Facility:	HB ROBINSON	Scenario No.: 1	Op Test No.:
Examiners:		Operators:	SRO -
			RO -
			BOP -

Initial Conditions:
- 100% RTP EOL, 15697 MWD/MTU, 95 ppm Boron
- "A" MDAFW pump inoperable with the breaker racked out
- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties

Turnover:
- Maintain current power level

Critical Tasks:
- Start SI Pump "C" to provide injection to the RCS
- Establish flow path to at least one S/G
- Restore Seal Cooling to the RCPs within 15 minutes or isolate seals

Event No.	Malf. No.	Event Type*	Event Description
1		(C) RO, BOP, SRO (TS) SRO	Loss of Instrument Bus #1
		(N) BOP	Restore Normal Letdown
2		(R) RO (N) BOP, SRO	Heater Drain Pump A trips / Load Reduction
3		(I) BOP, SRO (TS) SRO	S/G "C" LT-496 fails HIGH
4		(C) RO, SRO (TS, TRM) SRO	Seismic event causes RCS leakage.
5		(M) ALL	Small Break LOCA.
6			Loss of SUT on Generator Lockout
		(C) RO	SI Pump "C" fails to Auto-Start and SI Pump "A" trips
		(C) BOP	AFW Pump discharge valves V2-14A, B, C and V2-16A, B, C fail to open on auto start of pumps

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

ILC-11-2 NRC SCENARIO 1 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 100% steady state power. MDAFW Pump "A" is out of service for scheduled lube oil cooler replacement. The motor breaker has been racked out and the pump has been isolated and cleared for maintenance. Shift instructions are to maintain current reactor power.

On cue from the Chief Examiner, a loss of Instrument Bus #1 will occur due to the normal supply breaker on MCC-5 being inadvertently opened by cleaning personnel. The crew will perform the immediate actions for the loss of Instrument Bus #1 IAW AOP-024, Loss of Instrument Bus. The crew will verify that letdown is isolated and reduce charging flow to minimum while maintaining minimum RCP seal injection. Once the cause of the loss of Instrument Bus #1 is determined the bus will be re-energized. RCS Makeup will be restored along with various automatic controllers. Letdown will be placed back into service and pressurizer level will be restored to normal band. The SRO will identify that ITS LCO 3.8.7, Condition A, was in effect while the normal supply breaker to Instrument Bus #1 was open. This LCO requires that the AC Instrument Bus Power Source be restored to Operable status within 24 hours. Additionally, ITS LCO 3.8.9, Condition B, was in effect while Instrument Bus #1 was de-energized. This LCO requires that the AC instrument bus subsystem be restored to Operable status within 2 hours. ITS LCO 3.4.9, Condition A may be entered if pressurizer level is allowed to rise above 63.3%. The LCO requires that the plant be in Mode 3 with reactor trip breakers open within 6 hours and Mode 4 within 12 hours. ITS LCO 3.4.1, Condition A may be entered if pressurizer pressure is allowed to lower below 2205 psig. This LCO requires that pressurizer pressure be restored within 2 hours or be in Mode 2 in 6 hours.

On cue from the Chief Examiner,lightning strike results in a trip of "A" Heater Drain Pump. The crew will perform the immediate actions for a Main Feedwater Malfunction IAW AOP-010, Main Feedwater / Condensate Malfunction. The crew will identify the need to reduce turbine load to achieve less than 85% power in accordance with Attachment 1 of AOP-010.

On cue from the Chief Examiner, "C" S/G LT-496 fails HIGH, affecting the automatic operation of Feedwater Regulating Valve FCV-498 for S/G "C". The operator will have to take manual control of the FRV and restore the S/G to program level. The crew will perform the immediate actions for LT-496 failure IAW AOP-025, RTGB Instrument Failure, Section D. The failed S/G level transmitter will be removed from service IAW OWP-027, SGL-9. The SRO will implement ITS 3.3.1-1 Item 13 which requires 3 S/G Level channels with Condition E – Place channel in trip within 6 hours or Be in Mode 3 in 12 hours and ITS 3.3.8-1 Item 1 which requires 3 S/G Level channels with Condition C - Place channel in trip within 6 hours or Be in Mode 3 in 12 hours AND Mode 4 in 18 hours.

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 a seismic event report from the US Geological Department. The crew will take actions IAW AOP-021, Seismic Disturbances. The seismic event will cause damage to the RCS piping inside containment that will result in RCS leakage rising to a rate of 1000 gpm over a 10 minute time period. The crew will take actions IAW AOP-016, Excessive Primary Plant Leakage, to address the RCS leakage. The RCS leakage will also result in APP-036-D8, Process Monitor HI Rad, alarm due to high radiation levels on R-11. The crew will implement the actions of AOP-005, Radiation Monitoring

System. If dispatched, an operator will report that the DBE/SSE ALARM on Seismic Monitor "A" is illuminated. The SRO will identify that the plant has exceeded the TRM 3.17 Seismic Shutdown limits of 0.10g horizontal acceleration and 0.067g vertical acceleration and that the plant must be placed in Mode 3 in 6 hours and Mode 5 in 36 hours.

AOP-016 will be unsuccessful in controlling PZR level and the crew will trip the reactor, enter PATH-1 and initiate safety injection. One minute after the reactor trip a generator lockout will occur and the Startup Transformer will fail resulting in a loss of off-site power. Both E-buses will be energized by their respective EDGs. "C" SI Pump will fail to Auto-start and "A" SI Pump will trip while attempting to start. The operator must recognize this condition and manually start "C" SI pump. Also, AFW pump discharge valves V2-14A, B, C and V2-16A, B, C fail to open on auto start of the AFW pumps. This condition must be recognized and action taken to establish AFW flow to at least one S/G. Also, after the loss of off-site power the "A" Battery Charger will fail to restart when power is restored to 480V Bus E-1. A modification was added during the last refueling outage that has the Battery Chargers auto-start upon restoration of power to the E-bus. This failure must be recognized by the crew during the performance of PATH-1 and an operator must be dispatched to manually start "A" Battery Charger.

Once in PATH-1, Foldout A will identify the need to enter AOP-018, RCP Malfunctions, due to meeting the Loss of RCP Seal Cooling Criteria. AOP-018 will direct the operators to establish thermal barrier cooling by starting one CCW pump and verifying proper valve alignment. The procedure will then direct the operator to start one charging pump and align valves as necessary to establish adequate seal injection flow.

PATH-1 will be continued to the transition to EPP-8, Post LOCA Cooldown and Depressurization. Scenario may be terminated at the transition to EPP-8 or at the discretion of the Chief Examiner.

ILC-11-2 NRC SCENARIO 1 SIMULATOR SETUP

IC/SETUP:

- IC-801, SCN: 008_11_2_NRC_Exam_1
- "A" MDAFW Pump inoperable with the breaker racked out. Switch RED capped.
- Status board updated to reflect IC-21.
- Switchyard access is RESTRICTED.

PRE-LOADED EVENTS:

The following events should occur on the reactor trip:

Event 6: Loss of SUT on Generator Lockout
"A" SI Pump trips
"C" SI Pump fails to auto-start
AFW Valves V2-14A,B,C and V2-16A,B,C fail to open on auto start of pumps
"A" Battery Charger fails to Auto-Start upon restoring power to 480V Bus E-1

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

Event 1: Loss of Instrument Bus #1
Event 2: "A" Heater Drain Pump trips
Event 3: "C" S/G Level Transmitter LT-496 fails HIGH
Event 4: Seismic Event causes RCS Leakage
Event 5: Small Break LOCA

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- **AOP-024**
- **AOP-010**
- **AOP-025 Main Body and Section D**
- **OWP-027, Section SGL-9**
- **AOP-021**
- **AOP-016**
- **AOP-005**
- **PATH-1**
- **Foldout A**
- **AOP-018**
- **Foldout B**
- **EPP-8**

Op Test No.: 1	Scenario # 1	Event # 1	Page 5 of 41
Event Description: Loss of Instrument Bus #1			

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**When directed, insert Event 1, Loss of Instrument Bus #1**
EVENT INDICATIONS: **Rack #1 Nuclear Instruments Lost (N-31, N-35, N-41)** **Bistable Status Panel B Extinguished** **FR-478 Extinguished**		
	BOP	**AOP-024 LOSS OF INSTRUMENT BUS** **Immediate Action Step** Place The Main Turbine in Manual
	BOP	**Immediate Action Step** Verify S/G(s) Maintained At Program Level
	RO	**Immediate Action Step** Place Rods in M (Manual)
	SRO	Enters AOP-024 and verifies Immediate Actions.
	RO	Maintain Reactor Power ≤100%
	RO	**Continuous Action Step** Determine if RCS Makeup needs to be stopped: Check Auto Makeup, Boration OR Dilution – In Progress (NO) (Auto Makeup may or may not be in progress, but could occur.) OR Check Instrument Bus 2 AND Instrument Bus 7 – De-energized (NO)
	RO	Place the RCS Makeup System Switch to STOP.

Op Test No.: 1	Scenario # 1	Event # 1	Page 6 of 41
Event Description: Loss of Instrument Bus #1			

Time	Position	Applicant's Actions or Behavior
	RO	Control PZR Heaters and Sprays to restore RCS Pressure to the desired control band. (No control of PZR heaters and sprays until Instrument Bus is energized due to the controllers locked up.)
	CREW	Make PA Announcement For Procedure Entry
	RO	Control Charging and Letdown Flow to Maintain PZR Level. (Letdown cannot be restored until Instrument Bus is energized.)
	RO	Verify RCP Seal Injection Flow Between 8 GPM and 13 GPM.
	BOP	Determine Failed Instrument Bus (IB) From Any Of The Following: • Available indications OR • Table Below

Instrument Bus	Indication to Check
1	FR-478, "A" S/G Level

	BOP	**Continuous Action Step** Check Emergency Busses E-1 AND E-2 - ENERGIZED FROM THE 4160V BUSSES (YES)
	RO/BOP	**Continuous Action Step** Check Affected Instrument Bus – Energized (NO)
	RO	Check LCV-460A & B, LTDN LINE STOP – CLOSED (YES)
	RO	Place The Selector Switch For LCV-460A & B In The Closed Position
	RO	Verify only ONE Charging Pump running at minimum speed

Op Test No.: 1 Scenario # 1 Event # 1 Page 7 of 41

Event Description: Loss of Instrument Bus #1

Time	Position	Applicant's Actions or Behavior
	RO	Check RCP Seal Injection Flow between 8 GPM and 13 GPM
	RO	Adjust HCV-121, Charging Flow OR Throttle Seal Water Flow Control valves • CVC-297A • CVC-297B • CVC-297C IF the normal Seal Injection Range can NOT be maintained, THEN an expanded range of between 6 gpm and 20 gpm may be used.
	BOP	Check Affected Instrument Bus – ENERGIZED (NO) Locally perform the applicable step below: • IB-1 through IB-4 ▪ IF the cause is known AND NOT a fault, THEN attempt to reset and close the open Instrument Bus normal supply breaker. (YES) ▪ IF MCC-8 is supplying an Instrument Bus, THEN Go To Step 74. (NO) ▪ Transfer the affected Instrument Bus to the alternate (MCC-8) power supply. (If not placed back on normal supply breaker.)
Examiner's Note:		**LCO 3.4.1 for PZR Pressure < 2205 psig.**
Booth Operator		**Re-energize Instrument Bus 1 from Normal Power Supply**
	SRO	Stop All Radioactive Batch Releases
	BOP	Check Status Of Local Actions: a. Check Local Actions Of Step 19 RNO – REQUIRED (YES) b. Check Local Actions Of Step 19 RNO – ATTEMPTED (YES)

Op Test No.: 1	Scenario # 1	Event # 1	Page 8 of 41
Event Description:	Loss of Instrument Bus #1		

Time	Position	Applicant's Actions or Behavior
	BOP	**Continuous Action Step** Check Affected Instrument Bus – ENERGIZED (YES)
	RO/BOP	Restore Affected Controllers On The RTGB To AUTO Mode **(All Controllers go to Auto EXCEPT FC-605 which has no instrument air aligned to it normally)**
	RO	Restore RCS Makeup Control – IN AUTO • Place the RCS MAKEUP SYSTEM Switch in STOP • Verify the RCS MAKEUP MODE Switch in AUTO • Momentarily place the RCS MAKEUP SYSTEM Switch to START (If Charging Pump Suction has been allowed to swap to the RWST, then APP-003-D5, BA FLOW DEV and APP-003-E5, MAKEUP WATER DEV, will be received and FCV-113B will automatically close. Crew should identify that FCV-114B will need to be opened to allow for Makeup to be routed to the top of the VCT.)
	RO	**Continuous Action Step** Restore Rod Control To Automatic As Follows: a. Check Power - GREATER THAN 15% (YES) b. Check Automatic Rod Control – AVAILABLE (YES) c. Check Tavg – WITHIN -1.5 TO +1.5°F OF TREF d. Place the Rod Control Selector Switch to A (Automatic)
	BOP	Check Emergency Busses E-1 AND E-2 – ENERGIZED (YES)
	BOP	**Continuous Action Step** Check Emergency Busses E-1 AND E-2 - ENERGIZED FROM THEIR 4160V BUSSES (YES)
	SRO	Implement The EALs
Examiner's Note		**Possible ITS LCO 3.4.9 entry for PZR Level greater than 63.3%.**

Op Test No.: 1	Scenario # 1	Event # 1	Page 9 of 41
Event Description:	Loss of Instrument Bus #1		

Time	Position	Applicant's Actions or Behavior
	BOP	**Continuous Action Step** Check Status Of Turbine: • Check Instrument Bus 4 – ENERGIZED (YES) • Place Turbine Controls in Automatic
	RO	Check CCW Pumps – More than one running (NO)
	BOP	Check RMS-1, RMS-2, RMS-3 AND RMS-4 – ALL OPEN (YES)
	BOP	**Continuous Action Step** Check Affected Instrument Bus - ENERGIZED (YES)
	RO	Check PZR Heater Status - DEENERGIZED (YES) (May have been energized earlier as directed to control heaters and spray.)
	RO	Reset PZR Heaters As Follows: a. Place PZR HTR CONTROL GROUP Control Switch to OFF position AND return to ON position b. Place PZR HTR BACK-UP GROUP A Control Switch to OFF position AND return to AUTO OR ON position as desired c. Place PZR HTR BACK-UP GROUP B Control Switch to OFF position AND return to AUTO OR ON position as desired
	RO	Check Normal Letdown - ISOLATED (YES)
	RO	Restore Normal Letdown Using Attachment 15, Restoration of Normal Letdown.
NOTE: The following are the steps to restore normal letdown using Attachment 15 of AOP-024.		
	RO / BOP	Normal charging flow through the Regenerative Heat Exchanger is in service.

Op Test No.: 1 Scenario # 1 Event # 1 Page 10 of 41

Event Description: Loss of Instrument Bus #1

Time	Position	Applicant's Actions or Behavior
	RO / BOP	A Phase "A" Containment Isolation signal is **NOT** present.
	RO / BOP	The Residual Heat Removal System is **NOT** in service.
	RO / BOP	**VERIFY** the following valves are CLOSED: • CVC-204A, LETDOWN LINE ISO • CVC-204B, LETDOWN LINE ISO • LCV-460A, LTDN LINE STOP • LCV-460B, LTDN LINE STOP • CVC-200A, LETDOWN ORIFICE ISOLATION • CVC-200B, LETDOWN ORIFICE ISOLATION • CVC-200C, LETDOWN ORIFICE ISOLATION
	RO / BOP	**VERIFY** FULL OPEN HIC-121, CHARGING FLOW (CR 95-01752)
	RO / BOP	Check Pressurizer level is greater than **OR** equal to program level. (YES)
	RO / BOP	**IF** desired, **THEN PLACE** TCV-143, VCT/DEMIN. DIVERSION, in the VCT position.
	RO / BOP	**PLACE** PC-145, PRESSURE, in MANUAL.
	RO / BOP	**SET** PC-145 to throttle PCV-145 to 45% to 55% open to ensure the Letdown line is **NOT** overpressurized.
	RO / BOP	**OPEN** CVC-204A, LETDOWN LINE ISO.
	RO / BOP	**OPEN** CVC-204B, LETDOWN LINE ISO.
	RO / BOP	**PERFORM** the following: • **OPEN** LCV-460A&B by placing switch CVC-460A&B LTDN LINE STOP to OPEN. • **PLACE** LTDN LINE STOP CVC-460 A&B switch to AUTO.

Op Test No.: 1 Scenario # 1 Event # 1 Page 11 of 41

Event Description: Loss of Instrument Bus #1

Time	Position	Applicant's Actions or Behavior
	RO / BOP	**PLACE** TC-144, NON-REGEN HX OUTLET TEMP, in MANUAL **AND** adjust as necessary to ensure Letdown temperature does **NOT** increase above 127°F when letdown is reestablished.
	RO / BOP	While MAINTAINING Charging Pump discharge pressure as indicated on RTGB instrument PI-121 LESS THAN 2500 psig, **ADJUST** charging pump speed to the expected letdown flow to be established in the next step.
	RO / BOP	**OPEN** one LTDN ORIFICE valve: CVC-200A, CVC-200B or CVC-200C
	RO / BOP	**PLACE** PC-145 in AUTO **AND CHECK** letdown pressure as indicated on PI-145, LOW PRESS LTDN PRESS, is being maintained between 300 psig and 320 psig.
	RO / BOP	**PLACE** TC-144, NON-REGEN HX OUTLET TEMP, in AUTO.
	RO / BOP	IF TCV-143 was selected to the VCT, THEN Position TCV-143 as directed by the CRS/SM.
	RO / BOP	IF Charging flow is changed, THEN establish RCP Seal Injection Flow between 8 GPM and 13 GPM by throttling the following: • CVC-297A, RCP "A" SEAL WATER FLOW CONTROL VALVE • CVC-297B, RCP "B" SEAL WATER FLOW CONTROL VALVE • CVC-297C, RCP "C" SEAL WATER FLOW CONTROL VALVE

Op Test No.: 1	Scenario # 1	Event # 1	Page 12 of 41
Event Description:	Loss of Instrument Bus #1		

Time	Position	Applicant's Actions or Behavior
	RO / BOP	IF increased letdown flow is desired, THEN place additional letdown orifices in service as follows: • Verify HIC-121, Charging Flow is Full Open. • Verify Charging Pump discharge pressure as indicated on RTGB instrument PI-121 less than 2500 psig. • IF required, THEN start the second Charging Pump on MINIMUM SPEED. • IF required, THEN while maintaining Charging Pump discharge pressure as indicated on RTGB instrument PI-121 LESS THAN 2500 psig, ADJUST charging pump speed to meet flow requirement. • Place PC-145, PRESSURE, in MANUAL. • Slowly Throttle Open PC-145 to achieve 180-200 psig on PI-145 to ensure the Letdown Line is NOT overpressurized. • OPEN one additional LTDN ORIFICE valve. • Place PC-145 in AUTO and Check letdown pressure as indicated on PI-145, LOW PRESS LTDN PRESS, is being maintained between 300 psig and 320 psig. • Verify Seal Injection Flow between 8 GPM and 13 GPM by throttling the following: CVC-297A, B, C.
NOTE:		**Decision on additional letdown flow may be dependent on PZR Level. PZR Level at > 63.3% is ITS LCO 3.4.9, Condition A.**
	RO / BOP	Notify RC that letdown flow has been restored and the affected areas should be monitored for changing radiological conditions.
	BOP	Check All Radiation Monitor Alarms - EXTINGUISHED (YES)
	BOP	Check R-11 OR R-12 IN SERVICE (YES) RMS-1,2,3,4 – OPEN (YES) AND R-11 and R-12 Vacuum Pump Operating (YES)

Op Test No.: 1	Scenario # 1	Event # 1	Page 13 of 41
Event Description:	Loss of Instrument Bus #1		

Time	Position	Applicant's Actions or Behavior
	BOP	Check R-20 IN SERVICE (YES)
	BOP	Check R-21 IN SERVICE (YES)
	BOP	Check Control Room Ventilation - ALIGNED FOR PRESSURIZATION MODE (NO) ▪ Go To Step 43.
	RO	Check PZR PRV Safety Acoustic Monitor Lights - ILLUMINATED (YES)
	RO	Locally Reset PZR Safety Acoustic Monitors At INSTRUMENT CABINET A In The Computer Room By Performing The Following: • Depress RESET RC-551A Pushbutton. • Depress RESET RC-551B Pushbutton. • Depress RESET RC-551C Pushbutton.
Booth Operator		**Reset PZR Safety Valve Acoustic Monitors when requested.**
NOTE:		The crew may choose to unsaturate PZR Pressure Controller PC-444J
	BOP	**Continuous Action Step** Check Instrument Busses 1, 2, 3, AND 4 - ENERGIZED FROM THEIR NORMAL SOURCE (As Indicated Below): ▪ IB-1: MCC-5 (Via E-1) (YES) ▪ IB-2: INVERTER A ▪ IB-3: INVERTER B ▪ IB-4: MCC-6
	BOP	Check Status of EDGs – START SIGNAL RECEIVED (NO) ▪ Observe the NOTE prior to Step 65 and Go To Step 65.

Op Test No.: 1 Scenario # 1 Event # 1 Page 14 of 41

Event Description: Loss of Instrument Bus #1

Time	Position	Applicant's Actions or Behavior
	BOP	Check ALL Safety Related Electrical Buses - ENERGIZED (YES)
	SRO	Check Technical Specifications For Applicable LCOs ▪ ITS LCO 3.8.1, AC Sources – Operating (None) ▪ ITS 3.8.7, Condition A, One AC Instrument Bus power source inoperable – Restore AC Instrument Bus Power Source to operable status within 24 hours ▪ ITS 3.8.9 Condition B, One AC instrument bus subsystem inoperable – Restore AC instrument bus subsystem to operable status within 2 hours
	RO	Check Annunciator APP-005-A3, PR DROP ROD - ILLUMINATED (YES)
	RO	Reset Dropped Rod Alarm By Momentarily Placing DROPPED ROD MODE Selector Switch For The Affected Power Range Drawer To RESET Position and then back to NORMAL (N-41 Only)
	BOP	Check APP-006-F5, Steam Dump Armed - Illuminated (NO)
	RO	Check APP-005-F5, AMSAC TROUB/BYP- Illuminated (YES)
	RO	Reset AMSAC TROUB/BYP Alarm by depressing the System Reset Pushbutton on AMSAC Front Panel. (Key 52 is required.)
Booth Operator		**Reset AMSAC Trouble Alarm when requested.**
	SRO	Return to Procedure and Step in Effect.

Op Test No.: 1	Scenario # 1	Event # 2	Page 15 of 41
Event Description:	Heater Drain Pump "A" Trips / Load Reduction		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: When directed, insert Event 2, Heater Drain Pump "A" Trip		
EVENT INDICATIONS: **APP-007-A5 HDT PMP A Motor OVLD/TRIP** **APP-007-B6 HDT HI/LO LVL** **Heater Drain Pump A GREEN off indication ILLUMINATED**		
	BOP	**AOP-010 MAIN FEEDWATER/CONDENSATE MALFUNCTION** **Immediate Action Step** Check Feedwater Regulating Valves - OPERATING PROPERLY (MANUAL OR AUTO): (YES) • FCV-478 • FCV-488 • FCV-498
	BOP	**Continuous Action Step** Check Reactor Trip Setpoint - BEING APPROACHED (NO) • IF a Reactor Trip Setpoint is approached, THEN trip the Reactor and Go to PATH-1. • Go to Step 4.
	CREW	Make PA Announcement For Procedure Entry
	BOP	Go To The Appropriate Step from The Table Below: • Heater Drain Pump Trip Step 15
	SRO	Reduce Turbine Load At 1%/MIN To 5%/MIN Using **Attachment 1** To Achieve Reactor Power Less Than The Target Power Per The Following Table:

PUMPS RUNNING			Target Power
Main FWP	Cond	Htr Drn	Percent
2	2	1	85%

(OP-301, Section 8.2.8 Quick Boration Checklist included at end of Event 2 if the crew uses Boron to reduce power)

Op Test No.: 1 Scenario # 1 Event # 2 Page 16 of 41

Event Description: Heater Drain Pump "A" Trips / Load Reduction

Time	Position	Applicant's Actions or Behavior
	BOP	Check Main FW Pumps - TWO PUMPS RUNNING (YES)
	BOP	**Continuous Action Step** Check HCV-1459, LP HEATERS BYP – OPEN (NO) Perform the following: a. Monitor Feed Water Pump suction pressure (Local Indication) • PI-1433 - "A" FW PUMP SUCTION PRESSURE • PI-1434 - "B" FW PUMP SUCTION PRESSURE b. IF pressures lower to less than the applicable setpoint, THEN verify OPEN HCV-1459. • Any HDP Running - 300 psig • No HDPs Running - 350 psig (NO)
	BOP	Check APP-007-B6, HDT HI/LO LVL – EXTINGUISHED (NO) Perform the following: a. Dispatch an operator to check operation of HDT Level Control Valves • LCV-1530A, HDT LEVEL CONTROL VALVE • LCV-1530B, HEATER DRAIN PUMPS SUCTION DUMP TO CONDENSER b. IF either HDT level Control Valve is failed open, THEN contact I&C to initiate repairs.
	BOP	**Continuous Action Step** Check HCV-1459, LP HEATERS BYP – CLOSED (YES)
	BOP	Check S/G Level - AT OR TRENDING TO PROGRAM (YES)
	RO	Check Tavg - AT OR TRENDING TO Tref (YES)
	CREW	Contact Maintenance To Troubleshoot And Correct The Feedwater Problem
	SRO	Implement the EALs

Op Test No.: 1	Scenario # 1	Event # 2	Page 17 of 41
Event Description:	Heater Drain Pump "A" Trips / Load Reduction		

Time	Position	Applicant's Actions or Behavior
	BOP	Check current loading for the following pumps - LESS THAN MAXIMUM (YES) • 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. • Main Feedwater Pump 560 AMPS • Condensate Pumps 310 AMPS • Heater Drain Pump 75 AMPS		
	SRO	**Continuous Action Step** Determine Iodine Sampling Requirements As Follows: (NO) a. Check Power Change - GREATER THAN 15% IN ONE HOUR • Go To Step 44 • IF YES, then implement SR 3.4.16.2
	RO	**Continuous Action Step** 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
Power Reduction Required by "A" Heater Drain Pump Trip		
	BOP	**AOP-010 Attachment 1, Turbine Load Reduction** Check Turbine Control Mode – AUTOMATIC (YES)
	BOP	Depress the IMP IN Pushbutton
	BOP	Set The Desired Load In The SETTER

Op Test No.: 1	Scenario # 1	Event # 2	Page 18 of 41
Event Description:	Heater Drain Pump "A" Trips / Load Reduction		

Time	Position	Applicant's Actions or Behavior
	BOP	Set The Desired Load Rate
	BOP	Depress The GO Pushbutton **END- AOP-010 Attachment 1**
	BOP	IF a Power Limit Warning is received, reduce power by lowering the turbine governor valve limiter.
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 55 - 60 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.: 1 Scenario # 1 Event # 2 Page 19 of 41

Event Description: Heater Drain Pump "A" Trips / Load Reduction

Time	Position	Applicant's Actions or Behavior
	RO	**IF** any of the below conditions occur, **THEN** momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: • Rod Motion is blocked OR is 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 to the RCS, **THEN** verify the following: • 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.
	RO	**IF** desired, **THEN FLUSH** the Boric Acid flow 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 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: o Unanticipated Rod Motion o Primary Water addition reaches the desired value • **WHEN** the desired amount of Primary Water has been added to the RCS, **THEN** verify the following: o FCV-114A, PW TO BLENDER, closes. o FCV-113B, BLENDED MU TO CHG SUCT, closes. o **IF** in Auto, **THEN** the operating Primary Water Pump stops. o The RCS MAKEUP SYSTEM is OFF.
	RO	**RETURN** the RCS Makeup System to automatic as follows: • **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.

