Simulation Facility Braidwood | Scenario No.: **NRC 1** | Operating Test No.: **17-1 NRC**

Examiners: _____ Applicant: _____ SRO

_____ _____ ATC

_____ _____ BOP

Initial Conditions: IC-21

Turnover: Unit 1 is at 100% power, steady state, equilibrium xenon, BOL. Online risk is green. Instrument Maintenance is currently testing 1A SG NR level channel 1LT-517. Tech Spec 3.3.1 Conditions A and E and 3.3.2 Conditions A and D have been entered. After turnover is completed, perform 1BwOS EH-M1 "UNIT ONE PUMP OPERABILITY SURVEILLANCE."

Event No.	Malf. No.	Event Type*	Event Description
Preload	IMF RP02A IMF RP02B IMF RX06A 0 IRF RP30 OUT IOR ZDI1CV8112 OPEN IRF RX047A BYPASS IRF RX047B BYPASS		Reactor trip breaker A fails to open Reactor trip breaker B fails to open Fails 1LT-517 low Fails K607 relay to fail multiple Phase A valves Fail 1CV8112 open Bypass SG HI-2 level turbine trip Bypass SG LO-2 level trip/AF pump start
1		N-BOP, US	Perform 1BwOS EH-M1
2	IMF RX22A 1700	TS-US	PZR pressure channel, 1PT-457, fails low
3	IRF TC19 OPEN IMF TC17B	C-BOP, US	Trip of the 1B EH pump, 1A EH pump auto-start failure
4	IMF SLIM6pwrFail_mft IMF d11mod133c11f OPEN	I-ATC, US	Spurious automatic make-up relay actuation with Boric Acid flow controller failure
5	IMF RD02B08	C-ATC, US TS-US	Dropped rod B-8
6	None	R-ATC, US	Down power to recover rod
7	IMF RX06C 100 (5 min ramp)	I-BOP, US TS-US	1A SG level channel, 1LT-519, fails high
8	IMF RD02H08	M-ALL	Dropped rod H-8/ATWS
9	IMF RD09 8	C-ATC	Auto rod speed fails at 8 steps/minute
10	Preload Relay Failure	C-ATC	1CV8100 fails to auto close
11	IMF TH12C 100	M-ALL	PZR safety 1RY8010C fails open, Vapor Space LOCA

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

SCENARIO OVERVIEW

Unit 1 is at 100% power, steady state, equilibrium xenon, BOL. Online risk is green. Instrument Maintenance is currently testing 1A SG NR level channel 1LT-517. Tech Spec 3.3.1 Conditions A and E and 3.3.2 Conditions A and D have been entered. After turnover is completed, perform 1BwOS EH-M1 "UNIT ONE PUMP OPERABILITY SURVEILLANCE."

After completing shift turnover and relief, the BOP and ATC will perform 1BwOS EH-M1 "UNIT ONE PUMP OPERABILITY SURVEILLANCE."

After completing 1BwOS EH-M1, PZR pressure channel, 1PT-457, fails low. The Unit Supervisor will enter Tech Specs 3.3.1 Conditions A, E and K and 3.3.2 Conditions A and D. The US will enter 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL."

After making the Tech Spec declaration, the 1B EH pump will trip and the 1A EH pump will not auto-start because the relay failed after surveillance testing. The BOP will respond to the trip alarm and manually start the 1A EH pump to restore EH pressure before the main turbine trips on low EH pressure.

Once the 1B EH pump trip has been addressed, the Boric Acid flow controller, 1FK-110, will fail and a spurious automatic make-up will start due to a failure in the Ovation logic and relaying. This will require the ATC to stop the automatic make-up by placing the make-up control system to stop.

After stopping the automatic make-up, rod B-8 will drop to the bottom of the core. Rods will initially step out to respond to the transient. The operator will receive numerous alarms related to the dropped rod and place rod control in manual. The US will enter 1BwOA ROD-3 "DROPPED OR MISALIGNED ROD" and enter Tech Spec 3.1.4 Condition B. The dropped rod will require reactor power to be reduced to less than 70% power to recover the rod.

After the ramp down to recover the dropped rod has commenced *or* while preparing to ramp, 1A SG NR level channel, 1LT-519, fails high. Ovation will detect the second SG NR level channel failure causing the system to cause an OVATION ALTERNATE ACTION and swap the 1A FRV controller to manual. The crew will have to manually adjust the 1A FRV controller to restore the 1A SG level and stabilize the plant per 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL." The US will enter Tech Spec 3.0.3, 3.3.1 Conditions A and E and 3.3.2 Conditions A and D.

