Facility:	Watts Bar (2008-B)	Scenario No.: 1	Op Test No.: 1
Examiners:		Operators:	

Initial Conditions: 2% power at BOL, no equipment OOS. Preparing for power escalation and mode change.

Turnover: The plant is at BOL. A startup is in progress from a forced outage to repair an EHC high pressure piping leak. Power is stable at 2%. GO-3 Section 5.2 step 12 which required the completion of Appendix A (Mode 2 to Mode 1 approval) was just completed. The Operation Superintendent's approval to enter Mode 1 was just obtained. The crew is in GO-3 "Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power" section 5.3 step 3. The crew is then expected to raise reactor power to between 13% and 15% utilizing control rods.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-RO N-SRO/BOP	Raise reactor power to between 13% and 15%.
2	RX18	C-SRO/RO	Auctioneered Tavg fails high. AOI-2 entry.
3	CC12A CC03B	TS-SRO C-BOP	1A CCS Pump bearing wear results in pump failure. 1B CCS Pump fails to auto start. AOI 15 entry. Tech Spec evaluation.
4	RD07B	C-SRO/RO TS-SRO	Control rod H-12 drops to the bottom of the core. AOI-2 entry. Tech Spec evaluation.
5	RD07D	C-SRO/RO TS-SRO	While in AOI-2, control rod C-5 drops to the bottom of the core, requiring reactor trip and EOP entry.
6	RX20 100	C-BOP C-SRO	Main Steam pressure transmitter 1-PT-1-33 fails high resulting in steam dumps opening, requiring BOP action to close IAW ES-0.1.
7	TH01B RP02B ED06A	M-ALL C-RO	Large Break LOCA with failure of both SI trains to automatically actuate and a loss of 1A 6.9 KV Shutdown Board. RO manually actuates SI. Requires entry into E-0 and later E-1.
8	RH02	C-RO/SRO	Failure of automatic RHR Pump swap over to Containment Sump in ES-1.3. RO manually actuates.
9	RH01B	C-RO/SRO	Loss of 1B RHR Pump, requires entry into ECA-1.1

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

Scenario 1 Summary

Initial Conditions:

The plant is at BOL. A startup is in progress from a forced outage to repair an EHC high pressure piping leak. Power is stable at 2%. GO-3 Section 5.2 step 12 which required the completion of Appendix A (Mode 2 to Mode 1 approval) was just completed. The Operation Superintendent's approval to enter Mode 1 was just obtained. The crew is in GO-3 "Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power" section 5.3 step 3. The crew is then expected to raise reactor power to between 13% and 15% utilizing control rods.

1. Commence a power increase, in accordance with the reactivity plan.
2. Auctioneered Tavg fails high. Charging flow rises due to PZR level setpoint failing to 60%. RO manually controls charging IAW AOI-2 "Malfunction of Reactor Control".
3. 1A CCS Pump bearing starts to wear to the point it trips on overcurrent. The 1B CCS Pump fails to auto start on low pressure. BOP manually starts the 1B CCS Pump IAW AOI-15, Loss of Component Cooling Water. SRO evaluates Tech Specs.
4. Control rod H-12 drops to the bottom of the core. AOI-2, "Malfunction of Reactor Control", is entered. SRO evaluates Tech Specs.
5. At Lead Evaluators discretion, control rod C-5 drops into the core, requiring reactor trip and E-0 and ES-0.1 entry.
6. Main Steam pressure transmitter 1-PT-1-33 fails high resulting in steam dumps opening, requiring BOP action to close IAW ES-0.1.
7. Large Break LOCA with failure of both SI trains to automatically actuate and a loss of 1A 6.9 KV Shutdown Board. RO manually actuates SI. Requires entry into E-0 and later E-1.
8. Failure of automatic RHR Pump swap over to Containment Sump in ES-1.3, requiring manual actions by RO.
9. Just after RO takes manual action to swap suction 1B RHR Pump over to Containment Sump in ES-1.3, the 1B RHR Pump will trip, requiring transition to ECA-1.1. The scenario will end when the crew has addressed commencing a cooldown at less than 100° F/Hr.

Critical Tasks:	**1**	**2**	**3**
	Manually initiates SI or places in service at least one full train of ESF equipment before transition from E-0.	Perform transfer of available RHR Pump from RWST to Containment sump.	Maximize RWST Inventory during ECA-1.1: • Secure Containment Spray Pumps as required by ECA-1.1 • Initiate RWST makeup.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Sim. Setup	**rst 274, switch check, select RUN** ***verify malfunctions and overrides listed below***	2% RTP, BOL, C_b - 1807 ppm. This IC contains the overrides and triggers.
0	Disable simulator fault alarm	Turns off audible alarm for the simulator fault so the crew cannot hear this alarm.
0	Place A Train week 1 placard on entrance side panel.	On entrance side panel.
0	Indicate/Enter in the appropriate blanks this information into the reactivity briefing book, (appendix B TI-7.012)	Ensure **BOL *Reactivity Briefing Book*** is used. Item 3: blank and Manual rod control. Item 4: Negative, 1-CCP B, 1810 Item 5: 1807, Boron, BA 24, PW 70, BA Pot 60, PW POT 35 Item 6: Blank Item 7: Blank
Sim Setup if IC 274 does not work.	**rst 49, switch check, select run, follow GO-2 to take simulator critical and raise power to 2% and stabilize.**	2% RTP, BOL, C_b - 1807 ppm.
0	**imf rx18 (e1) 100**	**Auctioneered Tave fails high**
0	**imf cc12a (e2) 100**	**1A CCS Pump bearing wear results in pump failure with 1B CCS pump fails to auto start.**
0	**imf cc03b**	**1B CCS Pump fails to auto start.**
0	**imf rd07d (e3)**	**Control Rod H-12 drops inot the core**
0	**imf rd07b (e4)**	**Control Rod C-5 drops inot the core**
0	**imf rx20 (e5) 100 10:**	**Main Steam Transmitter 1-PT-1-33 fails to 100% over 10 minutes.**
0	**irf rpr63 inhibit**	**Inhibit P-12 to prevent Steam Dumps from automatically closing on Lo-Lo Tavg**
0	**imf th01b (e6) 65**	**LBLOCA at 65% design break**

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
0	imf rp02b	Both SI Trains fail to auto actuate
0	imf ed06a (e6)	Loss of 1A 6.6kv Shutdown Board
0	imf si07 (e6) 15	1500 gpm RWST leak to shorten time to ES-1.3
0	imf rh02	Failure of automatic RHR Pump swapover to CNTMT sump
0	imf rh01b (e7)	1B RHR Pump trip.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 1: Increase power as determined by NRC Examiner.	none	**Increase power from 2% to ~15% for turbine operation.**
Event # 2: When actions associated power rise are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 1**	**imf rx18 (e1) 100**	**Auctioneered Tave fails high** If notified as work control/maintenance concerning Auctioneered Tave failure acknowledge request
Event # 3: When actions associated with Auctioneered Tave failure are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 2**	**imf cc12a (e2) 100**	**1A CCS pump trip due to bearing failure with 1B CCS pump failing to auto start.** If notified as NAUO, wait 5 minutes and report that the 1A CCS pump motor is hot to the touch. If notified as NAUO, report that 1A CCS pump tripped on overcurrent. If notified as work control/maintenance concerning 1A CCS pump acknowledge request.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 4 : When actions associated with 1A CCS Pump are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 3**	**imf rd07d (e3)**	**Control Rod H-12 drops to the bottom of the core.**
		If asked as an NAUO to investigate Control Rod H-12 drop, wait 5 minutes and report that a fuse in the in the gripper coil circuit has blown
		As Reactor Engineering, if asked to evaluate the core acknowledge the request.
Event # 5 : When actions associated with dropped **Control Rod H-12** are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 4**	**imf rd07b (e4)**	**Control Rod C-5 drops to the bottom of the core.**
Event # 6 : When determined by NRC Examiner, Insert this Malfunction using **Trigger 5**	**imf rx20 (e5) 100 10:** **irf rpr63 inhibit**	**Main Steam Transmitter 1-PT-1-33 fails to 100% over 10 minutes (P-12 is inhibited).**
		If notified as work control/maintenance concerning Main Steam Transmitter 1-PT-1-33 fails acknowledge request
		If notified as NAUO to look for steam leaks or steam from relief/safety valves and/or S/G PORVs wait 2 minutes and report no leaks found.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Events # 7 & 8 When determined by NRC Examiner, Insert this Malfunction using **Trigger 6**	**imfTH01B (e6) 65** **imf ed06a (e6)** **imf rp02b**	**LBLOCA with failure of SI to auto actuate, Loss of 1A 6.9 KV Shutdown Board and failure of RHR Pump to auto swapover to CNTMT sump.**
		As NAUO, when asked initiate AOI-17, Turbine Trip BOP Alignment, acknowledge request.
	mrf sir 01 on	As NAUO, when asked to initiate E-1, Appendix A, CLA Breaker Operation, wait 10 minutes and report Appendix complete.
		As NAUO, when asked to initiate E-1, Appendix B, Ice Condenser AHU Breaker Operation wait 10 minutes and report Appendix complete.
	imf rh07 0 20:	As NAUO, when asked to manually close 1-FCV-63-1 wait 20 minutes and report complete
	mrf sir 06 on	As NAUO, when asked to initiate E-1, Appendix D, 1-FCV-63-22 Breaker Operation wait 10 minutes and report Appendix complete
		As NAUO, when asked to Locally **CHECK** low analyzer temp lights NOT lit, wait 5 minutes and report analyzer temp lights NOT lit.
		As NAUO, when asked CLOSE 1-ISV-70-700 RCP OIL COOLER CCS RETURN ISOLATION , wait 5 minutes and report closed.
		As NAUO, when asked to UNLOCK AND CLOSE 1-ISV-67-523B - LOWER CNTMT VENT CLR 1B &1D ERCW SUP ISOL wait 5 minutes and report closed.
When determined by NRC Examiner, modify malfunction for RWST Leak to 100 gpm	**mmf si07 1**	**Lowers RWST leak to 100 gpm.**

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO 1 Power Increase with LBLOCA

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Events # 9 When determined by NRC Examiner, Insert this Malfunction using **Trigger 7**	**imf rh01b (e7)**	**1B RHR Pump trip.**
		If notified as NAUO, investigate pump, wait 5 minutes and report that the 1B RHR Pump motor is hot to the touch.
		If notified as NAUO, to investigate breaker, report that 1B RHR Pump tripped on overcurrent.
		If notified as the TSC to evaluate transferring water to RWST, acknowledge request. Wait 5 minutes and report that a team will be briefed on transferring water to the RWST from the Holdup Tank.
		If notified as Radprot/Chemistry to evaluate radiation level of water in cntmt sump for potential transfer to RWST, acknowledge request.

Op Test No.: NRC Scenario # 1 Event # 1 Page 1 of 58

Event Description: Raise from ≈2% toward 14%

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **No action required for Event 1**		
Indications available: **None Applicable**		
	SRO	**Raise load in accordance with GO-3 Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power**
Evaluator Note: Following Steps are from GO-3 Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power starting at section 5.3 step 1.		
	CREW	[1] **REVIEW** plant parameters and indications, and **CHECK** stability before Reactor power escalation.
	BOP	[2] **IF** SG blowdown is in-service, **THEN ADJUST** 1-HIC-15-43, SG BLOWDOWN FLOW CONTROL to desired flow rate (pt F0619A). ***Step is N/A, blowdown is in service.***
	RO	[3] **INITIATE** a methodical and deliberate rise in Reactor power to between 13 and 15% by rod withdrawal and/or RCS dilution. ***Should use rod withdrawal as discussed in shift turnover.***
	RO	[4] **WHEN** greater than 5% power, **THEN LOG** MODE 1 ENTRY.
	BOP	[5] **ENSURE** MFW Bypass Reg Controllers maintain SG levels on program.

Op Test No.: NRC Scenario # 1 Event # 1 Page 2 of 58

Event Description: Raise from ≈2% toward 14%

Time	Position	Applicant's Actions or Behavior
Evaluator Note: Lead Examiner may direct initiation of the next event at his discretion.		
	RO	[6] **WHEN** greater than or equal to 10% power on at least 2-out-of-4 PRMs, **THEN** [6.1] **CHECK** Permissive 64-E, P-10 NUC AT POWER PERMISSIVE, is **LIT.** [6.2] **CHECK** Permissive 70-D, P-7 LO POWER TRIPS BLOCKED, is **NOT LIT**. [6.3] **COMPARE** the highest PRM with the highest loop ΔT indication, and **IF** greater than 5% deviation exists, **THEN STOP** power rise, and **NOTIFY** the SRO.
Start of Critical Step(s)		
	RO	[6.4] **BLOCK** the IR Hi-Flux Reactor trip and PR Lo-Flux Reactor trips by performing the following: [6.4.1] **PLACE** the following switches to **BLOCK:** • N38A, IR TRIP BLOCK P-10, AND • N38B, IR TRIP BLOCK P-10 [6.4.2] **CHECK** PERMISSIVE 65-C, INTERMED RANGE TRIP BLOCKED, IS LIT. [6.4.3] **PLACE** the following switches to **BLOCK:** • N47A, PR LO POWER TRIP BLOCK P-10, AND • N47B, PR LO POWER TRIP BLOCK P-10 [6.4.4] **CHECK** ALARM 64-D, POWER RANGE LO SETPOINT TRIP BLOCKED, IS LIT.
End of Critical Step(s)		

Op Test No.: NRC Scenario # 1 Event # 1 Page 3 of 58

Event Description: Raise from ≈2% toward 14%

Time	Position	Applicant's Actions or Behavior
	RO	[7] **IF NOT** already in service, **THEN ENSURE** one Fain Feed Pump (MFP) in-service by performing the following: [7.1] **START** a selected MFP per SOI-2 & 3.01. [7.2] **EVALUATE** starting one Condensate Booster Pump, based on MFP suction pressure or MFP vibration. [7.3] **IF** the Standby MFP is running, **THEN SHUTDOWN** the Standby MFP, and **PLACE** in Standby per SOI-2 & 3.01.

Op Test No.: NRC Scenario # 1 Event # 2 Page 4 of 58

Event Description: Auctioneered Tavg fails high.

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 2 (Trigger 1)**
		Indications available: Alarm 92A PZR Level Hi/Lo. Alarm 94B Tavg-Tauct Deviation. Auctioneered Tavg failed high on 1-TR-68-2B. Charging Flow rising. Pressurizer Level rising.
	Crew	The crew should diagnose that there has been a failure affecting Auctioneered Tavg.
	RO	May take Prudent Operator action IAW TI-12.04 to place Charging (1-FCV-62-93) in manual and lower charging flow to normal.
Evaluator Note (1):		***The crew may go to either AOI-2 "MALFUNCTION OF REACTOR CONTROL SYSTEM" or AOI-20, "MALFUNCTION OF PRESSURIZER LEVELCONTROL SYSTEM". (ARI-92A has a step which states: IF Malfunction Of Pressurizer Level Control System, THEN GO TO AOI-20)***
Evaluator Note (2):		***Following Steps are from AOI-20, "MALFUNCTION OF PRESSURIZER LEVELCONTROL SYSTEM".***
	RO	1. **CHECK** pzr level program signal NORMAL: • LR-68-339 (green pen). ***Perform RNO:*** ***PERFORM the following:*** a. PLACE charging valve controller 1-HIC-62-93A in MAN, and RESTORE level to normal. b. IF letdown in service, THEN GO TO Step 10.
	RO	10. **INITIATE** repairs to failed instrument/circuitry.

Op Test No.: NRC Scenario # 1 Event # 2 Page 5 of 58

Event Description: Auctioneered Tavg fails high.

Time	Position	Applicant's Actions or Behavior
	RO	11. **RETURN TO** instruction in effect.
Evaluator Note : Following Steps are from AOI-2 "MALFUNCTION OF REACTOR CONTROL SYSTEM.		
	SRO	Directs actions IAW AOI-2 **MALFUNCTION OF REACTOR CONTROL SYSTEM** **3.1 Diagnostics** **Diagnostics** **IF** / **GO TO Subsection** Continuous Rod Withdrawal/Insertion — 3.2 (Page 6) Instrument failure (e.g. T-avg, NIS, PT-1-73) with Rod Control in MAN — 3.2 (Page 6) Dropped RCCA — 3.3 (Page 11) RCCA Misalignment — 3.4 (Page 21) Rod Position Indicator (RPI) Malfunction — 3.5 (Page 39) Failure of Control Rods to Move on Demand — 3.6 (Page 42) Goes to Subsection 3.2
	RO	1. **PLACE** control rods in MAN.
	RO	2. **CHECK** control rod movement STOPPED.
	RO	3. **MAINTAIN** T-avg on PROGRAM. (Reference Attachment 1) • **USE** control rods. OR • **ADJUST** turbine load.
	RO	4. CHECK loop T-avg channels NORMAL.

Op Test No.: NRC Scenario # 1 Event # 2 Page 6 of 58

Event Description: Auctioneered Tavg fails high.

Time	Position	Applicant's Actions or Behavior
	RO	5. **CHECK** Auct Tavg NORMAL on 1-TR-68-2B. ***Perform RNO:*** **CONTROL** pzr level in MAN with 1-FCV-62-93. (Reference Attachment 1)

RX POWER	TAVG-TREF	PZR LEVEL
2%	557.6 °F	25.7 %
4%	558.2 °F	26.4 %
6%	558.8 °F	27.1 %
8%	559.3 °F	27.8 %
10%	559.9 °F	28.5 %
12%	560.5 °F	29.2 %
14%	561.1 °F	29.9 %

	RO	6. **CHECK** NIS power range channels NORMAL.
	BOP	7. **CHECK** the following: • Turbine impulse pressure channel 1-PI-1-73, NORMAL. • Tref and Auct Tavg NORMAL on 1-TR-68-2B ***Perform RNO: (No actions required, since plant in Startup Mode)*** **PLACE** steam dumps in pressure mode as follows: a. **PLACE** steam dumps to OFF. b. **PLACE** mode selector HS to STEAM PRESS. c. **ADJUST** steam dump demand to zero. d. **PLACE** steam dumps to ON. e. **ENSURE** controller set at 84% (1092 psig). f. **WHEN** conditions allow, **THEN REFER TO** SOI-1.02 and **PLACE** steam dumps in TAVG Mode.

Op Test No.: NRC	Scenario # 1	Event # 2	Page 7 of 58
Event Description: Auctioneered Tavg fails high.			

Time	Position	Applicant's Actions or Behavior
	RO	8. **MONITOR** core power distribution parameters: • Power range channels. • Δ Flux Indicators. • T-avg. • Loop □T. • Incore TCs. • Feed flow/Steam flow. ***Should be no changes***
	SRO	9. **INITIATE** repairs to failed equipment.
	SRO	10. **REFER TO** Tech Specs: ***none applicable.***
At discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC Scenario # 1 Event # 3 Page 8 of 58

Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 3 (Trigger 2)**
		Indications available: **CCS PMPS 1A-A & 1B-B DISCH PRESS LO [250C].** **LOW FLOW (headers or individual equipment).** **Breaker disagreement WHITE light on 1-HS-70-46A CCS PMP 1A-A Handswitch.** **Alarm 226E ERCW/CCS Motor Tripout.**
	Crew	The crew should diagnose that there has been a failure affecting CCS flow.
	BOP	May take Prudent Operator action IAW TI-12.04 to start 1B CCS Pump and place the 1A in PTL.
Evaluator Note:		***Following Steps are from AOI-15 Loss of Component Cooling Water***
	SRO	Directs actions IAW AOI-15 *Loss of Component Cooling Water* **3.1 Diagnostics**

IF	GO TO
Loss of CCS Flow, OR Surge tank level less than 60% or dropping uncontrolled.	Subsection 3.2
Surge tank level greater than 72% or rising uncontrolled OR CCS Rad Monitor alarm.	Subsection 3.3
Loss of CCS due to loss of AC power train.	AOI-35

Goes to Subsection 3.2

Op Test No.: NRC Scenario # 1 Event # 3 Page 9 of 58

Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure

Time	Position	Applicant's Actions or Behavior
	BOP	1. **CHECK** CCS pumps status: a. **CHECK** any CCS pump TRIPPED or running pump NOT pumping forward: • ERCW/CCS Motor tripout alarm, • Low header pressure (train A or B), • Multiple low flow alarms. b. **CHECK** at least one U-1 Train A header supply pump RUNNING AND pumping forward: • 1A-A • 1B-B ***Should diagnose that 1A CCS Pump is tripped. Should perform RNO to start 1B CCS*** b. **START** available U-1 Train A CCS Pump.
	BOP	c. **CHECK** any Train B header supply pump RUNNING AND pumping forward: • C-S • 2B-B ***Determines that "B" Train is operating properly***
	BOP	d. **PLACE** any non-operable or tripped CCS pump in STOP/PULL-TO-LOCK.
	BOP	e. **CHECK** TWO U-1Train A header supply pumps RUNNING: • 1A-A • 1B-B ***Perform RNO:*** ***ENSURE at least one of the following CLOSED to avoid excessive flow:*** ***• RHR htx A, 1-FCV-70-156,*** ***OR*** ***• SFP htx A, 0-FCV-70-197.***

Op Test No.: NRC Scenario # 1 Event # 3 Page 10 of 58

Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure

Time	Position	Applicant's Actions or Behavior
	BOP	f. **CHECK** flows returned to NORMAL. *Determines that flows returned to normal due to absence of alarms.*
	BOP	g. **CHECK** A and B side surge tank levels between 57% and 85%.
	BOP	h. ** **GO TO** Step 15.
BOP Evaluator Note:		**AOI-15 Appendix A pages are at the end of this section (page 11).**
	BOP	15. **EVALUATE** affected equipment operation USING Appendix A.
	BOP	16. **WHEN** CCS returned normal, **THEN CHECK** only one CCS pump per Train. **CHECK** one TBBP running. ***Will need to Perform RNO and stop and place one TBBP in P-Auto*** **IF** 2 CCS pumps or 2 TBBPs running, **THEN:** • **STOP** second running CCS pump and Return HS to A-P AUTO. • **STOP** second running TBBP pump and Return HS to A-PUTO.
Evaluator Note: Following Steps are from ARI-110-D LTDN TO DEMINS TEMP HI		
	RO	[1] **IF** letdown temperature is greater than 137.5 °F on 1-TI-62-78 [1-M-6], **THEN** **ENSURE** CVCS demineralizers bypassed (lights above 1-HS-62-79 [1-M-6]).
	RO	[2] **ENSURE** letdown flow is 45 gpm to 120 gpm on 1-FI-62-82 [1-M-6].
	RO	[3] **ENSURE** charging flow is 57 gpm to 132 gpm on 1-FI-62-93A [1-M-5].