Op Test No.: 1	Scenario # 1	Event # 2	Page 20 of 41
Event Description:	Heater Drain Pump "A" Trips / Load Reduction		

Time	Position	Applicant's Actions or Behavior
	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 the results of the boration. **(END OP-301 Section 8.2.8)**

Op Test No.: 1	Scenario # 1	Event # 3	Page 21 of 41
Event Description: S/G "C" LT-496 fails HIGH			

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: When directed, initiate Event 3, S/G "C" LT-496 fails HIGH **EVENT INDICATIONS:** **APP-006-C2, S/G C STM > FW FLOW** **APP-006-C3, S/G C LVL DEV** **APP-006-F2, S/G C NAR RANGE HI LEVEL** **FR-498, Pen 3 failing HIGH**
	SRO	**AOP-025 RTGB Instrument Failure** Go To The Appropriate Section For The Failed Transmitter: S/G NARROW RANGE LEVEL | SECTION D | Page 14
	BOP	**Immediate Action Step** Place The Affected FRV In MAN • FCV-498 (FRV "C") (YES)
	BOP	**Immediate Action Step** Restore Affected S/G Level To Between 39% And 52%
	RO	Make PA Announcement For Procedure Entry
	BOP	Remove The Affected Level Channel From Service Using OWP-027: CHANNEL: LT-496 | OWP: SGL-9
	BOP	**OWP-027 SGL-9** Precaution: • Refer to ITS Table 3.3.1-1 Item 13 for RPS OPERABILITY requirements in MODES 1 and 2. • Refer to ITS Table 3.3.3-1 Item 13 for PAM OPERABILITY requirements in MODES 1, 2, and 3. (NONE) • Refer to ITS Table 3.3.8-1 Item 1 for AFW instrumentation OPERABILITY requirements in MODES 1, 2, and 3. • Ensure only one S/G "C" level channel is out of service at any one time.

Op Test No.: 1	Scenario # 1	Event # 3	Page 22 of 41
Event Description: S/G "C" LT-496 fails HIGH			

Time	Position	Applicant's Actions or Behavior
	BOP	AMSAC PROCESSOR "A" LEVEL 3 NORMAL/BYPASS SWITCH (AMSAC PANEL)
	BOP	AMSAC PROCESSOR "B" LEVEL 3 NORMAL/BYPASS SWITCH (AMSAC PANEL)
	BOP	BISTABLE SWITCH BS 496-1 RACK #16 • Tripped
	BOP	BISTABLE LIGHT SG NO. 3 HI LEVEL LC496-1 • Illuminated
	BOP	BISTABLE SWITCH BS 496A-1 RACK #16 • Tripped
	BOP	BISTABLE LIGHT SG NO. 3 LO-LO LEVEL LC496A1 • Illuminated
	BOP	FCV-498 CONTROLLER • Manual **END OWP-027 SGL-9**
	SRO	**AOP-025** Go To Procedure Main Body, Step 2
	SRO	Implement The EALs
	SRO	The SRO will implement the following Tech. Specs. ITS 3.3.1-1 Item 13 which requires 3 S/G Level channels with Condition E – Place channel in trip within 6 hours or Be in Mode 3 in 12 hours ITS 3.3.8-1 Item 1 which requires 3 S/G Level channels with Condition C - Place channel in trip within 6 hours or Be in Mode 3 in 12 hours AND Mode 4 in 18 hours.

Op Test No.: 1	Scenario # 1	Event # 3	Page 23 of 41
Event Description: S/G "C" LT-496 fails HIGH			

Time	Position	Applicant's Actions or Behavior
	SRO	Return To Procedure And Step In Effect **END AOP-025**

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 24 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**When directed, insert Event 4, Seismic event causes RCS leakage to rise to 1000 gpm over 10 minutes.**
EVENT INDICATIONS: **APP-036-I5, Seismic Alarm** **Load Dispatcher reports a seismic event report from US Geological Department. No tremors felt in the control room.** **RR-1 Warning for R-11** **APP-036-D8, Process Monitor HI Rad (R-11)** **RCS Pressure Lowering** **PZR Level Lowering** **Automatic Makeup Begins**		
	SRO	**Enters AOP-021 for Seismic Disturbances.**
	SRO	Dispatch an Operator to the Seismic Monitors to check local alarms.
	Crew	Make PA Announcement
	Crew	Compare Current RTGB Indications with the Operating Logs to Detect any abnormal trends.
	SRO	Check Either Event Below – Has Occurred • Noticeable Tremors or Vibrations **(NO)** OR • Report by Outside Agency **(YES)**
	SRO	Notify the Manager – Operations of the following: • A Seismic event has occurred. • Any abnormal plant conditions that have been identified.
	SRO	Implement the EALs
	SRO	Implement Applicable Technical Specification LCOs. TRM 3.17 Seismic Shutdown Limits. Place plant in Mode 3 in 6 hours and Mode 5 in 36 hours.
	SRO	**Enters AOP-016 for Excessive Primary Plant Leakage**

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 25 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step** Check RCS Pressure – Greater than 1000 psig. (YES) Check the following: PZR Level – Less than 10% AND lowering in an uncontrolled manner (NO) OR RCS Subcooling – Less than 35°F (NO) IF PZR Level can NOT be maintained greater than 10% OR Subcooling can NOT be maintained greater than 35°F, THEN trip the Reactor and Go to PATH-1.
	Crew	Make PA Announcement for Procedure Entry
	RO	**Continuous Action Step** Check VCT Level - LESS THAN 12.5 INCHES (NO) • IF VCT level lowers to less than 12.5 inches, THEN perform Step 5. Go To Step 6
	RO	Check Charging Pump Status –LESS THAN TWO RUNNING (NO) • Go To Step 11. NOTE: May have only one Charging Pump Running due to previous loss of Instrument Bus. Step below annotated with a "@" is included if only one charging pump is running.
	RO	@Check Charging Pump Status – NONE RUNNING (NO) IF an additional Charging Pump is available, THEN perform the following: a. Start one additional Charging Pump. b. Observe charging flow on FI-122A, CHARGING LINE FLOW. c. Go To Step 11.
	RO	Place running Charging Pump Speed Controllers in MAN AND adjust output to maximum

Op Test No.: 1 Scenario # 1 Event # 4 and 5 Page 26 of 41

Event Description: Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>RO</td><td>Check RCS Level - LOWERING IN AN UNCONTROLLED MANNER (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>Check Any Letdown - IN SERVICE (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>Verify All Letdown Flowpaths Isolated As Follows:
• 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</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>Check RCS Level - LOWERING IN AN UNCONTROLLED MANNER (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>Check RCS Pressure – GREATER THAN 1000 PSIG (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>Trip The Reactor AND Go To PATH-1</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>Steps from AOP-005 Radiation Monitoring System
Perform The Following:
a. Make PA Announcement For Procedure Entry
b. Use Non-Performed Attachment(s) Listed Below For Radiation Monitor(s) in Alarm:
<table><tr><th>Radiation Channel</th><th>Process Monitor</th><th>Attachment Number</th></tr><tr><td>R-11 & R12</td><td>PROCESS MONITOR R-11/R-12 CV AIR AND PLANT VENT</td><td>12</td></tr></table></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>Check R-11/R-12 Selector Switch - SELECTED TO CV (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>Check RCS Temperature – GREATER THAN 200°F (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>Check Channel R-11/R-12 Low Flow Alarm – Illuminated (NO)</td></tr>
</table>

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 27 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	BOP	Check EOP Network Procedures – IMPLEMENTED (NO)
	BOP	Check Personnel – IN CV (NO)
	BOP	Check CONTAINMENT VENTILATION ISOLATION Valves – CLOSED (YES)
	BOP	Place the following CV IODINE REMOVAL FAN Control Switches to PREPURGE Position: • HVE-3 • HVE-4
	BOP	Request RC to perform a background radiation check at Radiation Monitors R-11 and R-12.
	BOP	Determine if primary system leakage is occurring, as follows: • Check RCS Level – Unexplained Lowering Level (YES) OR • RCS Leak – Locally Identified (NO) OR • VCT Auto Makeups – Excessive (YES) OR • Charging Pump Speed – Rising (YES)
	BOP	Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure.
	SRO	Refer to Technical Specification 3.3.6 and ODCM Table 3.10-1, Radioactive Gases
	BOP	Go to the Main Body, Step 1.b, of this procedure.
	BOP	Return to Procedure And Step In Effect **(END AOP-005)**

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 28 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: No Action Required. All malfunctions are pre-loaded for the reactor trip and SI Actuation.		
START OF PATH-1 ACTIONS		
	RO	**PATH-1 Actions** **Immediate Action Step** Reactor tripped (YES)
	BOP	**Immediate Action Step** Turbine tripped (YES)
	BOP	**Immediate Action Step** E1 & E2 energized (YES)
	BOP	**Continuous Action Step** IF Dedicated Shutdown Bus is Deenergized THEN Place Dedicated Shutdown Diesel Generator In Service Using EPP-25.
BOOTH OPERATOR:		**Ensure the actions of AOP-018 to restore seal cooling to the RCPs have been completed prior to re-energizing the DS Bus. At a minimum wait at least 10 minutes from request prior to energizing the DS Bus.**
	RO	**Immediate Action Step** SI initiated (YES – SI was manually initiated due to entry into PATH-1 from AOP-016)
	SRO	Open Foldout A

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 29 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	BOP	MSR ISOLATION CRITERIA • IF ANY Purge OR Shutoff Valve does not indicate fully closed, THEN place the associated RTGB Switch to CLOSE. • IF ANY Purge OR Shutoff Valve can NOT be closed from the RTGB AND RCS temperature is less than 540°F and lowering, THEN close the MSIVs AND MSIV BYPs. • **IF a loss of power prevents isolation of the MSRs, THEN close the MSIVs AND MSIV BYPs**
	RO	LOSS OF RCP SEAL COOLING CRITERIA IF both the conditions below are met, THEN perform AOP-018, Reactor Coolant Pump Abnormal Conditions to restore RCP Seal Cooling : • APP-001-B2, LABYRINTH SEAL LOW ΔP – ILLUMINATED (YES) AND • APP-001-D1, THERMAL BARRIER LO FLOW – ILLUMINATED (YES) **(AOP-018 Actions are located following the PATH-1 Actions)**
BOOTH OPERATOR:		**Ensure the actions of AOP-018 to restore seal cooling to the RCPs have been completed prior to re-energizing the DS Bus. At a minimum wait at least 10 minutes from request prior to energizing the DS Bus.**
	RO	Verify Phase A valves closed (YES)
	BOP	Verify FW isolation valves closed (YES)
	BOP	Verify both FW pumps tripped (YES)
	BOP	Verify both MDAFW pumps running (NO) MDAFW Pump A Inoperable due to initial conditions.
	BOP	If Additional Feedwater is required, THEN Start SDAFW Pump

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 30 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
Critical Task	RO	Verify two SI pumps running (NO) Manually Start "C" SI Pump "A" SI Pump trips while attempting to manually start.
CRITICAL TASK:		**Start "C" SI Pump to provide injection to the RCS.**
	RO	Verify both RHR pumps running (YES)
	RO	Verify SI valves properly aligned (YES)
	RO	At least one CCW pump running (NO)
	RO	E-1 AND E-2 Energized by Offsite Power (NO)
	RO	CV Spray Initiated (NO)
Critical Task	RO	Start CCW Pump (YES)
CRITICAL TASK:		**Start one CCW pump to restore Seal Cooling to the RCPs within 15 minutes. (May have already been performed IAW AOP-018)**
	RO	Verify Open Thermal Barrier Flow Control FCV-626 Unless Closed Due to Ruptured Thermal Barrier. (FCV-626 Verified Open)
	BOP	All SW & SW booster pumps running (YES)
	RO	Verify CV Fans HVH-1,2,3&4 running (YES)
	RO	Verify IVSW System initiated (YES)

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 31 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	Verify CV ventilation isolation (YES)
	BOP	Verify control room ventilation aligned for pressurization mode (YES) Operator to verify the following: - Verify CONT RM AIR EXHAUST Fan, HVE-16 - STOPPED - Verify CLEANING Fan HVE-19 A/B – RUNNING - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1A-SA - CLOSED - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1B-SB - CLOSED - IF CR-D1A-SA OR CR-D1B-SB have lost power, THEN locally verify position in the Control Room Kitchen.
	BOP	Verify both EDGs running (YES)
	BOP	**Continuous Action Step** Restart Battery Chargers within 30 minutes of Power Loss using OP-601 ("A" Battery Charger failed to automatically restart. Operator must be dispatched to locally restart the battery charger.)
	RO	**Continuous Action Step** CV pressure remained below 10 psig (YES)
	BOP	Automatic Steam Line Isolation Initiated (NO)
	BOP	Automatic Steam Line Isolation Required (NO)
	BOP	Locally open the breaker for HVS-1 at MCC-5 within 60 minutes of SI Initiation
BOOTH		**Open the breaker for HVS-1 3 minutes after directed by the Control Room.**

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 32 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	RCS pressure greater than 1350 psig [1250 psig] (NO)
	RO	SI flow verified (YES)
	RO	RCS pressure >125 psig (YES)
	BOP	At least 300 gpm AFW flow available (YES)
Critical Task	BOP	Verify AFW Valves Properly Aligned (NO) (AFW Valves must be manually aligned. May have been performed as an early action.) (Critical Task is to establish flow to at least one S/G.)
CRITICAL TASK:		**Establish feed flow to at least one S/G.**
	BOP	Control AFW flow to maintain S/G levels between 8% [18%] and 50%
	RO	RCP Thermal Barrier Cooling Water Hi or Lo flow alarms illuminated (NO)
	BOP	Place Steam Dump Mode switch to Steam Pressure
	RO	RCS temperature stable at or trending to 547°F (NO)
	RO	RCS temperature greater than 547°F (NO)
	RO	Attempt to limit cooldown

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 33 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	BOP	IF RCS Cooldown continues and is not due to SI flow, THEN CLOSE MSIVs and MSIV Bypasses. • MSIV and MSIV Bypasses are closed.
	RO	PZR PORVs Closed (YES)
	RO	PZR Spray & Aux Spray valves closed (YES)
	RO	At least one RCP running (NO)
	BOP	Any S/G with uncontrolled depressurization (NO)
	BOP	Any S/G Completely Depressurized (NO)
	BOP	R-19s, R-31s, R-15 Rad levels normal (YES)
	BOP	R-2, R-32A, R-32B Rad Levels Normal (YES)
	RO	CV Pressure Normal (NO) • GO TO PATH-1 Entry Point C
	RO	Reset SPDS and initiate monitoring CSFSTs
	CREW	Open Foldout B. **(No actions needed from this Foldout.)**
	BOP	Request Periodic Activity Samples of All S/Gs
	RO	At Least One RCP Running (NO)

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 34 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	BOP	Any S/G with Uncontrolled Depressurization (NO)
	BOP	Any S/G Completely Depressurized (NO)
	BOP	Control AFW Flow to Maintain S/G Levels between 8% [18%] and 50%
	BOP	Any S/G with Uncontrolled Level Rise (NO)
	BOP	R-19s, R-31s, AND R-15 Rad Levels Normal (YES)
	RO	PZR PORVs Closed (YES)
	RO	Open at least one PORV Block unless Closed to Isolate an Open PZR PORV
	RO	**Continuous Action Step** IF PZR PORV Opens on High Pressure, THEN Verify Reclosure at or Below 2335 PSIG. Close PORV Blocks as Necessary.
	RO	Reset SI
	CREW	**Continuous Action Step** IF Offsite Power is Lost, THEN Restart Emergency Safeguard Equipment
	RO	Reset CV Spray
	RO	Reset Phase A AND Phase B

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 35 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	Establish Instrument Air to CV. IF Compressor Not Running, THEN Start Compressor.
	BOP	Offsite Power Available to Charging Pumps (NO)
	BOP	IF Adequate diesel capacity not available to run charging pumps THEN shed non-essential loads using Supplement F.
	RO	At Least One Charging Pump Running (YES)
	RO	Establish Charging Flow as Necessary
	RO	CV Spray Pumps Running (NO)
	RO	RCS Subcooling Greater Than 35°F [55°F] (NO)
	RO	**Continuous Action Step** WHEN Below 10^{-10} Amps, THEN Energize Source Range detectors and monitor recorder.
	RO	RCS Pressure Greater Than 275 PSIG [400 PSIG] (YES)
	RO	RCS Pressure Stable or Rising (NO) May be answered as YES depending on PATH-1 timing. Steps annotated with a "@" are listed if answered YES.
	RO	@Stop RHR Pumps

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 36 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	**@ Continuous Action Step** @If RCS Pressure lowers below 275PSIG [400 PSIG], THEN Restart RHR Pumps
	BOP	Any S/G with Uncontrolled Depressurization in Progress (NO)
	RO	RCS Pressure Rising (NO)
	BOP	E-1 AND E-2 Energized by Offsite Power (NO)
	BOP	Attempt to restore offsite power to E-1 AND E-2
	BOP	Restart Battery Chargers within 30 min of power loss using OP-601.
	BOP	Verify EDGs Properly Loaded (YES)
	BOP	Verify Emergency Oil Pump Running (YES)
	BOP	Locally verify Air Side Seal Oil Backup Pump running. (YES)
	BOP	IF Diesel Capacity is not adequate to run Instr Air Compressors AND Battery Chargers, THEN shed non-essential loads using Supplement F.
	BOP	Locally Load Instr Air Compressors AND Battery Chargers
	BOP	E-1 OR E-2 Energized by Offsite Power (NO)
	RO	Supplement D components capable of Recirc (YES)

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 37 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO	Aux. Building Radiation Normal (YES)
	RO	RCS Pressure Greater Than 275 PSIG [400 PSIG] (YES)
	RO	Obtain RCS Boron, Activity, AND Hydrogen Samples
	CREW	Exit PATH-1 to EPP-8
		AOP-018, Reactor Coolant Pump Abnormal Conditions
	RO/BOP	Make PA announcement for procedure entry
	RO/BOP	Evaluate plant conditions AND Go to the appropriate section for RCP malfunction not yet addressed: Section C, Loss of Seal Injection.
	RO/BOP	Check APP-001-D1, RCP THERM BAR COOL WTR LO FLOW alarm – ILLUMINATED (YES)
	RO/BOP	Check elapsed time since all RCP Seal Cooling was lost – GREATER THAN 15 MINUTES (NO) • If RCP Seal Cooling is NOT or can NOT be restored in less than 15 minutes, THEN Go To Step 3. • Go To Step 10

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 38 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Establish Thermal Barrier Cooling as follows: a. Verify the following component alignment: 1. At least ONE CCW Pump – RUNNING (YES) 2. CC-716A, CCW TO RCP ISO – OPEN (YES) 3. CC-716B, CCW TO RCP ISO – OPEN (YES) 4. FCV-626, THERM BARRIER OUTLET – OPEN (YES) 5. CC-735, THERM BARRIER OUTLET – OPEN (YES) b. Check at least One Charging Pump – RUNNING (NO) • Observe the NOTE prior to Step 11 and Go To Step 11
	RO/BOP	Determine if a charging pump can be started: a. Check Charging system piping – RUPTURED (NO) • Go To Step 12
	RO/BOP	Check SI – INITIATED (YES)
	RO/BOP	Reset SI
	RO/BOP	Verify at least ONE Charging Pump - RUNNING
	RO/BOP	Check Seal Injection to RCPs: • ANY seal injection flow – LESS THAN 6 GPM AND • ANY thermal barrier Delta P – LESS THAN 5 inches
	RO/BOP	Check seal injection - ALIGNED
	RO/BOP	Adjust any OR all of the following to restore seal injection flow • HIC-121, CHARGING FLOW • Charging Pump Speed • CVC-297A, B, C

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 39 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Check Seal Injection to RCPs: • ANY seal injection flow – LESS THAN 6 GPM (NO) AND • ANY thermal barrier Delta P – LESS THAN 5 inches (NO) • Go To Step 47
	RO/BOP	Establish Charging flow on FI-122A, CHARGING LINE FLOW – GREATER THAN 35 GPM (YES)
	RO/BOP	Check Normal Letdown – IN SERVICE (NO) If desired, THEN restore normal letdown using Attachment 4, Restoration of Normal letdown
	RO/BOP	Control Charging and Letdown flow to maintain Pressurizer level as follows: • Within +/- 5% of reference level OR • PZR level between 30% and 40% with RCP C stopped.
	RO/BOP	Establish normal seal injection a. Check RCP seal injection – ALIGNED (YES) b. Check RCP seal injection flow – BETWEEN 8 GPM AND 13 GPM
	RO/BOP	Check seal injection flow – ESTABLISHED TO ALL RCPs (YES)
	SRO	Implement the EALs
	SRO	Refer to Technical Specification for ant applicable LCOs. • 3.4.13 – RCS Operational Leakage • 3.4.17 – CVCS • 3.4.9 – PZR Level • 3.4.4, 3.4.5, & 3.4.6 – RCS Loops
	RO/BOP	Check RCP Seal Cooling ISOLATED (NO) • Observe the NOTE prior to Step 2 and go to the Main Body, Step 2 of this procedure.

Op Test No.: 1	Scenario # 1	Event # 4 and 5	Page 40 of 41
Event Description:	Seismic event that causes RCS leakage to rise to 1000 GPM over 10 minutes, Loss of Startup Transformer upon Generator Lockout.		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Evaluate plant conditions AND Go to the appropriate section for RCP malfunction not yet addressed: None • Return to procedure and step in affect.
The Chief Examiner may terminate the scenario anytime after the transition to EPP-8 has been made or at his discretion.		

ILC-11-2 NRC SCENARIO 1 TURNOVER SHEET

POWER LEVEL:	**100% RTP**
Core Burnup:	**15697 MWD/MTU**
EFPD:	**448 EFPD**
Boron:	**95 PPM**
Xenon:	**EQ Xenon**
Tavg:	**575.9°F**
Bank D Rods	**218 Steps**

EQUIPMENT UNDER CLEARANCE:

- "A" MDAFW Pump OOS and Breaker Racked Out

EQUIPMENT STATUS:

- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.
- Switchyard access is RESTRICTED.

INSTRUCTIONS FOR THE WATCH:

- Maintain current power level

Unit 2 Status Board

	Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	15697	Design:	16590
	EFPD	448	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS				
	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	258
1.77% =△K/K	≥350 F	611
2.6% =△K/K	100 F Cold	776
6% =△K/K	N/A	1950

Condenser Air Inleakage			SGBD		
			Target Value GPM		Status
A	13	CFM	A	50	Flash Tank With Heat Recovery
B	0	CFM	B	50	
Known	8	CFM	C	50	
Total	5	CFM	N2 Flow	8	SCFM

PORV Settings			
Setting Date		POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints			
Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown		
	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	95
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents				
	UPPER	LOWER	TARGET	% BAND
N-41	144	136	0.0212	5 +/-
N-42	126	125	0.0212	5 +/-
N-43	121	113	0.0212	5 +/-
N-44	112	108	0.0212	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data
IC-21
EOL

ILC-11-2 NRC SCENARIO 1 TURNOVER SHEET

POWER LEVEL:	**100% RTP**
Core Burnup:	**15697 MWD/MTU**
EFPD:	**448 EFPD**
Boron:	**95 PPM**
Xenon:	**EQ Xenon**
Tavg:	**575.9°F**
Bank D Rods	**218 Steps**

EQUIPMENT UNDER CLEARANCE:

- "A" MDAFW Pump OOS and Breaker Racked Out

EQUIPMENT STATUS:

- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.
- Switchyard access is RESTRICTED.