After the 1A SG level channel failure has been addressed, rod H-8 will drop forcing the ATC to take action to attempt to manually trip the reactor from both panels. When a reactor trip signal is generated, the reactor will not trip. The resulting transient will cause a Pressurizer safety valve to stick open. The crew will take actions per 1BwFR-S.1 "RESPONSE TO NUCLEAR GENERATION/ATWS." Automatic rod control speed will fail to 8 steps per minute, and the ATC will manually insert the control rods and emergency borate to add negative reactivity. After the reactor is locally tripped, the crew will transition to 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION" during which the crew will identify the stuck open Pressurizer safety valve. The crew will isolate the RCP seal leakoff flow (manually close 1CV8100) due 1CV8112 sticking open and the failure of the K607 relay preventing auto closure of 1CV8100. This will lead the crew to 1BwEP-1 "LOSS OF PRIMARY OR SECONDARY COOLANT" due to the stuck open PZR safety valve.

Completion criteria is exiting 1BwEP-1.

Critical Tasks

1. Insert negative reactivity into the core by initiating RCCA insertion at greater than or equal to 48 steps per minute or establishing emergency boration flow greater than 30 gpm prior to completion of step 4 of 1BwFR-S.1. (Westinghouse – CT-52) (K/A number – EPE029EA1.14 importance – 4.2/3.9)
2. Close containment isolation Phase A valve (1CV8100) before exiting 1BwEP-0. (Westinghouse – CT-11) (K/A number – 013000A4.01 importance – 4.5/4.8)

SIMULATOR SETUP GUIDE

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.
- Establish the conditions of IC-21, 100% power, steady state, equilibrium xenon, BOL OR use the IC written below.
- Verify/place OA & OC VA plenums in service, 0B VA plenum in standby.
- Complete items on Simulator Ready for Training Checklist.
- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.
- Place simulator in RUN (allow simulator to run during board walk down and turnover).
- Release **SSF NRC 1 SETUP** from disk and verify the following insert:
  - **IMF RP02A**
  - **IMF RP02B**
  - **IMF RX06A 0**
  - **IRF RP30 OUT**
  - **IOR ZDI1CV8112 OPEN**
  - **IRF RX047A BYPASS**
  - **IRF RX047B BYPASS**
- Flag 1LT-517 meter, 3 bistables and associated annunciators.
- Remove 1LT-517 from service in Ovation per 1BwOA INST-2, Attachment E, step 3.
- Provide examinees with turnover sheets and a marked up copy of 1BwOS EH-M1 “UNIT ONE PUMP OPERABILITY SURVEILLANCE.”
- If desired, write an IC after all of the set-up actions are completed. This IC may be used for running the scenario on additional simulator groups.

Event 1: Perform 1BwOS EH-M1.

When requested, as EO, report you are standing by at the Unit 1 EH skid. Report the following data as EH pumps are started and stopped:

- EH system temperature is 110°F.
- EH system pressure is 1960 psig with ONE EH pump running.
- EH system pressure is 2040 psig with TWO EH pumps running.

If requested, as Field Supervisor, report you are providing direct supervision in the field for production risk.

Acknowledge as Shift Manager, the start and completion of procedure.

Event 2: PZR pressure channel, 1PT-457, fails low.

Release **SSF NRC 1 EVENT 2** from disk and verify the following actuates:

- **MF RX22A 1700**

As SM, acknowledge the failure, requests for on-line risk assessment, maintenance support, and IR initiation. If asked for personnel to bypass bistables, inform the US that 2 NSOs will be available in 1 hour. The US will enter Tech Specs 3.3.1 Conditions A, E and K and 3.3.2 Conditions A and D.

Event 3: Trip of the 1B EH pump / 1A EH pump auto-start failure.

Release **SSF NRC 1 EVENT 3** from disk and verify the following actuates:

- **RF TC19 OPEN**
- **MF TC17B**

If dispatched as EO to 1B EH pump and/or pump breaker, wait three minutes and report 1B EH pump breaker is open and the 1B EH pump motor is extremely hot.

If dispatched as EO to check for a good start on the 1A EH pump, report that the 1A EH pump had a good start.

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation.

Event 4: Spurious automatic make-up relay actuation with Boric Acid flow controller failure.

Release **SSF NRC 1 EVENT 4** from disk and verify the following actuates:

- **MF SLIM6pwrFail_mft**
- **MF d11mod133c11f OPEN**

If dispatched as EO to investigate the spurious auto make-up, report that no abnormal conditions were found.