Op Test No.: NRC Scenario # 1 Event # 3 Page 11 of 58

Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure

Time	Position	Applicant's Actions or Behavior
	RO	*After CCS is restored* **[4]** **ADJUST** 1-HIC-62-78A to maintain letdown temperature less than 127 °F on 1-TI-62-78.
	RO	**[7]** **WHEN** ready to return to normal, **THEN** **PLACE** 1-HS-62-79A, LTDN HI TEMP DIVERT, in DEMIN position, and **HOLD** until 1-TCV-62-79 is fully open.
Evaluator Note: Following Steps are SRO Actions in AOI-15		
	SRO	17. **REFER TO** Tech Specs 3.7.7, Component Cooling Water System (CCS). *Enters LCO 3.7.7 condition A for one train CCS inoperable.*
	SRO	18. **INITIATE** repairs.
	SRO	**GO TO** appropriate plant procedure.
When technical specifications have been identified or at discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC	Scenario # 1	Event # 3	Page 12 of 58
Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure			
Time	Position	Applicant's Actions or Behavior	

APPENDIX A
Page 1 of 2

HEADER CROSS-REFERENCE

ESF EQUIPMENT 1A

COMPONENT	NORMAL FLOW	FLOW INDICATOR
CCP 1A Gear & Oil Clr	≥28 gpm	1-FI-70-146
SIP 1A Oil Clr	≥15 gpm	1-FI-70-147
CS Pump 1A Oil Clr	≥2 gpm	1-FI-70-150
RHR Pump 1A Seal Hx	≥10 gpm	1-FI-70-151
RHR Hx 1A	≥5000 gpm	1-FI-70-158

ESF EQUIPMENT 1B

COMPONENT	NORMAL FLOW	FLOW INDICATOR
CCP 1B Gear & Oil Clr	≥28 gpm	1-FI-70-145
SIP 1B Oil Clr	≥15 gpm	1-FI-70-148
CS Pump 1B Oil Clr	≥2 gpm	1-FI-70-149
RHR Pump 1B Seal Hx	≥10 gpm	1-FI-70-152
RHR Hx 1B	≥5000 gpm	1-FI-70-155

Op Test No.: NRC	Scenario # 1	Event # 3	Page 13 of 58
Event Description: 1A CCS Pump trips. 1B CCS pump fails to auto start on low pressure			
Time	Position	Applicant's Actions or Behavior	

APPENDIX A
Page 2 of 2

HEADER CROSS-REFERENCE

Equipment Affected by Isolation of the Rx Bldg or Misc Equip Hdr

NOTE: All listed equipment affected by isolation Misc Equip and Rx Bldg Hdrs.

COMPONENT	ACTION
RX BLDG HDR EQUIPMENT	
Excess Letdown Hx	Remove from service USING SOI-62.01.
RCP Motor Bearings	Stop RCP(s) if motor bearing rises to 195°F (alarm @ 185°F). RCPs must be tripped within 10 minutes of loss of CCS to oil coolers.
Thermal Barrier Booster Pump supply	Stop TB pumps. Check RCP seal temp & flow.
Post Accident Sampling	Notify Chemistry.
MISC HDR EQUIPMENT	
Seal Water Hx	Check VCT temp. Should be slight rise in seal supply temp (max 130°F).
Letdown Hx	Isolate charging and letdown (Excess Letdown is NOT available).
Sample Hxs	Notify Chemistry.
Waste Gas Compressor	Remove from service USING SOI-77.02

Op Test No.: NRC Scenario # 1 Event # 4 Page 14 of 58

Event Description: Dropped Control Rod

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 4 & 5 (Trigger 3)**		
Indications available: **Alarm 87D Rod at Bottom** **Rod H-12 indicates fully inserted** **Reactor Power NIs lowering**		
	Crew	The crew should diagnose that there has been a dropped Control Rod.
	SRO	The SRO may direct the reactor trip breakers to be opened at any time the crew believes the reactor is subcritical.
Evaluator Note: Following Steps are from AOI-2 **MALFUNCTION OF REACTOR CONTROL SYSTEM**		
	SRO	Directs actions IAW AOI-2 **MALFUNCTION OF REACTOR CONTROL SYSTEM 3.1 Diagnostics** **Diagnostics** **IF** / **GO TO Subsection** Continuous Rod Withdrawal/Insertion — 3.2 (Page 6) Instrument failure (e.g. T-avg, NIS, PT-1-73) with Rod Control in MAN — 3.2 (Page 6) Dropped RCCA — 3.3 (Page 11) RCCA Misalignment — 3.4 (Page 21) Rod Position Indicator (RPI) Malfunction — 3.5 (Page 39) Failure of Control Rods to Move on Demand — 3.6 (Page 42) Goes to Subsection 3.3
	RO	1. **PLACE** control rods in MAN.

Op Test No.: NRC Scenario # 1 Event # 4 Page 15 of 58

Event Description: Dropped Control Rod

Time	Position	Applicant's Actions or Behavior
	RO	2. **CHECK** core power distribution parameters normal: Power Range Channels • ΔFlux Indicators • Tavg • Loop ΔT • Incore TCs • Feed Flow/Steam Flow Continue with Step 4.
EVALUATOR NOTE: The following step will be required when the second rod drops into the core. ***LEAD EVALUATOR NOTE:*** ***Cue Console Operator to initiate Trigger 4 (2nd rod drop) after Tech Spec evaluation, at your discretion.***		
	RO	4. **IF** two or more RCCAs have dropped, **THEN**: a. TRIP reactor. b. GO TO E-0, Reactor Trip or Safety Injection.
	RO	5. **ENSURE** T-avg and T-ref within 3°F: **ADJUST** turbine load and/or Boron concentration as necessary. ***NO ACTION SHOULD BE PERFORMED***
	RO	6. **MONITOR** core power distribution parameters: • Power range channels. • ΔFlux Indicators. • T-avg. • Core ΔT. • Incore TCs. • Feed flow/Steam flow.
	BOP	7. **RESET** any power range monitor POSITIVE RATE TRIP window LIT, [1-M-13].

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Event Description: Dropped Control Rod

Time	Position	Applicant's Actions or Behavior
		NOTE If the reactor is subcritical, retrieval of a dropped rod is NOT the conservative action. Reactor Engineering evaluation should consider opening the reactor trip breakers.
	SRO	8. **NOTIFY** Reactor Engineering to evaluate core anomaly.
	SRO	9. **NOTIFY** STA to perform 1-SI-0-21, Excore QPTR. ***Step is N/A.***
	SRO	10. **REFER TO** Tech Specs: 3.1.5, Rod Group Alignment Limits. ***Tech Spec 3.1.5 applies***

B. One rod not within alignment limits.	B.1	Restore rod to within alignment limits.	1 hour
	OR		
	B.2.1.1	Verify SDM is ≥ 1.6% k/k.	1 hour
	OR		
B. (continued)	B.2.1.2	Initiate boration to restore SDM to within limit.	1 hour
	AND		
	B.2.2	Reduce THERMAL POWER to ≤ 75% RTP.	2 hours
	AND		
	B.2.3	Verify SDM is ≥ 1.6% -k/k	Once per 12 hours
	AND		
	B.2.4	Perform SR 3.2.1.1.	72 hours
	AND		
	B.2.5	Perform SR 3.2.2.1.	72 hours
	AND		
	B.2.6	Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days

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Event Description: Dropped Control Rod

Time	Position	Applicant's Actions or Behavior
	SRO	11. **RECORD** the following information: • Time the RCCA dropped. • Core location of RCCA. • Reactor power prior to dropping. • Affected RCCA height prior to dropping.
At discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC Scenario # 1 Event # 5 & 6 Page 18 of 58

Event Description: 2nd Control Rod Drop, E-0, ES-0.1 and 1-PT-1-33 failure resulting in Steam Dumps opening

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: When requested by Lead Evaluator, initiate Event 5 (Trigger 4)
		Indications: **Rod C-5 drops into the core**
	SRO	Directs RO to manual trip the Reactor due to 2 dropped control rods.
		Evaluator Note: The following are steps from E-0.
		NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS. NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.
	RO	1. **ENSURE** reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. **ENSURE** Turbine Trip: • All turbine stop valves CLOSED.

Time	Position	Applicant's Actions or Behavior
	RO	3. **CHECK** 6.9 kV shutdown boards: a. At least one board energized from:CSST (offsite), OR D/G (blackout).
	RO	4. **CHECK** SI actuated: a. Any SI annunciator LIT. ***Perform RNO:*** **DETERMINE** if SI required: a. **IF** ANY of the following exists: • S/G press less than 675 psig, OR • RCS press less than 1870 psig, OR • Cntmt press greater than 1.5 psig **IF** SI **NOT** required, **THEN GO TO** ES-0.1, Reactor Trip Response.
	SRO	Directs crew to ES-0.1, Reactor Trip Response.
Evaluator Note (1): The following are steps from ES-0.1, Reactor Trip Response. ***Evaluator Note (2): SRO should call STA to perform Status Trees***		
	RO	**MONITOR** SI actuation criteria: • **IF** SI actuation occurs during the performance of this Instruction, **THEN** ** **GO TO** E-0, Reactor Trip or Safety Injection.
	BOP	**CHECK** Generator PCBs OPEN.

Op Test No.: NRC Scenario # 1 Event # 5 & 6 Page 20 of 58

Event Description: 2nd Control Rod Drop, E-0, ES-0.1 and 1-PT-1-33 failure resulting in Steam Dumps opening

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: ***The following RNO step will be required when Event 6 (1-PT-1-33 high failure) occurs.*** ***LEAD EVALUATOR NOTE:*** ***Cue Console Operator to initiate Event 6 (1-PT-1-33 failure) at your discretion.*** ***Due to the ramping of the malfunction and the initial steam pressure, it may take ≈ 2-3 minutes for the first three Steam Dumps to start to open. After they start to open, the MSIVs will automatically close ≈ 90 seconds later.*** ***Indications for 1-PT-1-33 high failure:*** • **Steam Dumps opening** • **Tave lowering** • **RCS Pressure lowering.** • **Main Steam flow rising.** • **Main Steam Pressure lowering** • **MSIV closure (should get an SI, but auto SI actuation is blocked)**
	BOP	**MONITOR** RCS temperature stable at or trending to 557°F: • **IF** any RCP running, **THEN MONITOR** RCS Loop T-avg trending to 557°F. ***Perform RNO:*** ***IF temperature is less than 557°F, THEN ENSURE steam dumps, S/G PORVs, and blowdown isolation valves CLOSED. IF cooldown continues, THEN:*** • ***ENSURE total feed flow is less than or equal to 500 gpm:*** ***a. REFER TO SOI-3.02, Auxiliary Feedwater System, for manual control of TDAFWP.*** • ***MAINTAIN at least one S/G NR level greater than 29%, or total feed flow between 410 and 500 gpm for heat sink.***

Time	Position	Applicant's Actions or Behavior
		IF cooldown continues after AFW flow is controlled, THEN: ***• CLOSE MSIVs.*** ***• ENSURE MSIV bypasses CLOSED.*** ***• PLACE steam dump controls OFF.***
LEAD EVALUATOR NOTE: ***Cue Console Operator to initiate Event 7 (Large Break LOCA, Loss of 1A 6.9 KV Shutdown Board) at your discretion.***		
	BOP	4. **ENSURE** AFW operation: a. AFW established: • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO or controlled in MANUAL. b. Heat sink available: • Total feed flow greater than 410 gpm, OR • At least one S/G NR level greater than 29%.
	BOP	5. **CHECK** MFW status: a. **CHECK** RCS T-avg less than 564°F. b. **ENSURE** MFW isolation: • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED.

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Event Description: 2nd Control Rod Drop, E-0, ES-0.1 and 1-PT-1-33 failure resulting in Steam Dumps opening

Time	Position	Applicant's Actions or Behavior
	RO	6. **ENSURE** all control rods fully inserted: • RPIs at bottom scale.
	RO	7. **ANNOUNCE** reactor trip over PA system.
Evaluator Note:		***No more ES-0.1 steps are included. When Event 7 is commenced, the SRO should direct the crew back to E-0.***

Op Test No.: NRC Scenario # 1 Event # 7 & 8 Page 23 of 58

Event Description: LBLOCA with failure of SI to auto actuate, Loss of 1A 6.9 KV Shutdown Board and failure of RHR Pump to auto swapover to CNTMT sump.

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 7 & 8 (Trigger 6)**
		Indications **PZR Pressure lowering toward 0 psig** **Cold Leg Accumulators injecting** **Loss of Sub Cooled Margin** **Loss of 1A 6.9 KV Shutdown Board voltage.**
	Crew	Diagnose a Large Break LOCA
	SRO	Direct actions per E-0
		Evaluator Note (1): ***When the LB LOCA occurs, there will also be a failure of auto initiation of both trains of SI***
		Evaluator Note (2): ***Adverse Numbers should be utilized***
		Evaluator Note (3): ***SRO should direct the crew to GO FR-P.1 when the STA reports RED path for Pressurized Thermal Shock status tree. SRO should verify RED path conditions and then go to FR-P.1. There is only one step to perform and then immediately back into E-1.***
		NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS. NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.
	RO	1. **ENSURE** reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.

Time	Position	Applicant's Actions or Behavior
	RO	2. **ENSURE** Turbine Trip: • All turbine stop valves CLOSED.
	RO	3. **CHECK** 6.9 kV shutdown boards: a. At least one board energized from:CSST (offsite), OR D/G (blackout). ***1A 6.9 kv Shutdown Board will be powered from EDG 1A-A***
CRITICAL TASK #1	RO	4. **CHECK** SI actuated: a. Any SI annunciator LIT. ***Perform RNO:*** **DETERMINE** if SI required: a. **IF** ANY of the following exists: • S/G press less than 675 psig, OR • RCS press less than 1870 psig, OR • Cntmt press greater than 1.5 psig **THEN ACTUATE** SI manually. b. Both trains SI **ACTUATED**. • 1-XX-55-6C • 1-XX-55-6D
	BOP	5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
	BOP	6. **ANNOUNCE** reactor trip and safety injection over PA system.

Time	Position	Applicant's Actions or Behavior
	RO	7. **ENSURE** secondary heat sink available with either: • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than [39% ADV].
	RO	8. **MONITOR** RCS temp stable at or trending to 557°F: • **IF** any RCP running, **THEN MONITOR** RCS Loop T-avg trending to 557°F. OR • **IF** NO RCP running, **THEN MONITOR** RCS Loop T-cold trending to 557°F.
	BOP	9. **ENSURE** excess letdown valves CLOSED: • 1-FCV-62-54 • 1-FCV-62-55
	RO	10. **CHECK** pzr PORVs and block valves: a. Pzr PORVs CLOSED. b. At least one block valve OPEN.
	RO	11. **CHECK** pzr safety valves CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitors.
	RO	12. **CHECK** pzr sprays CLOSED.
	RO	13. **CHECK** if RCPs should remain in service: a. Phase B signals DARK [MISSP]. ***RCPs should be secured..***

Time	Position	Applicant's Actions or Behavior
	RO	14. **CHECK** S/G pressures: • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
	RO	15. **CHECK** for RUPTURED S/G • All S/Gs narrow range levels CONTROLLED or DROPPING. • Secondary side radiation NORMAL from Appendix A.
	BOP	16. **CHECK** cntmt conditions: • Cntmt pressure NORMAL. • Radiation NORMAL from Appendix A. • Cntmt sump level NORMAL. • Cntmt temp ann window DARK [104-B]. ***Perform RNO:*** ***** GO TO E-1, Loss of Reactor or Secondary Coolant.***
Evaluator Note:		**SRO should direct the crew to GO TO E-1 at this point. The following steps are from E-1.**
	RO	1. **CHECK** if RCPs should remain in service: a. Phase B DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	SRO	2. **REFER TO** EPIP-1, Emergency Plan Classification Flowchart.
	SRO	3. **RECORD** current time to mark initiation of LOCA and determination of time for hot leg recirc.

Time	Position	Applicant's Actions or Behavior
	BOP	4. **CHECK** S/G pressures: • All S/G pressures controlled or rising. • All S/Gs pressures greater than 120 psig.
	BOP	5. **MAINTAIN** Intact S/G NR levels: a. **MONITOR** levels greater than [39% ADV]. b. **CONTROL** intact S/G levels between [39% and 50% ADV].
	BOP	6. **CHECK** secondary radiation: • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation.
	BOP	7. **ENSURE** cntmt hydrogen analyzers in service: • **PLACE** 1-HS-43-200A in ANALYZE [M-10]. • **PLACE** 1-HS-43-210A in ANALYZE [M-10]. • **CHECK** low flow lights not lit [M-10]. • Locally **CHECK** low analyzer temp lights NOT lit [North wall of Train A 480V SD Bd rm].
	RO	8. **MONITOR** pzr PORVs and block valves: a. Pzr PORVs CLOSED. b. At least one block valve OPEN.

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Event Description: LBLOCA with failure of SI to auto actuate, Loss of 1A 6.9 KV Shutdown Board and failure of RHR Pump to auto swapover to CNTMT sump.

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: ***Containment Pressure should be less than 2 psig approximately 20 minutes post LOCA. Only "B" Train operating.***
	RO	9. **DETERMINE** if cntmt spray should be stopped: a. **MONITOR** cntmt pressure less than 2.0 psig. b. **CHECK** at least one cntmt spray pump RUNNING. c. **RESET** cntmt spray signal. d. **STOP** cntmt spray pumps, and **PLACE** in A-AUTO. e. **CLOSE** cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39.
	BOP	10. **ENSURE** both pocket sump pumps STOPPED [M-15]: • 1-HS-77-410. • 1-HS-77-411.
	RO	11. **CHECK** SI termination criteria: a. **CHECK** RCS subcooling greater than [85°F ADV]. ***Perform RNO:*** ***a. GO TO Caution prior to Step 12.***
	RO	12. **RESET** SI and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.

Time	Position	Applicant's Actions or Behavior
	RO	13. **DETERMINE** if RHR pumps should be stopped: a. **CHECK** RCS pressure greater than 150 psig. ***Perform RNO:*** ***a. ENSURE "B" RHR pump RUNNING.GO TO Step 16.***
EVALUATOR NOTE:		***AOI-43.01,* Loss Of Unit 1 Train A Shutdown Board will be performed as resources allow. *Steps are at the end of this document.***
	BOP	16. **MONITOR** electrical board status: a. **CHECK** offsite power available. b. **CHECK** all shutdown boards ENERGIZED by offsite power. c. **PLACE** any unloaded D/G in standby USING SOI-82 Diesel Generators. ***Performs RNO:*** ***ENERGIZE shutdown boards USING:*** ***SOI-211 Shutdown Boards*** ***OR*** ***AOI-43 Loss of Shutdown Boards*** ***OR*** ***SOI-82 Diesel Generators***
EVALUATOR NOTE:		***AOI-17, Turbine Trip BOP realignment steps are at the end of this document.***
	BOP	17. **INITIATE** BOP realignment: • **REFER TO** AOI-17, Turbine Trip.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: E-1 Foldout page states: ***<u>SUMP RECIRC SWITCHOVER CRITERIA</u>*** ***IF RWST level less than 34%, THEN GO TO ES-1.3, Transfer to RHR Containment Sump.*** ***The crew should go to ES-1.3 when the RWST level gets to less than 34%.***
	BOP	18. **INITIATE** 480V board room breaker alignments USING the following: • Appendix A (E-1), CLA Breaker Operation. • Appendix B (E-1), Ice Condenser AHU Breaker Operation. • Appendix C (E-1), 1-FCV-63-1 Breaker Operation. • Appendix D (E-1), 1-FCV-63-22 Breaker Operation.
	BOP	19. **DETERMINE** if hydrogen igniters should be energized: a. **CHECK** hydrogen analyzers in service. b. **CHECK** cntmt hydrogen less than 5% [M-10]. c. **ENERGIZE** hydrogen igniters [M-10]: • 1-HS-268-73 ON. • 1-HS-268-74 ON.
	RO	20. **ENSURE** RHR available for cntmt sump recirculation: • Power to at least one operable RHR pump AVAILABLE. • Cntmt sump valve 1-FCV-63-73 to operable RHR pump AVAILABLE.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: Appendix E (E-1), Equipment Evaluation is located at the back of this section.
	SRO	21. **EVALUATE** plant equipment status: • **REFER TO** Appendix E (E-1), Equipment Evaluation.
	BOP	22. **CHECK** Aux Bldg radiation for loss of RCS inventory outside cntmt: a. Area monitor recorders 1-RR-90-1 and 0-RR-90-12 Aux Bldg points NORMAL. b. Vent monitor recorder 0-RR-90-101 NORMAL trend prior to isolation.
	SRO	23. **NOTIFY** Chemistry of event status and plant conditions.
	RO	24. **DETERMINE** if RCS cooldown and depressurization is required: a. **CHECK** RCS pressure greater than 150 psig. ***Perform RNO:*** ***a. IF RHR pump injecting to RCS, THEN GO TO Step 25.***
	RO	25. **PREPARE** for switchover to RHR cntmt sump: a. **ENSURE** power restored to 1-FCV-63-1 USING Appendix C (E-1), 1-FCV-63-1 Breaker Operation. b. **CHECK** RWST less than 34%. ***Perform RNO:*** ***GO TO Step 20.***

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Event Description: LBLOCA with failure of SI to auto actuate, Loss of 1A 6.9 KV Shutdown Board and failure of RHR Pump to auto swapover to CNTMT sump.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: ***The crew will loop between steps 20 and 25 until RWST is less than 34% and go then to ES-1.3.*** ***The following step are out of ES-1.3:*** ***LEAD EVALUATOR NOTE:*** ***When ES-1.3 is entered, cue console operator to reduce RWST leak to 100gpm***
	RO	1. **ENSURE** both RHR pumps RUNNING. ***When Event 9 is implemented the SRO should direct the crew to go to ECA-1.1.*** ***RNO:*** ***IF NO RHR pumps can be started, THEN*** ***** GO TO ECA-1.1, Loss of RHR Sump Recirculation.***
	BOP	2. **ESTABLISH** CCS to RHR heat exchangers [M-27B]: a. **ENSURE** RHR heat exchanger outlet valves 1-FCV-70-153 and 1-FCV-70-156 OPEN. b. **CLOSE** SFP heat exchanger A CCS supply 0-FCV-70-197. c. **ENSURE** CCS flow to ESF supply header and greater than 5000 gpm. • Train A: 1-FI-70-159 • Train B: 1-FI-70-165 d. **MONITOR** level in CCS surge tanks.
	RO	3. **CHECK** RWST level less than 34%.
	RO	4. **CHECK** cntmt sump level greater than or equal to 16.1 %.

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Event Description: LBLOCA with failure of SI to auto actuate, Loss of 1A 6.9 KV Shutdown Board and failure of RHR Pump to auto swapover to CNTMT sump.

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		***RO WILL BE REQUIRED TO MANUALLY OPEN CNTMT SUMP VALVE 1-FCV-63-73 using M-6 handswitch. (only one valve due to only having "B" train power)***
CRITICAL TASK #2 (5. a & b)	RO	5. **ENSURE** automatic switchover complete: a. **ENSURE** cntmt sump valve 1-FCV-63-73 OPEN. b. **ENSURE** RWST to RHR suction valve 1-FCV-74-21 CLOSED. c. **INITIATE** power restoration to 1-FCV-63-1 USING Appendix A (ES-1.3), 1-FCV-63-1 Breaker Operation.
	RO	6. **MONITOR** RWST level greater than 8%.
Lead Evaluator Note:		***Cue console operator to implement EVENT 9 (Trigger 7 loss of 1 B RHR Pump) at your discretion.***
Evaluator Note (1):		***ES-1.3 steps (up to step 20) are included in this section. When Event 9 is implemented the SRO should direct the crew to go to ECA-1.1.***
Evaluator Note (2):		***Actions to secure Containment Spray may have been performed earlier in E-1.***

Time	Position	Applicant's Actions or Behavior
	RO	7. DETERMINE if cntmt spray should be stopped: a. MONITOR cntmt press less than 2.0 psig. ***RNO: WHEN cntmt press less than 2.0 psig, THEN PERFORM Substeps 7b thru e. GO TO Step 8.*** b. CHECK at least one cntmt spray pump RUNNING. ***RNO: IF both spray pumps stopped, THEN GO TO Step 9.*** c. RESET cntmt spray signal. d. STOP cntmt spray pumps and PLACE in A-AUTO. e. CLOSE cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39. f. GO TO Step 9.
	RO	8. **DETERMINE** if ONE train cntmt spray should be stopped: a. **CHECK** BOTH trains cntmt spray delivering flow. ***RNO:*** **GO TO** Step 9. b. **RESET** cntmt spray signal. c. **STOP** ONE cntmt spray pump and **PLACE** in A-AUTO. d. **CLOSE** spray discharge valve for stopped pump.
	RO	9. **IF** RCS press rises to greater than 1350 psig, **THEN STOP** both SI pumps.