INSTRUCTIONS FOR THE WATCH:

- Maintain current power level

Unit 2 Status Board

Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	15697	Design:	16590
EFPD	448	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS

	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
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SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
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2.6% =△K/K	100 F Cold	776
6% =△K/K	N/A	1950

Condenser Air Inleakage		
A	13	CFM
B	0	CFM
Known	8	CFM
Total	5	CFM

SGBD		
Target Value GPM		Status
A	50	Flash Tank
B	50	With Heat
C	50	Recovery
N2 Flow	8	SCFM

PORV Settings

Setting Date		POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints

Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown

	Previous ARI Counts	Setpoint
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NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	95
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BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents

	UPPER	LOWER	TARGET	% BAND
N-41	144	136	0.0212	5 +/-
N-42	126	125	0.0212	5 +/-
N-43	121	113	0.0212	5 +/-
N-44	112	108	0.0212	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data	
IC-21	
EOL	

Facility:	HB ROBINSON	Scenario No.: 2	Op Test No.:
Examiners:	_____	Operators:	SRO -
	_____		RO -
	_____		BOP -

Initial Conditions:
- 75% RTP MOL, 9000 MWD/MTU, 775.5 ppm Boron
- "A" MDAFW pump inoperable with the breaker racked out
- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties

Turnover:
- Plant is at 75% power following maintenance on "A" HDP. Operations Management and RES have reported unusually high vibrations on "A" MFP and recommend a power reduction be performed and "A" MFP secured as soon as possible.

Critical Tasks:
- Isolation of "C" S/G
- Tripping "C" RCP within 5 minutes of Reactor Trip

Event No.	Malf. No.	Event Type*	Event Description
1		(C) BOP, SRO (TS) SRO	Service Water Pump "D" trips
2		(N) BOP, SRO (R) RO	"A" MFP Vibrations / Reduce Power
3		(C) RO, SRO	Control Bank "D" Rods unwarranted rod motion
4		(C) BOP, SRO	Feedwater Reg. Valve FCV-478 slowly drifts open
5		(I) RO, SRO (TS) SRO	Pressurizer Level Transmitter LT-459 fails LOW
6		(N) BOP, SRO	Restore normal letdown
7		(C) RO, SRO	RCP "C" High Vibrations
8		(M) ALL	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip
9			"C" S/G PORV fails OPEN / Tube Rupture size rises
		(C) RO	RHR Pumps "A" and "B" fail to auto-start
		(C) BOP	FW Isolation Valve V2-6C fails to close on SI Signal
		(C) RO	**Conditional:** Seal Failure on "C" RCP if "C" RCP not secure within 5 min. of reaching 20 mils vibration on "C" RCP.

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

ILC-11-2 NRC SCENARIO 2 SUMMARY DESCRIPTION

The crew will assume the watch with the unit being maintained at 75% RTP following the completion of maintenance on "A" Heater Drain Pump. The control room has received a report from the Operations Manager that the RES system engineer has reported that vibrations on "A" MFP have become abnormally high. RES recommends that "A" MFP be secured within the next hour. MDAFW Pump "A" is out of service for scheduled lube oil cooler replacement. The motor breaker has been racked out and the pump has been isolated and cleared for maintenance. Shift instructions are to maintain current power level while RES is monitoring performance of "A" Heater Drain Pump following maintenance.

On cue from the Chief Examiner, "D" Service Water Pump will trip. Various alarms will be received on APP-002 and APP-008. APP-008-F4, SW PMP A/B/C/D OVLD, will direct the operator to start a Standby Pump and verify 40 to 50 psig in the SW Headers. The SRO will direct entry into ITS LCO 3.7.7, Condition A, which requires that the train of SW be restored to Operable status within 72 hours. Once the Chief Examiner is satisfied with the ITS compliance he may cue the next event.

Once the crew has lowered power by at least 5% a malfunction will be inserted such that when "D" Bank Control Rods are moved, either in Auto or Manual, they will continue to insert until the immediate actions of AOP-001, Malfunction of Reactor Control System, are completed. The crew will perform the necessary actions in AOP-001.

On cue from the Chief Examiner, Feedwater Regulating Valve FCV-478 will slowly drift open. The crew will perform the immediate actions for the Main Feedwater malfunction IAW AOP-010, Main Feedwater / Condensate Malfunction. The operator will take manual control of FCV-478 and restore "A" S/G to its programmed level band. The crew will contact maintenance to begin troubleshooting and repair efforts while continuing to operate the plant with one FRV in manual. Once the Chief Examiner is satisfied with the actions of the crew and stability of the plant, he can cue the next event.

On cue from the Chief Examiner, Pressurizer Level Transmitter, LT-459 fails LOW causing normal letdown to isolate, de-energizing of pressurizer control group heaters and charging pump speed to rise for the pump in Auto. The crew will select the alternate channel for control and implement OWP-030, Section PLT-1, and remove LT-459 from service. ITS Table 3.3.1-1 Item 8, Pressurizer Water Level – High, Condition M requires that the channel be placed in trip within 6 hours or reduce thermal power to less than P-7 within 12 hours. Once the level transmitter has been removed from service and the Chief Examiner is satisfied with the Tech Specs compliance and plant restoration, the Chief Examiner will cue the next event.

On cue from the Chief Examiner, "C" RCP will begin experiencing high vibrations. The crew will enter AOP-018, Reactor Coolant Pump Abnormal Conditions, and determine that, based on current vibration levels, that a reactor trip is warranted. The crew will initiate a reactor trip, trip "C" RCP and then continue in PATH-1. A 500 gpm tube rupture in "C" S/G will be ramped in over 1 minute when "C" RCP is secured. The crew should identify the 500 gpm tube rupture and initiate safety injection while performing the immediate actions of PATH-1. Neither RHR Pump "A" nor "B" will auto-start on the safety injection signal. The operator will manually start

both pumps once identified. Also, FW Isolation Valve V2-6C will fail to close on the safety injection signal and must be manually closed by the operator.

If the operator fails to trip "C" RCP within 5 minutes of reaching 20 mils vibration on "C" RCP a seal failure will occur on "C" RCP. The crew will enter AOP-018, Reactor Coolant Pump Abnormal Conditions, and perform Section A, Reactor Coolant Pump Seal Failure.

Approximately 2 minutes after initiation of safety injection the "C" S/G Steam Line PORV will fail OPEN and the tube rupture will rise to 775 gpm over a 1 minute time period.

The crew will continue in PATH-1, performing the actions of Foldout A to isolate auxiliary feedwater flowpaths to "C" S/G and begin performing Supplement G, Steam Generator Isolation, for "C" S/G. EPP-11, Faulted Steam Generator Isolation, will be transitioned to from PATH-1. EPP-11 will direct the crew to transition to PATH-2, Entry Point J.

PATH-2 will verify the isolation of "C" S/G and perform rapid cooldown of the RCS to lower the RCS pressure to a point that will stop the primary to secondary leakage. After the cooldown is secured it will be determined that the ruptured S/G pressure is continuing to lower and RCS subcooling cannot be maintained with the ruptured / faulted S/G. PATH-2 will direct the crew to transition to EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery. EPP-17 will provide guidance to continue with RCS cooldown along with SI flow reduction, eventually leading up to placing the plant in a cold shutdown condition.

The Chief Examiner may terminate the scenario when the crew has made the determination that EPP-17, SGTR with Loss of Reactor Coolant: Subcooled Recovery, is the appropriate mitigation strategy, or at his discretion.

ILC-11-2 NRC SCENARIO 2 SIMULATOR SETUP

IC/SETUP:

- IC-802, SCN:008_11_2_NRC_Exam_2
- "A" MDAFW Pump inoperable with the breaker racked out
- Status board updated to reflect IC-42.
- Switchyard access is RESTRICTED.

PRE-LOADED EVENTS:

The following event should occur when "C" RCP is secured:

Event 8: "C" S/G Tube Rupture (500 gpm)
RHR Pumps "A" and "B" fail to auto-start on SI Signal
FW Isolation Valve V2-6C fails to close on SI Signal

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

Event 1: Service Water Pump "D" trips
Event 2: "A" MFP Vibrations / Reduce Power
Event 3: Control Bank "D" Rods unwarranted rod motion
Event 4: Feedwater Reg. Valve FCV-478 slowly drifts OPEN
Event 5: Pressurizer Level Transmitter LT-459 fails LOW
Event 6: Restore normal letdown
Event 7: RCP "C" High Vibrations
Event 9: "C" S/G Steam Line PORV fails OPEN and Tube Rupture size rises (775 gpm)
Conditional: Seal Failure on "C" RCP if "C" RCP not secure within 5 min. of reaching 20 mils vibration on "C" RCP.

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- **APP-008-F4**
- **OP-105**
- **AOP-001**
- **AOP-010**
- **AOP-025 Main Body and Section B**
- **OWP-030, PLT-1**
- **AOP-018**
- **PATH-1**
- **Foldout A**
- **Supplement G**
- **EPP-11**
- **PATH-2**
- **Foldout C**
- **EPP-17**

Op Test No.: 1	Scenario # 2	Event # 1	Page 5 of 47
Event Description: SW Pump "D" Trips			

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**When directed, insert Event 1, SW Pump "D" Trips**
EVENT INDICATIONS: **APP-008-F4, SW PMP A/B/C/D OVLD** **APP-002- A8, B8, C8, D8 HVH-1, 2, 3, 4 WTR OUTLET LO FLOW** **Service Water Pump "D" has dual indication on the RTGB**		
	BOP	Receives annunciator APP-008-F4, SW PMP A/B/C/D OVLD and Identifies that SW Pump "D" has tripped.
	BOP	If an operating SW Pump has tripped, THEN PERFORM the following: Start a Standby Pump.
	BOP	If an operating SW Pump has tripped, THEN PERFORM the following: Dispatch operator to check breaker and current limiter fuses for SW Pump D – 480V Bus E2 (CMP 25B)
Booth Operator:		**Report that SW Pump D breaker indicates that it tripped on over-current.**
	BOP	If an operating SW Pump has tripped, THEN PERFORM the following: THROTTLE CCW Heat Exchanger Return Valves, as necessary, to maintain 40 to 50 psig in the SW Headers.
	SRO	Directs entry into ITS LCO: 3.7.7, Condition A, One SWS train inoperable. Restore SWS train to Operable status within 72 hours. 3.6.6, Condition D, Two containment cooling trains inoperable. (Due to receiving the HVH-1,2,3,4 WTR OUTLET LO FLOW). Restore one containment cooling train to Operable status within 72 hours.

Op Test No.: 1	Scenario # 2	Event # 2	Page 6 of 47
Event Description:	Main Feedwater Pump A high vibrations and power reduction to secure pump.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**Following a 5% power reduction, insert the failure of the control rods to continue to insert (dependant on whether the control rods are in AUTO or MANUAL)**
	SRO	Notify the Load Dispatcher that unit load will be reduced (SOER 02-3, Large Power Transformer Reliability)
	SRO	Notify RC that higher radiation levels should be expected in the CV Pump Bays and in Pipe Alley due to normal shutdown crud bursts.
	RO	Monitor the highest operable Power Range Channel and the highest operable Intermediate Range Channel on NR-45.
	SRO/RO	IF Reactor Engineering has not provided technical guidance, THEN use the most recent OST-947 data to determine the reactivity change required.
	SRO	For each power change which is greater than or equal to 10%, UPDATE the Power Change Log in the Reactor Startups-Shutdowns-Trips book.
	RO	IF additional letdown flow is desired, THEN PERFORM the following: • Start additional Charging Pumps as necessary, IAW OP-301. • Place additional letdown orifice in service IAW OP-301.
	RO	IF a significant change in RCS Boron concentration occurs (10 ppm or more), THEN energize additional PZR heaters as needed.
	RO	**DETERMINE** the amount of Boric Acid to add to the RCS and **OBTAIN** an independent check of the volume of boric acid 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.

Op Test No.: 1	Scenario # 2	Event # 2	Page 7 of 47
Event Description:	Main Feedwater Pump A high vibrations and power reduction to secure pump.		

Time	Position	Applicant's Actions or Behavior
	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.
	RO	**IF** any of the below conditions occur, **THEN** momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: • 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 to the RCS, **THEN** verify the following: • FCV-113A, BA TO BLENDER, 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.: 1	Scenario # 2	Event # 2	Page 8 of 47
Event Description:	Main Feedwater Pump A high vibrations and power reduction to secure pump.		

Time	Position	Applicant's Actions or Behavior
	RO	**IF** desired, **THEN FLUSH** the Boric Acid flow 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 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: o Unanticipated Rod Motion o Primary Water addition reaches the desired value. • **WHEN** the desired amount of Primary Water has been added to the RCS, **THEN** verify the following: o FCV-114A, PW TO BLENDER, closes. o FCV-113B, BLENDED MU TO CHG SUCT, closes. o **IF** in Auto, **THEN** the operating Primary Water Pump stops. o The RCS MAKEUP SYSTEM is OFF.
	RO	**RETURN** the RCS Makeup System to automatic as follows: • **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 the AUTO position. • **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 the results of the boration.

Op Test No.: 1 Scenario # 2 Event # 2 Page 9 of 47

Event Description: Main Feedwater Pump A high vibrations and power reduction to secure pump.

Time	Position	Applicant's Actions or Behavior
	BOP	**IF** EH Turbine Control is in OPER AUTO, **THEN** reduce turbine load as follows: • Place the EH Turbine Control in the desired position: IMP IN or IMP OUT **(Per RNP Standing Instruction IMP OUT preferred.)** • Set the desired load in the SETTER. • Select the desired Load Rate. • Depress the GO pushbutton.
	RO	**WHEN** Reactor Power is <90% as indicated on NR-45, **THEN CHECK** that APP-005-D6 is received. (N/A, initial reactor power at 75%)
	RO	VERIFY proper programming of the following: Tavg tracks within 5°F of Tref. PZR level tracks within 5% of reference level.
	RO	Maintain the control rods above the minimum allowable rod height by borating the RCS IAW OP-301.
	BOP	Maintain Gland Seal Steam Header Pressure in the normal operating band (3 to 6 psig) (PI-4004, PI-1382 or ERFIS Pt GSP2095A)
	BOP	WHEN PI-1458, COND PUMPS HEADER PRESS indicates between 575 psig and 600 psig, THEN PERFORM the following: SECURE the following as needed for feedwater flow requirements: One Main Feedwater Pump may be secured when reactor power is less than or equal to 60%.

Op Test No.: 1	Scenario # 2	Event # 3	Page 10 of 47
Event Description:	Control Bank D rods unwarranted rod motion		

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 3, Control rod unwarranted rod motion.
		EVENT INDICATIONS: **Control rods continue to insert (AUTO or MANUAL).** **Rod direction indication light illuminated.** **Step counters audible** **Tave < Tref**
	RO	**Immediate Action Step** Check unexpected rod motion – IN PROGRESS (YES)
	RO	**Immediate Action Step** Check Reactor Power – GREATER THAN 15% (YES)
	RO	**Immediate Action Step** Check Turbine Load – CONTROL RODS STEPPING IN (YES) AND UNEXPECTED LOAD REDUCTION IN PROGRESS(NO) OR UNEXPECTED LOAD REDUCTION HAS OCCURRED (NO) RNO - a. IF ROD BANK SELECTOR switch position in A (AUTO), THEN place the ROD BANK SELECTOR switch in M (Manual) b. IF ROD BANK SELECTOR switch position in M (Manual) OR Individual Bank Select, THEN place the ROD BANK SELECTOR switch in A (AUTO) Go To Step 5
	BOP	Make PA Announcement For Procedure Entry
	CREW	Go To Section C, Continuous Rod Motion.

Op Test No.: 1	Scenario # 2	Event # 3	Page 11 of 47
Event Description:	Control Bank D rods unwarranted rod motion		

Time	Position	Applicant's Actions or Behavior
	RO	Check ROD BANK SELECTOR switch position when problem occurred – INDIVIDUAL BANK SELECT (NO) RNO – Go To Step 4
	RO	Stop any boron dilution in progress.
	RO	Check APP-005-B5, ROD BANKS A/B/C/D LO LIMIT – EXTINGUISHED (YES)
	RO	Check reactor power – LESS THAN OR EQUAL TO 100% (YES)
	RO	**NOTE: The following step depends on what mode the rod control system was in when the failure occurred.** Check Rod Bank Selector Switch Position – AUTO (NO) RNO – Perform the following: Maintain Tavg within -1.5 to +1.5°F of Tref using manual rod control OR Maintain Tavg within -1.5 to +1.5°F of Tref by adjusting turbine load using Attachment 1, Turbine Load Adjustment. **Attachment 1 – Turbine Load Adjustment** 1. Check Turbine Control Mode - AUTOMATIC RNO: Momentarily depress the GV (up/down) buttons on the EH Control Panel as needed to adjust Turbine Load. Return to Step In Effect. 2. Check Turbine Load Adjustment In IMP IN Desired RNO: Perform the following a. Verify IMP OUT light – ILLUMINATED b. Go To Step 4 3. Depress the IMP IN Pushbutton 4. Set The Desired Load In The SETTER 5. Set the Desired Load Rate 6. Depress the GO and HOLD Pushbuttons as necessary
	SRO	Contact I&C and Reactor Engineering to troubleshoot and correct the problem.

Op Test No.: 1	Scenario # 2	Event # 3	Page 12 of 47
Event Description:	Control Bank D rods unwarranted rod motion		

Time	Position	Applicant's Actions or Behavior
	SRO	Implement The EALs
	SRO	Review Technical Specifications to assure all applicable LCO requirements have been met: **(NONE are applicable)** • ITS 3.1.4 – Rod Alignment • ITS 3.1.5 – Shutdown Bank RIL • ITS 3.1.6 – Control Bank RIL and Overlap • ITS 3.1.7 – IRPI • ITS 3.2.1 – Fq(Z) • ITS 3.2.2 – F Delta h • ITS 3.2.3 – AFD • ITS 3.2.4 – QPTR • ITS 3.3.1 - NIS
NOTE: Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs, and notify the Operations Manager.		
	SRO	Return To Procedure And Step In Effect

Op Test No.: 1	Scenario # 2	Event # 4	Page 13 of 47
Event Description:	Feedwater Regulating Valve FCV-478 slowly drifts open.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 4, Feedwater Regulating Valve FCV-478 slowly drifts open.		
EVENT INDICATIONS: **FR-478 feedwater flow and S/G level rising** **APP-006-A3, S/G A LVL DEV**		
	BOP	**Immediate Action Step** Check feedwater regulating valves – OPERATING PROPERLY (MANUAL OR AUTO) (NO) RNO – a. Verify FRV for the affected S/G(s) in manual control (FCV-478 placed in manual) b. Attempt to stabilize S/G level using FRV and/or FRV bypass valves by matching steam flow with feed flow. c. Stop any load change in progress. d. IF unable to control S/G level, THEN trip the reactor AND Go To PATH-1 OR EOP – E-0, REACTOR TRIP or SAFETY INJECTION. e. Go To Step 37.
	RO	Make PA announcement for procedure entry unless previously made.
	BOP	Check S/G level – AT OR TRENDING TO PROGRAM (YES)
	RO	Check Tavg – AT OR TRENDING TO Tref (YES)
	SRO	Contact maintenance to troubleshoot and correct the feedwater problem.
	SRO	Implement the EALs

Op Test No.: 1 Scenario # 2 Event # 4 Page 14 of 47

Event Description: Feedwater Regulating Valve FCV-478 slowly drifts open.

Time	Position	Applicant's Actions or Behavior
	BOP	Check current loading for the following pumps – LESS THAN MAXIMUM • Main Feedwater Pump – 0.715 KAMPS • Condensate Pumps – 370 AMPS • Heater Drain Pumps – 90 AMPS
BOOTH OPERATOR: When requested, respond that the current readings on the secondary pumps are as follows: • **Main Feedwater Pump – 0.575 KAMPS** • **Condensate Pumps – 320 AMPS** • **Heater Drain Pumps – 75 AMPS**		
	RO	Determine Iodine sampling requirements as follows: a. Check power change – GREATER THAN 15% IN ONE HOUR (NO) RNO – WHEN the power change is greater than 15% in one hour, THEN perform step 43.b Go To Step 44
	RO	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.
	SRO	Notify load dispatcher of the unit's load capability.
	SRO	Return to procedure and step in effect.
NOTE: Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs for the FRV failure, and notify the Operations Manager.		
BOOTH OPERATOR: As soon as the plant is stabilized or at the discretion of the Chief Examiner, insert the next event.		

Op Test No.: 1 Scenario # 2 Event # 5 and 6 Page 15 of 47

Event Description: PZR level transmitter LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 5, PZR level Transmitter LT-459 fails LOW.
		EVENT INDICATIONS: **APP-003-F4 CHG PMP HI SPEED** **APP-003-B7 PZR PROT LO LEVEL** **APP-003-E8 PZR CONTROL HI/LO LVL** **APP-003-F8 PZR LO LVL HTR OFF & LTDN SECURE** **LR-459 Pen #1 fails to 0%** **LI-459A fails to 0%** **Charging Pump C (in AUTO) rises to full speed** **PRZR LO LEVEL LC459A2 bistable illuminated** **LCV-460A and B valves closed**
	RO	**AOP-025 RTGB INSTRUMENT FAILURE** Go To The Appropriate Section For The Failed Transmitter: • Pressurizer Level - Section B, Page 7
	RO	Check LCV-460 A&B, LTDN LINE STOP – CLOSED (YES)
	RO	Place LCV-460A&B switch in the CLOSE position.
	RO	Verify ONLY ONE Charging Pump Running at minimum speed.
	BOP	Make PA announcement for procedure entry.
	RO	Restore PRZR LEVEL To Between 22% TO 53% by performing one of the following: • Adjust operating Charging Pump speed in manual OR • Level controller LC-459G, in MAN - Place running Charging Pump speed controller in AUTO - Adjust LC-459G in MAN

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Event Description: PZR level transmitter LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior
	RO	Check RCP seal injection flow – BETWEEN 8 GPM AND 13 GPM (NO) RNO – Locally throttle RCP SEAL WATER FLOW CONTROL VALVE(s) to obtain flow to each RCP between 8 gpm and 13 gpm - CVC-297A, B, C IF required to maintain minimum flow, THEN throttle HIC-121, CHARGING FLOW valve 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 gpm and 20 gpm may be used.
	RO	Check Number Of Operable PZR Level Channels - GREATER THAN ONE (YES)
	RO	Place LM-459, PZR LEVEL, In The Switch Position For The Alternate Channel Below: Failed Channel: LT-459 — Switch Position: 461 REPL 459
	RO	Verify Selector Switch LR-459 - SELECTED TO THE CONTROLLING CHANNEL • REC 461

Op Test No.: 1 Scenario # 2 Event # 5 and 6 Page 17 of 47

Event Description: PZR level transmitter LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step** Restore PZR Level Control To Automatic As Follows: a. Check Normal Letdown – ISOLATED b. Restore Letdown to service using Attachment 1, Restoration of Normal Letdown. c. Start additional Charging Pump as desired d. Check PZR level - WITHIN ±1% OF PROGRAMMED REFERENCE LEVEL o **RNO** - WHEN PZR level is within ±1% of programmed reference level, THEN restore PZR Level Control to Automatic. o Go To Step 11. e. Restore PZR Level control to Automatic **(Steps for Attachment 1, Restoration of Normal Letdown, are located at end of this section)**
	RO	Reset PZR Heaters As Follows: a. Check affected PZR Level - FAILED LOW (YES) b. Place PZR HTR CONTROL GROUP Control Switch to OFF position AND return to ON position c. IF required, THEN place PZR HTR BACK-UP GROUP A Control Switch to OFF position AND return to AUTO OR ON position as desired d. IF required, THEN place PZR HTR BACK-UP GROUP B Control Switch to OFF position AND return to AUTO OR ON position as desired
	RO	Check RCP Seal Injection Flow – BETWEEN 8 GPM AND 13 GPM (YES)
	RO	Remove The Affected Transmitter From Service Using OWP-030: Channel: LT-459 — OWP: PLT-1
Examiner Note:		**The next step may have been performed earlier**

Op Test No.: 1	Scenario # 2	Event # 5 and 6	Page 18 of 47
Event Description:	PZR level transmitter LT-459 fails LOW		

Time	Position	Applicant's Actions or Behavior
	RO	Press. Prot. & (LM-459) Control Switch 461 REPLACE 459
BOOTH OPERATOR: Trip the bistables per the crew direction IAW OWP-030, PLT-1		
	SRO	Go To Procedure Main Body, Step 2
	SRO	Implement The EALs
	SRO	Check Technical Specifications (ITS) For Applicable LCOs • ITS Table 3.3.1-1 Item 8, Pressurizer Water Level – High, Condition M requires that the channel be placed in trip within 6 hours or reduce thermal power to less than P-7 within 12 hours.
	SRO	Return To Procedure And Step In Effect
		AOP-025, Attachment 1, Restoration of Normal Letdown
	RO/BOP	Check normal charging flow through the Regenerative Heat Exchanger is in service.
	RO/BOP	Check Phase "A" Containment Isolation signal **NOT** present.
	RO/BOP	Check RHR System **NOT** in service.