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation.

Event 5/6: Dropped rod B-8 / Down power to recover rod.

Release **SSF NRC 1 EVENT 5** from disk and verify the following actuates:

- **MF RD02B08**

If dispatched as EO to investigate the dropped rod, wait 3 minutes, then report that at 1RD06J, stationary gripper fuses FU26 & 30 are blown for rod B-8.

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation. Acknowledge the load ramp.

As U-2 NSO, acknowledge the request to perform 1BwOSR 3.1.1.1-2 “SHUTDOWN MARGIN SURVEILLANCE DURING OPERATION.”

Event 7: 1A SG level channel, 1LT-519, fails high.

Release **SSF NRC 1 EVENT 7** from disk and verify the following actuates:

- **MF RX06C 100 (5 minute ramp)**

As SM, acknowledge the failure, requests for on-line risk assessment, maintenance support, and IR initiation. If asked for personnel to bypass bistables, inform the US that 2 NSOs will be available in 1 hour. The US will enter Tech Specs 3.0.3, 3.3.1 Conditions A and E and 3.3.2 Conditions A and D.

Event 8/9/10/11: Dropped rod H-8 / Auto rod speed fails at 8 steps/minute / 1CV8100 fails to auto close (preload) / PZR safety 1RY8010C fails open (trigger)

Release **SSF NRC 1 EVENT 8** from disk and verify the following actuates:

- **MF RD09 8**
- **MF RD02H08**

Verify that the trigger on high PZR pressure causes the following to actuate:

SSF NRC 1 EVENT 9:

- **MF TH12C 100**

NOTE: Locally trip the reactor after the step 7 of 1BwFR-S.1 is completed AND the crew has requested a local Rx trip. Use the following to locally trip the Rx after using a First Check:

Release SSF NRC 1 EVENT DELETE RX TRIP BLOCK from disk and verify the following actuates:

- **DMF RP02A**
- **DMF RP02B**

Acknowledge as SM, procedure transitions, Emergency Plan evaluations and STA request.

When requested as an EO to establish 8000 gpm SX flow to the U-0/U-1 CC HXs, perform the following:

- **RF SW01 52**
- **RF SW02 52**

After STA is requested, as STA perform status tree passes as required and report results to US.

Scenario No:	**NRC 1**	Event No.	1
Event Description:	Perform 1BwOS EH-M1		

Time	Position	Applicant's Actions or Behavior
	CUE	• From turnover, perform 1BwOS EH-M1 "UNIT 1 PUMP OPERABILITY SURVEILLANCE."
	US	• Direct BOP to perform 1BwOS EH-M1.

	BOP	• Refer to 1BwOS EH-M1.
		• Notify EO at EH skid of pending 1B EH pump start.
		• At 1PM02J, depress EH PP LO PRESS AUTO START TEST (20-MPT) pushbutton.
		○ EO locally verifies 1B EH pump started.
		• Perform the following at 1PM02J:
		  • Verify annunciator 1-18-B15, EH SYSTEM TROUBLE, remained clear.
		  • Place 1B EH pump C/S in AFTER CLOSE.
		• Notify EO at EH skid of pending 1A EH pump shutdown.
		• At 1PM02J, place 1A EH pump C/S in AFTER TRIP.
		• EO locally verify EH pressure 2000 $\pm$ 50 psig.
		• Notify EO at EH skid of pending 1A EH pump start.
		• At 1PM02J, depress EH PP LO PRESS AUTO START TEST (20-MPT) pushbutton.
		○ EO locally verifies 1A EH pump started.
		• Perform the following at 1PM02J:
		  • Verify annunciator 1-18-B15, EH SYSTEM TROUBLE, remained clear.
		  • Place 1A EH pump C/S in AFTER TRIP.
		• EO locally verifies EH pressure 2000 $\pm$ 50 psig.
		• Record as left data on Data Sheet D-2.
		• Inform US that 1BwOS EH-M1 complete.

	US	• Acknowledge report of surveillance completion. ○ Notify SM that 1BwOS EH-M1 is complete.
		EXAMINER'S NOTE: After 1BwOS EH-M1 is complete and with Lead Examiner's concurrence, enter next event.