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		***The following ES-1.3 steps (10, 11, 12, & 13) will also be critical steps if the Lead Evaluator allows the scenario to continue before Event 9 is implemented.***
Potential PART OF CRITICAL TASK #2	RO	10. (#1) **ISOLATE** SI pump miniflow: • **CLOSE** 1-FCV-63-3. • **CLOSE** 1-FCV-63-175. • **CLOSE** 1-FCV-63-4.
Potential PART OF CRITICAL TASK #2	RO	11. (#2) **ISOLATE** RHR crossties: • **CLOSE** 1-FCV-74-33. • **CLOSE** 1-FCV-74-35.
Potential PART OF CRITICAL TASK #2	RO	12. (#3) **ALIGN** charging pump and SI pump supply from RHR: • **OPEN** 1-FCV-63-6. • **OPEN** 1-FCV-63-7. • **ENSURE** 1-FCV-63-177 OPEN.
Potential PART OF CRITICAL TASK #2	RO	13. (#4) **ALIGN** RHR discharge to charging pump and SI pump suction: a. **OPEN** 1-FCV-63-8. b. **OPEN** 1-FCV-63-11.
	RO	14. **DO NOT CONTINUE** this Instruction UNTIL Steps 10 thru 13 complete.
	RO	15. **RESTART** any charging pumps and SI pumps as necessary.

Time	Position	Applicant's Actions or Behavior
	RO	16. (#5) **RESET** SI, and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	17. **IF** offsite power is lost, **THEN:** a. **PLACE** charging pumps in PULL TO LOCK. b. **RESTART** RHR pumps. c. **RESTART** charging pumps. d. **IF** RCS press less than 1350 psig, **RESTART** SI pumps.
	RO	18. (#6) **ISOLATE** charging pump suction from RWST: a. **CLOSE** 1-LCV-62-135. b. **CLOSE** 1-LCV-62-136. c. **ENSURE** 1-HS-62-135A in A-AUTO (pushed in). d. **ENSURE** 1-HS-62-136A in A-AUTO (pushed in).
	RO	19. (#7) **ISOLATE** SI pump suction from RWST: • **CLOSE** 1-FCV-63-5.
	RO	20. (#8) **ISOLATE** RHR suction from RWST: a. **ENSURE** power restored to 1-FCV-63-1 USING Appendix A (ES-1.3), 1-FCV-63-1 Breaker Operation. b. **CLOSE** 1-FCV-63-1.

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 9 (Trigger 7)**		
Indications **Breaker disagreement light on 1B RHR Pump hand switch.** **Loss of RHR Flow**		
	SRO	Directs Crew to ECA-1.1.
Evaluator Note:		**The following are steps from ECA-1.1.**
CAUTION IF RWST level drops to 8%, then any ECCS or cntmt spray pump taking suction from the RWST must be stopped.		
	RO	1. **CHECK** cntmt sump recirculation equipment AVAILABLE: • Power to RHR pumps AVAILABLE. • RHR pumps AVAILABLE. • Cntmt sump valves AVAILABLE. ***Perform RNO:*** ***RESTORE at least one train.***
	SRO	2. **IF** RHR sump recirculation restored during performance of this Instruction, **THEN RETURN TO** Instruction in effect.
	RO	3. **MONITOR** RWST level greater than 8%.

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		***Actions to secure Containment Spray may have been performed earlier in E-1.***
CRITICAL TASK #3 **PART 1**	RO	4. **DETERMINE** cntmt spray pump alignment and operation: a. **CHECK** cntmt spray pump suction aligned to RWST. b. **MONITOR** cntmt press, and **DETERMINE** number of spray pumps required:

CONTAINMENT PRESS	SPRAY PUMPS REQUIRED
Greater than 13.5 psig	2
2.0 psig to 13.5 psig	1
Less than 2.0 psig	0

c. **CHECK** number of spray pumps running equal to number required.

If any running, Perform RNO:

STOP and PULL TO LOCK any cntmt spray pump NOT required,

AND

CLOSE discharge valve(s) 1-FCV-72-2 and/or 1-FCV-72-39 for pump(s) stopped.

Manually OPERATE spray pumps as required.

d. **DO NOT OPERATE** cntmt spray pumps as required by FR-Z.1, High Containment Pressure, UNTIL either of the following:

- Cntmt spray pump suction aligned to cntmt sump.

OR

- RWST makeup sufficient to support cntmt spray pump operation.

Time	Position	Applicant's Actions or Behavior
	RO	5. **DETERMINE** if cntmt spray should be aligned to cntmt sump: a. **CHECK** spray pumps RUNNING. ***Perform RNO:*** ***a. IF spray pumps stopped,*** ***THEN GO TO Caution prior to Step 8.***
CAUTION If offsite power is lost after SI reset, manual action may be required to restore ECCS equipment.		
	RO	8. **RESET** SI, and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	9. **RESET** SI interlock to RHR sump suction AUTO-swapover: • 1-HS-63-72D. • 1-HS-63-73D.
CRITICAL TASK #3 **PART 2**	SRO	10. **INITIATE** makeup to RWST: a. **NOTIFY** Radprot/Chemistry to evaluate radiation level of water in cntmt sump for potential transfer to RWST. b. **NOTIFY** TSC to evaluate transferring water to RWST from one of the following: • Appendix C (ECA-1.1), Cntmt Spray Recirc to RWST Alignment. • Spent fuel pit. • Holdup tank. • Normal RWST fill USING SOI-62.02.

Time	Position	Applicant's Actions or Behavior
		11. **MONITOR** CST volume greater than 200,000 gal.
		12. **MAINTAIN** Intact S/G NR levels: a. **MONITOR** Intact S/G NR levels greater than 39% ADV. b. **CONTROL** intact S/G levels 39% and 50% ADV.
		13. **MONITOR** shutdown margin during RCS cooldown: • **REFER TO** 1-SI-0-10, Shutdown Margin OR REACTINW Computer Program.
		14. **INITIATE** RCS cooldown to cold shutdown: a. **WHEN** RCS pressure is less than 1962 psig (P-11), **THEN** • **BLOCK** low pzr pressure SI. • **BLOCK** low steam pressure SI. b. **MAINTAIN** T-cold cooldown less than 100°F in any 1 hour. c. **DUMP** steam to condenser from Intact S/Gs. ***PERFORM RNO***: **IF** condenser **NOT** available, **THEN** Manually or locally **DUMP** steam from Intact S/G: • **USE** Intact S/G PORV, OR • **USE** TD AFW pump supply from Intact S/G. OR • **RESET** Phase A, AND **USE** Intact S/G blowdown.
Evaluator Note:		***The scenario may end when the crew has addressed initiating a RCS cooldown to cold shutdown or at the discretion of the Lead Evaluator***

Op Test No.: NRC Scenario # 1 Event # 8 Page 41 of 58

Event Description: E-0 Appendix A and B

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: NONE
		Indications: None
	SRO	Directs BOP to perform E-0 STEP 5: 5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
Evaluator Note:		**The following are E-0 Appendix A steps.**
Evaluator Note:		**The SRO may at times interrupt the BOP, during the performance of Appendixes A and B, to perform other higher priority task.**
	BOP	1. **ENSURE** PCBs OPEN: • PCB 5044. • PCB 5088.
	BOP	2 **ENSURE** AFW pump operation: • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL.
	BOP	3. **ENSURE** MFW isolation: • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED.

Time	Position	Applicant's Actions or Behavior
	BOP	4. **MONITOR** ECCS operation: a. Charging pumps RUNNING. b. Charging pump alignment: • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. c. RHR pumps RUNNING. d. SI pumps RUNNING. e. BIT alignment: • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. f. RCS pressure greater than 1650 psig. ***RNO not >1650psig:*** *f. **ENSURE** SI pump flow. **IF** RCS press drops to less than 150 psig, **THEN ENSURE** RHR pump flow.*
	BOP	5 **CHECK** cntmt isolation: a. Phase A isolation: • Train A GREEN. • Train B GREEN. b. Cntmt vent isolation: • Train A GREEN. • Train B GREEN.

Time	Position	Applicant's Actions or Behavior
	BOP	6. **CHECK** cntmt pressure: • Phase B DARK [MISSP]. • Cntmt Spray DARK [MISSP]. • Cntmt press less than 2.8 psig. ***Perform RNO:*** **PERFORM** the following: 1) **ENSURE** Phase B actuated. 2) **ENSURE** Cntmt Spray actuated. 3) **ENSURE** cntmt spray pumps running. 4) **ENSURE** cntmt spray flow. 5) **ENSURE** Phase B isolation: • Train A GREEN. • Train B GREEN. 6) **STOP** all RCPs. 7) **ENSURE** MSIVs and bypasses CLOSED. 8) **PLACE** steam dump controls OFF. 9) WHEN 10 minutes has elapsed since Phase B actuated, THEN ENSURE air return fans start. 10) **USE** adverse cntmt [ADV] setpoints where provided.
	BOP	7. **CHECK** plant radiation NORMAL: • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL. • Upper and Lower containment high range monitors NORMAL [M-30]. • **NOTIFY** Unit Supervisor conditions NORMAL.

Time	Position	Applicant's Actions or Behavior
	BOP	8 **ENSURE** all D/Gs RUNNING.
	BOP	9. **ENSURE** ABGTS operation: a. ABGTS fans RUNNING. b. ABGTS dampers OPEN: • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B.
	BOP	10. **ENSURE** at least four ERCW pumps RUNNING, one on each shutdown board preferred.
	BOP	11. **ENSURE** ERCW supply valves OPEN to running D/Gs.
	BOP	12. **ENSURE** CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.
	BOP	13. **CLOSE** CCS HX C DISCH TO HDR A, 0-FCV-67-144.
	BOP	14. **MONITOR** EGTS operation: • EGTS fans RUNNING. • **ENSURE** dampers OPEN VERIFY filter bank dp between 5 and 9 inches of water.
	BOP	15. **ENSURE** CCS pumps RUNNING: • 1A-A CCS pump. • 1B-B CCS pump. • C-S OR 2B-B CCS pump.
	BOP	16. **CHECK** CNTMT PURGE fans STOPPED:

Time	Position	Applicant's Actions or Behavior
	BOP	17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED:
	BOP	18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED.
	BOP	19. **ENSURE** AB GEN SUP & EXH dampers CLOSED.
	BOP	20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: • FCV-31-3. • FCV-31-4.
	BOP	21. **ENSURE** at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN: • CB EMERG CLEANUP FAN A-A, OR Fan B-B RUNNING. • FCO-31-8, OPEN OR FCO-31-7, OPEN.
	BOP	22. **ENSURE** at least one CB EMER PRESS fan RUNNING and associated damper OPEN: • CB EMERG PRESS FAN A-A, OR FAN B-B RUNNING. • FCO-31-6, OPEN. OR FCO-31-5, OPEN.
	BOP	23. **ENSURE** Control Building fans STOPPED and dampers CLOSED: • SPREADING ROOM SUPPLY and EXH FANS AND dampers. • TOILET & LKR RM EXHAUST FAN AND dampers.
	BOP	24. **INITIATE** Appendix B.

Appendix D	Required Operator Actions	Form ES-D-2

Op Test No.: NRC Scenario # 1 Event # 8 Page 46 of 58

Event Description: E-0 Appendix A and B

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**E-0 Appendix B is listed below**
	BOP	1. **CHECK** PHASE B actuated
	BOP	2. **ENSURE** 1-FCV-32-110 CLOSED. (CISP - 1-XX-55-6E) [A-train, window 13]
	BOP	3. **ENSURE** 1-FCV-67-107 CLOSED. (CISP - 1-XX-55-6E) [A - train, window 43]
	BOP	4. **ENSURE** 1-FCV-70-92 CLOSED. (CISP - 1-XX-55-6E) [A - train, window 73]
	BOP	5. **ENSURE** 1-FCV-70-140 CLOSED. (CISP - 1-XX-55-6F) [B - train, window 74]

Appendix D	Required Operator Actions	Form ES-D-2

Op Test No.: NRC Scenario # 1 Event # none Page 47 of 58

Event Description: AOI 43.01 LOSS OF UNIT 1 TRAIN A SHUTDOWN BOARDS

Time	Position	Applicant's Actions or Behavior

Evaluator Note:	**AOI-43.01 actions will be performed as resources/priorities allow. Actions that are performed will be performed by the BOP. On the next page start AOI-43.01 pages 4 thru 7, and 14 thru 16.** **The crew will not be able to restore 1A 6.9 kv Shutdown board since a fault on the bus is simulated.**

3.0 OPERATOR ACTIONS

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE 1 CCP 1A-A, SIP 1A-A, RHR Pump 1A-A, CS Pump 1A-A, AFW Pump 1A-A, ERCW Pumps A-A and B-A, Pressurizer Heaters Backup Group 1A, and Pressurizer Heaters Control Group 1D will be unavailable on a loss of 6.9KV Shutdown Board 1A-A.

NOTE 2 Operability of remaining AC power sources must be determined within one hour per LCO 3.8.1.

NOTE 3 Steps to energize 6.9KV Shutdown Board 1A-A (or intermediate supply paths) may be repeated based on completed repair(s), protective relay reset, or direction from TSC.

NOTE 4 RCP's can be operated for up to 10 minutes after loss of CCS flow.

1.	**MONITOR** 1B-B 6.9KV Shutdown Board ENERGIZED.	**EMERGENCY START** Diesel Generators: • 1-HS-82-15 [1-M-1]. OR • 2-HS-82-15 [2-M-1]. **IF** both Unit 1 6.9KV SD Bds still de-energized, AND Unit is in MODE 1, 2, or 3, **THEN** **TRIP** Reactor and RCPs and **GO TO** ECA-0.0, Loss of Shutdown Power. **IF** Unit is in MODE 4, 5, or 6, **THEN** **TRIP** RCPs and **PERFORM** AOI-14, Loss of RHR Shutdown Cooling, WHILE continuing in this procedure.

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
2. **ENSURE** Diesel Generators running: • DG 1A-A • DG 1B-B • DG 2A-A • DG 2B-B	**EMERGENCY START** Diesel Generators: • 1-HS-82-15 [1-M-1]. OR • 2-HS-82-15 [2-M-1]. **FOR ANY NON-RUNNING D/G:** **EVALUATE** RESETTING EMERGENCY STOP BY: **PRESS** and **RELEASE** DG AUTO SAFETY SHUTDOWN RELAY-RESET [0-M-26]: • 1-HS-82-20 [1A-A]. • 1-HS-82-50 [1B-B]. • 2-HS-82-80 [2A-A]. • 2-HS-82-110 [2B-B]. **AND** **EMERGENCY START** Diesel Generator [0-M-26]: • 1-HS-82-16A [1A-A]. • 1-HS-82-46A [1B-B]. • 2-HS-82-76A [2A-A]. • 2-HS-82-106A [2B-B].
3. **MONITOR** RCP seal cooling available: • Seal injection flow OR • CCS flow through Thermal Barrier Heat Exchangers	**MANUALLY START** opposite train CCP or CCS pump. **IF** seal cooling not restored, **THEN** **MONITOR** RCP trip criteria.

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE **RESPONSE NOT OBTAINED**

4. **DISPATCH** personnel to Auxiliary Bldg to UNLOCK and **RACK UP** the following breakers:

NOMENCLATURE	LOCATION	UNID
MAINT SUPPLY FROM 6.9KV UNIT BD 1B	6.9kV SDB 1A-A, C11	1-BKR-211-1718/11
MAINT SUPPLY FROM 6.9KV UNIT BD 2B	6.9kV SDB 2A-A, C11	2-BKR-211-1818/11

5. **DISPATCH** personnel to Turbine Bldg to **CLOSE** the following breakers:

NOMENCLATURE	LOCATION	UNID
MAINT FEEDER TO 6.9 KV SHUTDOWN BD 1A-A	6.9kV UNIT BD 1B	1-BKR-201-B/8
MAINT FEEDER TO 6.9 KV SHUTDOWN BD 2A-A	6.9kV UNIT BD 2B	2-BKR-201-B/8

6. **CHECK** both 1A-A and 2A-A 6.9 KV Shutdown bds DEENERGIZED.

** **GO TO** Step **[9]**.

7. **LOCALLY OPEN** 1-FCV-67-68, D/G 1A-A Sup From Hdr. 2B MANUALLY.

8. **LOCALLY OPEN** 2-FCV-67-68, D/G 2A-A Sup From Hdr. 2B MANUALLY

9. **DISPATCH** personnel to the following locations to inspect for equipment damage:
   - 6.9KV Shutdown Board
   - 480V Shutdown Boards
   - Diesel Generator Building

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **NOTIFY** MAINTENANCE personnel of failure of Shutdown Board.	
11. **ENSURE** Unit 1 Instrument Power A Rack selected to ENERGIZED feeder (amber light ON) [1-M-7] (SOI-237.01).	
12. **ALIGN** BAT A for operation via BA Pump 1B USING SOI-62.05.	
13. **MONITOR** Board Protective Relays NOT ACTUATED (local reports)	**GO TO** Step **[38]**.
14. **NOTIFY** Shift Manager to staff Technical Support Center for support (additional source of manpower). (**REFER TO** EPIP-6).	

NOTE Steps **[14]** through **[21]** attempt to energize 6.9KV SD BD 1A-A from any available energized source, including the maintenance feeder breaker.

15. **ENSURE** 1-XS-57-43, 6.9 SD BD 1A-A XFER SELECTOR [1-M-1], in MAN.

16. **IF** required,
THEN
TRIP the following breakers to clear DISAGREEMENT (WHITE) LIGHT:

NOMENCLATURE	LOCATION	UNID
1716 NORMAL- 6.9 SD BD 1A-A FROM CSST C	1-M-1, OR 0-M-26	1-HS-57-41A, OR 1-HS-57-41B
1932-ALT 6.9 SD BD 1A-A FROM CSST D	1-M-1, OR 0-M-26	1-HS-57-97A, OR 1-HS-57-97B
1912- DG TO SD BD 1A-A	0-M-26	1-HS-57-46A
1718 MAINTENANCE- 6.9 SD BD 1A-A FROM UNIT BD 1B	1-M-1, OR 0-M-26	1-HS-57-44A, OR 1-HS-57-44B

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. **ENSURE** affected equipment placed in **STOP PULL TO LOCK/OFF:** • 1A-A CCP. • Pressurizer Heaters Group 1A-A. • 1A-A Motor Driven AFW Pump. • 1A-A Component Cooling Water Pump. • 1A-A Thermal Barrier Booster Pump. • A-A ERCW Pump. • B-A ERCW Pump. • MCR Chiller A-A. • EBR Chiller A-A. • SD Bd Rm Chiller A-A.	
39. **DISPATCH** AUO to D/G Bldg to monitor D/G conditions USING SOI-82 series, Appendix A, for operating parameters	
40. **ENSURE** Train A ERCW pumps in service as required to maintain pressure and flows (SOI-67.01): • C-A ERCW Pump. • D-A ERCW Pump.	**EVALUATE** stopping D/G's without ERCW.

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE	**RESPONSE NOT OBTAINED**
41. **CHECK** any charging pump RUNNING	**PERFORM** the following: a. **ISOLATE** letdown: • **CLOSE** letdown orifice(s). • **CLOSE** 1-FCV-62-69A. • **CLOSE** 1-FCV-62-70A. b. **RESTORE** charging and letdown: • **REFER TO** Attachment 1 ALIGNMENT OF CHARGING AND LETDOWN.

NOTE 1 CCS Pump 1A-A, Aux Bldg General Sup Fan 1A-A, CRDM Cooler 1A-A, Lower Cntmt Cooler 1A-A, EBR Air Handling Unit A-A, and Cntmt Air Return Fan 1A-A will be unavailable on a loss of 480V SD BD 1A1-A.

NOTE 2 Aux Bldg General Exh Fan 1A-A, CRDM Cooler 1C-A, Lower Cntmt Cooler 1C-A, MCR Chlr A-A Compressor, 480V SDBR AHU A-A, Station Air Compr A, and HP Fire Pump 1A-A will be unavailable on a loss of 480V SD BD 1A2-A.

42. **ENSURE** 1B-B CCS Pump Supplying A Train (SOI-70.01).	**REFER TO** AOI-15, Loss of Component Cooling Water (CCS) FOR LOSS OF CCS FLOW.
43. **ENSURE** Thermal Barrier Booster Pump 1B-B in service (SOI-70.01).	**REFER TO** AOI-15, Loss of Component Cooling Water (CCS) FOR LOSS OF CCS FLOW.
44. **EVALUATE** starting additional Control Rod Drive Mech Cooler Fans, Lower Compartment Cooler Fans, and Upper Compartment Cooler Fans (SOI-30.03).	**MONITOR** containment upper and lower compartment average air temperatures are within limits: • S/R 3.6.5.1, Computer Point U9019 • S/R 3.6.5.2, Computer Point U9020

3.0 OPERATOR ACTIONS (continued)

ACTION/EXPECTED RESPONSE **RESPONSE NOT OBTAINED**

45. **ENSURE** Aux Bldg General Supply and Exhaust Fans in service as required to maintain ventilation and pressure (SOI-30.05).

46. **ENSURE** EBR Air Conditioning Unit B-B and MCR Air Conditioning Unit B-B in service (SOI-31.01).

NOTE Radiation Monitors powered from 480V C & A Vent Board 1A1-A or Radiation Monitor & Sampling & Fire Protection 1-BD-242-1 will be inoperable on a loss of 480V C & A Vent Board 1A1-A.

47. **RESET** Radiation Monitor modules and alarms on 0-M-12.

NOTE 1 Unit 1 A Train ESF Room Coolers, Area Coolers, and Space Coolers will be unavailable on a loss of 480V C & A Vent Board 1A1-A.

NOTE 2 Emergency Gas Treatment System Fan A-A will be unavailable on a loss of 480V C & A Vent Board 1A1-A.

48. **ENSURE** 1B Primary Water Pump in service as required (When in bypass mode, ensure Primary Water System aligned per SOI-81.01).

49. **ENSURE** 1B Annulus Vacuum Fan in service (SOI-65.01).

50. **ENSURE** A Train or B Train 480V and Shutdown Board Room Ventilation in service (SOI-30.07).

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: NONE
		Indications: NONE
		Evaluator Note: ***The following are the first ten steps from AOI-17 Turbine Trip, it is not expected that the BOP will perform all of these steps due to other higher priority issues..***
		CAUTION **Performance of this instruction should not be allowed to delay or interfere with actions required by applicable emergency procedures or abnormal operating procedures.**
		NOTE 1 Control room operators may initiate shutdown of pumps and equipment from the benchboard immediately after a trip. Performance of this instruction will subsequently verify proper secondary equipment alignment.
		NOTE 2 Steps in this section and items in Attachment 1 may be performed out of sequence.
	BOP	1. **DISPATCH** turbine building NAUO to perform Attachment 1.
	BOP	2. **NOTIFY** condensate demineralizer NAUO prior to Operator initiated press changes in condensate.
	BOP	3. **REMOVE** generator excitation from service: a. **PLACE** voltage regulator to TEST. b. **ZERO** exciter base adjuster. c. **OPEN** exciter field breaker. d. **PLACE** exciter regulator control to OFF.