Op Test No.: 1	Scenario # 2	Event # 5 and 6	Page 19 of 47
Event Description: PZR level transmitter LT-459 fails LOW			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Verify Closed the following valves: • CVC-204A, LETDOWN LINE ISO • CVC-204B, LETDOWN LINE ISO • LCV-460A, LTDN LINE STOP • LCV-460B, LTDN LINE STOP • CVC-200A, LETDOWN ORIFICE ISOLATION • CVC-200B, LETDOWN ORIFICE ISOLATION • CVC-200C, LETDOWN ORIFICE ISOLATION
	RO/BOP	Verify HIC-121, CHARGING FLOW is full open.
	RO/BOP	Check PZR level is greater than OR equal to program level.
	RO/BOP	IF desired, THEN PLACE TCV-143, VCT/DEMIN, in the VCT position.
	RO/BOP	PLACE PCV-145, PRESSURE in MANUAL.
	RO/BOP	Set PC-145 to throttle PCV-145 to 45% to 55% open to ensure the Letdown line is NOT overpressurized.
	RO/BOP	OPEN CVC-204A, LETDOWN LINE ISO.
	RO/BOP	OPEN CVC-204B, LETDOWN LINE ISO.
	RO/BOP	Perform the following: a. OPEN LCV-460A&B by placing switch LCV-460A&B LTDN LINE STOP to OPEN. b. PLACE LTDN LINE STOP LCV-460 A&B switch to AUTO.

Op Test No.: 1 Scenario # 2 Event # 5 and 6 Page 20 of 47

Event Description: PZR level transmitter LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Establish cooling to the NON-REGEN HX as follows: a. PLACE TC-144, NON-REGEN HX OUTLET TEMP, in MANUAL b. ADJUST TC-144, NON-REGEN HX OUTLET TEMP as necessary to ensure Letdown temperature does NOT increase above 127°F when letdown is reestablished.
	RO/BOP	While MAINTAINING Charging Pump discharge pressure as indicated on RTGB instrument PI-121 LESS THAN 2500 psig, ADJUST charging pump speed to the expected letdown flow to be established in the next step.
	RO/BOP	OPEN one LTDN ORIFICE valve: - CVC-200A, LETDOWN ORIFICE ISOLATION - CVC-200B, LETDOWN ORIFICE ISOLATION - CVC-200C, LETDOWN ORIFICE ISOLATION
	RO/BOP	PLACE PC-145 in AUTO AND CHECK letdown pressure as indicated on PI-145, LOW PRESS LTDN PRESS, is being maintained between 300 psig and 320 psig.
	RO/BOP	PLACE TC-144, NON-REGEN HX OUTLET TEMP, in AUTO.
	RO/BOP	IF TCV-143 was selected to the VCT, THEN POSITION TCV-143 as directed by the CRS/SM.
	RO/BOP	Verify RCP seal injection flow between 8 GPM and 13 GPM by throttling the following: • CVC-297A, RCP "A" SEAL WATER FLOW CONTROL VALVE • CVC-297B, RCP "B" SEAL WATER FLOW CONTROL VALVE • CVC-297C, RCP "C" SEAL WATER FLOW CONTROL VALVE

Op Test No.: 1	Scenario # 2	Event # 5 and 6	Page 21 of 47
Event Description:	PZR level transmitter LT-459 fails LOW		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	IF increased letdown flow is desired, THEN place additional letdown orifices in service as follows: a. VERIFY HIC-121, CHARGING FLOW is FULL OPEN b. VERIFY Charging Pump discharge pressure as indicated on RTGB instrument PI-121 LESS THAN 2500 psig. c. IF required, THEN start the second Charging Pump on MINIMUM SPEED. d. IF required, THEN while maintaining Charging Pump discharge pressure as indicated on RTGB instrument PI-121 LESS THAN 2500 psig, ADJUST charging pump speed to meet flow requirements e. Place PC-145, PRESSURE, in MANUAL. f. Slowly throttle open PC-145 to achieve 180-200 psig on PI-145 to ensure the letdown line is NOT overpressurized. g. OPEN one additional LTDN ORIFICE valve. h. Place PC-145 in AUTO and check letdown pressure as indicated on PI-145, LOW PRESS LTDN PRESS, is being maintained between 300 psig and 320 psig. i. Verify RCP seal injection flow between 8 gpm and 13 gpm by throttling the following: o CVC-297A o CVC-297B o CVC-297C
	RO/BOP	Notify RC that letdown flow has been restored and the affected areas should be monitored for changing radiological conditions.

Op Test No.: 1	Scenario # 2	Event # 7	Page 22 of 47
Event Description:	RCP "C" High Vibrations		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 7, RCP "C" High Vibrations		
EVENT INDICATIONS: APP-001-B5, RCP HIGH VIB Rising vibrations on "C" RCP Vibration Monitor and ERFIS GD RCP LOG		
	BOP	APP-001-B5 Actions: Checks affected RCP alarm valid as follows: 1. Check the alarming monitor for flashing "Alert". 2. Momentarily Depress the RES button for the alarming monitor. 3. Alarm will reset and then return. Alarm is valid. 4. If the alarm is valid, then refer to AOP-018. 5. While alarm is actuated, Monitor RCP Vibration Monitor for any increase on unaffected pumps.
	SRO	Announces entry into AOP-018.
	BOP	Make PA Announcement for procedure entry.
	SRO	Determines that Section B, High Reactor Coolant Pump Vibration, is the appropriate section.
	BOP	Check The Following Vibration Levels To Determine If RCP Trip(s) Are Required: Frame - GREATER THAN 5 MILS OR Frame - GREATER THAN 3 MILS AND RISING AT A RATE OF 0.2 MILS/HOUR CURRENTLY OR PRIOR TO ALARM OR Shaft - GREATER THAN 20 MILS OR Shaft - GREATER THAN 15 MILS AND RISING AT A RATE OF 1 MIL PER HOUR CURRENTLY OR PRIOR TO ALARM (YES)
	RO	Check Plant Status – Mode 1 OR Mode 2 (YES)

Op Test No.: 1	Scenario # 2	Event # 7	Page 23 of 47
Event Description: RCP "C" High Vibrations			

Time	Position	Applicant's Actions or Behavior
	RO	Trips the reactor and verifies the reactor tripped.
Critical Task	RO	Trip "C" RCP
BOOTH OPERATOR:		***Insert Seal Failure on "C" RCP if "C" RCP is not tripped within 5 of reaching 20 mils on "C" RCP.***
Examiners Note:		***AOP-018 steps to address the conditional seal failure on "C" RCP are listed at the end of the scenario guide.***
BOOTH OPERATOR:		**Insert Event 8, S/G "C" Tube Rupture when the "C" RCP is tripped.**
	RO	**Immediate Action Step:** Reactor Tripped. (YES)
	BOP	**Immediate Action Step:** Turbine Tripped. (YES)
	BOP	**Immediate Action Step:** E-1 AND E-2 energized (YES)
	BOP	**Continuous Action Step:** IF DS Bus is deenergized THEN place DSDG in service using EPP-25
	RO	**Immediate Action Step:** SI initiated. (NO)
	RO	**Immediate Action Step:** SI initiation required. (YES) (NOTE: Initial diagnosis may not determine that an SI is required.)

Op Test No.: 1	Scenario # 2	Event # 7	Page 24 of 47
Event Description: RCP "C" High Vibrations			

Time	Position	Applicant's Actions or Behavior
	RO	**Immediate Action Step:** Initiate SI (YES) (NOTE: Initial diagnosis may not determine that an SI is required.)
BOOTH OPERATOR: Insert Event 9 approximately 2 minutes after SI is initiated. Event 9 is "C" S/G PORV fails OPEN / "C" S/G Tube Rupture size rises.		
	SRO	Enters PATH-1 and verifies PATH-1 Immediate Actions.
Examiners Note:		**Following the performance and verification of PATH-1 Immediate Actions, the crew will continue with AOP-018. These steps may be handed off to the RO/BOP to perform independently. The remaining steps of AOP-018, Section B, High RCP Vibration are listed below.**
	RO/BOP	Check RCP B or C – Running (YES)
	RO/BOP	Check RCP B – Running (YES)
	RO/BOP	Check RCP C – Running (NO)
	RO/BOP	Place PCV-455B controller to MAN AND adjust controller output to ZERO.
	RO/BOP	Maintain PZR level between 30% and 40% to provide adequate PZR spray.
	RO/BOP	Check RCP OIL RESERV HI/LO LVL Alarms – EXTINGUISHED: (YES) • APP-001-D8 - RCP A • APP-001-E8 - RCP B • APP-001-F8 - RCP C

Op Test No.: 1	Scenario # 2	Event # 7	Page 25 of 47
Event Description: RCP "C" High Vibrations			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Check All RCP #1 Seal Leakoff Flows - BETWEEN 1 GPM AND 5 GPM (YES)
	RO/BOP	Check RCP Seal Injection Flow - BETWEEN 8 GPM AND *13* GPM (NO)
	RO/BOP	Locally throttle RCP SEAL WATER FLOW CONTROL VALVE(s) to obtain flow to each RCP between 8 gpm and 13 gpm • CVC-297A • CVC-297B • CVC-297C IF required to maintain minimum flow, THEN throttle HIC-121, CHARGING FLOW Valve while maintaining Charging Pump Discharge pressure less than 2500 PSIG.
	SRO	Notify Manager – Operations OR Designee of RCP Performance
	SRO	Implement the EALs
	SRO	Refer to ITS for any applicable LCOs • 3.4.4, 3.4.5 and 3.4.6
	SRO	Go to the Main Body, Step 2 of AOP-018.
Examiners Note:		**This is the end of AOP-018 steps. PATH-1 steps commence on the next page.**

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 26 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	SRO	Open Foldout A
	BOP	MSR ISOLATION CRITERIA Perform the following to isolate the MSRs: IF ANY Purge OR Shutoff Valve does not indicate fully closed, THEN place the associated RTGB Switch to CLOSE. (YES) IF ANY Purge OR Shutoff Valve can NOT be closed from the RTGB AND RCS temperature is less than 540°F and lowering, THEN close the MSIVs AND MSIV BYPs. (NO) IF a loss of power prevents isolation of the MSRs, THEN close the MSIVs AND MSIV BYPs. (NO)
	BOP	FAULTED S/G ISOLATION CRITERIA IF the both the conditions below are met, THEN perform the following: • Any S/G pressure is lowering in an uncontrolled manner OR Any S/G has completely depressurized. AND • At least ONE S/G is intact. a. Reset SI. b. CLOSE the appropriate Auxiliary Feedwater isolation valves to the faulted S/Gs AND OPEN the associated breaker for the valves closed. S/G "C" • V2-14C, SDAFW PUMP DISCH (MCC-10, CMPT-4M) • V2-16C, AFW HDR DISCH (MCC-9, CMPT-3J) c. WHEN the faulted S/Gs dry out, THEN dump steam from intact S/G to control RCS repressurization.

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 27 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	BOP	RUPTURED S/G ISOLATION CRITERIA (BOP may not recognize the ruptured S/G during initial Foldout A entry.) IF the conditions below are met, THEN perform the following: The Ruptured S/G is identified by observing an uncontrolled level rise OR abnormal radiation level on the R-19s or R-31s. AND The Ruptured S/G Level is Greater than 8% [18%] a. Reset SI. b. CLOSE the appropriate Auxiliary Feedwater isolation valves to the Ruptured S/Gs. *S/G* "C" • V2-14C. SDAFW PUMP DISCH • V2-16C. AFW HDR DISCH c. WHEN desired, THEN Perform Supplement G, Steam Generator Isolation
Indications Available: **"C" S/G level trending up at a faster rate than "A" and "B" S/Gs.** **"C" S/G level continues to trend up when feed secured to "C" S/G.** **PZR level continues to lower.** **PZR Pressure continues to lower.**		
Examiner Note:		**RO may recognize that neither RHR Pump started and take early action to start both RHR pumps.**
Examiner Note:		**BOP may recognize that V2-6C failed to close on SI and take early action to manually close V2-6C.**
NOTE:		**Candidate may direct that Supplement G be performed to isolate S/G C. Supplement G steps begin on Page 42.**
	SRO	Foldout A is in effect.
	RO	Verify Phase A Isolation valves closed (YES)
	BOP	Verify FW isolation valves closed (NO) Manual action is taken to close V2-6C, if not previously performed.

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Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify both FW pumps tripped (YES)
	BOP	Verify both MDAFW pumps running (NO) MDAFW Pump "A" inoperable from initial conditions.
	BOP	If Additional Feedwater is required, THEN Start SDAFW Pump (Running)
	RO	Verify two SI pumps running (YES)
	RO	Verify both RHR pumps running (NO) Manual action is taken to start both RHR pumps, if not previously performed.
	RO	Verify SI valves properly aligned (YES)
	RO	At least one CCW pump running (YES)
	BOP	All SW & SW booster pumps running (NO) SW Pump "D" Inoperable
	BOP	Attempt to start all SW and SWB Pumps
	BOP	North OR South SW HDR LO PRESS alarms illuminated (NO)
	RO	Verify CV Fans HVH-1,2,3 & 4 running (YES)

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 29 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	RO	Verify IVSW initiated (YES)
	RO	Verify CV ventilation isolation (YES) Verify the following valves – CLOSED: - V12-6, CONT PURGE VALVE - V12-7, CONT PURGE VALVE - V12-8, CONT PURGE VALVE - V12-9, CONT PURGE VALVE - V12-10, CONTAINMENT PRESSURE RELIEF - V12-11, CONTAINMENT PRESSURE RELIEF - V12-12, CONTAINMENT VACUUM RELIEF - V12-13, CONTAINMENT VACUUM RELIEF
	BOP	Verify control room ventilation aligned for pressurization mode (YES) Operator to verify the following: - Verify CONT RM AIR EXHAUST Fan, HVE-16 - STOPPED - Verify CLEANING Fan HVE-19 A/B - RUNNING - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1A-SA - CLOSED - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1B-SB - CLOSED - IF CR-D1A-SA OR CR-D1B-SB have lost power, THEN locally verify position in the Control Room Kitchen.
	BOP	Verify both EDGs running (YES)
	BOP	**Continuous Action Step** Restart Battery Chargers within 30 minutes of Power Loss using OP-601 (Not Required)

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 30 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step** CV pressure remained below 10 psig (YES)
	BOP	Automatic steam line isolation initiated (NO)
	BOP	Automatic Steam Line Isolation Required (NO)
	BOP	Locally open the breaker for HVS-1 at MCC-5 within 60 minutes of SI Initiation
Booth Operator		**Wait 3 minutes and open the breaker as requested by the operators and report the action completed.**
	RO	RCS pressure greater than 1350 psig [1250 psig] (NO)
	RO	SI flow verified (YES)
	RO	RCS pressure >125 psig (YES)
	BOP	At least 300 GPM AFW flow available (YES)
	BOP	Verify AFW valves properly aligned (YES)
	BOP	Control AFW flow to maintain S/G levels between 8% [18%] and 50%
	RO	RCP Thermal Barrier Cooling Water Hi or Lo flow alarms illuminated (NO)

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Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	BOP	Place Steam Dump Mode switch to Steam Pressure
	RO	RCS temperature stable at or trending to 547°F (NO)
	RO	RCS Temperature greater than 547°F (NO)
	BOP	Attempt to limit cooldown.
	BOP	IF RCS cooldown continues AND is not due to SI Flow THEN close MSIVs AND MSIV Bypasses. (Candidates may determine that cooldown is due to the stuck open PORV and decide not to close the MSIVs on the intact S/Gs.)
	RO	PZR PORVs Closed (YES)
	RO	PZR Spray & Aux Spray valves closed (YES)
	RO	At least one RCP running (YES)
	RO	At least one SI Pump Running (YES)
	RO	RCS Subcooling Less Than 35°F [55°F] (NO)
	BOP	Any S/G with uncontrolled depressurization (YES)

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 32 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	RO	Reset SPDS and monitor CSFSTs.
	SRO	Transition to EPP-11.
	BOP	Maintain At Least One S/G Available For RCS Cooldown
	BOP	Check S/G Status: a. Identify intact S/Gs as follows: • ANY S/G PRESSURE STABLE OR INCREASING (YES) b. Identify faulted S/Gs as follows: • ANY S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER (YES) OR • ANY S/G COMPLETELY DEPRESSURIZED
	BOP	Isolate Faulted S/Gs Using Supplement G, S/G Isolation **(Supplement G actions are included following this section.)**
	BOP	Maintain A Faulted S/G In The Isolated Condition During Subsequent Recovery Actions Unless Needed For Cooldown
	BOP	Check CST Level - GREATER THAN 10% (YES)
	BOP	Check Available Secondary Radiation Monitors – NORMAL (NO)
	SRO	Go to PATH-2, Entry Point J.
	RO	Reset SPDS AND Initiate Monitoring of Critical Safety Function Status Trees

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 33 of 47

Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	CREW	Open Foldout C **(No steps apply)**
	RO	**Continuous Action Step** When Below 10^{-10} AMPS, THEN Energize Source Range Detectors AND Transfer Recorder
	BOP	Request Periodic Activity Samples of All S/Gs
	BOP	Place Steam Dump Mode Switch to Steam Pressure
	BOP	Open QCV-10426 to bypass Condensate Polishers
	BOP	Close C-48A AND C-48B to isolate Hotwell return to CST
	RO	At Least One RCP Running (YES)
	RO	At Least One SI Pump Running (YES)
	RO	RCS Subcooling Less than 35°F [55°F] (NO)
	BOP	Ruptured S/G Identified (YES)
	BOP	Maintain at Least One S/G Available for RCS Cooldown

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 34 of 47

Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Ruptured Steam Line PORV Setpoint at 1035 PSIG using Status Board
	BOP	Verify RCS Temperature Less Than 547°F Prior to MSIV Closure
	BOP	Close Ruptured S/G MSIV and MSIV Bypass
	BOP	Ruptured S/G MSIV and MSIV Bypass Closed (YES)
	BOP	**Continuous Action Step** When Ruptured S/G Pressure lowers Below 1035 PSIG THEN Verify Ruptured Steam Line PORV Closed
	BOP	IF MDAFW Pump is not Available, THEN Maintain at least One S/G supply to SDAFW Pump
	BOP	Close Ruptured S/G Steam Shutoff to SDAFW Pump
	BOP	Verify S/G Blowdown Isolation and Sample Valves Closed
	BOP	Locally Close Warmup Steam Supply From Ruptured S/G to SDAFW Pump
Booth Operator		**Close Warmup Steam Supply Valve (MS-38) and Report action 3 Minutes after requested**
	BOP	Locally Close MSIV Above and Below Seat Drains from Ruptured S/G

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 35 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
Booth Operator		**Report Above and Below Seat Drains are closed 3 Minutes after requested**
	BOP	Isolate Feed Flow to Any Ruptured S/G that is Faulted Unless Needed for RCS Cooldown
	BOP	**Continuous Action Step** When Ruptured S/G Level Greater Than 8% [18%] THEN Isolate Feed Flow
	BOP	**Continuous Action Step** Open Breakers for any V1-8, V2-14 AND V2-16 Valve Closed to Isolate Ruptured S/G
Booth Operator		**Wait 3 minutes to Open Breakers as requested and report action complete.**
	BOP	Control Feed Flow to Maintain Intact S/G Level Between 8% [18%] and 50%
	BOP	Any Other S/G with Uncontrolled Level Rise (NO)
	RO	PZR PORVs Closed (YES)
	RO	Open At Least One PORV Block Unless Closed to Isolate an Open PZR PORV
	RO	**Continuous Action Step** IF PZR PORV Opens on High Pressure, THEN Verify Reclosure at or Below 2335 PSIG. Close PORV Blocks as Necessary

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 36 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	RO	Reset SI
	RO/BOP	**Continuous Action Step** IF Offsite Power is Lost, THEN Restart Emergency Safeguard Equipment
	RO	Reset CV Spray
	RO	Reset Phase A and Phase B
	RO	Establish Instrument Air to CV. IF Compressor not Running, THEN Start Compressor
	BOP	All AC Busses Energized by Offsite Power (YES)
	RO	RCS Pressure Greater Than 275 PSIG [400 PSIG] (YES)
	RO	Stop RHR Pumps
	RO	**Continuous Action Step** IF RCS Pressure Lowers Below 275 PSIG [400 PSIG], THEN Restart RHR Pumps

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 37 of 47

Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td>Critical Task</td><td>BOP</td><td>Ruptured S/G Isolated (YES)
The following must be Isolated to satisfy isolation:
- V1-3C, MSIV
- MS-353C, MSIV V1-3B BYP
- FRV "C" (Not needed if V2-6C closed.)
- FRV "C" BYP
- V2-6C, FW HDR SECTION (Not needed if FRV and FRV BYP closed.)
- V2-14C, SDAFW PUMP DISCH Valve
- V2-16C, AFW HDR DISCH Valve
- V1-8C, SDAFW STEAM SHUTOFF Valve
- S/G C Blowdown AND Blowdown Sample Valves
- MS-38 (No indication in Control Room)
- S/G "C" MSIV Above and Below Seat Drain Valves (No indication in Control Room.)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>Ruptured S/G Pressure Greater Than 220 PSIG (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>At Least One Intact S/G Available for RCS Cooldown (YES)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO/BOP</td><td>NOTE: After the Low Steam Line Pressure SI Signal is Blocked, Main Steam Line Isolation will occur if Hi Steam Line Flow Rate Setpoint is Exceeded</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO/BOP</td><td>Determine Required Core Exit Temperature From Table-3
<table><tr><th colspan="2">Table - 3</th></tr><tr><th>Ruptured S/G Pressure (PSIG)</th><th>Required Core Exit Temperature (°F)</th></tr><tr><td>Greater than 1000</td><td>490 [470]</td></tr><tr><td>900-1000</td><td>480 [460]</td></tr><tr><td>800-899</td><td>465 [445]</td></tr><tr><td>700-799</td><td>450 [430]</td></tr><tr><td>600-699</td><td>435 [415]</td></tr></table></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 38 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step** When PZR Pressure Lowers to Less Than 2000 PSIG, THEN Block PZR Pressure/High Steam Line DP Signals
	RO	IF RCPs are NOT Running, THEN Do Not Monitor CSF-4
Examiner Note:		Steam Dumps may be available if the MSIVs were left open on the intact S/G's. If this is the case then the cooldown will be performed via the steams dumps vice the Steam Line PORVs.
	BOP	Condenser Available For Steam Dump (NO)
	RO	Verify T-AVG less Than 543°F AND Block T-AVG SI Signal Prior to Maximum Steam Dump
	BOP	Dump Steam Using Intact Steam Line PORV Maximum Rate. - AFW flow may need to be raised.
	RO	At Least One Charging Pump Running (YES)
	RO	Align Charging Pump Suction To RWST
	RO	Establish Charging Flow to Maintain PZR Level
	RO	Core Exit Temperature Less Than Required Temperature (NO) **(PATH-2 begins a loop until CET is less than Required Temperature)**
	BOP	Reduce Steam Flow to Stabilize RCS Temperature

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 39 of 47

Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	CREW	Allow RCS Temperature to Stabilize from cooldown prior to continuing
	BOP	Ruptured S/G pressure stable or rising (NO)
	BOP	Ruptured S/G Pressure lowers to less than 250 psig above pressure of intact S/Gs used for cooldown. (YES)
	SRO	Transition to EPP-17.
	SRO	Open Foldout E (No steps apply.)
	RO	Reset SAFETY INJECTION
	RO	Reset CONTAINMENT ISOLATION PHASE A AND PHASE B
	BOP	**Continuous Action Step** Check Loss Of Offsite Power – IN PROGRESS (NO)
	RO	**Continuous Action Step** Establish Instrument Air To CV As Follows: • 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)
	RO	**Continuous Action Step** Determine If CV Spray Should Be Stopped As Follows: • Check CV Spray Pumps – RUNNING (NO)

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 40 of 47
Event Description:	"C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.		

Time	Position	Applicant's Actions or Behavior
	BOP	**Continuous Action Step** Control Ruptured S/G Level As Follows : • Check ruptured S/G level - LESS THAN 8% [18%] (NO) • Stop feed flow to ruptured S/Gs.
	RO	**Continuous Action Step** Determine If RHR Pumps Should Be Stopped a. Check RCS pressure: • GREATER THAN 275 PSIG [400 PSIG] (YES) AND • STABLE OR INCREASING b. Verify RHR Pumps – Stopped c. Check RCS pressure – Less than 275 psig [400 PSIG] (NO)
	RO	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
	RO	Establish Charging Flow As Follows : • Check Charging Pumps – ALL STOPPED (NO) • Verify charging flow on FI-122A – Greater than 35 GPM
	RO	Align Charging Pump Suction To RWST as follows: a. From the RTGB, verify LCV-115B, EMERG MU TO CHG SUCT - OPEN b. Verify LCV-115C, VCT OUTLET - CLOSED c. Start all available Charging Pumps d. Increase running Charging Pumps speed to maximum e. Verify maximum charging flow on FI-122A (YES)

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 41 of 47

Event Description: "C" S/G Tube Rupture when RCP "C" is secured following manual reactor trip. 2 minutes after SI initiation, "C" S/G PORV fails OPEN / Tube rupture size rises.