Comments: _____

Scenario No:	**NRC 1**	Event No.	2
Event Description:	Pressurizer pressure channel, 1PT-457, fails low		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-12-A1 PZR PRESS LOW RX TRIP STPT ALERT lit. • Annunciator 1-12-B1 PZR PRESS LOW lit. • PZR pressure meter 1PI-457 fails low.
	ATC/ BOP	• Determine 1PT-457 has failed low. ○ Reference BwARs, as time permits.
	CREW	• Identify entry conditions for 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL."
	US	• Notify SM of plant status. • Enter 1BwOA INST-2, ATTACHMENT B "PRESSURIZER PRESSURE CHANNEL FAILURE" and direct operator actions of 1BwOA INST-2 to establish the following conditions:

	ATC	• Check PZR pressure normal.
		• Check PZR PORVs, spray valves and heaters.
		  • 1RY455A and 1RY456 closed.
		  • 1RY455B and 1RY455C normal.
		  • PZR heaters normal.
		• Check PZR pressure control in auto.
		  • PZR PORV 1RY455A.
		  • PZR PORV 1RY456.
		  • PZR spray valve 1RY455B.
		  • PZR spray valve 1RY455C.
		  • Master PZR pressure controller.
		• Check P-11 interlock.
		  • With RCS pressure > P-11; P-11 Bypass perm light NOT LIT.

	BOP	• Remove the failed PZR pressure channel from service.
		  • Select OWS graphic 6100.
		  • Select PZR Pressure in Signal Selectors box.
		  • Select graphic header to enable the window.
		  • Select PLACE OUT OF SERVICE for channel 457.
		  • Exit window.

	US	• Locally bypass PZR pressure channel 1PT-457 bistables (will be delayed).
	US	• Enter Tech Specs 3.3.1 Conditions A, E and K and 3.3.2 Conditions A and D.

Comments: _____

Scenario No:	**NRC 1**	Event No.	2
Event Description:	Pressurizer pressure channel, 1PT-457, fails low		
Time	Position	Applicant's Actions or Behavior	
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.	
		EXAMINER'S NOTE: After the failed PZR pressure channel Tech Specs are determined and with Lead Examiner's concurrence, insert next event.	

Comments: _____

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Scenario No:	**NRC 1**	Event No.	3
Event Description:	Trip of the 1B EH pump / 1A EH pump auto-start failure		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-18-A15 EH PUMP TRIP lit.
	BOP	• Acknowledge alarm. • Report failure to the SM.
	BOP	• Refer to BwAR 1-18-A15. • Start 1A EH pump. ○ Dispatch EO to 1A EH pump to verify proper start. • Dispatch EO to investigate the 1B EH pump trip. • Recommend and place the 1B EH pump in PTL.
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
		EXAMINER'S NOTE: After the actions for starting the 1A EH pump are complete and with Lead Examiner's concurrence, enter next event.

Comments: _____

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Scenario No:	**NRC 1**	Event No.	4
Event Description:	Spurious automatic make-up relay actuation with Boric Acid flow controller failure		
Time	Position	Applicant's Actions or Behavior	
	CUE	• Boric Acid pump starts. • 1CV110A and 1CV111A throttle open, 1CV110B opens. • VCT level rises (initial level above auto-start setpoint of 37%). • 1FK-110, Boric Acid flow controller, fails.	
	ATC	• Determine that make-up has occurred with normal VCT level. • Place Makeup Control switch to STOP or Mode Select switch to OFF to stop the auto make-up. • Determine 1FK-110, Boric Acid flow controller, has lost power. ○ Dispatch an NSO to the AEER to investigate the spurious automatic make-up relay actuation with Boric Acid flow controller failure.	
	US	• Acknowledge ATC report. • Notify SM of spurious make-up and status of RMCS. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.	
		EXAMINER'S NOTE: After the actions for stopping the auto make-up are complete and with Lead Examiner's concurrence, enter next event.	