Time	Position	Applicant's Actions or Behavior
	BOP	4. **MONITOR** main turbine: a. **WHEN** less than 1500 rpm, **THEN**: • **ENSURE** seal oil backup pump RUNNING. • **ENSURE** turning gear oil pump RUNNING. b. **WHEN** less than 600 rpm, **THEN ENSURE** bearing lift oil pump RUNNING. c. **WHEN** turbine is at ZERO RPM, **THEN ENSURE** turbine on turning gear. d. **MAINTAIN** MTOT lube oil temp between 95° and 100°F (may require RCW isolation if TCV has excessive leakage). e. **MAINTAIN** GENERATOR H2 (Cold Gas) temp 95°F (may require RCW isolation if TCV has excessive leakage). f. **ENSURE** Gland Steam Spillover Bypass valve is CLOSED using 1-HS-47-191A.
	BOP	5. **ALIGN** MSRs: a. **PUSH** RESET on MSR control panel. b. **CLOSE** MSR HP steam and bypass isol. c. **ENSURE** MSR warming valves CLOSED. d. **OPEN** MSR startup vents. e. **CLOSE** MSR operating vents.
	BOP	6. **CHECK** MSIVs OPEN.
	BOP	7. **ENSURE** adequate FW press: a. **ENSURE** two hotwell pumps RUNNING. b. **IF** FW isolation reset, **THEN ENSURE** one condensate booster pump RUNNING if needed for unit conditions. c. **ENSURE** CNDS demin pumps OFF. d. **STOP** #3 HDT pumps, and **CLOSE** the discharge valves to condensate heater strings. Notify NAUO performing Attachment 1 that #3 HDT pumps are stopped. e. **STOP** #7 HDT pumps, and **CLOSE** the discharge valves to condensate heater strings.

Appendix D	Required Operator Actions	Form ES-D-2

Op Test No.: NRC Scenario # 1 Event # None Page 57 of 58

Event Description: AOI-17 BOP Realignment

Time	Position	Applicant's Actions or Behavior
	BOP	8. **SHUTDOWN** any MFW pump NOT required.
	BOP	9. **SHUTDOWN** any RCW pumps NOT required.
	BOP	10. **SHUTDOWN** any CCW pumps NOT required.

EQUIPMENT EVALUATION

1. **EVALUATE** plant equipment and systems needed to support long term cooling and recovery actions, as time and personnel availability permits:
   a. Cntmt Isolation Status.
   b. Emergency Gas Treatment System:
      One train in operation, **REFER TO** SOI-65.02.
   c. Auxiliary Building Gas Treatment:
      One train in operation, **REFER TO** SOI-30.06.
   d. Auxiliary Building Isolation alignment:
      REFER TO SOI-30.06.
   e. Main Control Room Isolation alignment:
      REFER TO SOI-31.01.
   f. ERCW System:
      Both trains in operation.
   g. Component Cooling Water System:
      Both trains in operation.

SHIFT TURNOVER CHECKLIST

Page _____ of _____

☐	SM			
☒	US/MCR	Unit _____		
☐	UO	Unit _____	Off-going - Name	
☐	AUO	Station _____		
☐	STA (STA Function)		On-coming - Name	

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 1807 ppm

- Abnormal equipment lineup/conditions:

None.

Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

See Schedule

Major Activities/Procedures in progress/planned:

The plant is at BOL. A startup is in progress from a forced outage to repair an EHC high pressure piping leak. Power is stable at 2%. GO-3 Section 5.2 step 12 which required the completion of Appendix A (Mode 2 to Mode 1 approval) was just completed. The Operation Superintendent's approval to enter Mode 1 was just obtained. The crew is in GO-3 "Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power" section 5.3 step 3.

-

Abnormal equipment lineup/conditions:

None.

- Radiological changes in plant during shift:

None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

SHIFT TURNOVER CHECKLIST

Page _____ of _____

☐	SM			
☐	US/MCR	Unit _____		
☒	UO	Unit _____		Off-going - Name
☐	AUO	Station _____		
☐	STA (STA Function)			On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 1807 ppm

- Abnormal equipment lineup/conditions:

None.

Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

See Schedule

- Major Activities/Procedures in progress/planned:

The plant is at BOL. A startup is in progress from a forced outage to repair an EHC high pressure piping leak. Power is stable at 2%. GO-3 Section 5.2 step 12 which required the completion of Appendix A (Mode 2 to Mode 1 approval) was just completed. The Operation Superintendent's approval to enter Mode 1 was just obtained. The crew is in GO-3 "Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power" section 5.3 step 3.

- Radiological changes in plant during shift:

None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

SHIFT TURNOVER CHECKLIST

Page _____ of _____

☐	SM			
☐	US/MCR	Unit	_____	
☒	UO	Unit	_____	Off-going - Name
☐	AUO	Station	_____	
☐	STA (STA Function)			On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 1807 ppm

- Abnormal equipment lineup/conditions:

None.

Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

See Schedule

- Major Activities/Procedures in progress/planned:

The plant is at BOL. A startup is in progress from a forced outage to repair an EHC high pressure piping leak. Power is stable at 2%. GO-3 Section 5.2 step 12 which required the completion of Appendix A (Mode 2 to Mode 1 approval) was just completed. The Operation Superintendent's approval to enter Mode 1 was just obtained. The crew is in GO-3 "Unit Startup From Less Than 4% Reactor Power to 30% Reactor Power" section 5.3 step 3.

- Radiological changes in plant during shift:

None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

Appendix A
(Page 1 of 1)
Reactivity Control Plan (Example Form)

Station: WBN Unit: 1 Cycle: 8 Burnup: 150 MWD/MTU Revision: 0

Preparer: _____/_____ Reviewer: _____/_____
/ Date RXE / Date

Approver: _____/_____ Authorizer: _____/_____
RXES or designee / Date Ops / Date

RXE support required Onsite? ☐Yes ☑ No Describe: Simulator Scenario

Title of Reactivity Control Plan: **Power Escalation for Simulator**

Assumptions:
1. Criticality is attained with Control Bank D (CBD) at **130** steps
2. Power escalation proceeds according to schedule

Major Steps:
1. Reactor power raised from HZP to ~**15%** RTP
2. Unit is maintained at ~**15%** RTP for ~**6** hrs
3. Unit is ramped to ~**30%** per the schedule
4. Unit is maintained ~**30%** for flux map

Detailed Description:

NOTE: See attached plots.

NOTE: Should deviations occur from the projected power ascension profile, particularly delays, there should be no major effects on the predicted parameters. Should delays occur, lower dilution rates could be expected later due to the additional Xenon build-in during the delays.

NOTE: This Reactivity Control Plan only covers power escalation through **30%** RTP. A Reactivity Control Plan covering the remainder of the power escalation will be issued prior to completion of the **30%** RTP hold.

Power Increase to ~15% RTP:

1. **WITHDRAW** CBD to facilitate power rise. (The actual amount of rod withdrawal necessary to attain **15%** RTP depends upon the CBD position at criticality.)
2. **IF** CBD has been withdrawn to ~**165** steps and reactor power has not reached **15%** RTP, **THEN DILUTE** as necessary to raise power to ~**15%** for synchronization of the Turbine-Generator. (The actual amount of dilution necessary depends upon the CBD position at criticality.)

Operation on Steam Dumps until Generator Synchronization:

1. **ENSURE** CBD has been withdrawn to ~**165** steps.
2. **DILUTE** ~**200** gal PW per hour to compensate for Xenon build-in.

Power Escalation for Simulator

Continued

Power Increase to ~30% RTP:

1. **DILUTE ~2700** gal PW to raise power to ~**30%** and maintain Tave matched with Tref.
2. **INITIATE** ramp up.
3. **MAINTAIN** CBD at ~**165** steps. Temporary rod withdrawal above **165** steps is allowed to support increases in reactor power provided CBD is re-inserted to approximately **165** steps once the desired power level is achieved and the dilution effects have caught up.

30% RTP Power Maintenance:

1. **DILUTE** ~**300** gal PW per hour to compensate for Xenon build-in.
2. **MAINTAIN** CBD at ~**165** steps.

Critical Parameter	Limit	Required Action
Rate of Power Increase	As specified in TI-45	Reduce ramp rate or hold power until limits satisfied.

Activated: _____/_____ Terminated: _____/_____

SM or US / Date SM or US / Date

Facility: Watts Bar (2008-B) Scenario No.: 2 Op Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 100% power, EOL, 69 ppm boron. 1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B.

Turnover: Maintain current power level. However, 1A Condensate Booster Pump has a small oil leak. A power reduction to 96% is being discussed by Ops Management in order to remove the pump from service.

Event No.	Malf. No.	Event Type*	Event Description
1	RP26E 0	I-BOP I-SRO	Steam Pressure Transmitter 1-PT-1-20A fails low. BOP manually controls feed to #3 S/G. AOI-16 entry. Tech Spec evaluation.
2	ZAIPIC6834 100 RCR05	C-RO TS-SRO	1-PIC-68-340A PZR Master Controller fails. Spray valves open and all heaters deenergize. RO manually controls PZR pressure. AOI-18 entry.
3	RX02D	I- RO I- SRO	Loop 4 Cold Leg RTD fails high, resulting in rod insertion. Tech Spec evaluation.
4	CC05B	C - BOP C - SRO	CCS leak inside containment on thermal barrier supply line to 2 RCP. Entry into AOI-15..
5	TH05C	M-ALL	# 3 S/G tube leak (~40 gpm). AOI-33 entry. Tech Spec evaluation.
6	N/A	R-RO N- SRO N-BOP	Power reduction due to S/G Tube leak
7	TH05C	M-ALL	# 3 S/G tube leak progresses to a S/G tube rupture. EOP network entry.
8	ZDIRT 1 Neutral	C-RO	Reactor Trip Switch on 1-M-4 fails to initiate a reactor trip. RO operates 1-M-6 trip switch.
9	SI09L SI09M	C-RO	Containment Phase A fails to automatically actuate. RO manual action.
10	MS13C	M-ALL	Steam leak # 3 S/G @ 0.2%, when SI is reset in E-3 cooldown.

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

Scenario 2 Summary

Initial Conditions:
The plant is stable at 100%, EOL, 69 ppm boron. 1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B. Plan is to stay at current power level. However, 1A Condensate Booster Pump has a small oil leak. A power reduction to 96% is being discussed by Ops Management for removing the pump from service. 1-PT-68-322, Channel IV Pressurizer Pressure Transmitter failed during the last shift and has been removed from service to comply with Tech Specs.

1. Steam Pressure Transmitter 1-PT-1-20A fails low. BOP takes manual control of #3 S/G feed flow to avoid a reactor trip IAW AOI-16 "Loss of Normal Feedwater". Tech Spec evaluation.

2. 1-PIC-68-340A PZR Master Controller fails, causing spray valves to open and all heaters to deenergize. RO manually controls 1-PIC-68-340A to control PZR pressure. Enter AOI-18 "Malfunction of Pressurizer Pressure Control System".

3. Eagle-21 Rack 4 EAI board # 3 loss of 15v power supply. Results in 1-PT-1-73 (Turbine Impulse Pressure) and 1-LT-63-180 (Containment Sump Level) failing low. RO manually controls. Enter AOI-44 "Eagle 21 Malfunctions", and AOI-2 "Malfunction of Reactor Control System". Tech Spec evaluation.

4. CCS leak occurs in containment on the supply line to the 1B RCP Thermal Barrier. The crew enters AOI-15 Loss of Component Cooling Water . Requires BOP actions to isolate the leak.

5. A tube leak (~40 gpm) occurs on # 3 S/G. Enter AOI-33, "Steam Generator Tube Leak". Tech Spec evaluation.

6. Either the crew decides to perform a rapid down power IAW AOI-39 or Operations management notifies the crew to do so.

7. The # 3 S/G tube leak progresses to a S/G tube rupture, requiring the crew to trip the reactor and enter E-0. The manual trip switch on 1-M-4 fails to initiate a reactor trip. RO operates the 1-M-6 trip switch.

8. When SI actuates in E-0, Containment Phase "A" fails to automatically actuate. RO manually actuates Phase "A".

9. After transition to E-3 and during the cooldown to target temperature, a fault occurs on # 3 S/G. Crew transitions to ECA-3.1.

10. Scenario terminates when the crew has started a plant cooldown IAW ECA-3.1.

Critical Tasks:	**1**	**2**
	Close containment isolation valves such that at least one valve is closed on each critical phase-A penetration before transition out of E-0.	Isolate steam flow and feedwater flow to the ruptured S/G prior to initiation of RCS cooldown to the target temperature.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO #2 STEAM GENERATOR TUBE RUPTRE WITH FAULT

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Sim. Setup	rst 249, switch check, select RUN ***verify malfunctions and overrides listed below***	100% RTP, EOL, C_b - 69 ppm. This IC contains the overrides and triggers.
0	Disable simulator fault alarm	Turns off audible alarm for the simulator fault so the crew cannot hear this alarm.
0	Place A Train week 1 placard on entrance side panel.	On entrance side panel.
0	Place DANGER Tag on 1A MDAFW Hand Switch	1A MDAFW out of service.
0	Indicate/Enter in the appropriate blanks this information into the reactivity briefing book, (appendix B TI-7.012)	Ensure **EOL *Reactivity Briefing Book*** is used. Item 3: Delta I -3 and AUTO rod control. Item 4: Negative, 1-CCP B, 70 Item 5: 69, Boron, BA 1, PW 70, BA Pot 2, PW POT 35 Item 6: PW 200 gal Item 7: PW 200 gal
Sim Setup if IC 249 does not work.	**rst 60, switch check, select run.**	100% RTP, EOL, C_b - 69 ppm.
0	**batch OOS_AFWP_A**	1A MDAFW out of service. Prevents start of pump and turns breaker lamp off.
0	**imf RX26E (e1) 0**	Steam Pressure Transmitter 1-PT-1-20A fails low
0	**iorZAIPIC68340 100**	PRZR Master Controller fails high
0	**imfRX02D (e3) 100**	Loop 4 Cold Leg RTD fails high
	imf CC05B (e4)	CCS leak inside CNTMT on thermal barrier supply to RCP #2
0	**imfTH05C (e5) 2.5**	#3 S/G tube leak ~ 45 gpm
	imfMS13 (e6) 5	#3 S/G steam leak @ 2%
0	**iorZDIRT 1**	RTS on 1-M-4 fails to initiate a reactor trip
0	**ior SI09L** **iorSI09M**	CNTMT Phase A fails to automatically actuate

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO #2 STEAM GENERATOR TUBE RUPTRE WITH FAULT

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 1: Insert this Malfunction using **Trigger 1**	**imf RX26E (e1) 0**	**Steam Pressure Transmitter 1-PT-1-20A fails low.** When MIG/ Work Control notified acknowledge report.
Event # 2: When determined by NRC Examiner, Insert this problem by changing Remote Function ***RCR05 to REMOTE***	**iorZAIPIC6834 100** **mrf rc05 remote**	**PRZR Master Controller fails high** When MIG/ Work Control notified acknowledge report.
Event # 3: When actions associated with AOI-18 are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 3**	**imfRX02D (e3) 100**	**Loop 4 Cold Leg RTD fails high** When MIG/ Work Control notified acknowledge report
Event # 4: When determined by NRC Examiner, Insert this Malfunction using **Trigger 4**	**imf CC05B (e4)**	**CCS leak inside CNTMT on thermal barrier supply line to #2 RCP** If notified as work control/maintenance concerning CCS leak acknowledge request.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO #2 STEAM GENERATOR TUBE RUPTRE WITH FAULT

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 5: When determined by NRC Examiner, Insert this Malfunction using **Trigger 5**	**imf TH05C (e5) 2.5**	**#3 S/G Tube leak of approximately 40 gpm..**
		When RADPRO is notified state that you will send a Tech to survey the steam lines. Wait 15 minutes (or until MCR has identified # 3 S/G) and report that # 3 S/G Main Steam Lines have higher radiation.
		When Chemistry is notified state that you will send a tech to sample the S/Gs. Wait 30 minutes and report that # 3 S/G has high activity.
		If asked as AUO to open 1-FCV-14-3 wait 5 minutes and report valve is open.
Event #6 Rapid Load Reduction		**When directed by the Lead Examiner (or if the crew decides to utilize a rate of 1%/hr or less), notify the crew of Management's decision to lower power at 2 %/hr.**
	mmf TH05C 30	**When notified by the Lead Examiner increase the malfunction to 30 to input the SGTR.**

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO #2 STEAM GENERATOR TUBE RUPTRE WITH FAULT

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Events # 7 When determined by NRC Lead Examiner, Insert this Malfunction using **Trigger 6**	**imf ms13c (e6) .2**	**#3 S/G steam leak between CNTMT and MSIV**
		As AUO or Security, when asked to investigate the steam leak, wait 5 minutes and report that steam is coming from the North Vault Room:
		When notifeid as Chemistry acknowledge report
		When notified as RADPRO acknowledge report

Op Test No.: NRC	Scenario # 2	Event # 1	Page 1 of 44
Event Description:	Steam Pressure Transmitter 1-PT-1-20A fails low		

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 1 (Trigger 1)**
		Indications available: **# 3 SG Press Indicator (1-PI-1-20A) fails to 0** **Alarm 63-F SG Level Deviation** **Alarm 118-A SG 3 Press LO**
	Crew	Diagnose a reduction in Feed Water to # 3 S/G.
	BOP	May take PRUDENT Operator action IAW TI-12.04 to take manual control of feed water flow to the #3 S/G.
	SRO	Direct crew actions IAW AOI-16 Loss of Normal Feedwater
		Evaluator Note: Following Steps are from AOI-16 Loss of Normal Feedwater, Section 3.1 Diagnostics and then to section 3.6
	SRO	**3.1 Diagnostics**

IF	GO TO Subsection
Standby MFWP TRIP without Main Turbine in service	3.2
Standby MFWP TRIP with Main Turbine in service	3.3
MFWP TRIP less than 800 MWe (67% Turbine Load)	3.4
MFWP TRIP greater than or equal to 800 MWe (67% Turbine Load)	3.5
MFW reg or bypass reg valve control failure	3.6
MFW pump speed control circuit failure	3.7

	BOP	1. **CONTROL** failed MFW reg or bypass reg valve in MANUAL.
	RO	2. **EVALUATE** placing control rods in MANUAL. ***The SRO may or may not direct RO to place Rods in manual, depending upon how much of effect the feedwater transient has on Tavg.***

Op Test No.: NRC Scenario # 2 Event # 1 Page 2 of 44

Event Description: Steam Pressure Transmitter 1-PT-1-20A fails low

Time	Position	Applicant's Actions or Behavior
	BOP	3. **CHECK** SG levels on bypass reg valve control. ** **GO TO** Step 5
	BOP	5. **CHECK** S/G levels returning to PROGRAM.
	BOP	6. **MONITOR** TDMFW Pump speed normal for current power level. ***The SRO may or may not direct BOP to place* TDMFW Pump speed control *in manual, depending upon how effective automatic speed control responds to the transient.***
		7. WHEN any S/G MFW flow drops to less than 0.55 x 10 E6 lb/hr, THEN INITIATE manual anti-water hammer actions: ***Step is N/A***
	RO	8. **CHECK** power range NORMAL.
NOTE Steps 9 & 10 should end up having the same channel (A or B) selected for steam flow and feed flow on each S/G to ensure a loss of voltage to any one channel will have minimal effect on the affected S/G level.		
	BOP	9. **CHECK** controlling steam flow Channels NORMAL. a. **SELECT** operable channel. b. **EVALUATE** effect of the failed channel on the MFPs Speed Control and **ADJUST** in MANUAL as necessary while continuing this section.

Op Test No.: NRC Scenario # 2 Event # 1 Page 3 of 44

Event Description: Steam Pressure Transmitter 1-PT-1-20A fails low

Time	Position	Applicant's Actions or Behavior
	BOP	10. **CHECK** controlling FW flow channels NORMAL. ***Perform RNO:*** ***IAW Note above, even though a FW flow channel did not fail, another channel is selected, to match steam flow channels.***
	SRO	11. **CHECK** press compensation channel(s) NORMAL. ***Perform RNO:*** ***REFER TO Tech Specs:*** ***LCO 3.3.2.1.e condition D,*** ***LCO 3.3.2.4.d condition D,*** ***LCO 3.3.3 Condition A.***
	RO	12. **IF** affected S/G controlling channel and level NORMAL, **THEN RETURN** MFW reg valve to AUTO.
	RO	13. **WHEN** conditions allow auto rod control, **THEN,** a. **ENSURE** T-avg and T-ref within 1°F. b. **ENSURE** zero demand on control rod position indication [1-M-4]. c. **PLACE** rods in AUTO.
	SRO	13. **INITIATE** repairs to failed equipment.
When technical specifications have been identified or at discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC Scenario # 2 Event # 2 Page 4 of 44

Event Description: 1-PIC-68-340A PZR Master Controller output signal fails high

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 2 (mrf RCR05 remote)**
		Indications available: **Alarm 90A PZR Press Hi** **RCS Pressure Lowering**
	Crew	Diagnose a failure of 1-PIC-68-340A PZR Master Controller.
	RO	May take PRUDENT Operator action IAW TI-12.04 to take manual control of 1-PIC-68-340A PZR Master Controller and lower the controller output to close the spray valves and energize heaters to raise RCS pressure to 2235 psig.
	SRO	Direct crew actions IAW AOI-18 **MALFUNCTION OF PRESSURIZER PRESSURE CONTROL SYSTEM.**
Evaluator Note: Following Steps are from AOI-18 MALFUNCTION OF PRESSURIZER PRESSURE CONTROL SYSTEM , section 3.0.		
	RO	1. **CHECK** pressurizer pressure stable or trending to desired pressure: • PI-68-340A, • PI-68-334, • PI-68-323, • PI-68-322. ***Perform RNO:*** ***PLACE pzr master controller 1-PIC-68-340A in MANUAL and RESTORE press to normal***
	RO	2. **CHECK** 1-XS-68-340D selected to a failed, controlling or backup channel. ***Perform RNO:*** ***IF pzr press is abnormally low, THEN ** GO TO Step 6.***

Op Test No.: NRC Scenario # 2 Event # 2 Page 5 of 44

Event Description: 1-PIC-68-340A PZR Master Controller output signal fails high

Time	Position	Applicant's Actions or Behavior
	RO	6. **CHECK** pzr spray valves CLOSED: • Green indicating lights LIT. • Pzr spray demand meters, 1-PIC-68-340B and 1-PIC-68-340D indicating ZERO [1-M-4].
	RO	7. **CHECK** pzr PORVs CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitor.
	RO	8. **CHECK** pzr Safeties CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitor.
	RO	9. **ENSURE** pzr heaters on as required: • Control Group on at 2220 psig. • Backup Groups on at 2210 psig.
	RO	10. **CHECK** aux spray, 1-FCV-62-84, CLOSED.
	RO	11. **CHECK** pzr press STABLE or RISING.
	RO	12. ** **GO TO** Step 16.

Op Test No.: NRC Scenario # 2 Event # 2 Page 6 of 44

Event Description: 1-PIC-68-340A PZR Master Controller output signal fails high

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: The SRO should direct that Pzr Heater controllers and Spray controllers are placed in Auto, but the PZR Master controller remains in manual and direction given to the RO to control RCS pressure.
	RO	16. **WHEN** pressurizer pressure stable and equipment status supports returned to normal, **THEN ENSURE** the following in AUTO: • Pzr Master controller, • Pzr spray controllers, • All heater groups.
	SRO	17. **REFER TO** the following Tech Specs: ***DNB Spec 3.4.1 if RCS Pressure lowers to 2214 psig or lower.***
	SRO	18. **INITIATE** repairs to failed equipment.
At the discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC Scenario # 2 Event # 3 Page 7 of 44

Event Description: Loop 4 Cold Leg RTD fails high, resulting in rod insertion.