Time	Position	Applicant's Actions or Behavior
	BOP	Identify Faulted S/Gs As Follows: a. Check pressure in all S/Gs: • ANY S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER (YES) OR • ANY S/G COMPLETELY DEPRESSURIZED (NO)
	BOP	Check Faulted S/Gs – PREVIOUSLY ISOLATED (YES)
	BOP	Control Intact S/G Levels As Follows : • Check intact S/G levels – ANY GREATER THAN 8% [18%] • Control feed flow to maintain intact S/G levels between *8%* [18%] and 50% • Check intact S/G levels – ANY INCREASING IN AN UNCONTROLLED MANNER (NO)
	RO	**Continuous Action Step** Ensure Adequate Shutdown Margin Exists As Follows: • Check boron sample results – AVAILABLE (NO)
	BOP	Initiate RCS Cooldown To Cold Shutdown As Follows: • Maintain cooldown rate in RCS cold legs less than 100°F in the last 60 minute • Maintain RCS temperature and pressure within limits of Curve 3.4, Reactor Coolant System Pressure – Temperature Limitations For Cooldown • Check intact S/Gs - AT LEAST ONE AVAILABLE FOR RCS COOLDOWN (YES) • Check steam dump to Condenser – Available (NO) • Dump steam using Steam Line PORVs
The Chief Examiner may terminate the scenario anytime after the RCS cooldown has been commenced or at his discretion.		

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 42 of 47

Event Description: Isolation of S/G "C" IAW Supplement G

Time	Position	Applicant's Actions or Behavior
		SUPPLEMENT G Steps
	SRO	Directs the BOP to perform Supplement G to isolate S/G "C"
	BOP	Go To Appropriate Step From Following Table: S/G TO BE ISOLATED: STEP S/G C: 34
	BOP	Check S/G C – FAULTED (YES).
	BOP	Verify V1-3C, MSIV – CLOSED (YES)
	BOP	Verify MS-353C, MSIV V1-3C BYP – CLOSED (YES)
	BOP	Verify FRV C – Closed (YES)
	BOP	Verify FRV C BYP – Closed (YES)
	BOP	Verify V2-6C, FW HDR SECTION Valve – CLOSED. (YES)
	BOP	Verify V2-14C, SDAFW PUMP DISCH Valve – CLOSED. (YES)
	BOP	Verify V2-16C, AFW HDR DISCH Valve CLOSED. (YES)
	BOP	Verify Steam Line PORV – CLOSED (NO)

Op Test No.: 1	Scenario # 2	Event # 8 and 9	Page 43 of 47
Event Description:	Isolation of S/G "C" IAW Supplement G		

Time	Position	Applicant's Actions or Behavior
	BOP	IF the PORV will NOT close from the RTGB, THEN isolate air via one of the methods below: • Close BOTH isolation valves for the individual controller: o IA-3273, IA TO PIC-497 UPPER I/P o IA-3274, IA TO PIC-497 LOWER I/P OR • Close IA-298, IA to PORVs (Before Dryer)
	BOP	Verify V1-8C, SDAFW STEAM SHUTOFF Valve – CLOSED. (YES)
	BOP	Verify S/G C Blowdown AND Blowdown Sample Valve Status Light Indication – CLOSED (YES)
	BOP	Dispatch Operator to the Pipe Jungle to Close MS-38, SG "C" Bypass Drn & Warm-up Line to AFW Pump
Booth Operator		**Close Warmup Steam Supply Valve (MS-38) and Report action 3 Minutes after requested**
	BOP	Check S/G "C" MSIV Above And Below Seat Drain Valves – CLOSED (YES)
Booth Operator		**Report Above and Below Seat Drains are closed 3 Minutes after requested.**
	BOP	Dispatch Operator To The E-1/E-2 To Perform The Following: • At MCC-9, verify V2-16C closed AND open breaker V2-16C, MDAFW PUMP HEADER DISCHARGE TO S/G C (CMPT-3J) • At MCC-6, verify V1-8C closed AND open breaker V1-8C, SDAFW PUMP STEAM ISOLATION (CMPT-18M)
	BOP	Dispatch Operator To The Aux. Bldg. To Perform The Following: • At MCC-10, verify V2-14C closed AND open breaker V2-14C, SDAFW PUMP TO S/G C (CMPT-4M)

Op Test No.: 1 Scenario # 2 Event # 8 and 9 Page 44 of 47

Event Description: Isolation of S/G "C" IAW Supplement G

Time	Position	Applicant's Actions or Behavior
Booth Operator		**Wait 3 minutes to Open Breakers as requested and report action complete.**
	BOP	Check All Faulted AND Ruptured S/Gs – ISOLATED (YES)
	BOP	WHEN the faulted S/Gs dry out, THEN dump steam from intact S/G to control RCS repressurization.
	BOP	Check Any S/G – RUPTURED (YES)
	BOP	Perform the following to minimize Secondary system contamination:
		• Direct AO to start Auxiliary Boilers.
		• IF Condensate Polishers are in service:
		• Verify QCV-10426, SECONDARY BYPASS – OPEN. (YES)
		• Locally depress the OFF Pushbutton on Condensate Polisher Vessels A, B, C, D, E and F.
		• Secure ANY evolution that passes water through the beds, such as a low volume rinse.
	BOP	Verify Hotwell return to CST isolated as follows:
		• Locally verify C-48A, LCV-1417B INLET – CLOSED.
		• Locally verify C-48B, LCV-1417B DISCHARGE - LOCKED CLOSED.
	BOP	Dispatch An Operator To Close GS-36, MANUAL GLAND STEAM DUMP.
End of Supplement G Steps		

Op Test No.: 1	Scenario # 2	Event # Conditional	Page 45 of 47
Event Description:	Seal Failure on "C" RCP		

Time	Position	Applicant's Actions or Behavior
This section is to address a Seal Failure on "C" RCP due to the Operator not tripping "C" RCP within 5 minutes of reaching 20 mils vibration on "C" RCP.		
	RO/BOP	Make PA Announcement for Procedure Entry
	RO/BOP	Evaluate Plant Conditions AND Go to the Appropriate Section for RCP Malfunction Not Yet Addressed: Reactor Coolant Pump Seal Failure – Section A
	RO/BOP	Check any RCP #1 Seal Leakoff Flow – Greater than 5.7 GPM (YES)
	RO/BOP	Check Either of the following Conditions Exist: • RCP #1 Seal Leakoff flow On Unaffected RCP(s) – Reduced (YES) OR • RCP Thermal Barrier ΔP On Affected RCP(s) - Reduced (YES)
	RO/BOP	Check Plant Status – Mode 1 OR Mode 2 (YES)
	RO/BOP	a. Trip the reactor b. Trip the affected RCP(s). c. Go to Path-1 while continuing in AOP-018.
	RO/BOP	Check Time Elapsed since stopping the affected RCP(s) – Greater Than 3 Minutes (NO) RNO: When at least 3 minutes elapsed since tripping the affected RCP(s), THEN go to step 6.
	RO/BOP	Close Seal Leakoff Valve(s) for affected RCP(s): CVC-303C
	RO/BOP	Check SI – Actuated (Conditions will be degrading such that an SI will be required.

Op Test No.: 1	Scenario # 2	Event # Conditional	Page 46 of 47
Event Description:	Seal Failure on "C" RCP		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Establish Instrument Air to CV as follows: a. Check APP-002-F7, INSTR AIR HDR LO PRESS – EXTINGUISHED (YES) b. Reset SAFETY INJECTION c. Reset CONTAINMENT ISOLATION PHASE A d. Momentarily place IA PCV-1716 to RESET position e. Check PCV-1716 – OPEN (YES)
	RO/BOP	Check RCP(s) B OR C – Running (YES)
	RO/BOP	Check RCP B – Running (YES)
	RO/BOP	Check RCP C- Running (NO) RNO: a. Place PCV-455B Controller to MAN AND adjust controller output to ZERO. b. Maintain PZR level between 30% and 40% to provide adequate PZR spray.
	RO/BOP	Check RCP Seal Injection Flow – Between 8 GPM and 13 GPM. RNO a. Locally throttle CVC-297A,B,C to obtain between 8 – 13 gpm. b. IF required the maintain minimum flow, THEN throttle HIC-121.
	RO/BOP	Check FCV-626, THERM BAR FLOW CONT VALVE – Closed (NO)
	RO/BOP	Implement EALs

ILC-11-2 NRC SCENARIO 2 TURNOVER SHEET

POWER LEVEL:	75% RTP
Core Burnup:	9000 MWD/MTU
EFPD:	257 EFPD
Boron:	775.5 PPM
Xenon:	Approaching EQ – 22 pcm/hr and lowering
Tavg:	567.5°F
Bank D Rods	183 Steps

EQUIPMENT UNDER CLEARANCE:

- "A" MDAFW Pump OOS and Breaker Racked Out
- Switchyard access is RESTRICTED.

EQUIPMENT STATUS:

- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.

INSTRUCTIONS FOR THE WATCH:

- Plant is at 75% power following maintenance on "A" HDP. Operations Management and RES have reported unusually high vibrations on "A" MFP and recommend a power reduction be performed and "A" MFP secured as soon as possible.

Unit 2 Status Board

Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	9000	Design:	16590
EFPD	257	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	795
1.77% =△K/K	≥350 F	1053
2.6% =△K/K	100 F Cold	1182
6% =△K/K	N/A	1950

Condenser Air Inleakage		
A	13	CFM
B	0	CFM
Known	8	CFM
Total	5	CFM

SGBD	Target Value GPM	Status
A	50	Flash Tank With Heat Recovery
B	50	
C	50	
N2 Flow	8	SCFM

PORV Settings	Setting Date	POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints			
Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	775.5
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents	UPPER	LOWER	TARGET	% BAND
N-41	125	119	-1.5	5 +/-
N-42	110	109	-1.5	5 +/-
N-43	105	99	-1.5	5 +/-
N-44	98	94	-1.5	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data	
IC-13, 42	
MOL	

ILC-11-2 NRC SCENARIO 2 TURNOVER SHEET

POWER LEVEL:	75% RTP
Core Burnup:	9000 MWD/MTU
EFPD:	257 EFPD
Boron:	775.5 PPM
Xenon:	Approaching EQ – 22 pcm/hr and lowering
Tavg:	567.5°F
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Unit 2 Status Board

	Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	9000	Design:	16590
	EFPD	257	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS

	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	795
1.77% =△K/K	≥350 F	1053
2.6% =△K/K	100 F Cold	1182
6% =△K/K	N/A	1950

Condenser Air Inleakage		
A	13	CFM
B	0	CFM
Known	8	CFM
Total	5	CFM

SGBD		
Target Value GPM		Status
A	50	Flash Tank With Heat Recovery
B	50	
C	50	
N2 Flow	8	SCFM

PORV Settings

Setting Date		POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints

Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown

	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	775.5
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents

	UPPER	LOWER	TARGET	% BAND
N-41	125	119	-1.5	5 +/-
N-42	110	109	-1.5	5 +/-
N-43	105	99	-1.5	5 +/-
N-44	98	94	-1.5	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst	
HVE-1A/B	35640.6	3/8/10	
HVE-15A	18643.5	3/18/10	
HVE-19A/B	6928.3	5/3/10	
SR 3.7.11.2 Last Completed		5/27/2010	19:45

Notes/Additional Data	
IC-13, 42	
MOL	

Facility:	HB ROBINSON	Scenario No.: 4	Op Test No.:
Examiners:	_____	Operators:	SRO -
	_____		RO -
	_____		BOP -

Initial Conditions:
- 1E-8 amps BOL, 150 MWD/MTU, 1531 ppm Boron
- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties

Turnover:
- Raise Reactor Power to the POAH and continue with plant startup

Critical Tasks:
- Open either SI injection valve SI-870A or SI-870B
- Establish Containment Isolation
- Align CR ventilation to pressurization mode

Event No.	Malf. No.	Event Type*	Event Description
1		(R) RO (N) SRO	Withdraw controls rods to POAH
2		(C) BOP, SRO (TS) SRO	"B" CCW Pump Trips and FCV-626 closes
3		(C) BOP, SRO (TS) SRO	North SW Header break at the intake structure
4		(TS) SRO	Failure of N-35 Compensation Voltage
5		(C) RO, SRO	Leak on CC-703B at 25 gpm and rises to 750 gpm
6		(M) ALL	Large Break LOCA on Reactor Trip
		(C) RO	SI-870A and B fail to open on SI signal
		(C) RO	FP-248, 249, 256 and 258 fail to close on CIV signal
		(C) BOP	Control Room Ventilation fails to transfer to pressurization mode
		(C) RO	Stop CV Spray Pump(s) and Close Discharge Valve(s)

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

ILC-11-2 NRC SCENARIO 4 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 1E-8 amps. GP-005, Power Operation, has been completed up to Step 8.2.2. Shift instructions are to adjust control rod position as necessary to raise reactor power to the POAH in anticipation of continuing with plant startup. Once the Chief Examiner is satisfied with the control of the reactor and RCS temperature is stable, the Chief Examiner may cue the next event.

On cue from the Chief Examiner, "B" CCW Pump will trip, CCW Pumps "A" and "C" will auto start on low pressure and valve FCV-626 will close. The crew will take actions IAW APP-001-F4 or –C1 and reopen FCV-626. The SRO will direct entry into ITS LCO 3.7.6, Condition A, for one required CCW train being inoperable. The LCO requires that the inoperable CCW train be restored to operable status within 72 hours. The crew may take actions IAW OP-306 to secure one of the two operating CCW pumps.

On cue from the Chief Examiner, the North Service Water Header will experience a break at the intake structure on the SW piping downstream of SW-8, SW Pump "D" Discharge Valve. The crew will take actions IAW AOP-022, Loss of Service Water, and will isolate the ruptured header and disable the service water pumps on the isolated header. This will result in the affected Emergency Diesel Generator being declared inoperable due to all the service water pumps supporting that EDG being disabled. The SRO will declare entry into ITS LCO 3.7.7, Condition A, due to one SW train inoperable. This LCO requires that the inoperable SW train be restored to operable status within 72 hours. The SRO will also declare entry into ITS LCO 3.8.1, Condition B, which requires the following: (1) Perform SR 3.8.1.1 for offsite circuit within 1 hour and once per 12 hours thereafter (OP-604, Section 8.4.9, Emergency Diesel Generator Inoperability), (2) 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 feature(s), (3) Determine Operable DG is not inoperable due to common cause failure within 24 hours and perform SR 3.8.1.2 for Operable DG within 96 hours and, (4) restore DG to Operable status within 7 days OR be in Mode 3 in 6 hours and Mode 5 in 36 hours. Due to CCW Pump "B" being inoperable and EDG "B" being declared inoperable due to all of its supporting Service Water Pumps being disabled, ITS 3.8.1.B.2 requires that CCW Pump "C" be declared inoperable within the next four hours. This will place the plant in LCO 3.0.3 due to not meeting ITS 3.7.6 for CCW System operability requirements. Once the Chief Examiner is satisfied with the stability of the plant and ITS compliance he may cue the next event.

On cue from the Chief Examiner, N-35, Intermediate Range NI, will experience a loss of compensation voltage and APP-005-B2, N35 Loss of Comp Voltage, will be received. The APP will direct the crew to remove N-35 from service IAW OWP-011, NI-7. ITS Table 3.3.1-1, Item 3, Intermediate Range Neutron Flux, Condition F, Thermal Power > P-6 and < P-10, requires that thermal power be reduced to less than P-6 or increased to greater than P-10 within 2 hours. N-36 will be selected to provide SUR signal by repositioning the Start Up Rate Channel Select switch. Once OWP-011 has been briefed, the crew may begin briefing GP-006 to reduce power to less than P-6 to meet the 2 hour ITS requirement. Once the Chief Examiner is satisfied with the ITS compliance he may cue the next event.

On cue from the Chief Examiner, a leak will develop on the downstream side of CC-703B, CCW Pump "B" Discharge Valve, at a rate of 25 gpm. The crew will take actions IAW AOP-014, Component Cooling Water System Malfunction, Section A, Loss of CCW Inventory. AOP-014 will direct the crew to commence making up to the CCW surge tank in an effort to maintain normal surge tank control band and dispatch operators to perform a CCW Leak Search. Once the CCW Surge Tank level has been stabilized and operators dispatched to search for leaks the leak will rise to 750 gpm over a 5 minute time period. The crew will make efforts to maintain surge tank level by starting a second primary water pump. Eventually, it will be determined that the CCW Surge Tank level cannot be maintained and the crew will initiate a reactor trip, stop all RCPs and go to PATH-1 while continuing with AOP-014.

On initiation of the manual reactor trip the plant will experience a Large Break LOCA. The crew will implement PATH-1 due to the reactor trip and safety injection. Manual actions will have to be taken to open either SI-870A or SI-870B since neither automatically opens on the SI signal. The operators must also identify that FP-248, 249, 256 and 258 fail to close automatically on the CIV signal and must be manually closed. The operators must identify that CR ventilation does not transfer to pressurization mode and must be manually realigned. The Turbine Building equipment will be secured in accordance with Supplement M, Component Alignment for Loss of SW to Turbine Building, due to service water being isolated to the turbine building as directed by PATH-1 due to the North SW Header low pressure alarm being illuminated. FRP-P.1, Response to Imminent Pressurized Thermal Shock, will be entered due to the rapid RCS depressurization and cooldown but exited due to the presence of a Large Break LOCA. Due to the loss of N-35, Source Range NIs will have to be manually energized. The crew will eventually transition to EPP-15, Loss of Emergency Coolant Recirculation, due to having no CCW pumps available to provide cooling to the ECCS equipment. EPP-15 will direct actions to make up to the RWST using Supplement P, Emergency Makeup to the RWST and eventually reduce ECCS flow to minimize the demand on the RWST.

The scenario may be terminated once direction is given to secure one SI Pump and one RHR Pump and/or at the Chief Examiners' discretion.

ILC-11-2 NRC SCENARIO 4 SIMULATOR SETUP

IC/SETUP:

- IC-804, SCN: 008_11_2_NRC_Exam_4
- Status board updated to reflect IC-1

PRE-LOADED EVENTS:

The following events should occur on the reactor trip:

Event 6: Large Break LOCA on Reactor Trip
SI-870A and B fail to open on SI signal
FP-248, 249, 256 and 258 fail to close on CIV signal
Control Room Ventilation fails to transfer to pressurization mode

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

Event 1: Withdraw controls rods to POAH
Event 2: "B" CCW Pump Trips and FCV-626 closes
Event 3: North SW Header break at the intake structure
Event 4: Failure of N-35 Compensation Voltage
Event 5: Leak on CC-703B starts at 25 gpm and rises to 750 gpm

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- **GP-005**
- **OP-306**
- **AOP-022**
- **OP-604, Section 8.4.9**
- **APP-005-B2**
- **OWP-011, NI-7**
- **GP-006-1**
- **AOP-014, Main Body, Section A, Attachment 1 and Attachment 3**
- **PATH-1**
- **Foldout A**
- **Supplement M**
- **FRP-P.1**
- **Foldout B**
- **EPP-15**
- **Supplement P**

Op Test No.: 1	Scenario # 4	Event # 1	Page 5 of 37
Event Description:	Withdraw control rods to the POAH		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: Event 1 involves the withdrawal of control rods to the POAH IAW GP-005, Power Operation.		
EVENT INDICATIONS: None		
	RO	IF additional letdown flow is desired, **THEN PERFORM** the following IAW OP-301 section for Charging and Letdown Operations with Normal Pressurizer Level: • **START** additional Charging Pumps as necessary. • **PLACE** additional letdown orifice in service
	RO	**ENERGIZE** all available Pressurizer heaters to equalize boron concentration in the Pressurizer. - PZR HTR CONTROL GROUP - PZR HTR BACK-UP GROUP "A" - PZR HTR BACK-UP GROUP "B"
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 • If MTC is positive, then SUR will be RISING • Onset of RCS temperature rise, Onset of PZR pressure rise, Onset of 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.		
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.

Op Test No.: 1	Scenario # 4	Event # 1	Page 6 of 37
Event Description:	Withdraw control rods to the POAH		

Time	Position	Applicant's Actions or Behavior
	RO	**ADJUST** control rods as necessary to achieve the following while continuing with this procedure: • RCS T_{avg} between 547°F and 551°F • Maintain Reactor Power ≤ 5%.
	SRO	**WHEN** Reactor power is greater than 1%, **THEN NOTIFY** Reactor Engineering to COMMENCE logging data required by EST-067.
Booth Operator		**Insert Event #2, "B" CCW Pump trips and FCV-626 closes, on cue from the Chief Examiner.**

Op Test No.: 1	Scenario # 4	Event # 2	Page 7 of 37
Event Description: "B" CCW Pump trips and FCV-626 closes			

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**At the discretion of the Chief Examiner, insert Event 2 – B CCW Pump trips and FCV-626 closes**
EVENT INDICATIONS: **B CCW Pump has dual indication** **A and C CCW Pumps auto start** **APP-001-A8, CCW TO CRDM LO FLOW** **APP-001-B1, RCP BRG COOL WTR LO FLOW** **APP-001-C1, RCP THERM BAR COOL WTR HI FLOW** **APP-001-D1, RCP THERM BAR COOL WTR LO FLOW (Locked in)** **APP-001-F4, CCW PMP MOTOR OVLD/TRIP (Locked in)** **APP-001-F5, CCW PMP LO PRESS** **APP-002-E5, SI PMP COOL WTR LO FLOW**		
	RO	**APP-001-F4 actions** **IF** alarm is due to intentional operator actions, **THEN** no further actions required.
	RO	**APP-001-F4 actions** **IF** the running CCW Pump has tripped, **THEN VERIFY** Standby CCW Pump STARTED.
	RO	**APP-001-F4 actions** **IF** Standby CCW Pump can **NOT** be started, **THEN REFER TO** AOP-014 (A and C CCW Pumps auto started on low pressure signal).
	RO	**APP-001-F4 actions** **IF** FCV-626, THERM BAR FLOW CONT, closes due to pump start, **THEN PERFORM** the following: 1) **CHECK** R-17 for increasing trends **OR** alarm. 2) **IF** no adverse trend on R-17, **THEN REOPEN** FCV-626.
	RO	**APP-001-F4 actions** **IF** CCW Pump tripped due to electrical fault, **THEN DISPATCH** an operator to check breaker and Current Limiter Fuses (E-1/E-2 breakers only).

Op Test No.: 1 Scenario # 4 Event # 2 Page 8 of 37

Event Description: "B" CCW Pump trips and FCV-626 closes

Time	Position	Applicant's Actions or Behavior
		Examiner Note: AOP-014 may be entered by the crew to address the event rather than using the APP actions. AOP-014 steps are listed below.
	SRO	Implement the EALs.
	RO/BOP	Make PA announcement for Procedure Entry.
	SRO	Go to Appropriate Section for Indicated Malfunction: Section C (CCW Pump Discharge Pressure Low)
	RO/BOP	Check Spray AND Blackout Signal – Actuated (NO)
	RO/BOP	Start Standby CCW Pump As Follows: a. Check EI AND E2 BUSSES - ENERGIZED BY OFFSITE POWER (YES) b. Start one CCW Pump (NO, two pumps running.) c. Check CCW Pump status – AT LEAST ONE RUNNING (YES) d. Check APP-001-F5, CCW PMP LO PRESS – EXTINGUISHED (YES) e. Check FCV-626, THERM BAR FLOW CONT – CLOSED DUE TO STARTING PUMP (YES) f. Open FCV-626 (Operator opens FCV-626) g. Go to the MAIN BODY, Step 4, of this procedure.
	RO/BOP	Check RCS temperature – LESS THAN 350°F (NO)
	RO/BOP	IF CCW HX outlet temperature is greater than 105°F, THEN go to step 3. (NO) OR IF CCW HX outlet temperature is less than 105°F, THEN go to step 4.c. (YES)
	RO/BOP	Check CCW HX outlet temperature – STABLE OR DECREASING (YES)

Op Test No.: 1	Scenario # 4	Event # 2	Page 9 of 37
Event Description: "B" CCW Pump trips and FCV-626 closes			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Check APP-001-F5, CCW PMP LO PRESS – EXTINGUISHED (YES)
	SRO	Refer to Technical Specifications for Applicable LCOs T.S. 3.4.17 – CVCS (N/A) T.S. 3.5.2 – ECCS – Operating (N/A) T.S. 3.5.3 – ECCS – Shutdown (N/A) T.S. 3.6.6 – Containment Spray and Cooling Systems (N/A) T.S. 3.7.6 – Component Cooling Water (CCW) System (See below)
	RO	**APP-001-C1 actions** **IF** CCW AND Seal Injection are lost to any RCP, **THEN REFER TO** AOP-018.
	RO	**APP-001-C1 actions** **IF** result of CCW Pump start only, **THEN REOPEN** FCV-626.
	SRO	Direct entry into ITS LCO 3.7.6, Condition A, for one required CCW train inoperable. LCO requires that the inoperable CCW train be restored to operable status within 72 hours.
Booth Operator		**When Tech Specs are identified and at Chief Examiner's discretion, proceed to Event #3.**

Op Test No.: 1	Scenario # 4	Event # 3	Page 10 of 37
Event Description:	North Service Water Header break at the Intake Structure.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**At the discretion of the Chief Examiner, insert Event 3, North Service Water Header break at the Intake Structure**
EVENT INDICATIONS: **APP-008-F7, SOUTH SW HDR LO PRESS** **APP-008-F8, NORTH SW HDR LO PRESS** **APP-008-E7, S SW HDR STRAINER PIT HI LEVEL** **APP-008-E8, N SW HDR STRAINER PIT HI LEVEL** **APP-008-D7, S SW HDR STRAINER PIT HI-HI LVL (Delayed)** **APP-008-D8, N SW HDR STRAINER PIT HI-HI LVL (Delayed)** **PI-1616, North SW Header pressure lowering** **PI-1684, South SW Header pressure lowering**		
	BOP	**Immediate Action Step** Check the following alarms – EXTINGUISHED: • APP-008-E7, S SW HDR STRAINER PIT HI LEVEL (NO) • APP-008-E8, N SW HDR STRAINER PIT HI LEVEL (NO) RNO – Perform the following: a. Close the following valves: • V6-12B • V6-12C b. Go To Section F.
	BOP	Verify PA announcement for procedure entry performed
	BOP	Verify SW X-CONN Valves – CLOSED • V6-12B • V6-12C
	BOP	Evaluate Control Room Indications AND Perform Local Inspections To Determine Source Of Flooding Prior To Continuing
	BOP	Check Service Water Leak Location - ON SOUTH HEADER (NO)

Op Test No.: 1 Scenario # 4 Event # 3 Page 11 of 37

Event Description: North Service Water Header break at the Intake Structure.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify The Following a. SW PUMP A - RUNNING b. SW PUMP B - RUNNING c. SW PUMP C - STOPPED d. SW PUMP D - STOPPED
	BOP	Evaluate SW Header Pressure Indications As Follows: • Check North SW Header pressure on PI-1616 – LOWERING (YES) • Check South SW Header pressure on PI-1684 – STABLE OR RISING (YES)
Examiners Note:		**With Service Water Pumps "C" AND "D" isolated, EDG "B" is inoperable. ITS 3.8.1 requires SR 3.8.1.1 to be performed within 1 hour.**
	BOP	Close V6-12D, SW NORTH HDR ISO
	BOP	Verify The Following Valves At The Intake Structure - CLOSED: • SW-839 • SW-845
	BOP	Check Flooding Status – STOPPED (YES)
	BOP	Check South SW Header Pressure On PI-1684 - GREATER THAN 40 PSIG (YES)
	BOP	Remove Control Power Fuses From The Following Breakers At 480V Bus E-2: • SERVICE WATER PUMP C (CMPT-24A) • SERVICE WATER PUMP D (CMPT-25B)
	BOP	Determine If A SW Booster Pump Should Be Started: a. Check SW Booster Pumps – ALL STOPPED (NO) RNO - a. Verify only ONE SW Booster Pump is running (YES)

Op Test No.: 1 Scenario # 4 Event # 3 Page 12 of 37

Event Description: North Service Water Header break at the Intake Structure.