Comments: _____

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Scenario No:	**NRC 1**	Event No.	5 & 6
Event Description:	Dropped Rod B-8 / Down power to recover rod		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-10-E6 ROD AT BOTTOM lit. • DRPI position for rod B-8 = 0 steps. • Tave dropping.
	US	• Enter 1BwOA ROD-3 "DROPPED OR MISALIGNED ROD." • Notify SM to evaluate for Emergency Plan. • Direct operator actions of 1BwOA ROD-3 to establish the following conditions:
	ATC	• Identify rod B-8 dropped and informs US. • Place rod control in manual.
	ATC	• Check DRPI not failed. • Check reactor power level – reduce turbine load if Rx power exceeds 100%. • Check for dropped rod(s). • Stabilize RCS temperature (adjust turbine load to maintain Tave within 3F of Tref – 1BwOA PWR-1).
		EXAMINER'S NOTE: The crew may use 1BwOA PWR-1 to lower turbine load.
	US	• Notify SM to make notifications, risk evaluation, and write IR. ○ Enter Tech Spec 3.4.1 Condition A if PZR pressure < 2209 psig.
	ATC/ BOP	• Check flux rate trip alarm. • Record data and report to Reactor Engineering. • Check core power distribution.
	US	• Enter LCO 3.1.4 Condition B. • Request U-2 NSO to perform 1BwOSR 3.1.1.1-2 "SHUTDOWN MARGIN SURVEILLANCE DURING OPERATION."
	ATC	• Verify reactor power proper for rod recovery – reduce Rx power < 70%.
	US	○ May conduct Emergent Ramp Reactivity Summary Brief.
	ATC	• Initiate RCS boration, as required. • Determine required boric acid volume. ○ Determine from Op Aid (ramp to < 70%). **Batch addition of Boric Acid (BwOP CV-6 hard card, step 1):** ○ Turn on PZR backup heaters to equalize boron concentration. ○ If desired to reset the Boric Acid Totalizer to 0, select soft button RESET for Boric Acid Blender Predet Setpoint.

Comments: _____

Scenario No:	**NRC 1**	Event No.	5 & 6
Event Description:	Dropped Rod B-8 / Down power to recover rod		

Time	Position	Applicant's Actions or Behavior
		• Open 1CV110B. • Open 1CV110A. • Start the BA Transfer Pump. o If desired, control VCT level by adjusting 1LK-112 controller setpoint to desired value. • When desired amount of BA has been added, stop the BA Transfer Pump. • Close 1CV110A. • Close 1CV110B. • Verify VCT level/pressure at desired value and adjust 1LK-112 setpoint to desired corresponding level setpoint. • Place 1CV110A/1CV110B in AUTO. • Record time and amount of BA addition. • Perform appropriate step of BwOP CV-7 to return RMCS to AUTO following the final boration. o May flush boric acid lines per BwOP CV-6 step F.5.
	BOP	• Ramp turbine to desired load.
	ATC/ BOP	• Dispatch EO to check affected rod(s) for blown fuses (replace blown fuses). • Record affected rod position. • Record Master Cycler status. • Prepare affected rod bank for rod recovery.
		EXAMINER'S NOTE: After Rx power is reduced to an adequate level or the crew is preparing to ramp and with Lead Examiner's concurrence, enter next event.

Comments: _____

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Scenario No:	**NRC 1**	Event No.	7
Event Description:	1A SG Level channel, 1LT-519, fails high		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-10-E4 OVATION SYSTEM TROUBLE reflash. • 1A SG feed flow/level slowly lowering. • Annunciator 1-10-E5 OVATION ALTERNATE ACTION lit.

	BOP	• Determine 1A SG feed flow and NR level lowering at 1PM04J.
		• Identify 1LI-519 (SG NR level) meter rising at 1PM04J.
		• Review hard card 1BwPR 1-15-SG and perform the following actions:
		  • Place 1A FRV controller in manual (ALT ACTION will fail controller in manual).
		  • Manually restore 1A SG level to pre-failed value.
		  • Determine failed input channel.
		  • Recommend to US to enter 1BwOA INST-2.
		○ Refer to BwARs, as time permits.

	CREW	• Identify entry conditions for 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL."
	US	• Notify Shift Manager of SG level channel 1LT-519 failure. • Enter 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL," ATTACHMENT E "NARROW RANGE SG LEVEL CHANNEL FAILURE," and direct operator actions of 1BwOA INST-2 to establish the following conditions:

	BOP	• Stabilize 1A SG level at 1PM04J (actions performed previously by hard card).
		  ○ Place 1FK-510, FW Reg Valve 1FW510 controller, in manual.
		  ○ Adjust demand on 1FK-510 to restore 1A SG level.
		  ○ Operate 1FK-510 in manual to maintain 1A SG level in the normal operating band.
		○ Establish automatic level control (ALTERNATE ACTION prevents restoring to auto).

	ATC	• Check Rx power < 100% - monitor reactor power at 1PM05J/PPC. ○ Refer to BwARs, as time permits.

	BOP	• Remove the failed NR SG level channel from service:
		  • Select OWS graphic SG A Level (6041).
		  • Select NR LEVEL in the Signal Selectors box.
		  • Select the graphic header to enable the window.
		  ▪ Select PLACE OUT OF SERVICE for channel 519 (CANNOT remove channel from service – 2 failed channels).
		  • Exit window.

	US	• Locally bypass SG level channel 1LT-519 bistables (will be delayed).