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event 3 (Trigger 3)**
		Indications available: Continuous Control Rod insertion. Alarm 93-F EAGLE PROC PROT CH-IV RTD FAILURE Alarm 93A RCS LOOP ΔT DEVIATION Alarm 94A TAVG-TREF DEVIATION Alarm 94B TAVG-T AUCT DEVIATION Alarm 110F PROT SET TROUBLE Loop 4 ΔT Power Indication ≈ 35% (1-TI-68-67B) Loop 4 Tavg indication ≈ 604° F (1-TI-68-67E) Auctioneered Tavg indication ≈ 604° F (1-TR-68-2B)
	Crew	The crew should diagnose that there has been a malfunction of the Reactor Control system since the rods are continuously inserting, and there no indications of a plant runback since MWe is constant.
	RO	Takes Prudent Operator action IAW TI-12.04 to place Rod Control in MANUAL to stop continuous rod insertion.
		Evaluator Note: Following Steps are from AOI-2 **MALFUNCTION OF REACTOR CONTROL SYSTEM**
	SRO	Directs actions IAW AOI-2 **MALFUNCTION OF REACTOR CONTROL SYSTEM** **3.1 Diagnostics** **Diagnostics**

IF	GO TO Subsection
Continuous Rod Withdrawal/Insertion	3.2 (Page 6)
Instrument failure (e.g. T-avg, NIS, PT-1-73) with Rod Control in MAN	3.2 (Page 6)
Dropped RCCA	3.3 (Page 11)
RCCA Misalignment	3.4 (Page 21)
Rod Position Indicator (RPI) Malfunction	3.5 (Page 39)
Failure of Control Rods to Move on Demand	3.6 (Page 42)

Goes to Subsection 3.2

Op Test No.: NRC	Scenario # 2	Event # 3	Page 8 of 44
Event Description: Loop 4 Cold Leg RTD fails high, resulting in rod insertion.			

Time	Position	Applicant's Actions or Behavior
	RO	1. **PLACE** control rods in MAN.
	RO	2. **CHECK** control rod movement STOPPED.
	RO	3. **MAINTAIN** T-avg on PROGRAM. (Reference Attachment 1) • **USE** control rods. OR • **ADJUST** turbine load.
Evaluator Note:		***The following is the portion of AOI-2 Attachment 1 that is expected to be use now in the scenario and later during the down power to remove the 1A CBP.***

RX POWER	TAVE-TREF	PZR LEVEL
90%	583.3 °F	56.5 %
92%	583.9 °F	57.2 %
94%	584.4 °F	57.9 %
96%	585.0 °F	58.6 %
98%	585.6 °F	59.3 %
100%	586.2 °F	60.0 %

Op Test No.: NRC Scenario # 2 Event # 3 Page 9 of 44

Event Description: Loop 4 Cold Leg RTD fails high, resulting in rod insertion.

Time	Position	Applicant's Actions or Behavior
	RO	4. CHECK loop T-avg channels NORMAL. ***Performs RNO*** **DEFEAT** failed loop ΔT and loop T-avg channels by placing 1-XS-68-2D, ΔT CHANNEL DEFEAT, and 1-XS-68-2M, TAVG CHANNEL DEFEAT , in failed channel position then PULL. **ENSURE** TR-68-2A placed to operable channel using.1-XS-68-2B, ΔT RCDR TR-68-2A LOOP SELECT [1-M-5]. **NOTIFY** Maintenance to implement IMI-160 for failed channel. **WHEN** at least 3 minutes have elapsed since failed T-avg channel is defeated, **THEN** a) **ENSURE** T-avg and T-ref within 1°F. b) **ENSURE** zero demand on control rod position indication [1-M-4]. c) **PLACE** rods in AUTO.
	RO	5. **CHECK** Auct Tavg NORMAL on 1-TR-68-2B.
	RO	6. **CHECK** NIS power range channels NORMAL.
	RO	7. **CHECK** the following: **PLACE** steam dumps in pressure mode as follows: • Turbine impulse pressure channel 1-PI-1-73, NORMAL. a. **PLACE** steam dumps to OFF. • Tref and Auct Tavg NORMAL b. **PLACE** mode selector HS to on 1-TR-68-2B STEAM PRESS.

Op Test No.: NRC Scenario # 2 Event # 3 Page 10 of 44

Event Description: Loop 4 Cold Leg RTD fails high, resulting in rod insertion.

Time	Position	Applicant's Actions or Behavior
	RO	8. **MONITOR** core power distribution parameters: • Power range channels. • Δ Flux Indicators. • T-avg. • Loop ΔT. • Incore TCs. • Feed flow/Steam flow. ***RO should make recommendations for withdrawing Control Bank "D" back out to 220 steps.***
	RO	9. **INITIATE** repairs to failed equipment.
	SRO	10. **REFER TO** Tech Specs: Refers to Tech Specs, announces entry into: • LCO 3.3.1, Table 3.3.1-1, item 6 & 7 condition W, item 13 condition V, • LCO 3.3.2, Table 3.3.2-1, item 6.b, condition N.
When technical specifications have been identified or at discretion of the Lead Examiner, proceed to the next event		

Op Test No.: NRC Scenario # 2 Event # 4 Page 11 of 44

Event Description: CCS leak inside containment on thermal barrier supply line

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 4 (Trigger 4)**		
Indications available: **Alarm 237B RCP 1 Thermal barrier RET Flow LO** **Alarm 238B RCP 2 Thermal barrier RET Flow LO** **Alarm 239B RCP 3 Thermal barrier RET Flow LO** **Alarm 240B RCP 4 Thermal barrier RET Flow LO** **Thermal Barrier #2 HX ΔP (1-PDI-70-104) reading 0** **Thermal Barrier #2 HX Flow (1-PDI-70-105) reading 0** **Thermal Barrier RET HDR Flow lowers to ≈112 gpm** **Alarm 83D Rx Bldg Pocket Sump Rate of Rise** **Alarm 160C Rx Bldg Pocket Sump Level Hi** **CCS Surge Tank slowly rising**		
	BOP	Should diagnose that a leak is occurring in the CCS supply line to #2 RCP.
	SRO	Direct crew actions IAW AOI-15 **LOSS OF COMPONENT COOLING WATER (CCS).**
Evaluator Note: Following Steps are from AOI-15 **LOSS OF COMPONENT COOLING WATER (CCS), section 3.2.**		
	BOP	1. **CHECK** CCS pumps status: a. **CHECK** any CCS pump TRIPPED or running pump NOT pumping forward ***Perform RNO:*** **GO TO** Caution prior to Step 2.
	BOP	2. **CHECK** 1-FCV-70-66, U1 Surge Tank Vent, OPEN.
	BOP	3. **IF** surge tank level less than 57%, **THEN ENSURE** 1-LCV-70-63, U1 Surge Tank Makeup LCV, OPEN (Refer to SOI-70.01 as required if makeup not available).

Op Test No.: NRC Scenario # 2 Event # 4 Page 12 of 44

Event Description: CCS leak inside containment on thermal barrier supply line

Time	Position	Applicant's Actions or Behavior
	BOP	4. **MONITOR** A and B side surge tank levels greater than 10%.
	BOP	5. **IF** RHR Shutdown Cooling is in service, **THEN GO TO** AOI-14, Loss Of RHR Shutdown Cooling.
	BOP	6. **MONITOR** the following for Unit 1 CCS Train A: • U-1 CCS Train A level • ERCW flow to CCS Hx A **IF** loss of either is imminent, **THEN PERFORM** the following: ***PERFORM RNO:*** **GO TO** Step 7.
	BOP	7. **MONITOR** the following for Unit 1 CCS Train B: • U-1 CCS Train B level • ERCW flow to CCS Hx C **IF** loss of either is imminent, **THEN STOP** and **LOCKOUT** the following Train B equipment: ***STEP IS N/A***
	BOP	8. **CHECK** all RCP upper and lower oil cooler flows NORMAL: • Upper Cooler flow: 150-220 gpm • Lower Cooler flow: 5-10 gpm

Op Test No.: NRC	Scenario # 2	Event # 4	Page 13 of 44
Event Description: CCS leak inside containment on thermal barrier supply line			

Time	Position	Applicant's Actions or Behavior
Evaluator Note: In the following step, when the performer secures the TBBPs, the STBY Pump should be placed in PTL first, and then stop and place the running pump in PTL. This prevents auto start of the STBY pump.		
	BOP	9. **CHECK** Thermal Barrier Hx flows NORMAL. • Thermal Barrier flow 40-50 gpm ***Perform RNO:*** ***IF flow abnormally high or low indicating possible line break, THEN:*** ***a. ENSURE Thermal Barrier Booster pumps STOPPED.*** ***b. ENSURE the following isol valves CLOSED:*** • ***FCV-70-133 or FCV-70-134, Thermal Barrier Supply*** • ***FCV-70-87 or FCV-70-90, Thermal Barrier Return.*** ***c. IF RCP lower bearing temp rising uncontrolled (180 °F max), THEN REFER TO AOI-24, Reactor Coolant Pump Seal Abnormalities.***
	BOP	10. **CHECK** 1A ESF Supply Header flow NORMAL, 1-FI-70-159A. • Normal ~100 gpm with RHR out of service.
	BOP	11. **CHECK** 1B ESF Supply Header flow NORMAL, 1-FI-70-165A. • Normal 5000-6000 gpm with RHR in service.
	BOP	12. **CHECK** SFP Hx A flow NORMAL, 0-FI-70-20. • Normal 2700-3500 gpm with SFP Hx A in service.

Op Test No.: NRC Scenario # 2 Event # 4 Page 14 of 44

Event Description: CCS leak inside containment on thermal barrier supply line

Time	Position	Applicant's Actions or Behavior
	BOP	13. **CHECK** SFP Hx B flow NORMAL, 0-FI-70-6. • Normal top of scale with SFP Hx B in service (may require local observation to determine if leak exists).
	BOP	14. **IF** leak location can be isolated, **THEN RETURN** CCS surge tank to normal level (refer to SOI-70.01).
	BOP	15. **EVALUATE** affected equipment operation USING Appendix A.
	BOP	16. **WHEN** CCS returned normal, **THEN** • **CHECK** only one CCS pump per Train. • **CHECK** one TBBP running. ***(Step is N/A)***
	SRO	17. **REFER TO** Tech Specs 3.7.7, Component Cooling Water System (CCS). ***Step is N/A for CCS, however see ARI 83D and ARI 160C actions starting on the next page.***
	SRO	18. **INITIATE** repairs.

Op Test No.: NRC Scenario # 2 Event # 4 Page 15 of 44

Event Description: CCS leak inside containment on thermal barrier supply line

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		***The following are steps from ARI 83D Plant Computer Generated Alarm. (steps 1 and 5 are only steps that are applicable)***
	RO	**[1] CHECK** ICS computer "Annunciator 83D Alarms" screen.
	RO	**[5] IF** pocket sump Rate of Rise in alarm, **REFER TO** window 160-C
Evaluator Note:		***The following are the first 5 steps from ARI-160C RX BLDG Pocket***
	SRO	**1] CHECK** pocket sump level by one or more of the following: • 1-LI-77-410, RB POCKET SUMP LEVEL [1-M-15]. • 1-LI-77-411, RB POCKET SUMP LEVEL [1-M-15]. • Plant Computer (L0472A & L0473A).
	SRO	**2] ENSURE** window 159-C, RX BLDG F&EQ SUMP LEVEL HI, NOT LIT.
	SRO	**3] START** Pocket Sump Pump(s).
	SRO	**[4] IF** Pocket Sump rate-of-rise alarms on plant computer, **THEN** **[a]** **INITIATE** 1-SI-68-32, Reactor Coolant System Water Inventory Balance. **[b]** **IF** RCS leak is NOT suspected, **THEN EVALUATE** the need for entering LCO 3.4.15.
	SRO	**[5] IF** Pocket Sump Inleakage Bias alarms on plant computer, **THEN EVALUATE** the need for entering LCO 3.4.15. ***SRO should declare "Rate of Rise" function of Pocket Sump level monitor inoperable while ARI 83D is in alarm for rate of rise. Tech Spec LCO 3.4.15 condition A.***
At the Lead Evaluator's discretion proceed to the next event.		

Op Test No.: NRC	Scenario # 2	Event # 5	Page 16 of 44
Event Description: # 3 S/G tube leak (~40 gpm). AOI-33 entry			

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 5 (Trigger 5)**		
Indications available: Vacuum Pump exhaust rad monitor RISING. Alarm 175B Vac Pmp Exhaust 1-RM-119 Rad Hi Charging flow RISING. Pressurizer Level lowering		
	CREW	Should diagnose that a S/G Tube Leak is occuring
	SRO	Direct crew actions IAW AOI-33 **STEAM GENERATOR TUBE LEAK**
Evaluator Note: Following Steps are from AOI-33 **STEAM GENERATOR TUBE LEAK, section 3.0.**		
	RO	**1. CHECK** If PZR Level Can Be Maintained: **a. CONTROL** charging flow as necessary. **1. OPEN** 1-FCV-62-93 as required. **2. OPEN** 1-FCV-62-89 as required. **b. MONITOR** pzr level STABLE or INCREASING.
	BOP	**2. IDENTIFY** Leaking SG(s); **a. EVALUATE** the following: • Unexpected rise in any SG narrow range level, • Feedwater flow mismatches, • High radiation from any Chemistry SG sample results, • High radiation on any SG main steamline radiation monitor, • RADCON survey of main steamlines and SG blowdown lines. **b. MONITOR** Condenser Vacuum Exhaust and SG Blowdown Radiation Monitors

Op Test No.: NRC Scenario # 2 Event # 5 Page 17 of 44

Event Description: # 3 S/G tube leak (~40 gpm). AOI-33 entry

Time	Position	Applicant's Actions or Behavior
	SRO	**3. CHECK** If VCT Level Can Be Maintained: **a. MAINTAIN** VCT level greater than 13%, using automatic **OR** manual makeup.
Evaluator Note: When management notified, the direction will be to shut down the plant at 2 %/hr.		
	CREW	Determine S/G Tube Leak rate to be ≈45 gpm.
	SRO	**4. DETERMINE** If Plant Shutdown Is Required: • High Secondary Radiation, **AND** • PZR level continues to decrease, **OR** • Charging flow continues to rise.
	SRO	**5. NOTIFY** The Following: **a.** Plant personnel via PA system. • "Attention plant personnel. The Unit has developed a S/G tube leak and Unit shutdown is in progress. Treat all leaks as radioactive." **b.** Operations Manager. **c.** RadCon to survey secondary plant and site environment. **d.** Chemistry to initiate the following: • Hourly RCS Cb sampling. • CM-5.01, Primary to Secondary Leak Rate Methods. • CM-9.93, Abnormal Release Assessment (for unmonitored steam releases such as SG PORVs and TD AFWP). • ODI-90-2, Steam Generator Blowdown Release.

Op Test No.: NRC Scenario # 2 Event # 5 Page 18 of 44

Event Description: # 3 S/G tube leak (~40 gpm). AOI-33 entry

Time	Position	Applicant's Actions or Behavior
	SRO	**6. PERFORM** The Following Evaluations: **a. EVALUATE** Tech Specs for applicability: • 3.4.13, RCS Operational Leakage, ***SRO to evaluate Tech Spec 3.4.13 and determine secondary leakage is out of spec and LCO states to be in spec within 4 hours and be in Mode 3, 6 hours after that.*** **b. EVALUATE** EPIP-1, Emergency Plan Classification Matrix.
	SRO	**7. CHECK** Unit Load -GREATER THAN 30%: **a. INITIATE** unit shutdown USING: • **AOI-39**, Rapid Load Reduction. **AND** • **CONTINUE** performance of this procedure.
	BOP	**8. MONITOR** CST Level - GREATER THAN 200,000 GAL,
	BOP	**9. MINIMIZE** Secondary System Contamination: **a. CONTROL** Condensate return to CST: **1. PLACE** 1-LIC-2-3, in MANUAL, and **CLOSE**. **2. MAINTAIN** condenser level 1-LR-2-12 onscale [1-M-3].
Evaluator Note:		***Event 6 Power Reduction IAW AOI-39 starts on the next page.***

Op Test No.: NRC Scenario # 2 Event # 6 Page 19 of 44

Event Description: AOI-39 Rapid Load Reduction

Time	Position	Applicant's Actions or Behavior
Booth Instructor: NONE		
Indications: None		
	SRO	Directs the crew to perform a rapid load reduction IAW AOI-39
	BOP	1. **ESTABLISH** a turbine load reduction rate less than or equal to 5%/min: a. **SET** a desired load in the SETTER with the REFERENCE CONTROL. b. **SET** the LOAD RATE at less than or equal to 5%/min. c. **DEPRESS** GO pushbutton.
	RO	2. **INITIATE** a manual boration: a. **DETERMINE** recommended boration flowrate and volume from table below.

TURBINE LOAD REDUCTION RATE (%/min)	BORATION FLOWRATE (gal/min)	BORIC ACID VOLUME TO REDUCE POWER FROM 100% TO 20%
2%	20 GPM	~ 800 GALs TOTAL
3%	30 GPM	
≥4%	40 GPM	

b. **INITIATE** boration to maintain control rods above low-low insertion limit:

1) **ADJUST** BA flow controller, 1-FC-62-139, to desired flow rate.

2) **ADJUST** BA batch counter 1-FQ-62-139 to required quantity.

3) **PLACE** mode selector 1-HS-62-140B to BOR.

4) **PLACE** VCT makeup control 1-HS-62-140A, to START.

5) **VERIFY** desired boric acid flow indicated on 1-FI-62-139.

Op Test No.: NRC Scenario # 2 Event # 6 Page 20 of 44

Event Description: AOI-39 Rapid Load Reduction

Time	Position	Applicant's Actions or Behavior
		3. **REFER TO** EPIP-1, Emergency Plan Classification Flowchart.
	US	4. **NOTIFY** the Load Coordinator of the required load reduction and expected ramp rate.
NOTE IF reactor power is stabilized at a lower level a drop in Tavg will occur due to Xenon build up. Dilution may be required to maintain power level.		
	RO	5. **MONITOR** Tavg and Tref: • Tavg trending to Tref. • Mismatch less than 5°F.
	RO BOP	6. **CHECK** rate of power reduction is rapid enough for existing plant conditions.
	BOP	7. **NOTIFY** Cnds Demin AUO of impending pmp shutdowns.
	US	8. **WHEN** rated thermal power change exceeds 15% in one hour, **NOTIFY** Chemistry to initiate 1-SI-68-28.
Lead Evaluator Note:		**Cue console operator to implement the next event at your discretion.**
	BOP	9. **WHEN** between 70 and 75% power, **THEN REMOVE** one Cnds Bstr Pmp and one Cnds Demin Pmp from service: • **PLACE** selected Cnds Bstr Pmp handswitch to STOP. • **PLACE** selected Cnds Demin Pmp handswitch to STOP, and **CLOSE** the suction valve.

Op Test No.: NRC Scenario # 2 Event # 6 Page 21 of 44

Event Description: AOI-39 Rapid Load Reduction

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: When Lead Evaluator cue console operator to raise the severity to a SGTR, the following AOI-33 MONITOR step will be applicable:
	RO	**1. CHECK** If PZR Level Can Be Maintained: **b. MONITOR** pzr level STABLE or INCREASING. ***Perform RNO:*** **b. PERFORM** the following; **1. ISOLATE** letdown as necessary. **2. INCREASE** chg flow, and start additional chg pmp as needed. **3. IF** loss of PZR level is imminent, **THEN** **a) TRIP** the reactor. **b) WHEN** reactor trip is verified, **THEN INITIATE** Safety Injection. **c) GO TO** E-0, Reactor Trip or Safety Injection, Step 1.

Op Test No.: NRC Scenario # 2 Event # 7, 8, & 9 Page 22 of 44

Event Description: E-0, to E-3 cool down to target temperature

Time	Position	Applicant's Actions or Behavior
Booth Instructor: NONE		
Indications		
	SRO	Directs RO to manual trip the Reactor, VERIFY that the Reactor Trips, then manually actuate Safety Injection.
Evaluator Note: The Reactor Trip switch on 1-M-4 will not work, if the RO attempts that switch first, the RO should go to Reactor Trip switch on 1-M-6.		
	RO	Manual trip the Reactor, VERIFY that the Reactor Trips,
	RO	Manually actuate Safety Injection
Evaluator Note: The following are steps from E-0.		
NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS. NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.		
	RO	1. **ENSURE** reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. **ENSURE** Turbine Trip: • All turbine stop valves CLOSED.

Time	Position	Applicant's Actions or Behavior
	RO	3. **CHECK** 6.9 kV shutdown boards: a. At least one board energized from: CSST (offsite), OR D/G (blackout).
	RO	4. **CHECK** SI actuated: a. Any SI annunciator LIT. b. Both trains SI **ACTUATED**. • 1-XX-55-6C • 1-XX-55-6D
BOP Evaluator Note:		**Appendix A (E-0), SI Support Systems, and Appendix B, Phase B Pipe Break Contingencies are contained at the end of this document.**
	BOP	5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
	BOP	6. **ANNOUNCE** reactor trip and safety injection over PA system.
	RO	7. **ENSURE** secondary heat sink available with either: • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than 29% [39% ADV].
	RO	8. **MONITOR** RCS temp stable at or trending to 557°F: • **IF** any RCP running, **THEN MONITOR** RCS Loop T-avg trending to 557°F. OR • **IF** NO RCP running, **THEN MONITOR** RCS Loop T-cold trending to 557°F.

Time	Position	Applicant's Actions or Behavior
	BOP	9. **ENSURE** excess letdown valves CLOSED: • 1-FCV-62-54 • 1-FCV-62-55
	RO	10. **CHECK** pzr PORVs and block valves: a. Pzr PORVs CLOSED. b. At least one block valve OPEN.
	RO	11. **CHECK** pzr safety valves CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitors.
	RO	12. **CHECK** pzr sprays CLOSED.
	RO	13. **CHECK** if RCPs should remain in service: a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	14. **CHECK** S/G pressures: • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.

Time	Position	Applicant's Actions or Behavior
	RO	15. **CHECK** for RUPTURED S/G • All S/Gs narrow range levels CONTROLLED or DROPPING. • Secondary side radiation NORMAL from Appendix A. ***Perform RNO:*** ***IF*** *any S/G has level rising in an uncontrolled manner or has high radiation,* ***THEN*** *** **GO TO** *E-3, Steam Generator Tube Rupture.*
Evaluator Note:		**SRO should direct the crew to GO TO E-3 at this point. The following steps are from E-3.**
	SRO	1. **REFER TO** EPIP-1, Emergency Plan Classification Flowchart.
	RO	2. **CHECK** if RCPs should remain in service: a. Phase B DARK [MISSP]. b. RCS pressure greater than 1500 psig.
Critical Task	BOP RO	3. **IDENTIFY** Ruptured S/G based on ANY of the following: • Unexpected rise in S/G NR level. OR • S/G discharge monitor high radiation. OR • RADPROT Survey. OR • Chemistry sample.

Time	Position	Applicant's Actions or Behavior
Critical Task	RO BOP	4. **ENSURE** Ruptured S/G PORV aligned: a. **ENSURE** controller in AUTO set at 90%. b. **ENSURE** HS in P-AUTO. c. **WHEN** Ruptured S/G pressure less than 1130 psig. **THEN** 1) **ENSURE** Ruptured S/G PORV CLOSED, OR 2) **OBTAIN** RADPROT support and Locally **CLOSE** Ruptured S/G isolation valve:
	RO BOP	5. **ENSURE** TD AFW pump being supplied from Intact S/G.
Critical Task	RO BOP	6. **ENSURE** Ruptured S/G blowdown isolated.
Critical Task	RO BOP	7. **CLOSE** Ruptured S/G MSIV and bypass valve.
Critical Task	RO BOP	8. **CONTROL** Ruptured S/G level: a. **CHECK** Ruptured S/G NR level greater than 29% [39% ADV]. b. **ISOLATE** AFW flow to Ruptured S/G. c. **ENSURE** MFW ISOLATED to Ruptured S/G: • MFW isolation valves CLOSED. • MFW bypass isolations CLOSED. • MFW reg and bypass reg valves CLOSED. • MFW pumps TRIPPED. d. **CONTROL** Ruptured S/G NR level greater than 29% [39% ADV].