Time	Position	Applicant's Actions or Behavior
	BOP	Check Circulating Water Pump Status - ANY RUNNING (YES)
	BOP	Determine If Adequate Seal Water Is Available To Circulating Water Pumps As Follows: • APP-008-E4, CW PMP A SEAL WTR LOST –EXTINGUISHED (YES) • APP-008-E5, CW PMP B SEAL WTR LOST –EXTINGUISHED (YES) • APP-008-E6, CW PMP C SEAL WTR LOST –EXTINGUISHED (YES)
	RO	Determine Maximum Allowable CCW Temperature As Follows: a. 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.
	SRO	Perform The Following: a. Inspect the area of the leak b. Report findings to the Control Room c. Identify and isolate the source of the SW leak
	SRO	Contact Maintenance To Install Temporary Pumps To Dewater Service Water Pits
	SRO	Contact Engineering To Perform The Following: • Evaluate operability of equipment affected by flooding • Provide corrective actions for flooding

Op Test No.: 1 Scenario # 4 Event # 3 Page 13 of 37

Event Description: North Service Water Header break at the Intake Structure.

Time	Position	Applicant's Actions or Behavior
	SRO	The SRO will declare entry into the following LCOs: ITS LCO 3.7.7, Condition A, due to one SW train inoperable. This LCO requires that the inoperable SW train be restored to operable status within 72 hours. ITS LCO 3.8.1, Condition B, which requires the following: (1) Perform SR 3.8.1.1 for offsite circuit within 1 hour and once per 12 hours thereafter (OP-604, Section 8.4.9, Emergency Diesel Generator Inoperability) (2) 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 feature(s) (3) Determine Operable DG is not inoperable due to common cause failure within 24 hours and perform SR 3.8.1.2 for Operable DG within 96 hours and (4) restore DG to Operable status within 7 days OR be in Mode 3 in 6 hours and Mode 5 in 36 hours. Due to CCW Pump "B" being inoperable and EDG "B" being declared inoperable due to all of its supporting Service Water Pumps being disabled, ITS 3.8.1.B.2 requires that CCW Pump "C" be declared inoperable within 4 hours. This will place the plant in LCO 3.0.3 due to not meeting ITS LCO 3.7.6 for CCW System operability requirements.
	SRO	Implement The EALs
	SRO	Return To Procedure And Step In Effect
NOTE:		**Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs, and notify the Operations Manager.**
Booth Operator:		**Initiate Event #4, Failure of N-35 Compensation Voltage, after ITS entry and on cue from the Chief Examiner.**

Op Test No.: 1 Scenario # 4 Event # 4 Page 14 of 37

Event Description: Failure of N-35 Compensation Voltage.

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 4, Failure of N-35 Compensation Voltage.
		EVENT INDICATIONS: **APP-005-B2, N-35 LOSS OF COMP VOLT** **N-35 indication deflects higher that original reading**
Examiner Note:		**Due to JPM overlap, the next event should be inserted once it has been identified that OWP-011, NI-7 needs to be implemented and a plant shutdown performed.** **DO NOT HAVE CREW IMPLEMENT THE OWP.**
	RO	APP-005-B2, N-35 LOSS OF COMP VOLT, is received.
	RO	**APP-005-B2 action** **IF** N-35 has failed, **THEN REMOVE** NI-35 from service in accordance with OWP-011.
	RO	**APP-005-B2 action** **IF** a unit shutdown occurs, **THEN** Source Range NIS will require manual activation.
	SRO	**DO NOT HAVE CREW IMPLEMENT THE OWP.** OWP-011, NI-7 actions: - Refer to ITS Table 3.3.1-1 for Intermediate Range applicability and operability requirements (ITS Table 3.3.1-1, Item 3) - REMOVE NI-35 from ERFIS SCAN: NIN0035A - START UP RATE CHANNEL SELECT Switch – Switch should be selected to an NI which is NOT removed from service (NI-36) - LEVEL TRIP Switch – BYPASS - NIS TRIP BYPASS NI-35 Status Light - ILLUM
	SRO	The SRO will declare entry into the following LCO: ITS Table 3.3.1-1, Item 3, Intermediate Range Neutron Flux, Condition F, Thermal Power > P-6 and < P-10, requires that thermal power be reduced to less than P-6 or increased to greater than P-10 w/in 2 hrs.
BOOTH OPERATOR:		**As soon as the crew has identified the need to implement OWP-11, NI-7 and determine the need for a plant shutdown, and with concurrence of the Chief Examiner, insert Event 5, CCW system leakage.**

Op Test No.: 1	Scenario # 4	Event # 5	Page 15 of 37
Event Description:	Leakage on CC-703B at 25 GPM and rising to 750 GPM.		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**At the discretion of the Chief Examiner, insert Event 5, Leakage on CC-703B at 25 GPM and rising to 750 GPM.**
EVENT INDICATIONS: **APP-001-A4, CCW SURGE TK HI/LO LVL** **CCW Surge Tank Level indicator LI-614B lowering** **APP-036-H1, WDBRP TROUBLE (Delayed several minutes)**		
		AOP-014, COMPONENT COOLING WATER SYSTEM MALFUNCTION
	SRO	Implement the EALs
	BOP	Make PA announcement for procedure entry
	SRO	Go To appropriate section for indicated malfunction: Loss of CCW Inventory – Go To Section A
	RO	**Continuous Action Step:** Determine If Pump Cavitation is Occuring *OR* Imminent As Follows: - Check Surge Tank Level - LESS THAN 5% (NO) - Check CCW Pump Discharge Pressure (Local) AND Flow - WIDE OSCILLATIONS (NO) RNO - IF CCW Surge Tank level lowers to less than 5% OR CCW Pump Cavitation occurs, THEN Go To Step 2.
	RO	Verify at the RTGB, Primary Water Makeup To CCW As Follows: a. Primary Water Pump - RUNNING b. CC-832, MAKEUP – OPEN
	RO	Check CCW Surge Tank level (LI-614B) - STABLE OR RISING (YES)
	RO	Throttle CC-832 OR CC-711 To Maintain Surge Tank Level (LI-614B) 47% to 53%.

Op Test No.: 1 Scenario # 4 Event # 5 Page 16 of 37

Event Description: Leakage on CC-703B at 25 GPM and rising to 750 GPM.

Time	Position	Applicant's Actions or Behavior
	SRO	Dispatch Operator To Perform Attachment 3, CCW Leak Search, While Continuing With Procedure
	RO	**Continuous Action Step** Check CV For CCW Break Using Control Room Indications As Follows : a. Monitor the following CV indications: - ERFIS CV SUMP LEVEL - CV WATER LEVEL (White Sump Lights) - LI-801, CHANNEL I CV WATER LEVEL - LI-802, CHANNEL II CV WATER LEVEL - RCP Abnormal Conditions b. Check CV – LOCATION OF CCW BREAK (NO)
	RO	**Continuous Action Step** Determine If Actions For Auxiliary Building Flooding Are Necessary As Follows: a. Check for any of the following indications of flooding : - Water level on Aux Bldg first floor - GREATER THAN 6 INCHES (NO) OR - APP-001-E4, RHR PIT A HI LEVEL – ILLUMINATED (NO) OR - APP-001-E5, RHR PIT B HI LEVEL – ILLUMINATED (NO) b. Dispatch Operator to perform Attachment 4, Flood Control In The Auxiliary Building RNO – IF at any time flooding is indicated, THEN perform Attachment 4, Flood Control In The Auxiliary Building Go To Step 26.
Examiner's Note:		**At this point, the CCW leakage will rise to 750 gpm. The crew will transition to Step 8 (Continuous Action Step) and proceed through the procedure to combat the change in the leakage rate.**

Op Test No.: 1	Scenario # 4	Event # 5	Page 17 of 37
Event Description:	Leakage on CC-703B at 25 GPM and rising to 750 GPM.		

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step** Check CCW Surge Tank level (LI-614B) - STABLE OR RISING (NO) RNO - WHEN CCW Surge Tank level (LI-614B) is Stable OR Rising, THEN perform Step 9.
	RO	Start a Second Primary Water Pump
	RO	Check CCW Surge Tank level (LI-614B) – LOWERING (YES)
	SRO	Dispatch Operator To Perform Attachment 3, CCW Leak Search, While Continuing With Procedure
	RO	**Continuous Action Step** Determine If Pump Cavitation is Occurring *OR* Imminent As Follows: - Check Surge Tank Level - LESS THAN 5% (YES) - Check CCW Pump Discharge Pressure (Local) AND Flow - WIDE OSCILLATIONS (YES)
	RO	Check Reactor – CRITICAL (YES)
	RO	Verify Reactor – TRIPPED **(Large Break LOCA will occur when the reactor trip breakers are opened)**
	RO	Stop ALL RCPs
	SRO	Go To PATH-1 While Continuing With This Procedure **(NOTE: AOP-014 actions are listed at the end of the scenario guide.)**

Op Test No.: 1	Scenario # 4	Event # 6	Page 18 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
		START OF PATH-1 ACTIONS
	RO	**Immediate Action Step** Reactor tripped (YES)
	BOP	**Immediate Action Step** Turbine tripped (YES)
	BOP	**Immediate Action Step** E1 & E2 energized (YES)
	BOP	**Continuous Action Step** IF Dedicated Shutdown Bus is Deenergized THEN Place Dedicated Shutdown Diesel Generator In Service Using EPP-25.
	RO	**Immediate Action Step** SI initiated (YES)
	SRO	Open Foldout A
	RO	<u>RCP TRIP CRITERIA</u> a. IF BOTH conditions below are met, THEN stop all RCPs: • SI Pumps – AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW TO THE CORE • RCS Subcooling – LESS THAN 35°F [55°F] b. IF the PHASE B Isolation valves are closed, THEN stop all RCPs. (YES)

Op Test No.: 1 Scenario # 4 Event # 6 Page 19 of 37

Event Description: Large Break LOCA on Reactor Trip

Time	Position	Applicant's Actions or Behavior
	BOP	EMERGENCY COOLING WATER SWITCHOVER CRITERIA IF normal cooling is lost to any of the following components, THEN establish emergency cooling water using the referenced procedure: Charging Pump Oil Coolers - Use Attachment 1 of AOP-014, Component Cooling Water System Malfunction. (YES)
Critical Task	RO	Verify Phase A valves closed (NO) FP-248, 249, 256 and 258 did not close automatically and will have to be manually closed from the CFPP.
	BOP	Verify FW isolation valves closed (YES)
	BOP	Verify both FW pumps tripped (YES)
	BOP	Verify both MDAFW pumps running (YES)
	BOP	If Additional Feedwater is required, THEN Start SDAFW Pump
	RO	Verify two SI pumps running (YES)
	RO	Verify both RHR pumps running (YES)
Critical Task	RO	Verify SI valves properly aligned (NO) Valves SI-870A and 870B did not open on the SI and at least one of the valves must be opened to provide an injection flow path to the core.

Op Test No.: 1	Scenario # 4	Event # 6	Page 20 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
		Examiner's Note: AOP-014 is in effect due to being a concurrent AOP. Actions in the AOP will lockout all of the CCW Pumps due to the loss of inventory in the system. Depending on when an operator is assigned to perform the remaining actions in AOP-014 will affect the following steps that are preceded by a "@" symbol. AOP-014 actions are continued from previous section at the end of the scenario guide.
	RO	@ At least one CCW pump running (NO)
	BOP	@ E-1 AND E-2 energized by offsite power (YES)
	RO	@ Start CCW Pump (Cannot be started.)
	RO	@ Verify open Therm Bar Flow Cont FCV-626 unless closed due to ruptured Therm Bar (Cannot be opened due to a Phase B signal)
	BOP	All SW & SW booster pumps running (NO)
	BOP	Attempt to start all SW and SWB Pumps
	BOP	NORTH or SOUTH SW HDR LO PRESS ALARMS ILLUMINATED (YES)
	BOP	CLOSE V6-16C OR V6-16A and V6-16B
	BOP	Secure Turbine Building equipment using Supplement M. **(Supplement M actions included at the end of PATH-1 actions)**
	RO	Verify CV Fans HVH-1,2,3 & 4 running (YES)
	RO	Verify IVSW System initiated (YES)

Op Test No.: 1	Scenario # 4	Event # 6	Page 21 of 37
Event Description: Large Break LOCA on Reactor Trip			

Time	Position	Applicant's Actions or Behavior
	RO	Verify CV ventilation isolation (YES)
Critical Task	BOP	Verify control room ventilation aligned for pressurization mode (NO) Operator to verify the following: - Verify CONT RM AIR EXHAUST Fan, HVE-16 - STOPPED - Verify CLEANING Fan HVE-19 A/B – RUNNING - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1A-SA - CLOSED - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1B-SB - CLOSED - IF CR-D1A-SA OR CR-D1B-SB have lost power, THEN locally verify position in the Control Room Kitchen.
	BOP	Verify both EDGs running (YES)
	BOP	**Continuous Action Step** Restart Battery Chargers within 30 minutes of Power Loss using OP-601
	RO	**Continuous Action Step** CV pressure remained below 10 psig (NO)
	RO	Verify CV Spray Initiated (YES)
	RO	Verify all CV Spray Pumps running with valves properly aligned (YES)
	RO	Verify appropriately 12 GPM Spray Additive tank flow (Valve SI-845C will be throttled to adjust flow to ~12 GPM as read on FI-949)
	RO	Verify Phase B Isolation Valves closed (YES)

Op Test No.: 1	Scenario # 4	Event # 6	Page 22 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	Stop all RCPs (Previously secured IAW AOP-014)
	BOP	Verify all MSIVs and MSIV Bypasses Closed (YES)
	BOP	Locally open the breaker for HVS-1 at MCC-5 CMPT 7J within 60 minutes of SI Initiation
BOOTH OPERATOR:		**Open the breaker for HVS-1 3 minutes after directed by the Control Room.**
	RO	RCS pressure greater than 1350 psig [1250 psig] (NO)
	RO	SI flow verified (YES)
	RO	RCS pressure >125 psig (NO)
	RO	RHR flow verified (YES)
	BOP	At least 300 gpm AFW flow available (YES)
	BOP	Verify AFW Valves Properly Aligned (YES)
	BOP	Control AFW flow to maintain S/G levels between 8% [18%] and 50%
	RO	RCP Thermal Barrier Cooling Water Hi or Lo flow alarms illuminated (YES)

Op Test No.: 1	Scenario # 4	Event # 6	Page 23 of 37
Event Description: Large Break LOCA on Reactor Trip			

Time	Position	Applicant's Actions or Behavior
	RO	IF seal cooling is NOT restored within 15 minutes, THEN perform Supplement R
	RO	At least one charging pump running (YES)
	RO	Greater than 5 inches thermal barrier Delta P OR 6 GPM seal injection to all RCPs (YES)
	RO	At least one Instrument Air Compressor running (YES)
	RO	Stop RCP with Therm Bar Delta P less than 5 inches AND seal injection less than 6 GPM (RCPs previously secured).
	RO	Seal cooling established to all RCPs (YES)
	BOP	Place Steam Dump Mode switch to Steam Pressure
	RO	RCS temperature stable at or trending to 547°F (NO)
	RO	RCS temperature greater than 547°F (NO)
	BOP	Attempt to limit cooldown
	BOP	IF RCS Cooldown continues and is not due to SI flow, THEN CLOSE MSIVs and MSIV Bypasses. • MSIVs and MSIV Bypasses are closed due to Phase B Isolation signal.

Op Test No.: 1	Scenario # 4	Event # 6	Page 24 of 37
Event Description: Large Break LOCA on Reactor Trip			

Time	Position	Applicant's Actions or Behavior
	RO	PZR PORVs Closed (YES)
	RO	PZR Spray & Aux Spray valves closed (YES)
	RO	At least one RCP running (NO)
	BOP	Any S/G with uncontrolled depressurization (NO)
	BOP	Any S/G Completely Depressurized (NO)
	BOP	R-19s, R-31s, R-15 Rad levels normal (YES)
	BOP	R-2, R-32A, R-32B Rad Levels Normal (YES)
	RO	CV Pressure Normal (NO) • GO TO PATH-1, Entry Point C
	RO	Reset SPDS and initiate monitoring CSFSTs
	RO	FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK, has a RED Path due to the excessive RCS cooldown. **FRP-P.1 actions to follow.**

Op Test No.: 1	Scenario # 4	Event # 6	Page 25 of 37
Event Description: Large Break LOCA on Reactor Trip			

Time	Position	Applicant's Actions or Behavior
	BOP	**FRP-P.1 Actions** Check CST Level – LESS THAN 10% (NO) RNO – IF CST level lowers to less than 10%, THEN perform Step 2. Go To Step 3.
	RO	**FRP-P.1 Actions** Determine if RCS cooldown is due to a Large Break LOCA as follows: a. Check both of the following conditions exist: • RCS pressure – LESS THAN 275 PSIG [400 PSIG] (YES) AND • RHR flow on FI-605 – GREATER THAN 1200 GPM (YES) b. Reset SPDS and return to procedure and step in effect.
	SRO	Re-enter PATH-1 at Entry Point C
	SRO	Open Foldout B (No actions required)
	BOP	Request periodic activity samples of All S/Gs
	RO	At least one RCP running (NO)
	BOP	Any S/G with Uncontrolled Depressurization (NO)
	BOP	Any S/G Completely Depressurized (NO)
	BOP	Control AFW Flow to Maintain S/G Levels between 8% [18%] and 50%

Op Test No.: 1	Scenario # 4	Event # 6	Page 26 of 37
Event Description: Large Break LOCA on Reactor Trip			

Time	Position	Applicant's Actions or Behavior
	BOP	Any S/G with Uncontrolled Level Rise (NO)
	BOP	R-19s, R-31s, AND R-15 Rad Levels Normal (YES)
	RO	PZR PORVs Closed (YES)
	RO	Open at least one PORV Block unless Closed to Isolate an Open PZR PORV
	RO	**Continuous Action Step** IF PZR PORV Opens on High Pressure, THEN Verify Reclosure at or Below 2335 PSIG. Close PORV Blocks as Necessary.
	RO	Reset SI
	CREW	**Continuous Action Step** IF Offsite Power is Lost, THEN Restart Emergency Safeguard Equipment
	RO	Reset CV Spray
	RO	Reset Phase A AND Phase B
	RO	Establish Instrument Air to CV. IF Compressor Not Running, THEN Start Compressor.
	BOP	Offsite Power Available to Charging Pumps (YES)

Op Test No.: 1	Scenario # 4	Event # 6	Page 27 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	At Least One Charging Pump Running (YES)
	RO	Establish Charging Flow as Necessary
	RO	CV Spray Pumps Running (YES)
	RO	**Continuous Action Step** WHEN CV PRESS LOWERS BELOW 4 PSIG, THEN STOP CV SPRAY PUMPS AND CLOSE SI-880 VALVES
	RO	RCS Subcooling Greater Than 35°F [55°F] (NO)
	RO	**Continuous Action Step** WHEN Below 10^{-10} Amps, THEN Energize Source Range detectors and monitor recorder. **(Due to failure of N-35, Source Range detectors will have to be manually re-energized)**
	RO	RCS Pressure Greater Than 275 PSIG [400 PSIG] (NO)
	BOP	E-1 AND E-2 energized by offsite power (YES)
	BOP	Starting Air Receivers repressurized to unloaded EDGs (YES)
	BOP	Stop the unloaded EDGs

Op Test No.: 1	Scenario # 4	Event # 6	Page 28 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	Supplement D components capable of recirc (NO) **No CCW Pumps are available**
	SRO	Exit PATH-1 to EPP-15, Loss of Emergency Coolant Recirculation
	RO	**Continuous Action Step:** Check Emergency Coolant Recirculation Capability – RESTORED (NO)
	RO	Reset SPDS AND Initiate Monitoring Critical Safety Function Status Trees
	SRO	Foldout Pages Are Not Applicable During Performance Of This Procedure
	RO	**Continuous Action Step:** Check Suction Source To Any Of The Following Pumps – LOST (NO) • SI Pumps • RHR Pumps • CV Spray Pumps
	RO	Check Emergency Recirculation Equipment – AVAILABLE USING SUPPLEMENT D (NO) RNO – Try to restore at least one train while continuing with this procedure.
	RO	Verify The Following CV RECIRC FANS – RUNNING (YES) • HVH-1 • HVH-2 • HVH-3 • HVH-4

Op Test No.: 1	Scenario # 4	Event # 6	Page 29 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	**Continuous Action Step:** Check RWST Level - LESS THAN 9% (NO)
	RO	Place The CONTAINMENT SPRAY Key Switch To The OVRD/RESET Position
	RO	Determine CV Spray Pump Requirements a. Determine Number Of CV Spray Pumps Required Using the Following Table: RWST level greater than 27% CV Pressure less than 4 psig HVH-1, 2, 3, 4 operating CV Spray Pumps required – 0 b. Check CV Spray Pump running – EQUAL TO NUMBER REQUIRED (YES, unless spray not previously secured.) IF a CV Spray Pump is required to be stopped, THEN close the discharge valves of any stopped pump: CV Spray Pump A – SI-880A and B CV Spray Pump B – SI-880C and D
	RO	Makeup to RWST using Supplement P while continuing with this procedure.
	BOP	**Continuous Action Step:** Check CST Level - LESS THAN 10% (NO)
	BOP	Control Intact S/G Levels As Follows : a. Check intact S/G levels - ANY GREATER THAN 8% [18%] (YES) b. Control feed flow to maintain intact S/G levels - BETWEEN 8% [18%] AND 50%

Op Test No.: 1	Scenario # 4	Event # 6	Page 30 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	Contact Chemistry To Obtain Periodic Boron Samples Of The Following: • Reactor Coolant System • Pressurizer
	RO	**Continuous Action Step** Ensure Adequate Shutdown Margin Exists As Follows: a. Check boron sample results – AVAILABLE (NO) RNO - WHEN sample results available, THEN perform Step 18.b Observe NOTE prior to Step 19 and *Go* To Step 19.
	BOP	Initiate RCS Cooldown To Cold Shutdown As Follows: a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F IN THE LAST 60 MINUTE b. Maintain RCS temperature and pressure - WITHIN LIMITS OF CURVE 3.4, REACTOR COOLANT SYSTEM PRESSURE – TEMPERATURE LIMITATIONS FOR COOLDOWN c. Check RHR System - ALIGNED FOR CORE COOLING (NO) RNO – Go To Step 19.f
	BOP	Check intact S/Gs - AT LEAST ONE AVAILABLE FOR RCS COOLDOWN (YES)
	BOP	Check steam dump to Condenser – AVAILABLE (NO) RNO – Dump steam from S/Gs using STEAM LINE PORVs. Go To Step 20
	RO	Check RCS Hot Leg Temperatures - LESS THAN 543°F (YES)
	BOP	Restore Steam Dumps As Follows: a. Check steam dump to Condenser – AVAILABLE (NO) RNO - Continue RCS cooldown using STEAM LINE PORVs. Observe the NOTE prior to Step 22 and Go To Step 22.