Comments: _____

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Scenario No:	**NRC 1**	Event No.	7
Event Description:	1A SG Level channel, 1LT-519, fails high		

Time	Position	Applicant's Actions or Behavior
		EXAMINER'S NOTE: Tech Specs 3.3.1 & 3.3.2 were previously entered for the failed SG NR level channel 1LT-517 (turnover item). However, Tech Spec 3.0.3 must be entered with 2 failed SG NR level channel failures in addition to Tech Spec 3.3.1 & 3.3.2.
	US	• Determine AMS channel NOT affected. • Enter Tech Spec 3.0.3 (2 SG NR level channels failed). • Enter Tech Spec 3.3.1 Conditions A and E. • Enter Tech Spec 3.3.2 Conditions A and D. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure, and make other notifications.
		EXAMINER'S NOTE: After the Tech Spec determinations are made by the US and with Lead Examiner's concurrence, insert next event.

Comments: _____

Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		
Time	Position	Applicant's Actions or Behavior	
	CUE	• Annunciator 1-10-A7 ROD DEV POWER RNG TILT reflash. • DRPI position for rod H-8 = 0 steps. • Tave dropping.	
	ATC	• Identify/report 2nd dropped rod (H-8). ○ Refer to BwARs, as time permits.	
	US	• Direct ATC to trip reactor.	
	CREW	• Initiate a manual reactor trip and transition to 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION."	
	US	• Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter 1BwEP-0 and direct operator actions of 1BwEP-0 to establish the following conditions:	
	ATC	Perform immediate operator actions of 1BwEP-0: • Verify reactor trip. • Rod bottom lights – ONLY 2 LIT (dropped rods). • Reactor trip & Bypass breakers – CLOSED. • Neutron flux – NOT DROPPING. • Manually trip the reactor. • 1PM05J. • 1PM06J. • PR channels > 5%. • GO TO 1BwFR-S.1 "RESPONSE TO NUCLEAR POWER GENERATION/ATWS."	
	US	• Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Enter 1BwFR-S.1 and direct operator actions of 1BwFR-S.1 to establish the following conditions:	

Comments: _____

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Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		

Time	Position	Applicant's Actions or Behavior

	ATC	Perform immediate operator actions of 1BwFR-S.1.
		• Verify reactor trip:
		  • Rod bottom lights – ONLY 2 LIT (dropped rods).
		  • Reactor trip & Bypass breakers – CLOSED.
		  • Neutron flux – NOT DROPPING.
		  • Manually trip the reactor.
		  • 1PM05J.
		  • 1PM06J.
		  • Determine control rods NOT inserting automatically at required speed.

	ATC **[CT-52]** Emergency boration actions listed below.	**Insert negative reactivity into the core by initiating RCCA insertion at greater than or equal to 48 steps per minute or establishing emergency boration flow greater than 30 gpm prior to completion of step 4 of 1BwFR-S.1.** **(Westinghouse – CT-52) (K/A number – EPE029EA1.14 importance – 4.2/3.9)** • **Manually insert rods in manual.**

	BOP	Perform immediate operator actions of 1BwFR-S.1:
		• Verify Turbine Trip:
		  • All Turbine throttle valves – NOT CLOSED.
		  • All Turbine governor valves – NOT CLOSED.
		• Manually trip turbine:
		  o From Trip pushbutton.
		  o From OWS graphic 5512.

	BOP	• Check AF pumps running: • AF pump run lights – LIT (manually start AF pumps).
	ATC/ BOP Rod insertion actions listed above. **[CT-52]** **[CT-52]**	• Initiate emergency boration of the RCS: o Check CV pump – at least 1 RUNNING. **Insert negative reactivity into the core by initiating RCCA insertion at greater than or equal to 48 steps per minute or establishing emergency boration flow greater than 30 gpm prior to completion of step 4 of 1BwFR-S.1.** **(Westinghouse – CT-52) (K/A number – EPE029EA1.14 importance – 4.2/3.9)** • **Open 1CV8104.** • **Start boric acid transfer pump.**
	ATC/ BOP	• Check emergency boration flow > 30 gpm (1FI-183A). • Verify charging flow > 30 gpm (1FI-121A or 1FI-917). • Check PZR pressure < 2335 psig.

Comments: _____

Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		
Time	Position	Applicant's Actions or Behavior	
	BOP	• Verify CNMT vent isolation. • Group 6 CNMT vent isolation monitor lights – LIT.	