Time	Position	Applicant's Actions or Behavior
	RO BOP	9. **PLACE** dumpback valve to CST, 1-LIC-2-3, in MANUAL, and **CLOSE** valve.
	RO BOP	10. **MAINTAIN** condenser level 1-LR-2-12 on-scale [M-3].
	RO BOP	11. **DISPATCH** operator to OPEN 1-FCV-14-3 to bypass condensate DI.
	SRO	12. **ENSURE** RADPROT dispatched to survey secondary plant.
	SRO	13. **NOTIFY** Chemistry to obtain samples as necessary for confirming Ruptured S/G.
	SRO	14. **NOTIFY** plant personnel of potential contaminated release.
Critical Task	RO BOP	15. **ENSURE** major steam flowpaths from the ruptured S/G isolated: a. TD AFW pump steam supply from Ruptured S/G CLOSED b. Ruptured S/G MSIV and bypass valve CLOSED, OR Intact S/G MSIVs and bypass valves CLOSED.
	RO	16. **CHECK** Ruptured S/G pressure greater than 690 psig.

Time	Position	Applicant's Actions or Behavior
	RO	17. **DETERMINE** target incore temp for RCS cooldown: • **IF** Ruptured S/G pressure is between listed values, **THEN USE** lower value:

RUPTURED S/G PRESSURE (PSIG)	TARGET INCORE TEMP (°F)
1100	491°F [471°F ADV]
1000	479°F [459°F ADV]
900	466°F [446°F ADV]
800	451°F [431°F ADV]
700	434°F [414°F ADV]
690	433°F [413°F ADV]

	RO BOP	18. **INITIATE** RCS cooldown to target incore temp, determined from Step 17. a. **DUMP** steam to condenser from Intact S/G(s) at maximum achievable rate **IF** dumps are in Tavg mode, **THEN:** 1) **PLACE** steam dump controls OFF. 2) **PLACE** steam dump mode switch in STEAM PRESSURE. 3) **ENSURE** steam dump demand indicator 1-XI-1-33 reading zero. 4) **PLACE** steam dump controls ON. 5) **PLACE** steam dump controller in MAN, AND **FULLY OPEN** three cooldown valves (≤25% demand). b. **WHEN** RCS pressure is less than 1962 psig (P-11), **THEN** • **BLOCK** low pzr pressure SI. • **BLOCK** low steam pressure SI. c. **WHEN** Tavg is less than 550 °F (P-12), **THEN BYPASS** Lo-Lo Tavg interlock.

Time	Position	Applicant's Actions or Behavior
		d. **WHEN** incore temp is less than target temp, **THEN STOP** RCS cooldown, AND **MAINTAIN** incore temperature less than or equal to target. e. **CONTINUE** with Step 19 of this Instruction.
	RO BOP	19. **MONITOR** Intact S/G levels: a. At least one S/G NR level greater than 29% b. S/G NR levels less than 50% and controlled.
	RO BOP	20. **CONTROL** Intact S/G NR levels between 29% and 50%.
	RO BOP	21. **MONITOR** pzr PORVs and block valves: a. Pzr PORVs CLOSED. b. At least one block valve OPEN.
	RO BOP	22. **CHECK** pzr safety valves CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitors.
	RO	23. **RESET** SI, and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	24. **RESET** Phase A and Phase B.
	BOP	25. **ENSURE** cntmt air in service: a. Aux air pressure greater than 75 psig b. Cntmt air supply valves OPEN [M-15]: • 1-FCV-32-80. • 1-FCV-32-102. • 1-FCV-32-110.

Time	Position	Applicant's Actions or Behavior
	RO	26. **DETERMINE** if RHR pumps should be stopped: a. **CHECK** RHR suction aligned from RWST. b. **CHECK** RCS pressure greater than 150 psig. c. **CHECK** RCS pressure stable or rising. ***Perform RNO:*** c. **ENSURE** CCS aligned to RHR heat exchanger: • 1-FCV-70-153 OPEN • 1-FCV-70-156 OPEN. **CLOSE** SFP heat exchanger A CCS supply 0-FCV-70-197. **GO TO** Step 27.
Lead Evaluator NOTE:		***When at Target Temperature, Cue console operator to insert Trigger 6 to implement Steam Leak on #3 S/G***
	RO BOP	27. **CHECK** target incore temperature: a. **VERIFY** incore temperature less than target temperature. ***DO NOT CONTINUE*** *this instruction UNTIL incore temperature less than target temperature.* b. **STOP** RCS cooldown. c. **MAINTAIN** incore temperature less than target temperature.
EVALUATOR NOTE:		***The crew should determine either in step 28 or 29 that a transition to ECA-3.1 is required.***
	RO BOP	28. **MONITOR** Ruptured S/G pressure stable or rising. *Perform RNO:* *MAINTAIN Ruptured S/G at least 250 psig greater than the pressure of the S/G(s) used for cooldown:* • *Slowly DUMP steam from S/G(s) used for cooldown.* • *MAINTAIN RCS cooldown rate less than 100° F in one hour.* *IF the Ruptured S/G depressurizes to less than 250 psig above the pressure of the S/G(s) used for cooldown, THEN GO TO ECA-3.1, SGTR and LOCA – Subcooled Recovery.*

Time	Position	Applicant's Actions or Behavior
	RO	29. **CHECK** RCS subcooling greater than 85°F [105°F ADV]. ***Perform RNO:*** ***IF*** *subcooling is less than 65°F [85°F ADV],* ***THEN GO TO*** *ECA-3.1, SGTR and LOCA – Subcooled Recovery.* ***IF*** *subcooling is STABLE* ***OR*** *DROPPING,* ***THEN GO TO*** *ECA-3.1, SGTR and LOCA – Subcooled Recovery.*

Time	Position	Applicant's Actions or Behavior
Booth Instructor: NONE		
Indications: None		
	SRO	Directs BOP to perform E-0 STEP 5: 5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
Evaluator Note:		**The following are E-0 Appendix A steps.**
Evaluator Note:		**The SRO may at times interrupt the BOP, during the performance of Appendixes A and B, to perform other higher priority task.**
	BOP	1. **ENSURE** PCBs OPEN: • PCB 5044. • PCB 5088.
	BOP	2 **ENSURE** AFW pump operation: • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL.
	BOP	3. **ENSURE** MFW isolation: • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED.

Time	Position	Applicant's Actions or Behavior
	BOP	4. **MONITOR** ECCS operation: a. Charging pumps RUNNING. b. Charging pump alignment: • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. c. RHR pumps RUNNING. d. SI pumps RUNNING. e. BIT alignment: • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. f. RCS pressure greater than 1650 psig. ***RNO if not >1650psig:*** *f. **ENSURE** SI pump flow. **IF** RCS press drops to less than 150 psig, **THEN ENSURE** RHR pump flow.*
Evaluator Note:		**The BOP or the RO may have already taken PRUDENT operator action IAW TI-1204 to perform the next step.**
Critical Step	BOP	5. **CHECK** cntmt isolation: a. Phase A isolation: • Train A GREEN. • Train B GREEN. b. Cntmt vent isolation: • Train A GREEN. • Train B GREEN. ***Perform RNO:*** ***ACTUATE Phase A and Cntmt Vent Isolation signal.***

Time	Position	Applicant's Actions or Behavior
	BOP	6. **CHECK** cntmt pressure: • Phase B DARK [MISSP]. • Cntmt Spray DARK [MISSP]. • Cntmt press less than 2.8 psig.

Time	Position	Applicant's Actions or Behavior
	BOP	7. **CHECK** plant radiation NORMAL: • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • **NOTIFY** Unit Supervisor conditions NORMAL.
	BOP	8 **ENSURE** all D/Gs RUNNING.
	BOP	9. **ENSURE** ABGTS operation: a. ABGTS fans RUNNING. b. ABGTS dampers OPEN: • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B.
	BOP	10. **ENSURE** at least four ERCW pumps RUNNING, one on each shutdown board preferred.
	BOP	11. **ENSURE** ERCW supply valves OPEN to running D/Gs.
	BOP	12. **ENSURE** CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.
	BOP	13. **CLOSE** CCS HX C DISCH TO HDR A, 0-FCV-67-144.

Time	Position	Applicant's Actions or Behavior
	BOP	14. **MONITOR** EGTS operation: • EGTS fans RUNNING. • **ENSURE** dampers OPEN VERIFY filter bank dp between 5 and 9 inches of water.
	BOP	15. **ENSURE** CCS pumps RUNNING: • 1A-A CCS pump. • 1B-B CCS pump. • C-S OR 2B-B CCS pump.
	BOP	16. **CHECK** CNTMT PURGE fans STOPPED:
	BOP	17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED:
	BOP	18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED.
	BOP	19. **ENSURE** AB GEN SUP & EXH dampers CLOSED.
	BOP	20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: • FCV-31-3. • FCV-31-4.
	BOP	21. **ENSURE** at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN: • CB EMERG CLEANUP FAN A-A, OR Fan B-B RUNNING. • FCO-31-8, OPEN OR FCO-31-7, OPEN.

Time	Position	Applicant's Actions or Behavior
	BOP	22. **ENSURE** at least one CB EMER PRESS fan RUNNING and associated damper OPEN: • CB EMERG PRESS FAN A-A, OR FAN B-B RUNNING. • FCO-31-6, OPEN. OR FCO-31-5, OPEN.
	BOP	23. **ENSURE** Control Building fans STOPPED and dampers CLOSED: • SPREADING ROOM SUPPLY and EXH FANS AND dampers. • TOILET & LKR RM EXHAUST FAN AND dampers.
	BOP	24. **INITIATE** Appendix B.
Evaluator Note:		**Only step 1 of E-0 Appendix B is listed below**
	BOP	1. **CHECK** PHASE B actuated **WHEN** PHASE B actuation occurs; **THEN GO TO** step 2.

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: NONE
		Indications None
	SRO	Directs the crew to *ECA-3.1, SGTR and LOCA – Subcooled Recovery* due to ruptured S/G pressure lowering uncontrolled.
		Evaluator Note: The crew should recognize ECA-3.1 Foldout: **EVENT DIAGNOSTIC TRANSITIONS** • **IF** any S/G press low or dropping uncontrolled AND S/G has NOT been isolated, unless needed for RCS cooldown, **THEN** ** **GO TO** E-2, Faulted Steam Generator Isolation. ***The crew may go to E-2 and perform steps to verify #3 S/G is isolated, or they may continue in ECA-3.1, since they know that #3 S/G is already isolated IAW E-3.*** ***E-2 Faulted Steam Generator steps start at page 43.***
	RO	1. **PREPARE** for switchover to RHR cntmt sump: a. **RESTORE** power to 1-FCV-63-1 USING Appendix A (ECA-3.1), 1-FCV-63-1 Breaker Operation. b. **WHEN** RWST level is less than 34%, **THEN** ** **GO TO** ES-1.3, Transfer to RHR Containment Sump.
	RO	2. **RESET** SI, and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.

Time	Position	Applicant's Actions or Behavior
	RO	3. **RESET** Phase A and Phase B.
	RO	4. **ENSURE** cntmt air in service: a. Aux air press greater than 75 psig b. Cntmt air supply valves OPEN [M-15]: • 1-FCV-32-80. • 1-FCV-32-102. • 1-FCV-32-110.
	BOP	5. **MONITOR** electrical board status: a. **CHECK** offsite power available. b. **CHECK** all shutdown boards ENERGIZED by offsite power. c. **CHECK** all unit boards ENERGIZED. d. **PLACE** any unloaded D/G in standby USING SOI-82 Diesel Generators.
	RO	6. **ENSURE** pzr heaters off: • **PLACE** Backup heaters A-A OFF. • **PLACE** Backup heaters B-B OFF. • **PLACE** Backup heaters C OFF. • **PLACE** Control heaters D OFF.
CAUTION If any Ruptured S/G is also faulted, feed flow should remain isolated in subsequent steps UNLESS needed for RCS cooldown.		
	BOP	7. **CONTROL** Ruptured S/G level: a. **CHECK** Ruptured S/G NR level greater than 29% b. **ISOLATE** feed flow to Ruptured S/G. c. **CONTROL** Ruptured S/G NR level greater than 29%

Time	Position	Applicant's Actions or Behavior
	BOP	8. **DETERMINE** if RHR pumps should be stopped: a. **CHECK** RHR suction aligned from RWST. b. **CHECK** RCS pressure : • RCS pressure greater than 150 psig. • RCS pressure stable or rising. c. **STOP** RHR pumps, and **PLACE** in A-AUTO. d. **MONITOR** RCS pressure greater than 150 psig. If pressure still lowering: ***Perform RNO:*** *b. **IF** RCS pressure low or dropping, **THEN GO TO** Step 9.*
	RO	9. **DETERMINE** if cntmt spray should be stopped:
	SRO	10. **NOTIFY** Chemistry of event status and plant conditions.
	SRO	11. **NOTIFY** Radiological Protection of event status and plant conditions.
Evaluator Note:		***Appendix D (ECA-3.1), Equipment Evaluation is at the end of this section***
	BOP	12. **EVALUATE** plant equipment status: • **REFER TO** Appendix D (ECA-3.1), Equipment Evaluation.
	RO	13. **CHECK** S/G pressure: • All S/G pressures controlled or rising. • All S/Gs pressures greater than 120 psig. ***Perform RNO:*** ***IF** steamline **AND** feedline isolation has been performed or attempted for the Faulted S/G,* ***THEN ** GO TO** Step 14.*

Time	Position	Applicant's Actions or Behavior
	RO	14. **MAINTAIN** Intact S/G NR levels: a. **MONITOR** levels greater than 29% b. **CONTROL** intact S/G levels between 29% and 50%
	RO	15. **MONITOR** shutdown margin during cooldown: a. **NOTIFY** Chemistry to initiate sampling for boron concentration: • Ruptured S/G. • RCS. b. **REFER** TO 1-SI-0-10, Shutdown Margin OR REACTINW Computer Program. c. **INITIATE** boration as necessary: • **REFER TO** SOI-62.02, CVCS Boron Concentration Control.
	RO	16. **INITIATE** RCS cooldown to cold shutdown: a. **MAINTAIN** T-cold cooldown rate less than 100°F in one hour. b. **IF** RHR in service, **THEN USE** RHR cooling. c. **DUMP** steam to condenser from Intact S/Gs.
Evaluator Note:		***At the Lead Evaluator's discretion, the scenario may be terminated when crew has determined that the plant cooldown should not be initiated until a soak time has occurred to ensure 100 °F/hr will not be violated. Remainder of ECA-3.1 procedure not included.***

Time	Position	Applicant's Actions or Behavior
		The following pages are pages from E-2 and at the end is Appendix D (ECA-3.1), Equipment Evaluation
	BOP	1. **ENSURE** all MSIVs and MSIV bypasses CLOSED.
	BOP	2. **PLACE** steam dump controls OFF: • 1-HS-1-103A, STEAM DUMP FSV "A". • 1-HS-1-103B, STEAM DUMP FSV "B".
	BOP	3. **CHECK** for at least one Intact S/G: • Any S/G pressure controlled or rising, OR • Any S/G pressure greater than P-sat for RCS incore temperature.
	BOP	4. **IDENTIFY** Faulted S/G based on ANY of the following: • Any S/G pressure dropping in an uncontrolled manner, OR • Any S/G pressure less than 120 psig,
	BOP	5. **ISOLATE** Faulted S/G: a. **ISOLATE** AFW flow to Faulted S/G. b. **ENSURE** MFW ISOLATED to Faulted S/G: • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFPs TRIPPED. c. **ENSURE** Faulted S/G PORV CLOSED. d. **ENSURE** Faulted S/G blowdown ISOLATED.
	RO	6. **ENSURE** TD AFW pump being supplied from Intact S/G.
	RO	7. **MONITOR** CST volume greater than 200,000 gal.

Time	Position	Applicant's Actions or Behavior
	RO BOP	8. **WHEN** RCS temperature is stable or rising following Faulted S/G blowdown, **THEN ADJUST** Intact S/G PORV controllers in AUTO to: ***This step is N/A***
	BOP	9. **CHECK** secondary side radiation: ***The crew will now go back to E-3, and then go to ECA-3.1***

APPENDIX D
(ECA-3.1)
Page 1 of 1

EQUIPMENT EVALUATION

1. **EVALUATE** plant equipment and systems needed to support long term cooling and recovery actions, as time and personnel availability permits:
   a) Cntmt Isolation Status.
   b) Emergency Gas Treatment System:
      One train in operation,
      REFER TO SOI-65.02.
   c) Auxiliary Building Gas Treatment:
      One train in operation,
      REFER TO SOI-30.06.
   d) Auxiliary Building Isolation alignment:
      REFER TO SOI-30.06.
   e) Main Control Room Isolation alignment:
      REFER TO SOI-31.01.
   f) ERCW System:
      Both trains in operation.
   g) Component Cooling Water System:
      Both trains in operation.
   h) Auxiliary Building Radiation:
      - 1-RR-90-1
      - 0-RR-90-12A
      - 0-RM-90-101.

SHIFT TURNOVER CHECKLIST

Page _____ **of** _____

☐	SM			
☒	US/MCR	Unit	_____	_____
☐	UO	Unit	_____	Off-going - Name
☐	AUO	Station	_____	_____
☐	STA (STA Function)			On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 69 ppm

- Abnormal equipment lineup/conditions:

  1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B.

  Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

  See Schedule

- Major Activities/Procedures in progress/planned:

  100% power, EOL, 69 ppm boron. 1A Condensate Booster Pump has a small oil leak. A power reduction to 96% is being discussed by Ops Management in order to remove the pump from service

- Radiological changes in plant during shift:

  None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

SHIFT TURNOVER CHECKLIST

Page _____ **of** ____

☐ SM
☐ US/MCR Unit _____
☒ UO Unit _____ Off-going - Name
☐ AUO Station _____
☐ STA (STA Function) On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 69 ppm

- Abnormal equipment lineup/conditions:

1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B.

Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

See Schedule

- Major Activities/Procedures in progress/planned:

100% power, EOL, 69 ppm boron. 1A Condensate Booster Pump has a small oil leak. A power reduction to 96% is being discussed by Ops Management in order to remove the pump from service

- Radiological changes in plant during shift:

None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)
☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)
☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

SHIFT TURNOVER CHECKLIST

Page _____ **of** _____

☐	SM			
☐	US/MCR	Unit	_____	
☒	UO	Unit	_____	Off-going - Name
☐	AUO	Station	_____	
☐	STA (STA Function)			On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 69 ppm

- Abnormal equipment lineup/conditions:

  1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B.

  Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

  See Schedule

- Major Activities/Procedures in progress/planned:

  100% power, EOL, 69 ppm boron. 1A Condensate Booster Pump has a small oil leak. A power reduction to 96% is being discussed by Ops Management in order to remove the pump from service

- Radiological changes in plant during shift:

  None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

Facility: Watts Bar (2008-B) Scenario No.: Spare Op Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 75% power, 1305 ppm boron (BOL). 1A MD AFW Pump is out of service for pump bearing replacement. LCO 3.7.5.b was entered 48 hours ago. Pump is expected to be returned to service in 16 hours. 1B MFP tripped 5 days ago, and power has been maintained at 75% while repairs were completed. The 1B MFP was started late during the last shift. Currently, the 1A MFP, 1B MFP, and Standby MFPs are in service.

Turnover: Shutdown Standby MFP per SOI-2&3.01. Then, perform power escalation using GO-4, Section 5.2 at 3%/hour.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N - BOP N - SRO	Shutdown Standby MFP.
2	N/A	R - RO N - SRO N - BOP	Perform power escalation.
3	RX20	I - BOP I - SRO	1-PT-1-33 Main Steam Header Pressure transmitter fails low. BOP takes manual control of the MFP Master Controller. AOI -16 entry.
4	RX05	I - RO I - SRO TS- SRO	1-LT-68-339 fails high (charging flow and RCP seal injection flows lower). AOI-20 entry. Tech Spec evaluation.
5	CH01D	TS - SRO	Containment Pressure transmitter PDT-30-45 fails high; Tech Spec evaluation.
6	FW05B FW06	C - BOP C - SRO	1B MFP trips. Standby MFP starts, but trips on overcurrent. BOP runs back the turbine to <800 MWe. AOI -16 entry.
7	RD09	C - RO C - SRO	Automatic rod control fails. RO inserts control rods manually to reduce power during the runback. AOI -2 entry.
8	MS06B MS03F MS03G	M - ALL	SG #2 MSIV fails closed. Two safety valves fail open and remain open. Reactor trip (manual) or on Overpower/delta T. EOP network entry.
9	RP13	C - BOP C - SRO	Feedwater isolation signal fails. BOP manually isolates feedwater.
10	CV21	C-RO C-SRO	BIT Outlet Isolation Valve 1-FCV-63-25 fails open.

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

Scenario (Spare) Summary

Initial Conditions:
75% power, BOL, 1305 ppm boron. 1B Main Feedwater Pump tripped 5 days ago, and power has been maintained at 75% while repairs were being completed. 1 B MFP has been restarted and placed in service, minimizing some of the Standby MFP forward flow. The crew is to shutdown Standby MFP per SOI-2&3.01, section 5.11. [41.16]. The crew is then to perform a power escalation using GO-4, Section 5.2 at 2%/hour. 1A MD AFW Pump is out of service for pump bearing replacement. LCO 3.7.5.b was entered 48 hours ago. 1A MD AFW Pump is expected to be returned to service in 16 hours.

1. Shutdown Standby MFP using SOI-2&3.01 starting at step 5.11. [41.16].
2. The crew performs a power escalation using GO-4, Section 5.2 at 2%/hour.
3. 1-PT-1-33 Main Steam Header Pressure transmitter fails low. Affects automatic MFP speed control for Feed Reg Valve ΔP. MFP speed drops, S/G levels lower. BOP takes MANUAL control of the MFP Master Controller and controls speed and Feed Reg Valve ΔP IAW AOI -16, Loss of Normal Feedwater.
4. 1-LT-68-339 fails high, causing charging flow and RCP seal injection flows to drop. RO takes 1-FCV-62-93 to MANUAL and raises charging and RCP seal injection flow. AOI-20, Malfunction of PZR Level Control, is entered. SRO evaluates Tech Specs.
5. Containment Pressure transmitter PDT-30-45 fails high. SRO evaluates Tech Specs.
6. 1B MFP trips due to low bearing oil pressure. Since the plant load is not >85%, an automatic runback does not occur, requiring the BOP to perform a manual runback. When the Standby MFP automatically starts, it trips on overcurrent. BOP runs back the turbine to <800 MWe. AOI -16, Loss of Normal Feedwater, is entered.
7. During the plant runback and resulting Tave/Tref mismatch, automatic rod control fails. RO takes MANUAL control of rods to reduce reactor power during the runback. Crew enters AOI -2, Malfunction of Reactor Control System.
8. SG #2 MSIV fails closed. The resultant pressure transient lifts S/G safety valves. Two safety valves on the same S/G stick open. If the reactor is not tripped manually, a reactor trip occurs due to Overpower ΔT. The steam leak requires the operators to actuate a safety injection. The crew performs E-0, and transitions to E-2. When termination criteria are met, the crew performs ES-1.1.
9. On the reactor trip, feedwater isolation signal fails. BOP closes valves and stops pumps manually to isolate feedwater.
10. BIT Outlet Isolation Valve 1-FCV-63-25 fails to close from the Main Control Room handswitch. RO must implement ES-1.1 Appendix F, Operation of MOVs at Train B Electrical Board.
11. The scenario terminates when the crew secures both SI Pumps and places them in automatic IAW ES-1.1.