Op Test No.: 1	Scenario # 4	Event # 6	Page 31 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO	Defeat Low Tavg Safety Injection Signal As Follows: a. Momentarily place SAFETY INJECTION T-AVG Selector Switch to BLOCK position b. Verify LO TEMP SAFETY INJECTION BLOCKED status light – ILLUMINATED (YES)
	RO	Check RCS Pressure - LESS THAN 1950 PSIG (YES)
	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)
	RO	Reset SAFETY INJECTION
	BOP	**Continuous Action Step** Check Off-Site Power – AVAILABLE (YES)
	RO	Check Safeguards Pump Status - ANY RUNNING (YES) • SI Pumps OR • RHR Pumps
	RO	Establish One Train Of SI Flow As Follows: a. Verify SI PUMPS - ONLY ONE RUNNING b. Check RCS Pressure – LESS THAN 275 PSIG [375 PSIG] (YES) c. Verify RHR PUMPS - NO MORE THAN ONE RUNNING

Op Test No.: 1	Scenario # 4	Event # 6	Page 32 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
		Supplement M, Component Alignment for Loss of SW to Turbine Building Actions
	BOP	Shutdown secondary as follows: a. Check S/Gs – ANY RUPTURED (NO) Go To Step 1.c
	BOP	Close all MSIVs AND MSIV Bypass Valves
	BOP	Break vacuum to the Condenser as follows: 1. Depress AND hold the THINK pushbutton 2. Open VACUUM BREAKER VALVES: • MS-70A • MS-70B 3. WHEN the valves are open, THEN release the THINK pushbutton.
	BOP	Verify the following equipment is stopped: • FW PUMP A and B • COND PUMP A and B • HEATER DRAIN PUMP A and B • GOV FLUID PUMP A and B • VACUUM PUMP A and B
	BOP	Return to procedure and step in effect **END of Supplement M steps**

Op Test No.: 1	Scenario # 4	Event # 6	Page 33 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
		AOP-014, Component Cooling Water System Malfunction ACTIONS
	RO/BOP	Lockout CCW Pumps As Follows: a. Place AND hold all CCW Pump switches in STOP position b. Check APP-001-F5, CCW PMP LO PRESS - ILLUMINATED c. Release CCW Pump Switches d. Go To Step 13
	RO/BOP	Dispatch Operator To Perform Attachment 3, CCW Leak Search, While Continuing With Procedure
	RO/BOP	**Continuous Action Step** Check CV For CCW Break Using Control Room Indications As Follows : a. Monitor the following CV indications: • ERFIS CV SUMP LEVEL • CV WATER LEVEL (White Sump Lights) • LI-801, CHANNEL I CV WATER LEVEL • LI-802, CHANNEL II CV WATER LEVEL • RCP Abnormal Conditions b. Check CV - LOCATION OF CCW BREAK (NO) RNO - IF subsequent parameters indicate location of break in the CV, THEN Go To Step 15. Observe the NOTE Prior to Step 25 and Go To Step 25

Op Test No.: 1	Scenario # 4	Event # 6	Page 34 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	**Continuous Action Step** Determine if actions for Auxiliary Building flooding are necessary as follows: a. Check for any of the following indications of flooding: • Water level on Aux Bldg first floor – GREATER THAN 6 INCHES (NO) OR • APP-001-E4, RHR PIT A HI LEVEL – ILLUMINATED (NO) OR • APP-001-E5, RHR PIT B HI LEVEL – ILLUMINATED (NO) RNO – IF at any time flooding is indicated, THEN perform Attachment 4, Flood Control in the Auxiliary Building. Go To Step 26.
	RO/BOP	Determine If RHR Must Be Stopped As Follows: a. Check CCW Pumps - ALL STOPPED (YES) b. Check RHR Pump status - ANY PUMP RUNNING IN CORE COOLING MODE (NO) RNO – Go To Step 29.
	RO/BOP	Verify Letdown Isolated As Follows : • LCV-460 A&B, LTDN LINE STOP - CLOSED • HIC-142, PURIFICATION FLOW - SET TO 0% • CVC-387, EXCESS LTDN STOP - CLOSED
	RO/BOP	Determine If Charging Pump(s) Should Be Stopped As Follows: a. Check Charging Pumps – ANY PUMP RUNNING (YES) b. Check RCS temperature - GREATER THAN 150°F (YES)

Op Test No.: 1	Scenario # 4	Event # 6	Page 35 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Establish Alternate Cooling To Charging Pumps As Follows: a. Stop ALL but one Charging Pump b. Raise the speed of the running Charging Pump to at least 75% Demand Signal c. Dispatch an operator to perform Attachment 1, Emergency Cooling To Charging Pumps
	RO/BOP	Check Attachment 1 – COMPLETE (NO) RNO - WHEN Attachment 1, EMERGENCY COOLING TO CHARGING PUMPS, has been completed, THEN perform steps 33, 34 and 35 Go To Step 36
	RO/BOP	Notify Chemistry Personnel To Stop Any Primary Sampling In Progress
	RO/BOP	Determine If Emergency Cooling To Spent Fuel Pit Heat Exchanger Is Required As Follows: a. Check APP-036-B4, SPENT FUEL PIT HI TEMP – ILLUMINATED (NO) RNO - IF at any time APP-036-B4, SPENT FUEL PIT HI TEMP, illuminates, THEN perform Step 37.b. Go To Step 38.
	RO/BOP	Determine If CCW May Be Restored As Follows: a. Check CV – LOCATION OF CCW BREAK (NO) RNO – Go To Step 39.
	RO/BOP	Check leak source – LOCATED (YES)
	RO/BOP	Check Leak Source – ISOLABLE (NO) RNO – Perform one of the following: • IF CCW Pumps have ALL been stopped, THEN Go To Step 44.

Op Test No.: 1	Scenario # 4	Event # 6	Page 36 of 37
Event Description:	Large Break LOCA on Reactor Trip		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Initiate Action For Emergency Repair Of The Pipe Break
	RO/BOP	Check Repair Status – COMPLETE (NO) RNO - WHEN the repairs have been completed, THEN Go To Step 47.
Booth Operator:		**After approximately 15 minutes of being requested, report that Attachment 1, Emergency Cooling to Charging Pumps, is completed.**
	RO/BOP	Step 33: Reduce the Speed of the Running Charging Pump to Minimum
	RO/BOP	Step 34: Check RCP Thermal Barrier ΔP – Greater than 5 inches (YES) (IF NO, then locally throttle RCP Seal Water Flow Control Valves to obtain at least 6 gpm to each RCP.)
	RO/BOP	Check RCP Parameters: • RCP Thermal Barrier ΔP Greater Than 5 inches OR • RCP Seal Injection Flow – At least 6 gpm to each RCP (IF NO, then raise charging pump speed to establish RCP Thermal Barrier ΔP greater than 5 inches OR RCP seal injection flow at least 6 gpm to each RCP.)
The Chief Examiner may terminate the scenario anytime after RHR and SI Pump operation has been reduced to minimum pumps operating or at his discretion.		

ILC-11-2 NRC SCENARIO 4 TURNOVER SHEET

POWER LEVEL:	1E-8 amps
Core Burnup:	150 MWD/MTU
EFPD:	4.3 EFPD
Boron:	1531 PPM
Xenon:	88 pcm (72 hours post trip)
Tavg:	547°F
Bank D Rods:	99 Steps

EQUIPMENT UNDER CLEARANCE:

- NONE

EQUIPMENT STATUS:

- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.

INSTRUCTIONS FOR THE WATCH:

- Raise reactor power to the POAH and continue with plant startup.

Unit 2 Status Board

Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	150	Design:	16590
EFPD	4.3	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS				
	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	1051
1.77% =△K/K	≥350 F	1281
2.6% =△K/K	100 F Cold	1430
6% =△K/K	N/A	1950

Condenser Air Inleakage			SGBD		
			Target Value GPM		Status
A	13	CFM	A	50	Flash Tank With Heat Recovery
B	0	CFM	B	50	
Known	8	CFM	C	50	
Total	5	CFM	N2 Flow	8	SCFM

PORV Settings			
Setting Date		POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints			
Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown		
	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	1531
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents				
	UPPER	LOWER	TARGET	% BAND
N-41	115	109	2.3	5 +/-
N-42	101	100	2.3	5 +/-
N-43	96	89	2.3	5 +/-
N-44	91	87	2.3	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed	5/27/2010	19:45

Notes/Additional Data	
IC-1, 2, 40	
BOL	

ILC-11-2 NRC SCENARIO 4 TURNOVER SHEET

POWER LEVEL:	1E-8 amps
Core Burnup:	150 MWD/MTU
EFPD:	4.3 EFPD
Boron:	1531 PPM
Xenon:	88 pcm (72 hours post trip)
Tavg:	547°F
Bank D Rods:	99 Steps

EQUIPMENT UNDER CLEARANCE:

- NONE

EQUIPMENT STATUS:

- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.

INSTRUCTIONS FOR THE WATCH:

- Raise reactor power to the POAH and continue with plant startup.

Unit 2 Status Board

Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	150	Design:	16590
EFPD	4.3	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS

	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	1051
1.77% =△K/K	≥350 F	1281
2.6% =△K/K	100 F Cold	1430
6% =△K/K	N/A	1950

PORV Settings

Setting Date		POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

Condenser Air Inleakage

A	13	CFM
B	0	CFM
Known	8	CFM
Total	5	CFM

SGBD

Target Value GPM		Status
A	50	Flash Tank With Heat Recovery
B	50	
C	50	
N2 Flow	8	SCFM

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints

Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown

	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	1531
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
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HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data	
IC-1, 2, 40	
BOL	

Facility:	HB ROBINSON	Scenario No.: 5	Op Test No.:
Examiners:		Operators:	SRO -
			RO -
			BOP -
Initial Conditions:	• 68% RTP EOL, 15697 MWD/MTU, 132 ppm Boron • "A" MDAFW pump inoperable with the breaker racked out • Automatic Rod Control is inoperable • Currently thunderstorm watch is in effect for Darlington and Chesterfield counties		
Turnover:	• "A" HDP recently started for PMT following maintenance. Maintain current power while RES is evaluating PMT results.		
Critical Tasks:	• Stop excessive steam flow • Establish feedwater flow to at least one S/G		

Event No.	Malf. No.	Event Type*	Event Description
1		(C) BOP, SRO	"A" CW Pump trips and V6-50A fails to close automatically
2		(I) RO, SRO (TS) SRO	PZR Pressure Controller PC-444J Range Shifts
3		(I) BOP, SRO (TS) SRO	Steam Pressure Channel PT-485 fails LOW
4		(C) BOP, SRO	Loss of Cooling to the Auxiliary Transformer
5		(R) RO (N) BOP, SRO	Load Reduction to 50%
6		(M) ALL	"B" S/G Feedwater Regulating Valve FCV-488 fails closed and complete loss of feedwater
7		BOP	Turbine Trip Does Not Occur
8		BOP	"B" MDAFW and SDAFW Pumps Trip when Start Signal Received
9		BOP	Steam Dump Valves fail Open on Reactor Trip
10		BOP	MSIVs fail to close on auto-close signal
11		RO	RHR-744A and 744B fail to auto-open on Safety Injection

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

ILC-11-2 NRC SCENARIO 5 SUMMARY DESCRIPTION

The crew will assume the watch with the plant at 68% RTP. MDAFW Pump "A" is out of service for scheduled lube oil cooler replacement. The motor breaker has been racked out and the pump has been isolated and cleared for maintenance. Bearing replacement has been completed on "A" HDP and PMT is in progress. Shift instructions are to maintain current power level while RES is evaluating the PMT results on "A" HDP.

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 verify that V6-50A is closed. 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.

PZR Pressure Controller PC-444J control range will shift causing the PZR Spray valves to open and lower PZR pressure. AOP-019, Malfunction of RCS Pressure Control, immediate actions will be taken and the procedure will take actions to restore pressure to the normal control band with PC-444J operated in manual control. 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 less than 2205 psig. Once the Chief Examiner is satisfied with the crew's actions and Tech Spec compliance, the Chief Examiner will cue the next event.

Steam Pressure Transmitter PT-485 will fail LOW, causing the controlling steam flow channel on S/G B to fail low and causing a transient on the Feedwater Regulating valve FCV-488. AOP-025, RTGB Instrument Failure, Section G immediate actions will be taken by the crew to stabilize the S/G level transient. The procedure will place an alternate control channel in service and direct the removal of the channel from service. ITS Table 3.3.1-1 Item 14 which requires 2 S/G Level channels (not affected by the failure) and 2 Steam Flow / Feedwater Flow mismatch channels with Condition E – Place channel in trip within 6 hours or Be in Mode 3 within 12 hours. ITS Table 3.3.2-1 Items 1e, 1g, and 4e for Safety Injection and Steam Line Isolation High Steam Line Flow with Low Tave or Low Steam Line Pressure – Condition D: Place channel in trip within 6 hours OR Be in Mode 3 in 12 hours AND Be in Mode 4 within 18 hours. ITS Table 3.3.3-1 Item 20 Post Accident Monitoring Instrumentation for Steam Generator pressure required channels is 2 per S/G which is currently met. ITS Table 3.3.6-1 Item 4 Safety Injection for Containment Ventilation Isolation Instrumentation refers to LCO 3.3.2 Functions 1.a-f (which have already been addressed) requirements will be reviewed by the SRO to ensure that all of the ITS specs are satisfied. Once the S/G level control has been stabilized and the Chief Examiner is satisfied with the Tech Spec compliance, he can cue the next event.

Auxiliary Transformer Trouble alarm (APP-009-C6) will be received on the RTGB. The report from the field is that all cooling fans and oil pumps on the transformer have been lost. Breaker 4BR on MCC-4 (Power supply to Power Cooler #1 and #2) has tripped and cannot be reset. AOP-037, Large Transformer Malfunctions, Attachment 4, will be implemented by the crew with the requirement to reduce load to less than 50% within 30 minutes and unload the transformer. The operator will have to manually insert control rods since the automatic rod insertion function has been disabled. Power reduction will commence and will continue until the UAT is unloaded or until the Chief Examiner cues the next event.

"B" S/G Feedwater Regulating Valve FCV-488 will fail CLOSED. This will cause an immediate reduction in the "B" S/G level and the crew will take immediate actions of AOP-010, Main Feedwater / Condensate Malfunction, and attempt to control FCV-488 in manual. This will be unsuccessful and the crew should manually trip the reactor due to lowering "B" S/G level. Once the reactor is tripped, the crew will enter PATH-1.

The turbine will not trip automatically or manually from the RTGB and the operator will have to manually runback the turbine with the EH controls until the governor valves are closed.

"B" MDAFW Pump and the SDAFW Pump will trip when the start signal is received.

Steam dump valves will fail open and cannot be closed from the RTGB. The MSIVs will fail to automatically close but can be closed manually from the RTGB control switches. If requested to locally close the Steam Dump valves, the task will be successful to close the valves.

RHR-744A and 744B fail to auto-open on the safety injection signal. The operator will have to manually open the valves from the RTGB.

The crew will transition to FRP-H.1, Response to Loss of Secondary Heat Sink, due to the inability to feed the S/Gs. During the procedure, all RCPs will be secured to remove the additional heat source to the RCS. FRP-H.1 will direct the operators to over-ride the Feedwater Isolation Signals and start one MFP to re-establish feedwater flow. Once feedwater flow is re-established the crew will be directed to reset SPDS and return to PATH-1.

The Chief Examiner may terminate the scenario after the crew has restored feedwater flow to at least one S/G or at his discretion.

ILC-11-2 NRC SCENARIO 5 SIMULATOR SETUP

IC/SETUP:

- IC-805, SCN: 008_11_2_NRC_Exam_5
- "A" MDAFW Pump inoperable with the breaker racked out
- Rods selected to Manual with automatic rod control defeated
- Status board updated to reflect IC-17

PRE-LOADED EVENTS:

The following events should occur on the reactor trip and safety injection:

Event 7:	Turbine Trip does not occur
Event 8:	"B" MDAFW and SDAFW Pumps Trip when Start Signal Received
Event 9:	Steam Dump Valves fail Open on Reactor Trip
Event 10:	MSIVs fail to Close on Automatic Signal
Event 11:	RHR-744A and 744B fail to auto-open on Safety Injection

EVENTS/TRIGGERS INITIATED DURING THE SCENARIO:

Event 1:	"A" CW Pump trips and V6-50A fails to close automatically
Event 2:	PZR Pressure Controller PC-444J Range Shifts
Event 3:	Steam Pressure Channel PT-485 fails LOW
Event 4:	Loss of Cooling to the Auxiliary Transformer
Event 5:	Load Reduction to 50%
Event 6:	"B" S/G Feedwater Regulating Valve FCV-488 fails closed

EXPECTED PROCEDURE FLOWPATH OR COPIES NEEDED:

- **AOP-012**
- **AOP-019**
- **AOP-025 Main Body and Section G**
- **OWP-025, SGP-8**
- **APP-046**
- **AOP-037**
- **AOP-010**
- **PATH-1**
- **Foldout A**
- **FRP-H.1**

Op Test No.: 1	Scenario # 5	Event # 1	Page 5 of 30
Event Description: "A" CW Pump trips and V6-50A fails to close automatically.			

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**When directed, insert Event 1, "A" CW Pump trips and V6-50A fails to close automatically.**
EVENT INDICATIONS: **APP-008-D4, CW PMP A MOTOR/DISCH VLV TRIP/OVLD, is illuminated.** **CW Pump A RTGB indication is Green (Pump Off).** **V6-50A indicates OPEN on the RTGB.**		
	BOP	**Immediate Action Step:** Check Circulating Water Pump – ANY TRIPPED (YES)
	BOP	**Immediate Action Step:** Verify The Tripped Circulating Water Pump Discharge Valve - CLOSED OR 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 CWPs. (All available are running.)
	RO	Make PA Announcement for Procedure Entry.
	BOP	Check Liquid Waste Batch Release – In Progress (NO)
	BOP	Check Condenser Status – VACUUM PREVIOUSLY ESTABLISHED (YES)

Op Test No.: 1 Scenario # 5 Event # 1 Page 6 of 30

Event Description: "A" CW Pump trips and V6-50A fails to close automatically.

Time	Position	Applicant's Actions or Behavior
	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 OR 2 (YES)
	BOP	Check Condenser Back Pressure On PI-1312 AND PI-1313 – APPROACHES RESTRICTED REGION OF ATTACHMENT 3, CONDENSER BACKPRESSURE LIMIT CURVE (NO)
	BOP	Check Condenser Vacuum Degrading (NO)
	SRO	Implement the EALs
NOTE:		**Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs, and notify the Operations Manager.**
Booth Operator		**Insert Event #2 (PZR Pressure Controller PC-444J range shifts) on cue from the Chief Examiner.**

Op Test No.: 1 Scenario # 5 Event # 2 Page 7 of 30

Event Description: PZR Pressure Controller PC-444J Range Shifts

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 2 – PZR Pressure Controller PC-444J Range Shifts
		EVENT INDICATIONS: **APP-003-D8: PZR CONTROL HI/LO PRESS** **PZR Spray Valves PCV-455A and B OPEN** **PZR Pressure lowering**
	RO	Recognizes PZR Spray Valves are OPEN and PZR Pressure lowering below normal control band. Takes Immediate Actions of AOP-019, MALFUNCTION OF RCS PRESSURE CONTROL.
	RO	**Immediate Action Step:** Determine if PZR PORVs should be CLOSED: • Check PZR Pressure less than 2335 PSIG. (YES) • Verify both PZR PORVs CLOSED. (YES) IF any PZR PORV can NOT be CLOSED, THEN close its PORV BLOCK valve.
	RO	**Immediate Action Step:** Control Heaters and Spray valves to restore RCS Pressure to desired control band.
	BOP	Make PA Announcement for Procedure Entry.
	RO	**Continuous Action Step:** Check PZR Pressure under operator control. (YES)
	RO	**Continuous Action Step** Check Pressurizer Pressure Transmitter PT-444 OR PT-445 FAILED (NO)
	RO	Check PC-444J, PZR PRESSURE operating properly in AUTO. (NO)

Op Test No.: 1 Scenario # 5 Event # 2 Page 8 of 30

Event Description: PZR Pressure Controller PC-444J Range Shifts

Time	Position	Applicant's Actions or Behavior
	RO	Place PC-444J in MAN. (YES)
	RO	IF PC-444J is operating properly in manual, THEN Go To Step 9. (YES)
	RO	Operate PC-444J as follows: a. Check PZR SPRAY VALVE Controllers - IN AUTO (YES) b. Check PZR Heaters - IN NORMAL CONFIGURATION (YES) c. Manually adjust PC-444J to maintain PZR pressure. d. Check PZR pressure – UNDER CONTROL (YES)
	SRO	Implement the EALs
	SRO	Contact I&C to Make Repairs to the PZR Pressure Control System
	SRO	Refer To ITS For Applicable LCOs • LCO 3.4.11, PZR PORV (N/A) • TRM 3.4, PZR Spray ΔT (N/A) • LCO 3.4.4 AND 3.4.5, RCS Loops (N/A) • 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 less than 2205 psig (The only applicable LCO.) • LCO 3.4.9, PZR Level (N/A)
Booth Operator		**Insert Event #3 (Steam Pressure Channel PT-485 fails LOW) on cue from the Chief Examiner.**

Op Test No.: 1 Scenario # 5 Event # 3 Page 9 of 30

Event Description: Steam Pressure Channel PT-485 fails LOW

Time	Position	Applicant's Actions or Behavior
		BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 3 – Steam Pressure Channel PT-485 fails LOW
		EVENT INDICATIONS: **APP-006-A4 Steam Line High ΔP** **APP-006-B1 S/G B FW>STM Flow** **APP-006-B2 S/G B STM>FW Flow (When bistables are tripped.)** **APP-006-B3 S/G B Level Dev** **APP-006-E3 S/G B Wide Range Hi/Lo Level** **APP-006-E5 Steam Line Low Pressure** **FR-488, Pen #1 – Lowering and Pen #3 - Lowering**
	SRO	**AOP-025 RTGB INSTRUMENT FAILURE** Go To The Appropriate Section For The Failed Transmitter: S/G Steam Pressure | Section G | Page 21
	BOP	**SECTION G - S/G Steam Pressure Transmitter Failure** **Immediate Action Step** Place The Affected FRV In MAN • FCV-478 (FRV "A") (NO) • FCV-488 (FRV "B") (YES) • FCV-498 (FRV "C") (NO)
	BOP	**Immediate Action Step** Restore Affected S/G Level To Between 39% And 52%
	RO	Make PA Announcement For Procedure Entry
	BOP	Place The Affected S/G Steam Flow Selector Switch To The Alternate Channel Below: Failed Channel | Affected Channel | Selected Position PT-485 | FI-484 | CH 485

Op Test No.: 1 Scenario # 5 Event # 3 Page 10 of 30

Event Description: Steam Pressure Channel PT-485 fails LOW

Time	Position	Applicant's Actions or Behavior
	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
	BOP	Remove The Affected Transmitter From Service Using OWP-025: Channel: PT-485 — OWP: SGP-8
OWP-025 SGP-8 STEAM GENERATOR PRESSURE **Main Steam Line "B" Pressure Transmitter PT-485**		
	BOP	FR-488 (STM) Selected To 485
	BOP	DELETE INPUT PT-485 FROM CALO PROCESSING. (MSP0421A) **(Two Options)** • **Option 1 – Remove via CALO ERFIS program.** o Access Calorimetric on ERFIS by typing CALO o Click on the DELETE INPUTS button. This will display the DELETE INPUT FROM CALORIMETRIC page. o Select MSP0421A o Click on the ENTER DATA button. • **Option 2 – Delete the ERFIS point from scan.** o Access the Delete function by typing DR. o Click on DELETE SCAN o Enter MSP0421A
	BOP	Trip the Bistables for PT-485 **(END OWP-025)**
Booth Operator		**Trip the bistables for PT-485 in accordance with OWP-025, SGP-8, after the operator requests and report completed actions**
	SRO	Implement The EALs

Op Test No.: 1 Scenario # 5 Event # 3 Page 11 of 30

Event Description: Steam Pressure Channel PT-485 fails LOW

Time	Position	Applicant's Actions or Behavior
	SRO	Check Technical Specifications (ITS) For Applicable LCOs • ITS Table 3.3.1-1 Item 14 which requires 2 S/G Level channels (not affected by the failure) and 2 Steam Flow / Feedwater Flow mismatch channels with Condition E – Place channel in trip within 6 hours or Be in Mode 3 within 12 hours. • ITS Table 3.3.2-1 Items 1e, 1g, and 4e for Safety Injection and Steam Line Isolation High Steam Line Flow with Low Tave or Low Steam Line Pressure – Condition D: Place channel in trip within 6 hours OR Be in Mode 3 in 12 hours AND Be in Mode 4 within 18 hours. • ITS Table 3.3.3-1 Item 20 Post Accident Monitoring Instrumentation for Steam Generator pressure required channels is 2 per S/G which is currently met. • ITS Table 3.3.6-1 Item 4 Safety Injection for Containment Ventilation Isolation Instrumentation refers to LCO 3.3.2 Functions 1.a-f (which have already been addressed)
NOTE:		**Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs, and notify the Operations Manager.**
	SRO	Return To Procedure And Step In Effect
Booth Operator		**Insert Event #4 (Loss of Cooling to the Auxiliary Transformer) on cue from the Chief Examiner.**

Op Test No.: 1	Scenario # 5	Event # 4 and 5	Page 12 of 30
Event Description:	Loss of Cooling to the Auxiliary Transformer		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR:		**At the direction of the Chief Examiner, insert Event 4, Loss of Cooling to the Auxiliary Transformer.**
EVENT INDICATIONS: **APP-009-C6 AUX TRANSF TROUBLE**		
	BOP	Dispatch an Operator to respond IAW APP-046.
BOOTH OPERATOR:		**Acknowledge the request to check the alarms at the Auxiliary Transformer and report the below listed conditions.**
BOOTH OPERATOR		**Report the following alarms:** **APP-46-11, Loss of Normal 480Vac Power Source (18G)** **APP-46-3, Loss of Power Cooler #1 (27-1)** **APP-46-4, Loss of AC Control Power TX-1 (27-4)** **APP-46-7, Loss of Power Cooler #2 (27-2)** **APP-46-8, Loss of AC Control Power TX-2 (27-5)** **Attempted to reset the alarms, alarms remained illuminated.** **Also, report that NO cooling or oil pumps are operating.**
	BOP	APP-046-11 actions are to REFER TO AOP-037.
	SRO	Directs crew entry to AOP-037.
	Crew	Make PA Announcement for Procedure Entry
	SRO	Go to Section B for Auxiliary Transformer
	BOP	Dispatch an Operator to the Auxiliary Transformer to determine the alarming function, acknowledge the alarm and attempt to reset the alarm.