	ATC	• Check if the following trips have occurred.
		  • Reactor trip has NOT occurred.
		  • Dispatch operator to locally trip reactor.
		  • Turbine trip:
		  • All Turbine throttle valves – CLOSED.
		  • All Turbine governor valves – CLOSED.	

	RO	• Check if reactor subcritical:
		  • PR channels > 5%.
		  • IR channels startup rate – NEGATIVE.
		NOTE: Depending on timing, PRNIs may be < 5% with a negative SUR at this step.	

		EXAMINER'S NOTE: The reactor will be locally tripped after the previous step (step 7 of 1BwFR-S.1 is complete) AND the crew has requested a local Rx trip. When this occurs, the crew will transition to 1BwFR-S.1 step 16 (see below), then back to 1BwEP-0, therefore several of the following steps (*italicized below*) in 1BwFR-S.1 may NOT be performed.	

	ATC/ BOP	• *Check SG levels:*
		  • *At least one SG level > 10% (31%).*
		  • *Control SG levels between 10% (31%) and 50%.*
		  • *Check 1SD002A-H – CLOSED.*
		• *Verify all dilution paths isolated:*
		  • *Check 1CV111A & B – CLOSED.*
		  • *Verify BTRS mode selector switch – OFF.*
		  • *Dispatch operator to locally verify dilution paths isolated.*
		• *Check for reactivity insertion from uncontrolled RCS cooldown:*
		  • *RCS temperature – NOT DROPPING IN AN UNCONTROLLED MANNER.*
		  • *ALL SG pressures – NOT DROPPING IN AN UNCONTROLLED MANNER.*
		• *Check CETCs < 1200°F.*
		• *Verify reactor subcritical.*
		  • *PR channels < 5%.*
		  • *IR channels startup rate – NEGATIVE.*	

	US	**1BwFR-S.1 step 16:** • Return to procedure and step in effect.	
	US	Transition to 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION."	

Comments: _____

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Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		
Time	Position	Applicant's Actions or Behavior	
	US	• Enter 1BwEP-0 "REACTOR TRIP OR SI." • Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Direct operator actions of 1BwEP-0 to establish the following conditions:	

	ATC	Perform immediate operator actions of 1BwEP-0 at 1PM05J:
		• Verify reactor trip:
		  • Rod bottom lights - ALL LIT.
		  • Reactor trip & Bypass breakers - OPEN.
		  • Neutron flux - DROPPING.	

	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J:
		• Verify turbine trip:
		  • All Turbine throttle valves - CLOSED.
		  • All Turbine governor valves - CLOSED.	

	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J: • Verify power to 4 KV busses: • ESF Buses – BOTH ENERGIZED (141 & 142).	

	CREW	• Check SI Status:
		  • SI First OUT annunciator - LIT.
		  • SI ACTUATED Permissive Light - LIT.
		  • SI Equipment – AUTOMATICALLY ACTUATED.
		  o Either SI pump - RUNNING.
		  o Either CV pump to cold leg isolation valve OPEN – 1SI8801A/B.
		• Manually actuate SI from 1PM05J and 1PM06J.	

	US	• Direct BOP to perform Attachment B of 1BwEP-0.	
		EXAMINER'S NOTE: US and ATC will continue in 1BwEP-0 while BOP is performing Attachment B.	

	BOP	**1BwEP-0 ATTACHMENT B:**
		• Verify FW isolated at 1PM04J:
		  • FW pumps – TRIPPED.
		  • FW isolation monitor lights – LIT.
		  • FW pumps discharge valves – CLOSED (or going closed) 1FW002A-C.
		• Verify DGs running at 1PM01J:
		  • DGs – BOTH RUNNING.
		  • 1SX169A/B OPEN.
		  • Dispatch operator locally to monitor D/G operation.
		• Verify Generator Trip at 1PM01J:
		  • OCB 1-8 and 7-8 open.	

Comments: _____

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Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		

Time	Position	Applicant's Actions or Behavior

		• PMG output breaker open.
		• Verify SX pumps running.
		  • 1CC9473A/B open.
		  • Both SX pumps running.
		  • Dispatch EO to establish 8000 gpm SX flow to the U-0 & U-1 CC HXs.
		• Verify Control Room ventilation aligned for emergency operations at 0PM02J:
		  • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT.
		  • Operating VC train equipment – RUNNING.
		  • 0B Supply fan.
		  • 0B Return fan.
		  • 0B M/U fan.
		  • 0B Chilled water pump.
		  • 0B Chiller.
		  • Operating VC train dampers – ALIGNED.
		  • M/U fan outlet damper – 0VC08Y – NOT FULLY CLOSED.
		  • 0B VC train M/U filter light – LIT.
		  • 0VC09Y - OPEN.
		  • 0VC313Y - CLOSED.
		  • Operating VC train Charcoal Absorber aligned for train B.
		  • 0VC44Y - CLOSED.
		  • 0VC05Y - OPEN.
		  • 0VC06Y - OPEN.
		  • Control Room pressure greater than +0.125 inches water on 0PDI-VC038.
		• Verify Auxiliary Building ventilation aligned for emergency operations at 0PM02J:
		  • Two inaccessible filter plenums aligned.
		  • Plenum A:
		  • 0VA03CB - RUNNING.
		  • 0VA023Y - OPEN.
		  • 0VA436Y - CLOSED.
		  • Plenum C:
		  • 0VA03CF - RUNNING.
		  • 0VA072Y - OPEN.
		  • 0VA438Y - CLOSED.
		• Verify FHB ventilation aligned for emergency operation at 0PM02J:
		  • 0VA04CB - RUNNING.
		  • 0VA055Y - OPEN.
		  • 0VA062Y - OPEN.
		  • 0VA435Y - CLOSED.
		• Trip all running HD pumps.
		• Initiate periodic monitoring of Spent Fuel Cooling.
		• Notify US Attachment B complete/manual actions taken.

Comments: _____

Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		
Time	Position	Applicant's Actions or Behavior	

	ATC	• Verify ECCS pumps running:
		  • Both CV pumps - RUNNING.
		  • Both RH pumps - RUNNING.
		  • Both SI pumps - RUNNING.	

	ATC	• Verify RCFCs running in Accident Mode. • Group 2 RCFC Accident Mode lights – LIT.	

	ATC
	
	[CT-11]
		• Verify Phase A isolation.
		  • Group 3 Cnmt Isol monitor lights – all NOT LIT (manually actuate Phase A).
		Close containment isolation Phase A valve (1CV8100) before exiting 1BwEP-0. (Westinghouse – CT-11) (K/A number – 013000A4.01 importance – 4.5/4.8)
		  • **Close 1CV8100.**	

	ATC	• Manually close the following Phase A valves:
		  • 1PR001A.
		  • 1PS228A.
		  • 1PS228B.
		  • 1CV8152.
		  o 1CV8112 (stuck open).
		  • 1IA065.	

	ATC	• Verify Cnmt Vent isolation.
		  • Group 6 Cnmt Vent Isol monitor lights - LIT.
		• Verify AF system:
		  • BOTH AF pumps – RUNNING.
		  • AF isolation valves – 1AF013A-H OPEN.
		  • AF flow control valves – 1AF005A-H throttled OPEN.
		• Verify CC pumps running:
		  • BOTH CC pumps – RUNNING.
		• Verify SX pumps running:
		  • BOTH SX pumps – RUNNING.	

	ATC/ BOP	• Check if Main Steamlines should be isolated:
		  • SG pressures > 640 psig.
		  • CNMT pressure < 8.2 psig.	

	BOP	• Check if CS is required. • CNMT pressure remained < 20 psig.	

	BOP	• Verify total AF flow:
		  • AF flow > 500 gpm.
		  • Check S/G NR levels – NOT rising in an uncontrolled manner.	

Comments: _____

Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		

Time	Position	Applicant's Actions or Behavior

	ATC/ BOP	• Verify ECCS valve alignment:
		  • Group 2 Cold Leg Injection monitor lights required for injection – LIT.
		• Verify ECCS flow:
		  • High head SI flow >100 gpm (1FI-917).
		  • RCS pressure < 1700 psig.
		  • SI pump discharge flows > 200 gpm.
		  • RCS pressure > 325 psig.

	ATC	• Check PZR PORVs and spray valves:
		  • PORVs – BOTH CLOSED.
		  • PORV isolation valves – BOTH ENERGIZED.
		  • PORV relief paths – BOTH PORVs in AUTO, PORV isolation valves OPEN.
		  • Normal spray valves CLOSED.

	ATC	• Check RCS temperatures:
		  • NO RCPs running.
		  • RCS cold leg temperature stable at or trending to 557°F - NO.
		  o Stop dumping steam.
		  o Throttle AF flow.

	ATC	• Check status of RCPs:
		  • ALL RCPs – RUNNING (RCPs previously tripped).
		  • Check RCP trip criteria.
		  • Verify high head SI flow (1FI-917) > 100 gpm.
		  • RCS pressure < 1425 psig:
		  • