONE RUNNING (YES) Align charging pump suction to RWST <ol style="list-style-type: none"> Open LCV-115B Close LCV-115C Place RCS makeup system switch to STOP Establish charging flow: <ul style="list-style-type: none"> Start charging pump(s) as necessary to establish at least one running Adjust charging pump speed controllers as necessary to establish maximum charging flow for running pump(s) Adjust HIC-121, charging flow control valve, as necessary to establish desired charging flow: <ul style="list-style-type: none"> Maintain seal injection flow - BETWEEN 6 GPM AND 20 GPM PER RCP UNLESS SEAL INJECTION ISOLATED
EOP-E-3	RO/BOP	<p>Check If RCS Cooldown Should Be Stopped:</p> <ol style="list-style-type: none"> Check core exit TCs - LESS THAN REQUIRED TEMPERATURE FROM STEP 6 (YES, if NO then hold at this step until YES) Stop RCS cooldown Maintain core exit TCs – LESS THAN REQUIRED TEMPERATURE

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Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

EOP-E-3	BOP	Check Ruptured S/G Pressure – Stable or Rising (YES)
EOP-E-3	RO	Check RCS Subcooling Based on Core Exit TCs – Greater than 55°F (YES)
EOP-E-3	RO	Depressurize RCS to Minimize Break Flow and Refill the PZR: <ol style="list-style-type: none"> Normal PZR spray – AVAILABLE (NO, Observe CAUTION and NOTE prior to Step 18 and go to Step 18)

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Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

CAUTION

- The PRT may rupture if a PZR PORV is used to depressurize the RCS. This may result in abnormal containment conditions.
- Cycling of the PZR PORV should be minimized.

NOTE

The upper head region may void during RCS depressurization if RCPs are NOT running. This will result in a rapidly rising PZR level.

EOP-E-3	RO	<p>Step 18: Depressurize RCS using PZR PORV to minimize break flow and refill the PZR:</p> <ol style="list-style-type: none"> At least one PZR PORV – Available (YES) Open one PZR PORV until any of the following conditions are satisfied: <ul style="list-style-type: none"> Both of the following: <ol style="list-style-type: none"> RCS pressure – LESS THAN RUPTURED S/G PRESSURE PZR level – GREATER THAN 14% PZR level – GREATER THAN 73% Close PZR PORV when any condition in Step 18.b satisfied (conditions listed above)
EOP-E-3	RO	Check RCS Pressure – Rising (YES)

Op Test No.:	ILC-13 NRC	Scenario #	4	Event #	5-11	Page	59	of	59
Event Description:		"A" S/G Tube Leak to Tube Rupture, Loss of SUT, V2-16s (AFW Header Discharge Valves) and V1-8s (SDAFW Pump Steam Shutoff Valves) fail to Auto-Open, Feed Regulating Bypass Valves fail to close on Phase A. (AOP-035, AOP-005, EOP-E-0, Suppl. M, EOP-E-3)							
Time	Position	Applicant's Actions or Behavior							

CAUTION

SI must be terminated when termination criteria are satisfied to prevent overfilling the ruptured S/G(s).

EOP-E-3	RO	Check if SI Flow Should be Terminated: <ul style="list-style-type: none"> a. RCS subcooling based on core exit TCs – GREATER THAN 35°F (YES) b. Secondary heat sink: <ul style="list-style-type: none"> • Total feed flow to S/Gs – AT LEAST 300 GPM AVAILABLE (YES) <li style="text-align: center;"><u>OR</u> • Narrow range level in at least one intact S/G – GREATER THAN 8% (YES) c. RCS pressure – STABLE OR RISING (YES) d. PZR level – GREATER THAN 14% (YES)
EOP-E-3	RO	Stop Both SI Pumps.
The Chief Examiner may terminate the scenario at his discretion or anytime after the SI pumps have been secured IAW EOP-E-3.		

ILC-13 NRC SCENARIO 4 TURNOVER SHEET

1. INITIAL CONDITIONS

- a) Time in Core Life: EOL
- b) Reactor Power: 10E-8 amps
- c) Turbine Load: 0 MWe
- d) Boron Concentration: 513 ppm
- e) Rod Height: 95 CBD
- f) RCS Pressure: 2235 psig
- g) RCS Level: 22.5 %
- h) Xenon: Equilibrium

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
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3. CLEARANCES IN EFFECT

- a) None

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) None

6. DEGRADED EQUIPMENT

- a) None

7. SWITCHYARD ACCESS

- a) Unrestricted

8. PLANNED EVOLUTIONS

- a) Continue with plant startup in accordance with GP-003 and raise reactor power to the POAH. Once at the POAH, stabilize power and hold until the on-coming crew that is performing Just-In-Time training for the Turbine startup relieves the shift.

9. TURNOVER INFORMATION

- a) No additional information.

10. REACTIVITY INFORMATION

- a) Power Trax Information.

11. RISK

- a) GREEN