Op Test No.: 1	Scenario # 5	Event # 4 and 5	Page 13 of 30
Event Description: Loss of Cooling to the Auxiliary Transformer			

Time	Position	Applicant's Actions or Behavior
	BOP	Check Alarm Function – Remains Illuminated. (YES)
	SRO	NOTE: The APP-046 alarms in the table below are prioritized by importance.
	SRO	Observe the NOTE OR CAUTION prior to the step and go to the appropriate step based on the listed alarm function that is illuminated.
	BOP	APP-46-11, Loss of Normal 480Vac Power Source (18G) APP-46-3, Loss of Power Cooler #1 (27-1) APP-46-4, Loss of AC Control Power TX-1 (27-4) APP-46-7, Loss of Power Cooler #2 (27-2) APP-46-8, Loss of AC Control Power TX-2 (27-5) Alarms Illuminated. (YES)
	SRO	Caution: IF the Auxiliary Transformer is operated for more than 30 minutes with no fans or pumps, THEN damage to the Transformer could occur.
	BOP	Dispatch an Operator to Observe the Status of the Fans and Pumps
	SRO	NOTE: IF APP-046-11 or APP-046-12 are valid alarms, THEN there will be no fans OR pumps running and APP-046-3, APP-046-4, APP-046-7, and APP-046-8 will also be illuminated.
	BOP	Check Status of the Fans and Pumps – ALL LOST (YES)
	BOP	Check Status of 480 Volt Bus 3 – POWER LOST (NO) Go to Step 11

Op Test No.: 1 Scenario # 5 Event # 4 and 5 Page 14 of 30

Event Description: Loss of Cooling to the Auxiliary Transformer

Time	Position	Applicant's Actions or Behavior
	BOP	Check Status of MCC-4 – POWER LOST (NO) Go to Step 17
	BOP	Check Status of MCC-4, Breaker 4BR – TRIPPED (YES)
	BOP	Attempt to Reset and Close MCC-4, Breaker 4BR One Time. (YES)
	BOP	Check Status of MCC-4, Breaker 4BR – Closed (NO)
	SRO	Initiate action to repair problem causing the tripped breaker.
	SRO	IF breaker MCC-4 (4BR) can NOT be reclosed promptly, THEN go to Step 28.
	BOP	**Continuous Action Step** Determine If Trip Required As Follows: - Check time elapsed since loss of all cooling – Greater than 30 min. (NO)
	SRO	IF the Auxiliary Transformer is NOT unloaded within 30 minutes, THEN perform Step 28.b.
	SRO	Caution Rapid power reductions at the beginning of core life 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	Reduce power to less than 50% using Attachment 4, Turbine Load Reduction

Op Test No.: 1	Scenario # 5	Event # 4 and 5	Page 15 of 30
Event Description:	Loss of Cooling to the Auxiliary Transformer		

Time	Position	Applicant's Actions or Behavior
	BOP	Check ANY of the following Diesel Generators – Paralleled to the Grid - EDG A (NO) - EDG B (NO) - DS Diesel (NO)
	RO	Check Power – Less than 50% (NO) (Go to Power Reduction.)
NOTE:		**The crew is currently in a loop until power is less than 50% RTP and the Auxiliary Transformer Unloaded. The following steps are for the Power Reduction. (Attachment 4, Turbine Load Reduction)**
	BOP/SRO	Notify Load Dispatcher of Load Reduction to less than 50% power.
	BOP	Check Turbine Control Mode – Automatic (YES)
	BOP	Depress the IMP IN Pushbutton
	BOP	Set the Desired Load in the SETTER
	BOP	Set the Desired Load Rate
	BOP	Depress the GO Pushbutton
NOTE:		**OP-301, Section 8.2.8 Quick Boration Checklist (shaded area) is included in the following steps, as it will be needed for the rapid downpower.**
	RO	**DETERMINE** the amount of Boric Acid to add to the RCS and **OBTAIN** an independent check of the volume required.

Op Test No.: 1	Scenario # 5	Event # 4 and 5	Page 16 of 30
Event Description:	Loss of Cooling to the Auxiliary Transformer		

Time	Position	Applicant's Actions or Behavior
NOTE:		**~85 gallons of Boric Acid. (The crew will add Boric Acid in 2-4 batches.) (Values based on 3%/min load reduction rate)**
	RO	**OBTAIN** permission from the CRS **OR** the SM to add the amount of boric acid previously determined, including the expected change in RCS temperature and Reactor Power.
	RO	**PLACE** the RCS MAKEUP MODE selector switch to 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 flow rate.
	RO	Momentarily **PLACE** the RCS MAKEUP SYSTEM switch to the START position.
	RO	**IF** any of the below conditions occur, **THEN** momentarily place the RCS MAKEUP SYSTEM switch in the STOP position: • 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 to the RCS, **THEN** verify the following: • 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.: 1	Scenario # 5	Event # 4 and 5	Page 17 of 30
Event Description:	Loss of Cooling to the Auxiliary Transformer		

Time	Position	Applicant's Actions or Behavior
	RO	**IF** desired, **THEN FLUSH** the Boric Acid flow 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 the CLOSE position. • Momentarily **PLACE** 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: o Unanticipated Rod Motion o Primary Water addition reaches the desired value • **WHEN** the desired amount of Primary Water has been added to the RCS, **THEN** verify the following: o FCV-114A, PW TO BLENDER, closes. o FCV-113B, BLENDED MU TO CHG SUCT, closes. o **IF** in Auto, **THEN** the operating Primary Water Pump stops. o The RCS MAKEUP SYSTEM is OFF.
	RO	**RETURN** the RCS Makeup System to automatic as follows: • **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 the AUTO position. • **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 the results of the boration.
NOTE:		**End of Boration and Power Reduction Steps. AOP-037 steps continue below.**

Op Test No.: 1 Scenario # 5 Event # 4 and 5 Page 18 of 30

Event Description: Loss of Cooling to the Auxiliary Transformer

Time	Position	Applicant's Actions or Behavior
	BOP	Stop the following components: 1. Circulating Water Pump "A" 2. Feedwater Pump "A" 3. Heater Drain Pump "A" 4. Condensate Pump "B"
	BOP	Transfer loads from the Auxiliary Transformer to the Startup Transformer with the Unit at greater than 110 Mwe using Attachment 5, Transfer of Electrical Loads to the Startup Transformer.
NOTE:		**The following steps are from Attachment 5, Transfer of Electrical Loads to the Startup Transformer.**
	BOP	Notify the Load Dispatcher of the 4KV switching evolution
	BOP	Insert key into Startup Transf synchroscope switch AND turn switch to STARTUP BUS 2 position
	BOP	WHEN the synchroscope comes up to the 12 o'clock position, THEN close START-UP TO 4KV BUS 2 BKR 52/12
	BOP	WHEN breaker 52/12 indicates closed, THEN return switch to the mid-position AND verify UNIT AUX TO 4KV BUS 1 BKR 52/7 has opened.
	BOP	Insert key into 4KV TIES synchroscope switch AND turn switch to BUS 3 & 4 position.
	BOP	WHEN synchroscope comes up to 12 o'clock position, THEN close 4KV BUS 3-4 TIE BKR 52/19.
	BOP	WHEN breaker 52/19 indicates closed, THEN return switch to the mid-position AND verify UNIT AUX TO 4KV BUS 4 BKR 52/20 has opened.

Op Test No.: 1 Scenario # 5 Event # 4 and 5 Page 19 of 30

Event Description: Loss of Cooling to the Auxiliary Transformer

Time	Position	Applicant's Actions or Behavior
	BOP	Turn synchroscope key switch to mid position.
	BOP	Check Auxiliary Transformer – Unloaded (YES)
	BOP	Check Auxiliary Transformer Alarm Status as Follows: a. Press and release the Reset pushbutton. b. Check all APP-046 Alarms extinguished. (NO)
	SRO	IF APP-046 Alarms are present that have not been addressed, THEN go to Step 3.
	SRO	Implement the EALs.
	SRO	Check Technical Specifications for Applicable Action Statements. 3.8.1 – AC Sources Operating (N/A) 3.8.2 – AC Sources – Shutdown (N/A) 3.8.9 – Distribution Systems – Operating (N/A) 3.8.10 – Distribution Systems – Shutdown (N/A)
NOTE:		**Crew should notify WCC SRO and/or I&C to write a work request, investigate and initiate repairs for the loss of cooling to the transformer, and notify the Operations Manager.**
	SRO	Check Status of Condition Causing Alarm – Corrected (NO)
BOOTH OPERATOR:		**As soon as the power reduction is ≥ 5% or at the discretion of the Chief Examiner, insert Event # 6 ("B" S/G Feedwater Regulating Valve FCV-488 fails closed.)**

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 20 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
BOOTH OPERATOR: At the discretion of the Chief Examiner, insert Event 6, "B" S/G Feedwater Regulating Valve FCV-488 fails closed.		
EVENT INDICATIONS: **APP-006-B2, S/G B STM>FW FLOW** **APP-006-B3, S/G B LVL DEV** **APP-006-E1, S/G B NAR RANGE LO/LO-LO LEVEL (Once low level is reached.)** **FR-488 Pen 2 Feed Flow Lowers to 0 PPH** **FCV-488 Indicated CLOSED on the RTGB**		
	BOP	**Immediate Action Step (AOP-010)** Check Feedwater Regulating Valve – Operating Properly (Manual OR Auto) (NO)
	BOP	Verify FRV for affected S/G in manual control. (Takes manual control of FCV-488 and attempts to OPEN) (No response from controller.)
	BOP	Stop any load change in progress. (Turbine to Manual, if applicable)
	BOP	IF unable to control S/G level THEN trip the Reactor AND Go to PATH-1. (YES)
	RO	**Immediate Action Step:** Reactor Tripped. (YES)
	BOP	**Immediate Action Step:** Turbine Tripped.(NO) Trip or Runback the Turbine. (YES, Runback was successful)
Booth Operator:		**Manually trip the Turbine locally, if requested, after a 3 min time delay.**

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 21 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	BOP	**Immediate Action Step:** E-1 AND E-2 energized. (YES)
	BOP	**Continuous Action Step** IF DS Bus is deenergized THEN place DSDG in service using EPP-25.
	RO	**Immediate Action Step:** SI Initiated. (YES)
	SRO	Enters PATH-1 and verifies Immediate Actions.
	CREW	Open Foldout A.
	BOP	<u>MSR Isolation Criteria.</u> IF ANY Purge OR Shutoff Valve does not indicate fully closed, THEN place the associated RTGB Switch to CLOSE.
NOTE:		**Operators may identify that steam dump valves have failed open and cannot be closed and take action to close the MSIVs.**
NOTE:		**Operators may identify that RHR-744A and -744B failed to auto-open on SI and take action to open the valves.**
Booth Operator:		**If requested to locally close the Steam Dumps, the task will be successful to close the valves. Begin isolating the steam dumps 5 minutes after requested.**
	RO	Verify Phase A Isolation valves are closed. (YES)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 22 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	BOP	Verify FW Isolation valves are closed. (YES)
	BOP	Verify both FW pumps are tripped. (YES)
	BOP	Verify both MDAFW pumps are running. (NO) (Unable to start any MDAFW pump from RTGB.)
	BOP	If additional Feedwater is required, start the SDAFW pump. (NO, SDAFW Pump started but tripped)
	SRO	WCC SRO or AO may be dispatched to investigate the cause of the MDAFW Pump B and SDAFW Pump trip.
	RO	Verify 2 SI pumps running. (YES)
	RO	Verify Both RHR pumps running. (YES)
	RO	Verify SI valves are properly aligned. (NO) RHR-744A/B failed to auto-open on SI. Manual action must be taken to open the valves.
	RO	At least one CCW pump is running. (YES)
	BOP	All SW and SW Booster pumps running. (YES)
	RO	Verify CV Fans HVH-1, 2, 3, 4 running. (YES)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 23 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	RO	Verify IVSW System Initiated. (YES)
	RO	Verify CV Ventilation isolation. (YES) Verify the following valves – CLOSED: - V12-6, CONT PURGE VALVE - V12-7, CONT PURGE VALVE - V12-8, CONT PURGE VALVE - V12-9, CONT PURGE VALVE - V12-10, CONTAINMENT PRESSURE RELIEF - V12-11, CONTAINMENT PRESSURE RELIEF - V12-12, CONTAINMENT VACUUM RELIEF - V12-13, CONTAINMENT VACUUM RELIEF
	BOP	Verify Control Room Vent aligned for Pressurization Mode. (YES) Operator to verify the following: - Verify CONT RM AIR EXHAUST Fan, HVE-16 - STOPPED - Verify CLEANING Fan HVE-19 A/B - RUNNING - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1A-SA - CLOSED - Verify CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER, CR-D1B-SB - CLOSED - IF CR-D1A-SA OR CR-D1B-SB have lost power, THEN locally verify position in the Control Room Kitchen.
	BOP	Verify both EDGs running. (YES)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 24 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	BOP	**CONTINUOUS ACTION STEP:** Restart battery chargers within 30 minutes of power loss using OP-601.
	RO	**CONTINUOUS ACTION STEP:** CV Pressure has remained below 10 psig. (YES)
	BOP	Automatic Steam Line Isolation Initiated (NO)
	BOP	Automatic Steam Line Isolation Required (YES)
Critical Task	BOP	Verify all MSIVs AND MSIV Bypasses Closed MSIVs must be manually closed, if not performed earlier.
	SRO	Locally open breaker for HVS-1 at MCC-5 CMPT 7J within 60 min of SI Initiation.
Booth Operator		**Open the breaker for HVS-1 within approximately 3 minutes of request.**
	RO	RCS pressure > 1350 psig. [1250 psig] (YES) (May be NO if manual turbine runback not started immediately or if the steam dump malfunction not identified. Contingency steps have been added should RCS pressure be less than 1350 psig and are annotated with a "@" symbol.)
	RO	@ SI Flow Verified (YES)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 25 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	RO	@ RCS pressure > 125 psig (YES)
	BOP	At least 300 GPM AFW flow available. (NO)
	BOP	Level in at least one S/G greater than 8% [18%] (NO)
	BOP	Align AFW valves.
	BOP	At least 300 GPM AFW flow verified (NO)
	RO	Reset SPDS and Initiate Monitoring of Critical Safety Function Status Trees
	SRO	**Transition to FRP-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.**
	BOP	Check Total Feed Flow less than 300 GPM due to operator action. (NO)
	RO	Determine if Secondary Heat Sink is required: • Check RCS pressure greater than any non-faulted S/G pressure. (YES) • Check RCS temperature greater than 350°F [310°F] (YES) (May be NO if manual turbine runback not started immediately or if the steam dump malfunction not identified. Contingency steps have been added should RCS temperature be less than 350°F and are annotated with a "@" symbol.)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 26 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	SRO	@ Place RHR System in service using Supplement I.
	SRO	@ Consult Plant Operations Staff to determine if RHR should be placed in Core Cooling Mode.
Booth Operator		**Operations Staff is not currently available for consultation.**
	RO	@ Check RHR System – To be used in core cooling mode. (YES)
	RO	@ Check RCS Pressure – Less than 375 psig [350 psig] (NO)
	RO	@ WHEN RCS pressure less than 375 psig [350 psig], THEN go to Step 4.
Examiner's Note:		**Crew should have realized at this point that Supplement I is not the appropriate mitigation strategy and transition back to FRP-H.1.**
	BOP	**Continuous Action Step:** Check Any TWO S/G Wide Range Levels less than 10%. [19%] (NO)
	BOP	**Continuous Action Step:** Check CST level – Greater Than 10% (YES)
	BOP	Verify all S/G Blowdown AND Sample Isolation Valves – CLOSED (YES)
	BOP	Check AFW Lines – INTACT (YES)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 27 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	BOP	Check AFW Pump Breakers – Tripped (YES) ("B" MDAFW Tripped.)
	BOP	Attempt to reclose breaker on "B" MDAFW Pump as follows: a. Position the MDAFW Pump Control Switch to the STOP position. b. Reset SI c. Position the MDAFW Pump Control Switch to the START position.
	BOP	Check MDAFW Pump – RUNNING (NO)
	SRO	Contact I&C to investigate the tripped breaker.
	BOP	Attempt to Start SDAFW Pump as follows: Verify SDAFW Steam Shutoff Valves – OPEN (V1-8A,B,C opened and then re-close on SDAFW Pump trip.)
	BOP	Locally investigate AND attempt to restore AFW Flow as follows: a. Verify "B" AFW Pump suction supply is available. b. Position the "B" MDAFW Pump LOCAL/REMOTE Switch to LOCAL c. Attempt to start the "B" MDAFW Pump as follows: 1) Depress the "B" MDAFW Pump local STOP Pushbutton 2) Depress the "B" MDAFW Pump local START Pushbutton 3) Check "B" MDAFW Pump – STARTED (NO) Place the LOCAL/REMOTE Switch to REMOTE.
	BOP	Check AFW Flow to S/Gs – Greater than 300 gpm. (NO)

Op Test No.: 1	Scenario # 5	Event # 6, 7, 8, 9, 10, 11	Page 28 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open		

Time	Position	Applicant's Actions or Behavior
	RO	Stop ALL RCPs
	BOP	Check Condensate System – IN SERVICE (YES)
	RO	Place ALL the Feedwater Isolation Key Switches in the OVRD/RESET Position
Critical Task	BOP	Attempt To Establish Feedwater Flow AS Follows: a. Verify the FW HDR SECTION Valves – CLOSED (YES) • V2-6A • V2-6B • V2-6C b. Start one Main FW Pump (YES) c. Open the FRV Bypass Valves • FCV-479 • FCV-489 • FCV-499 d. Check FW Flow – Established (YES) **Criteria: Must be performed prior to 2 S/G WR Levels reaching less than 10%.**
	BOP	Check S/G Levels As Follows: a. Level In At Least One S/G - GREATER THAN 8% [18%] (NO)
	BOP	Determine If Feedwater Flow Is Adequate: a. Check the following: • Core Exit T/C Temperature – LOWERING (YES) OR • S/G Wide Range Level - RISING IN AT LEAST ONE S/G (YES) b. Maintain FW flow to restore S/G Level to greater than 8%[18%] c. Reset SPDS And Return To Procedure And Step In Effect

Op Test No.:	1	Scenario #	5	Event #	6, 7, 8, 9, 10, 11	Page	29 of 30
Event Description:	"B" S/G FRV FCV-488 fails closed, Turbine Trip does not occur, Steam Dump Valves fail Open, MSIVs fail to close on auto-close signal, RHR-744A/B fail to auto-open						

Time	Position	Applicant's Actions or Behavior

The Chief Examiner may terminate the scenario anytime after FW flow has been established to at least one S/G, or at his discretion.

ILC-11-2 NRC SCENARIO 5 TURNOVER SHEET

POWER LEVEL:	68% RTP
Core Burnup:	15697 MWD/MTU
EFPD:	448 EFPD
Boron:	132 PPM
Xenon:	Approaching EQ - 37 pcm/hr and lowering.
Tavg:	565.8°F
Bank D Rods	168 Steps

EQUIPMENT UNDER CLEARANCE:

- "A" MDAFW pump inoperable with breaker racked out
- Switchyard access is RESTRICTED.

EQUIPMENT STATUS:

- Automatic Rod Control is not operable.
- Currently thunderstorm watch is in effect for Darlington and Chesterfield counties.

INSTRUCTIONS FOR THE WATCH:

- "A" HDP recently started for PMT following maintenance. Maintain current power while RES is evaluating PMT results.

Unit 2 Status Board

Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	15697	Design:	16590
EFPD	448	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	258
1.77% =△K/K	≥350 F	611
2.6% =△K/K	100 F Cold	776
6% =△K/K	N/A	1950

Condenser Air Inleakage			SGBD		
			Target Value GPM		Status
A	13	CFM	A	50	Flash Tank With Heat Recovery
B	0	CFM	B	50	
Known	8	CFM	C	50	
Total	5	CFM	N2 Flow	8	SCFM

PORV Settings	Setting Date	POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints			
Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	132
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents	UPPER	LOWER	TARGET	% BAND
N-41	144	136	0.0212	5 +/-
N-42	126	125	0.0212	5 +/-
N-43	121	113	0.0212	5 +/-
N-44	112	108	0.0212	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data	
IC-17, 20, 22	
EOL	

ILC-11-2 NRC SCENARIO 5 TURNOVER SHEET

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EFPD:	448 EFPD
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Date:	Today	Time:	6:00:00 AM	Cycle:	27	MWD/MT:	15697	Design:	16590
EFPD	448	Design	473.5						

HUT	Level %	Status
CVCS-A	20	Filling
CVCS-B	10	Standby
CVCS-C	86	Standby
WHUT	#NAME?	Filling

Tank	Level %	Status
Monitor A	10	Standby
Monitor B	38	Standby
WCT A	37	Standby
WCT B	7	Standby
WCT C	9	Standby
WCT D	10	Standby
WCT E	9	Standby

Data Linked to PI

WGDTS	Pressure	PSIG	Status
A	#NAME?	PSIG	On cover
B	#NAME?	PSIG	In Service
C	#NAME?	PSIG	Isolated
D	#NAME?	PSIG	Standby

DEMINERALIZERS

	PPM	In Service	Date	Resin Replaced
MB A	2194	YES	7/17/2010	5/4/2010
MB B	2265	NO	7/17/2010	3/29/2010
CATION	1021	NO	9/17/2010	12/9/2009
DEB A	0	NO	New	2/3/2010
DEB B	0	NO	3/28/2010	
SFP	1963	NO	9/23/2008	4/22/2008

Shutdown Requirement	Temp	Boron
1.77% =△K/K	547 F Hot	258
1.77% =△K/K	≥350 F	611
2.6% =△K/K	100 F Cold	776
6% =△K/K	N/A	1950

Condenser Air Inleakage			SGBD		
			Target Value GPM		Status
A	13	CFM	A	50	Flash Tank With Heat Recovery
B	0	CFM	B	50	
Known	8	CFM	C	50	
Total	5	CFM	N2 Flow	8	SCFM

PORV Settings

	Setting Date	POT	GP-3 Psig
A	7/18/2010	3.21	1000
B	7/18/2010	3.12	1040
C	7/18/2010	3.44	1000

RCS Leakage	0.00	Unidentified
Total	0.03	GPM
PRT	0.02	GPM
RCDT Leakage	0.01	GPM
Charging Leakoff	0	GPM
Misc Identified	0	GPM
Primary/Secondary	0	GPD
Secondary Loss	17.3	GPM

Effluent Radiation Monitor Setpoints

Rad Monitor	Current Setpoint	Alert Value 200X	NUE Value 2X
R-14C	1.01E+04	N/A	2.020E+04
R-20	7.40E+03	N/A	1.480E+04
R-18	1.00E+06	2.000E+08	2.000E+06
R-19A	1.05E+04	2.100E+06	2.100E+04
R-19B	9.72E+03	1.944E+06	1.944E+04
R-19C	9.58E+03	1.916E+06	1.916E+04
R-37	8.53E+03	1.706E+06	1.706E+04

Hi Flux At Shutdown

	Previous ARI Counts	Setpoint
NI-31	50	150
NI-32	60	180

Manually Entered Data

Boron PPM	Date	PPM
RCS	Today	132
BAST-A	9/16/2010	21,535
BAST-B	9/16/2010	21,032
SFP	9/15/2010	2246
RWST	9/16/2010	2219
Accum-A	8/30/2010	2211
Accum-B	8/30/2010	2206
Accum-C	8/30/2010	2230
RHR	7/6/2010	2221
Refuel Canal		
Refuel Cavity		
SFP Canal		

Linked to Chem data base

Date	PPM
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Normal Currents

	UPPER	LOWER	TARGET	% BAND
N-41	144	136	0.0212	5 +/-
N-42	126	125	0.0212	5 +/-
N-43	121	113	0.0212	5 +/-
N-44	112	108	0.0212	5 +/-
POWERTRAX Rev# 2.1.0 RNP			% APL	112.55

FANS	Test/Hrs	Date/Tst
HVE-1A/B	35640.6	3/8/10
HVE-15A	18643.5	3/18/10
HVE-19A/B	6928.3	5/3/10
SR 3.7.11.2 Last Completed		5/27/2010 19:45

Notes/Additional Data	
IC-17, 20, 22	
EOL	