Critical Tasks:	**1**	**2**
	Identifies failure of Feedwater Isolation: • Closes MFW isolation valves. • Closes #1 FW Heater Outlet Valves. • Closes MFW reg and bypass reg valves. • Trips MFW pumps. • Trips demin pumps and cond booster pumps.	Isolates faulted S/G prior to transition from E-2: • Isolates AFW flow.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO (Spare) Faulted Steam Generator

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Sim. Setup	rst 245, switch check, select RUN ***verify malfunctions and overrides listed below***	75% RTP, BOL, C_b - 1305 ppm. This IC contains the overrides and triggers.
0	Disable simulator fault alarm	Turns off audible alarm for the simulator fault so the crew cannot hear this alarm.
0	Place A Train week 1 placard on entrance side panel.	On entrance side panel.
0	Place DANGER Tag on 1A MDAFW Hand Switch	1A MDAFW out of service.
0	Indicate/Enter in the appropriate blanks this information into the reactivity briefing book, (appendix B TI-7.012)	Ensure **BOL *Reactivity Briefing Book*** is used. Item 3: Delta I -0.3 and AUTO rod control. Item 4: Negative, 1-CCP B, 1308 Item 5: 1305, Boron, BA 16 PW 70, BA Pot 40, PW POT 35 Item 6: PW 33 gal Item 7: PW 35 gal
Sim Setup if IC 245 does not work.	**rst , switch check, select run.**	75% RTP, MOL, C_b - 1305 ppm.
0	**batch OOS_AFWP_A**	1A MDAFW out of service. Prevents start of pump and turns breaker lamp off.
0	**imf rx20 (e1) 0**	1-PT-1-33 Main Steam Pressure transmitter fails low
0	**imf rx05a (e2) 100**	1-LT-68-339 fails high
0	**imf ch01d (e3) 15**	CNTMT Pressure Transmitter PDT-30-45 fails high
	ior an:ov:11c040 (e4) alarm **ior an:ov:11c035 (e4) alarm** **ior zaopi4639 (e4) 0** **imf fw05b (e4 15)** **imffw06**	1B MFP trips; STBY MFP starts, but trips on overcurrent
0	**imfms06b (e5) 0** **imfms03f (e5) 100** **imfms03g (e5) 85**	#2 S/G MSIV fails closed. 2 S/G safety valves fail open
0	**imf rp13**	Failure of FWI
0	**imf cv21 (e18 15) 100**	BIT Outlet Valve 1-FCV-63-25 fails open.
0	**imf rd09**	Failure of control rods to move in automatic

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO (Spare) Faulted Steam Generator

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 1& 2: Stop the STBY MFP and increase power as determined by NRC Examiner.	none	**Stop the STBY MFP and increase power from 75% to 100%.** When directed as AUO to close 1-FCV-3-205, wait 10 minutes and report valve is closed. **mrf fw21 close.** When directed to reopen 1-FCV-3-205, wait 5 minutes and report valve open. **mrf fw21 open**
Event # 3: When power increase complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 1**	**imf rx20 0 (e1)**	**1-PT-1-33 Main Steam Header Pressure Transmitter fails low.** If notified as work control/maintenance concerning 1-PT-1-33 problems, acknowledge request
Event # 4: When actions associated with AOI-16 are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 2**	**imf rx05a 100 (e2)**	**1-LT-68-339 fails high causing 1-FCV-62-93 Charging Flow Control Valve to close** If notified as work control/maintenance concerning 1-LT-68-339 Level Transmitter failure acknowledge request
Event # 5: When actions associated with 1-LT-68-339 Transmitter are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 3**	**imf ch01d 15 (e3)**	**CNTMT Pressure Transmitter PDT-30-45 fails high** If notified as work control/maintenance concerning PDT-30-45 acknowledge request. If asked if anyone is in Protection Set I Racks, wait 2 minutes then respond NO work is being performed.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO (Spare) Faulted Steam Generator

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Event # 6 & 7: When actions associated with PDT-30-45 are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 4**	**ior an:ov:11c052 (e4) alarm** **ior an:ov:11c035 (e4) alarm** **ior zaopi4639 (e4) 0** **imf fw05b (e4 15)** **imffw06 (e4)**	**1B MFP trips. STBY MFP starts but trips on overcurrent. Manual plant runback to less than 800 MWe.**
		As AUO, when dispatched, report the MFPT tripped on low oil pressure caused by an oil line break to the pressure switch. Leak has been isolated ,oil spill has been wiped up.
		As AUO, if asked to to investigate the STBY MFP trip, wait 5 minutes then inform MCR that the STBY MFP tripped on overcurrent.
		If notifed as Chemistry of the power change, acknowledge request to sample the RCS.
		If notified as work control/maintenance concerning the failure of control rods acknowledge request.

CONSOLE OPERATOR INSTRUCTIONS
SCENARIO (Spare) Faulted Steam Generator

EVENT	IC/MF/RF/OR #	DESCRIPTION/FEEDBACK
Events # 8 & 9 When actions associated with AOI-16 & AOI-2 are complete as determined by NRC Examiner, Insert this Malfunction using **Trigger 5**	**ms06b 0 (e5)** **ms03f 100 (e5)** **ms03g 85 (e5)**	**S/G #2 MSIV fails closed. Manual Reactor trip with failure of automatic FWI and two (2) stuck open safeties on S/G #2.**
		As AUO, when asked to investigate the owering S/G #2 pressure, wait 5 minutes and report that steam is coming from the North Vault room..
		As Security, when asked to investigate the lowering S/G #2 pressure, wait 5 minutes and report that steam is coming from the North Vault room.
		As AUO, when asked to perform AUO actions of AOI-17, Turbine Trip acknowledge request.
		10 minutes after the Reactor trip, if the control room has not sent AUOs out to investigate, call the control room as Nuclear Security and inform them that a Security Officer on rounds has reported a lot of noise and steam coming from the North Vault Room.
Event # 10	**imf cv21 (e18 15) 100**	**1-FCV-63-25, BIT Outlet Isolation valve fails to the full open position.**
Perform actions to close 1-FCV-63-25 BIT Outlet Isolation Valve	**ior:an:** **mrf cv21 0**	Switch taken to AUX on the 1B1-B Rx MOV Board. Closes 1-FCV-63-25 BIT Outlet Isolation Valve.

Op Test No.: NRC	Scenario # Spare	Event # 1 & 2	Page 1 of 36
Event Description: Shutdown Standby MFP and Power Escalation			

Time	Position	Applicant's Actions or Behavior
Booth Instructor: None		
Indications available:		**None**
	SRO	Direct the BOP to shutdown the Standby MFP in accordance with SOI-2&3.01.
Evaluator Note:		***Following Step is from SOI-2&3.01, Condensate and Feedwater System section 5.11.***
	BOP	[41.20] **WHEN** MFPT has been loaded enough to minimize SMFP forward flow, **THEN PERFORM** Section 5.12[3], Standby MFP Shutdown and Standby Alignment.
Evaluator Note:		***Following Steps are from SOI-2&3.01, Condensate and Feedwater System section 5.12.***
	BOP	**Standby MFP Shutdown And Standby Alignment** 1 **IF** TDMFP to carry load, PERFORM the following: 1.1 **SLOWLY OPEN** 1-FCV-3-208, STANDBY MAIN FEEDWATER PUMP MIN FLOW valve using 1-FIC-3-208 [1-M-3]. 1.2 **SLOWLY RAISE** TDMFP output to minimize SMFP forward flow USING the following controllers, as desired [**N/A** option(s) **NOT** used]: • 1-SIC-46-20A, MFPT A- SPEED CONTROL. • 1-SIC-46-20B, MFPT B- SPEED CONTROL. • 1-PC-46-20, MFPT A & B MASTER SPEED CONTROL.
	BOP	[2] **ENSURE** 1-FCV-3-208, STANDBY MAIN FEEDWATER PUMP MIN FLOW is full open when SMFP flow is reduced below 1500 gpm (minimum required flow).

Op Test No.: NRC Scenario # Spare Event # 1 & 2 Page 2 of 36

Event Description: Shutdown Standby MFP and Power Escalation

Time	Position	Applicant's Actions or Behavior
	BOP	[3] **ENSURE** 1-PIC-3-40 set at 1200 psia, and 1-PCV-3-40 CLOSED.(May be N/A'd if 1-HS-3-45 is in Normal).
	BOP	[4] **WHEN** MFP(s) have stabilized, **THEN** [4.1] **MONITOR** MFP(s) picking up additional load, [4.2] **CLOSE** SBMFP Discharge Valve 1-FCV-3-205, [4.3] **PLACE** 1-HS-3-200A in STOP/PULL TO LOCK, [4.4] **OPEN** SBMFP Discharge Valve 1-FCV-3-205 [4.5] **PLACE** 1-HS-3-200A in P-AUTO.
	BOP	[5] **ENSURE** 1-FIC-3-208, STANDBY MFWP RECIRC CONTROL, in AUTO at 90% (1500 gpm)[1-M-3], and 1-FCV-3-208 CLOSED [T1J/729].
	BOP	[6] **RETURN** controller used in Step 5.12[1.2] to the as found position or as required for current operating conditions.
	BOP	[7] **IF** in LONG CYCLE RECIRC and TDMFPs to remain in service, **THEN SET** 1-PIC-3-40 as desired (900 - 1200 psia), and **ENSURE** 1-PCV-3-40 OPEN..
	BOP	[8] **IF** SMFP is to be placed in AUTO Standby, **THEN** 8.1 **ENSURE** 1-HCV-3-208 is THROTTLED OPEN as required to maintain SMFP warmed and ready for AUTO START. 8.2 **ENSURE** 1-THV-24-948, STANDBY MFW PMP OIL CLR RCW OUTLET THROTTLE, is THROTTLED as necessary to maintain lube oil temperature greater than 75°F.

Op Test No.: NRC Scenario # Spare Event # 1 & 2 Page 3 of 36

Event Description: Shutdown Standby MFP and Power Escalation

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>[9] STOP one of the SMFP AUX OIL PUMPS using the following handswitches and then return to AUTO. (N/A switch NOT used)

A. 1-HS-3-210, STANDBY MAIN FEEDWATER PUMP AUX OIL PUMP A. [T1J/729]

B. 1-HS-3-211, STANDBY MAIN FEEDWATER PUMP AUX OIL PUMP B. [T1J/729]</td></tr>
<tr><td></td><td>SRO</td><td>Raise load in accordance with Reactivity Briefing book and GO-4 Normal Power Operations, Section 5.2 starting at step 23 and skipping to step 40.</td></tr>
<tr><td colspan="3">Evaluator Note: Following Steps are from SOI-62.02 Boron Concentration Control, Section 6.6 starting with step 2 (Dilution)</td></tr>
<tr><td></td><td>RO</td><td>[2] ADJUST 1-FQ-62-142, PW BATCH COUNTER, for required quantity.</td></tr>
<tr><td></td><td>RO</td><td>[3] PLACE 1-HS-62-140B, VCT MAKEUP MODE in DIL.</td></tr>
<tr><td></td><td>RO</td><td>[4] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START.
[4.1] CHECK Red light is LIT.</td></tr>
<tr><td></td><td>RO</td><td>[5] MONITOR the following parameters:
<table>
<tr><th>Instrument</th><th>Location</th><th>Parameters</th></tr>
<tr><td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr>
<tr><td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr>
<tr><td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr>
<tr><td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr>
<tr><td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr>
</table></td></tr>
<tr><td></td><td>RO</td><td>[6] WHEN dilution is COMPLETE, AND 1-FCV-62-128 is closed, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.</td></tr>
</table>

Op Test No.: NRC Scenario # Spare Event # 1 & 2 Page 4 of 36

Event Description: Shutdown Standby MFP and Power Escalation

Time	Position	Applicant's Actions or Behavior
	RO	[7] **TURN** 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [7.1] **CHECK** Red light is LIT.
Evaluator Note: Following Steps are from GO-4, *Normal Power Operation,* Section 5.2 Step 23 and then skipping to step 40 thru 41.		
	SRO	Direct the crew to increase reactor power to 100%.
	RO	RCS should be maintaining Tavg/Tref when Turbine load is raised. Control rods will be used along with dilution to maintain ΔI and, temperature.
Evaluator Note: Following GO-4 step will be repeated as the crew "bumps" the turbine load up.		
	BOP	[23] **CONTINUE** ascension to 90% power by performing the following: [23.1] **IF** during any of the following steps the REFERENCE changes in an undesired manner, **THEN ADJUST VPL** to stop turbine load rise. **OR** **PUSH** TURBINE MANUAL to place the turbine control mode in manual mode and **PROCEED** to section 5.6 [23.2] **ADJUST** VALVE POSITION LIMIT to 90% or to 5% above the Gov Control Indication . [23.3] **SET** LOAD RATE at predetermined value. [23.4] **PUSH** REFERENCE CONTROL Δ (raise) button to set desired load in SETTER display. [23.5] **PUSH** GO button.

Op Test No.: NRC Scenario # Spare Event # 1 & 2 Page 5 of 36

Event Description: Shutdown Standby MFP and Power Escalation

Time	Position	Applicant's Actions or Behavior
	BOP	[23.6] **MONITOR** Generator Megawatts RISING. [23.7] **CHECK** that load rise has **STOPPED** when reference display equals setter **OR** **IF** desired to stop the load change **THEN STOP** the load change by **DEPRESSING** the HOLD pushbutton. [23.8] **WHEN** desired to resume the load change, **THEN PRESS** the GO push button and continue to monitor load.
	BOP	[40] **BEFORE** raising above 80% power, **THEN ENSURE** the following: [40.1] 1-LCV-6-106A controlling properly. [40.2] 1-LCV-6-105A and 105B are **NOT** open.
When a power increase has been initiated or at the Lead Examiner's discretion, proceed to the next event.		
	BOP	[41] **WHEN** power is at or above 95%, **THEN PERFORM** the following [41.1] **ADJUST** PR NIS per 1-SI-92-1, NIS Daily Comparison. [41.2] **IF** evaluation of Hot Channel Factors is required, **THEN ENSURE** 1-SI-0-20, COMPLETE. [41.3] **NOTIFY** MIG to perform 1-SI-68-30 within 24 hours after power stabilizes at 90% or above (N/A if NOT applicable). [41.4] **ENSURE** the following level controllers maintaining levels within normal ranges: A. Feedwater heaters. B. MSR drain tanks

Op Test No.: NRC	Scenario # 1	Event # 3	Page 6 of 36
Event Description:	1-PT-1-33, Main Steam Pressure Transmitter, fails low		

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **Insert Event 3 - Trigger 1**
		Indications available: Alarm 63E S/G Level Deviation. All S/G Levels lowering. Feedwater flow lowering. ICS alarm FW Pump Suction Pressure Hi.
	BOP	Respond to annunciators and recognize 1-PT-1-33 failure. Informs crew.
	SRO	Direct crew actions IAW AOI-16 LOSS OF NORMAL FEEDWATER.
	BOP	Determines that MFPT speed control is NOT normal and takes Prudent Operator Action IAW TI-12.04 to place MFW pump master controller in Manual, and raise MFP speed.
		Evaluator Note: Following Steps are from IAW AOI-16 LOSS OF NORMAL FEEDWATER , section 3.7.
	BOP	**CHECK** MFWPT speed controller(s) NORMAL. ***Performs RNO:*** ***CONTROL MFP speed using MANUAL control of master controller or individual controller(s) as required.*** ***IF MANUAL control of individual MFWPT controller is ineffective, THEN TRIP affected MFWPT, and GO TO Section 3.4 or 3.5 as applicable.***
	RO	Place control rods in MANUAL.
	RO	**CHECK** MFW pumps recirc valves NORMAL.
	RO	Ensures T-avg and T-ref within 3°.

Op Test No.: NRC	Scenario # 1	Event # 3	Page 7 of 36
Event Description: 1-PT-1-33, Main Steam Pressure Transmitter, fails low			

Time	Position	Applicant's Actions or Behavior
	BOP	Adjusts pump speed to maintain MFW pump discharge pressure normal. Restore SG levels to program.
	BOP	Checks steam dump mode in T-AVG position.
	SRO	Notify Work Control to have instrument repaired.
	SRO/RO	May direct/request control rods be returned to Auto. • **ENSURE** Tavg and Tref within 1° • **PLACE** control rods to auto.
When the plant has been stabilized or at the Lead Examiner's discretion, proceed to the next event.		

Op Test No.: NRC	Scenario # 1	Event # 4	Page 8 of 36
Event Description: 1-LT-68-339 fails high			

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 4 (Trigger 2)**		
Indications available: **Alarm 92B PZR LEVEL HI DEVIATION.** **Alarm 101E RCP SEAL SUPPLY FLOW LO.** **Alarm 108A CHARGING FLOW HI/LO.** **Alarm 124A PZR LEVEL HI/LO.**		
	Crew	Diagnose a failure of the controlling PZR Level channel HIGH.
	RO	May take PRUDENT Operator action IAW TI-12.04 to take manual control of 1-FCV-62-93 to raise charging flow to normal.
	SRO	Direct crew actions IAW AOI-20 MALFUNCTION OF PRESSURIZER LEVEL CONTROL SYSTEM.
Evaluator Note: Following Steps are from AOI-20 MALFUNCTION OF PRESSURIZER LEVEL CONTROL SYSTEM.		
	RO	1. **CHECK** pzr level program signal NORMAL: • LR-68-339
	RO	2. **CHECK** if 1-XS-68-339E is selected to FAILED channel,(control or backup): • LI-68-339, • LI-68-320, • LI-68-335.
	RO	3. **CHECK** failure HIGH.

Op Test No.: NRC Scenario # 1 Event # 4 Page 9 of 36

Event Description: 1-LT-68-339 fails high

Time	Position	Applicant's Actions or Behavior
	RO	4. **IF** controlling channel failed,**THEN PLACE** charging valve controller 1-HIC-62-93A in MAN, and **RESTORE** level to program.
	RO	5. **SELECT** operable pzr level channels for control and indication [1-M-5]: a. **SELECT** operable channels for control and backup with 1-XS-68-339E. b. **ENSURE** operable channel selected recording with 1-XS-68-339B.
Evaluator Note: If the crew elected to isolate letdown to control regenerative heat exchanger temperature then Step 6 RNO MUST BE IMPLEMENTED, AND ATTACHMENT 1 STEPS performed to restore charging and letdown to normal. **AOI-20 Attachment 1 begins on Page 26.**		
	RO	6. **CHECK** letdown IN SERVICE: • FCV-62-69 OPEN. • FCV-62-70 OPEN. • FCV-62-77 OPEN. • Letdown orifice OPEN. ***If Letdown Isolated:*** ***ESTABLISH letdown REFER TO Attachment 1.***

Op Test No.: NRC	Scenario # 1	Event # 4	Page 10 of 36
Event Description: 1-LT-68-339 fails high			

Time	Position	Applicant's Actions or Behavior
	RO	7. **RESTORE** pzr level control to normal: a. **MAINTAIN** regen hx letdown temp < 380 °F. b. **CONTROL** charging and letdown to return pzr level to program. c. **ENSURE** pzr control heater bank D red light LIT. d. Momentarily **PLACE** 1-HS-68-341H, pzr backup heater bank C, to OFF. e. **CHECK** pzr program level NORMAL. 1-LR-68-339 (green pen) f. **RETURN** charging valve controller 1-HIC-62-93A to AUTO.
	SRO	8. **NOTIFY** Work Control to remove failed channel from service.
	SRO	9. **REFER TO** the following Tech Specs: 3.3.1, Reactor Trip System (RTS) Instrumentation. 3.3.3, Post Accident Monitoring. ***Refer to Tech Specs and enters:*** ▪ ***LCO 3.3.1, Table 3.3.1-1, item 9 condition X.*** ▪ ***LCO 3.3.3, Table 3.3.3-1, item 14, condition F. (Action A)***
	SRO	10. **INITIATE** repairs to failed instrument/circuitry.
When Tech Specs have been addressed or at the Lead Examiner's discretion, proceed to the next event.		

Op Test No.: NRC Scenario # 1 Event # 5 Page 11 of 36

Event Description: PDT-30-45, Containment Pressure Transmitter, fails high

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **Insert Event 5 - Trigger 3**
		Indications available: Alarm 125A Cntmt Hi-Hi- Press Steamline Isolation. Containment Pressure Indicator 1-PDT-30-45 fails High. Alarm 83D Plant Computer Generated Alarm - High Containment Pressure Input.
	SRO	Refers to Technical Specification 3.3.2, Action E for required actions
		ACTIONS (continued) CONDITION: E. One Containment Pressure channel inoperable. REQUIRED ACTION: E.1 --------NOTE--------- One additional channel may be bypassed for up to 4 hours for surveillance testing. ---------- Place channel in bypass. — COMPLETION TIME: 6 hours OR E.2.1 Be in MODE 3. — 12 hours AND E.2.2 Be in MODE 4. — 18 hours
	SRO	Notify Work Control to initiate repairs.
		When the SRO has referred to Tech Specs or at the Lead Examiner's discretion, proceed to the next event.

Op Test No.: NRC Scenario # 1 Event # 6 & 7 Page 12 of 36

Event Description: 1B MFP Trip & STBY MFP trip on overcurrent

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, initiate Event (Trigger 4)**
		Indications available: **Alarm 50B MFPT 1B Abnormal.** **Alarm 51A Tripped.** **Alarm 52A Bearing Oil Press Lo.** **White Breaker Disagreement light on STBY MFP.** **Feed Flow lowering.** **Lube Oil Pressure (1-PI-46-39) reading 0.**
	Crew	Should diagnose a loss of the 1B MFP and the SRO should go to AOI-16.
Evaluator Note: The following are steps in AOI-16 starting in section 3.5 step 2.		
	BOP	2. **CHECK** turbine load less than or equal to 1000 MWe (85%).
	BOP	3. **PLACE** tripped MFP recirc valve controller in MANUAL, and **CLOSE** recirc valve.
Evaluator Note:		***The BOP should recognize that the Standby MFWP has tripped.***
	BOP	4. **CHECK** turbine load less than 800 MWe (67%), ***Perform RNO:*** ***ENSURE Standby MFWP running.*** ***IF Standby MFWP NOT available,*** ***THEN*** ***REDUCE turbine load to less than 800 MWe with valve position limiter.***
	BOP	5. **ENSURE** MFWP speed rising to control S/G ΔP and levels on program.

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 13 of 36
Event Description: 1B MFP Trip & STBY MFP trip on overcurrent			

Time	Position	Applicant's Actions or Behavior
	BOP	6. **ENSURE** adequate feed flow for existing conditions: • Feed flow greater than or equal to steam flow. • S/G levels returning to program.
Note: To prevent Rods from excessive insertion, the SRO may direct a Minor Boration in an amount as described in the Reactivity Briefing Book, IAW 62.02 Boron Concentration Control section 6.7.		
	RO	7. **ENSURE** T-avg and T-ref within 3°. RO recognizes that automatic rod insertion is not occurring. ***RNO:*** ***INSERT control rods to match reactor power with turbine load.***
	SRO	8. **REFER TO** Tech Specs: • 3.2.3 AFD. *Crew should also be prompted to review this Tech Spec from ARI-83 D PLANT COMPUTER GENERATED ALARM, if it is in alarm.*
	BOP	9. **IF** feed flow greater than 40%, **THEN ENSURE** tripped MFWP turbine condenser valves CLOSED: • Pump B, 1-FCV-2-206 and -211
	BOP	10. **MONITOR** reg valves controlling S/G levels on program.
	BOP	11. **IF** C-7 LOSS OF LOAD STM DUMP INTERLOCK annunciator LIT [66E], **THEN** a. **ENSURE** steam dump valves have zero demand. b. **RESET** loss-of-load interlock with steam dump mode switch.

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 14 of 36
Event Description: 1B MFP Trip & STBY MFP trip on overcurrent			

Time	Position	Applicant's Actions or Behavior
	SRO	12. **ENSURE** Condensate System Pumps in service as necessary: **REFER TO** GO-4, Normal Power Operation. *No Action necessary*
	SRO	13. **IF** reactor power dropped by greater than or equal to 15% in one hour, **THEN NOTIFY** Chemistry to initiate power change sampling requirements.
	BOP	14. **CHECK** VALVE POS LIMIT LIT.
	BOP	15. **REDUCE** turbine load setpoint using REFERENCE CONTROL ▼ (lower) AND GO button until VALVE POS LIMIT LIGHT not LIT, **THEN SET** valve position limiter to 95%.
	SRO	16, **INITIATE** repairs on failed pumps.
	SRO	17. **RETURN TO** Instruction in effect.

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 15 of 36
Event Description: 1B MFP Trip & STBY MFP trip on overcurrent			

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: The following are steps in ARI-87-B ROD INSERTION LIMIT LO-LO (The following actions are dependent upon how far control rods are manually inserted.)
	RO	**[1] IF** low-low rod insertion limit has been exceeded, **THEN** **[a] STOP** all dilutions of RCS. **[b] SELECT** manual rod control, and **RESTORE** Tavg to Tref, if necessary. **[c] INITIATE** SDM determination. **[d] RESTORE** rods to within limits within 2 hours. **[e] GO TO** AOI-34, IMMEDIATE BORATION.
		Evaluator Note: The following are steps in A0I-34 IMMEDIATE BORATION, starting in section 3.2 step 1. Crew should reference Reactivity Briefing book to estimate amount of boric acid to add.
	RO	1. **INITIATE** normal boration to change CB as necessary: a. **PLACE** BA flow controller, 1-FC-62-139, to desired flow rate. b. **ADJUST** BA batch counter 1-FQ-62-139 to ensure boration continues. c. **PLACE** mode selector 1-HS-62-140B to BOR. d. **PLACE** VCT makeup control 1-HS-62-140A, to START. e. **VERIFY** boric acid flow indicated on 1-FI-62-139.
	RO	2. **ENSURE** PW to blender isol 1-FCV-62-143, CLOSED.

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 16 of 36
Event Description: 1B MFP Trip & STBY MFP trip on overcurrent			

Time	Position	Applicant's Actions or Behavior
	RO	3. **CHECK** PW to blender flow 1-FI-62-142, indicating ZERO.
	RO	4. **MONITOR** for negative reactivity Insertion: • Neutron flux dropping. • TAVG dropping. • Control rod bank position rising (if in AUTO). *If Rods have been placed in Manual, RO shall withdraw control rods as necessary to maintain Tavg/Tref.*
When the plant is stable or when determined by the NRC, Lead Examiner may cue the next event		

Op Test No.: NRC Scenario # 1 Event # 8 , 9 & 10 Page 17 of 36

Event Description: # 2 MSIV fails closed, E-0 entry with failure of FWI, transition to E-2, transition to ES-1.1 with 1-FCV-63-25 BIT Outlet Isolation Valve failure to close.

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: When directed by Lead Examiner, insert Trigger 5
		Indications **No. 2 MSIV fails closed, 2 SG safety valves open and fail to close.** **Reactor Tripped.**
	SRO	Directs RO perform E-0.
Evaluator Note:		The following are steps from E-0.
		NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS. NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.
	RO	1. **ENSURE** reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. **ENSURE** Turbine Trip: • All turbine stop valves CLOSED.
	RO	3. **CHECK** 6.9 kV shutdown boards: a. At least one board energized from:CSST (offsite), OR D/G (blackout).
	RO	4. **CHECK** SI actuated: a. Any SI annunciator LIT. b. Both trains SI **ACTUATED**. • 1-XX-55-6C • 1-XX-55-6D

Op Test No.: NRC Scenario # 1 Event # 8 , 9 & 10 Page 18 of 36

Event Description: # 2 MSIV fails closed, E-0 entry with failure of FWI, transition to E-2, transition to ES-1.1 with 1-FCV-63-25 BIT Outlet Isolation Valve failure to close.

Time	Position	Applicant's Actions or Behavior
		BOP Evaluator Note: Appendix A (E-0), SI Support Systems, and Appendix B, Phase B Pipe Break Contingencies are contained at the end of this document. Appendix A contains the steps that are required for Critical Task #1. Appendix A (E-0) starts on Page 28.
	BOP	5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
	BOP	6. **ANNOUNCE** reactor trip and safety injection over PA system.
	RO	7. **ENSURE** secondary heat sink available with either: • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than 29%

	RO	8. **MONITOR** RCS temp stable at or trending to 557°F:
		• **IF** any RCP running, **THEN MONITOR** RCS Loop T-avg trending to 557°F.
		
		Perform RNO:
		IF temp less than 557°F, THEN
		ENSURE steam dumps and S/G PORVs CLOSED.
		IF cooldown continues, THEN:
		• PLACE steam dump controls OFF.
		• CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29%
		
		IF cooldown continues after AFW flow is controlled, THEN
		• CLOSE MSIVs.
		• ENSURE MSIV bypasses CLOSED.

Time	Position	Applicant's Actions or Behavior
	BOP	9. **ENSURE** excess letdown valves CLOSED: • 1-FCV-62-54 • 1-FCV-62-55
	RO	10. **CHECK** pzr PORVs and block valves: a. Pzr PORVs CLOSED. b. At least one block valve OPEN.
	RO	11. **CHECK** pzr safety valves CLOSED: • **EVALUATE** tailpipe temperatures and acoustic monitors.
	RO	12. **CHECK** pzr sprays CLOSED.
	RO	13. **CHECK** if RCPs should remain in service: a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	14. **CHECK** S/G pressures: • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig. ***Perform RNO:*** ***IF S/G pressure low OR dropping uncontrolled, THEN ** GO TO E-2, Faulted Steam Generator Isolation.***
Evaluator Note:		***SRO should direct the crew to GO TO E-2 at this point. The following steps are from E-2.***

Time	Position	Applicant's Actions or Behavior
	BOP	**ENSURE** all MSIVs and MSIV bypasses CLOSED.
	BOP	**PLACE** steam dump controls OFF: • 1-HS-1-103A, STEAM DUMP FSV "A". • 1-HS-1-103B, STEAM DUMP FSV "B".
	BOP	**CHECK** for at least one Intact S/G: • Any S/G pressure controlled or rising, OR • Any S/G pressure greater than P-sat for RCS incore temperature
Evaluator Note: the crew should identify # 2 S/G as the faulted S/G.		
	BOP	**IDENTIFY** Faulted S/G based on ANY of the following: • Any S/G pressure dropping in an uncontrolled manner, OR • Any S/G pressure less than 120 psig, OR • S/G enclosure temps high: 1) T1002A for 2 and 3, 2) T1003A for 1 and 4. OR • Local indication of break in any of the following: 1) Main steam lines, 2) Main feedwater lines, 3) Other secondary piping.

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Event Description: # 2 MSIV fails closed, E-0 entry with failure of FWI, transition to E-2, transition to ES-1.1 with 1-FCV-63-25 BIT Outlet Isolation Valve failure to close.

Time	Position	Applicant's Actions or Behavior
		Evaluator Note: The feedwater isolation failure is addressed by the BOP during the performance of E-0, Appendix A, Step 3. RNO actions to close the #1 Feedwater Heater Isolation valves and to dispatch an AUO to manually close the MFW bypass isolation valves should have been completed.
CRITICAL Task 2	BOP	**ISOLATE** Faulted S/G: a. **ISOLATE** AFW flow to Faulted S/G. b. **ENSURE** MFW ISOLATED to Faulted S/G: • MFW isolation valves CLOSED. • MFW bypass isolations CLOSED. • MFW reg and bypass reg valves CLOSED. ***Perform RNO:*** ***Manually CLOSE valves as necessary.*** **Actions should have been completed during Appendix A performance.** • MFW pumps TRIPPED. c. **ENSURE** Faulted S/G PORV CLOSED. b. **ENSURE** Faulted S/G blowdown ISOLATED.
	BOP	**ENSURE** TD AFW pump being supplied from Intact S/G.
	BOP	**MONITOR** CST volume greater than 200,000 gal.

Time	Position	Applicant's Actions or Behavior
	BOP	**WHEN** RCS temperature is stable or rising following Faulted S/G blowdown, **THEN** **ADJUST** Intact S/G PORV controllers in AUTO to P-sat for the hottest RCS temp.
	BOP	**CHECK** secondary side radiation: • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders • NORMAL trend prior to isolation. • S/G sample results by Chemistry.
	RO	**MONITOR** SI termination criteria: a. **MONITOR** RCS subcooling greater than 65°F ADV. b. **MONITOR** secondary heat sink available with either: • Total feed flow to Intact S/Gs greater than 410 gpm, OR • At least one Intact S/G NR level greater than 29% ADV. c. **MONITOR** RCS pressure stable or rising. d. **MONITOR** pzr level greater than 15% ADV. c. **GO TO** ES-1.1,SI Termination.

Op Test No.: NRC Scenario # 1 Event # 8 , 9 & 10 Page 23 of 36

Event Description: # 2 MSIV fails closed, E-0 entry with failure of FWI, transition to E-2, transition to ES-1.1 with 1-FCV-63-25 BIT Outlet Isolation Valve failure to close.

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**SRO should direct the crew to GO TO ES-1.1 at this point. The following steps are from ES-1.1.**
	RO	**RESET** SI, and **CHECK** the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	**RESET** Phase A and Phase B.
	BOP	**ENSURE** cntmt air in service: a. Aux air press greater than 75 psig [M-15]. b. Cntmt air supply valves OPEN [M-15]: • 1-FCV-32-80. • 1-FCV-32-102. • 1-FCV-32-110.
	RO	**ENSURE** ONLY one Charging Pump running: • **STOP** all but one CCP and **PLACE** in A-AUTO.
	RO	**CHECK** RCS press stable or rising.

Time	Position	Applicant's Actions or Behavior
	RO	**ALIGN** charging: a. **CLOSE** RCP seal flow control 1-FCV-62-89. b. **OPEN** charging isolation valves 1-FCV-62-90 and 1-FCV-62-91. c. **ENSURE** charging valve 1-FCV-62-85 OR 1-FCV-62-86 OPEN. d. **CHECK** RHR Suction aligned from RWST. e. **OPEN** seal return valves 1-FCV-62-61 and 1-FCV-62-63.
Evaluator Note:		**1-FCV-63-25 fails to close from the MCR. Steps required to close 1-FCV-63-25 are contained in ES-1.1 Appendix F, OPERATION OF MOVs AT TRAIN B ELECTRICAL BOARD. Appendix F (ES-1.1) starts at Page 35.**
	RO	**CLOSE** BIT outlet valves 1-FCV-63-25 and 1-FCV-63-26. ***Perform RNO:*** ***CLOSE BIT outlet valve(s) at RX MOV BD using Appendix E and/or F for failed train.*** **Dispatches AUO to the 1B1-B Rx MOV board, Compt 11E.**
	RO	**ADJUST** 1-FCV-62-89 and 1-FCV-62-93 to maintain: • Seal injection flow between 8 and 13 gpm for each RCP. • Pzr level stable or rising.

Time	Position	Applicant's Actions or Behavior
	RO	**CONTROL** charging flow to maintain pzr level: a. **IF** any S/G Faulted, **THEN** **DO NOT CONTINUE** this Instruction UNTIL Faulted S/G depressurization stops. b. **CHECK** pzr level stable or rising.
	RO	**DETERMINE** if SI pumps should be stopped: a. **CHECK** RCS pressure: • Stable or rising. • Greater than 1350 psig. b. **CHECK** RHR Suction aligned from RWST. c. **CHECK** RCS pressure: • Stable or rising. • Greater than 1650 psig.
	RO	11. **STOP** SI pumps, AND **PLACE** in A-AUTO.
Evaluator Note: Scenario may be terminated when crew has stopped and placed both SI Pumps in P-Auto, or at the discretion of the Lead Evaluator. Remainder of ES-1.1 procedure not included.		

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: NONE
		Indications **THE FOLLOWING STEPS ARE ASSOCIATED WITH AOI-20 ATTACHMENT 1 RESTORING CHARGING AND LETDOWN.**
	RO	1. **IF** charging **NOT** established, **THEN PERFORM** the following: a. **CLOSE** 1-FCV-62-89, CHRG HDR-RCP SEALS FLOW CONTROL. b. **ENSURE** Charging Pump running. c. **OPEN** 1-FCV-62-90 and 1-FCV-62-91, CHARGING LINE ISOL. d. **ENSURE** 1-FCV-62-85, NORM CHARGING TO LOOP 1, or 1-FCV-62-86, ALT CHARGING TO LOOP 4, OPEN. e. **ADJUST** 1-FCV-62-93 to maintain seal injection flow between 8 and 13 gpm for each RCP.
	RO	2. **ENSURE** letdown isol valves OPEN: • 1-FCV-62-69, CVCS LETDOWN ISOLATION. • 1-FCV-62-70, CVCS LETDOWN ISOLATION. • 1-FCV-62-77, CVCS LP LETDOWN ISOLATION.
	RO	3. **PLACE** 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL, in MANUAL at 25% OPEN.

Time	Position	Applicant's Actions or Behavior
	RO	4. **PLACE** 1-HIC-62-81A, LETDOWN PRESS CONTROL, in MANUAL at 40-50% OPEN if using 75 gpm orifice (20-30% OPEN if using 45 gpm orifice).
	RO	5. **ESTABLISH** 75 gpm or greater charging flow while maintaining seal injection flow between 8 and 13 gpm for each RCP.
Evaluator Note:		**Candidate will place either 1-FCV-62-73 or -74 in service.**
	RO	6. **OPEN** letdown orifices as needed: • 1-FCV-62-72 (45 gpm). • 1-FCV-62-73 (75 gpm). • 1-FCV-62-74 (75 gpm). • 1-FCV-62-76 (5 gpm).
	RO	7. **ADJUST** 1-HIC-62-81A, LETDOWN PRESS CONTROL, for desired press, (320 psig at normal letdown temp), and **PLACE** in AUTO.
	RO	8. **PLACE** 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL, in AUTO.
	RO	9. **RETURN** pzr level to program.
	RO	10. **RETURN** 1-HIC-62-93A, CHARGING FLOW PZR LEVEL CONTROL, in AUTO.

Time	Position	Applicant's Actions or Behavior
Booth Instructor: NONE		
Indications **THE FOLLOWING STEPS ARE ASSOCIATED WITH E-0 Appendix A**		
	SRO	Directs BOP to perform E-0 STEP 5: 5. **EVALUATE** support systems: • **REFER TO** Appendixes A and B (E-0), Equipment Verification pages 15-28.
Evaluator Note:		**The following are E-0 Appendix A steps.**
Evaluator Note:		**The SRO may at times interrupt the BOP, during the performance of Appendixes A and B, to perform other higher priority task.**
	BOP	1. **ENSURE** PCBs OPEN: • PCB 5044. • PCB 5088.
	BOP	2 **ENSURE** AFW pump operation: • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL.
Evaluator Note:		**The BOP or the RO may have already taken PRUDENT operator action IAW TI-1204 to perform the next step.** **If the Operator may either close the manual isolation for the MFW isolation (and Bypass isolation valves**

Time	Position	Applicant's Actions or Behavior
Critical Task #1	BOP	3. **ENSURE** MFW isolation: • MFW isolation and bypass isolation valves CLOSED. ***PERFORM RNO:*** ***Manually CLOSE:*** ***1-HS-3-33A (S/G #1 MFW ISOL VLV)*** ***1-HS-3-47A (S/G #2 MFW ISOL VLV*** ***1-HS-3-87A (S/G #3 MFW ISOL VLV*** ***1-HS-3-100A (S/G #4 MFW ISOL VLV)*** ***Manually CLOSE:*** ***1-HS-3-10A (A1 Heater Outlet)*** ***1-HS-3-10A (B1 Heater Outlet)*** ***1-HS-3-10A (C1 Heater Outlet)***
Critical Task #1		• MFW reg and bypass reg valves CLOSED. ***PERFORM RNO:*** ***Take the controllers to MANUAL and CLOSE for the MFW Reg Valves and MFW Bypass Reg valves, and verify valve positions on 1-XX-3-35 and 1-XX-3-35A*** ***1-FIC 3-35*** ***1-FIC 3-48*** ***1-FIC 3-90*** ***1-FIC 3-103*** ***1-LIC 3-35A*** ***1-LIC 3-48A*** ***1-LIC 3-90A*** ***1-LIC 3-103A***

Time	Position	Applicant's Actions or Behavior
Critical Task #1	BOP	• MFP A and B TRIPPED. ***PERFORM RNO:*** ***TRIP 1A MFP MANUALLY.***
Critical Task #1	BOP	• Standby MFP STOPPED.
Critical Task #1	BOP	• Cond demin pumps TRIPPED. **PERFORM RNO:** **TRIP COND Demin Pumps MANUALLY**
Critical Task #1	BOP	• Cond booster pumps TRIPPED. ***PERFORM RNO:*** ***TRIP Condensate Booster Pumps MANUALLY.***
	BOP	4. **MONITOR** ECCS operation: a. Charging pumps RUNNING. b. Charging pump alignment: • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. c. RHR pumps RUNNING. d. SI pumps RUNNING.

Time	Position	Applicant's Actions or Behavior
	BOP	e. BIT alignment: • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. f. RCS pressure greater than 1650 psig. ***RNO if not >1650psig:*** ***f. ENSURE SI pump flow. IF RCS press drops to less than 150 psig, THEN ENSURE RHR pump flow.***
	BOP	5 **CHECK** cntmt isolation: a. Phase A isolation: • Train A GREEN. • Train B GREEN. b. Cntmt vent isolation: • Train A GREEN. • Train B GREEN.
	BOP	6. **CHECK** cntmt pressure: • Phase B DARK [MISSP]. • Cntmt Spray DARK [MISSP]. • Cntmt press less than 2.8 psig.

Time	Position	Applicant's Actions or Behavior
	BOP	7. **CHECK** plant radiation NORMAL: • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • **NOTIFY** Unit Supervisor conditions NORMAL.
	BOP	8 **ENSURE** all D/Gs RUNNING
	BOP	9. **ENSURE** ABGTS operation: a. ABGTS fans RUNNING. b. ABGTS dampers OPEN: • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B.
	BOP	10. **ENSURE** at least four ERCW pumps RUNNING, one on each shutdown board preferred.
	BOP	11. **ENSURE** ERCW supply valves OPEN to running D/Gs.
	BOP	12. **ENSURE** CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.

Time	Position	Applicant's Actions or Behavior
	BOP	13. **CLOSE** CCS HX C DISCH TO HDR A, 0-FCV-67-144.
	BOP	14. **MONITOR** EGTS operation: • EGTS fans RUNNING. • **ENSURE** dampers OPEN VERIFY filter bank dp between 5 and 9 inches of water.
	BOP	15. **ENSURE** CCS pumps RUNNING: • 1A-A CCS pump. • 1B-B CCS pump. • C-S OR 2B-B CCS pump.
	BOP	16. **CHECK** CNTMT PURGE fans STOPPED:
	BOP	17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED:
	BOP	18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED.
	BOP	19. **ENSURE** AB GEN SUP & EXH dampers CLOSED.
	BOP	20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: • FCV-31-3. • FCV-31-4.
	BOP	21. **ENSURE** at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN: • CB EMERG CLEANUP FAN A-A, OR Fan B-B RUNNING. • FCO-31-8, OPEN OR FCO-31-7, OPEN.

Time	Position	Applicant's Actions or Behavior
	BOP	22. **ENSURE** at least one CB EMER PRESS fan RUNNING and associated damper OPEN: • CB EMERG PRESS FAN A-A, OR FAN B-B RUNNING. • FCO-31-6, OPEN. OR FCO-31-5, OPEN.
	BOP	23. **ENSURE** Control Building fans STOPPED and dampers CLOSED: • SPREADING ROOM SUPPLY and EXH FANS AND dampers. • TOILET & LKR RM EXHAUST FAN AND dampers.
	BOP	24. **INITIATE** Appendix B.
Evaluator Note:		**Only step 1 of E-0 Appendix B is listed below**
	BOP	1. **CHECK** PHASE B actuated **WHEN** PHASE B actuation occurs; **THEN GO TO** step 2.

Appendix D	Required Operator Actions	Form ES-D-2

Op Test No.: NRC Scenario # 1 Event # _____ Page 35 of 36

Event Description: ES-1.1, Appendix F, OPERATION OF MOVs AT TRAIN B ELECTRICAL BOARD

Time	Position	Applicant's Actions or Behavior
Booth Instructor: NONE		
Indications		**THE FOLLOWING STEPS ARE ASSOCIATED WITH ES-1.1 Appendix F.**
Evaluator Note:		
		IF any of the following valves requires manipulation from the Train B Rx MOV Bd, **THEN PERFORM** the applicable substep when directed by the UO/SRO:
		1. 1-FCV-62-91, Charging Isolation Valve ***NOT APPLICABLE***
		2. 1-FCV-62-61, Seal Return Valve ***NOT APPLICABLE***

Appendix D	Required Operator Actions	Form ES-D-2

Op Test No.: NRC Scenario # 1 Event # _____ Page 36 of 36

Event Description: ES-1.1, Appendix F, OPERATION OF MOVs AT TRAIN B ELECTRICAL BOARD

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The RO must perform the following steps to close BIT Outlet Valve 1-FCV-63-25.**
	RO	3. 1-FCV-63-25, BIT Outlet Valve a) **GO TO** 480V Rx MOV Bd 1B1-B, Compt. 11E. b) **PLACE** 1-XS-63-25 to AUX position. c) **PLACE** 1-HS-63-25C to CLOSE position. d) **VERIFY** 1-FCV-63-25 CLOSE. e) **WHEN** directed by the UO or SRO, • **PLACE** 1-HS-63-25C in NORMAL position • **PLACE** 1-XS-63-25 in NORMAL position.

SHIFT TURNOVER CHECKLIST

Page _____ of _____

☐	SM			
☒	US/MCR	Unit _____		
☐	UO	Unit _____	Off-going - Name	
☐	AUO	Station _____		
☐	STA (STA Function)		On-coming - Name	

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 1305 ppm

- Abnormal equipment lineup/conditions:

  1A MD AFW Pump OOS for motor bearing replacement. 24 hours remain in LCO 3.7.5, Action B.

  Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

  See Schedule

- Major Activities/Procedures in progress/planned:

  75% power, BOL, 1305 ppm boron. 1B MFP tripped 5 days ago, and power has been maintained at 75% while repairs were completed. The 1B MFP was started late during the last shift. Currently the 1A, 1B, and Standby MFPs are in service.

  Shutdown the Standby MFP and commence power escalation to 100%

- Radiological changes in plant during shift:

  None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐ Standing Orders ☐ LCO(s) in actions (N/A for AUOs)

☐ Immediate required reading ☐ TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____

SHIFT TURNOVER CHECKLIST

Page _____ **of** _____

☐	SM			
☐	US/MCR	Unit	_____	
☒	UO	Unit	_____	Off-going - Name
☐	AUO	Station	_____	
☐	STA (STA Function)			On-coming - Name

Part 1 - Completed by off-going shift/Reviewed by on-coming shift: C_b= 1305 ppm

- Abnormal equipment lineup/conditions:

  1A MD AFW Pump OOS for motor bearing replacement. 28 hours remain in LCO 3.7.5, Action B.

  Green risk associated with equipment OOS.

- SI/Test in progress/planned: (including need for new brief)

  See Schedule

- Major Activities/Procedures in progress/planned:

  75% power, BOL, 1305 ppm boron. 1B MFP tripped 5 days ago and power was maintained at 75% while repairs were completed. The 1B MFP was started late during the last shift. Currently the 1A MFP, 1B MFP, and Standby MFPs are in service.

  Shutdown the Standby MFP and commence power escalation to 100%.

- Radiological changes in plant during shift:

  None

Part 2 - Performed by on-coming shift

☐ A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)

☐ A review of the Rounds sheets/Abnormal readings (AUOs only)

Review the following programs for changes since last shift turnover:

☐	Standing Orders	☐	LCO(s) in actions (N/A for AUOs)
☐	Immediate required reading	☐	TACF (N/A for AUOs

Part 3 - Performed by both off-going and on-coming shift

☐ A walkdown of the MCR control boards (N/A for AUOs)

Relief Time: _____ Relief Date: _____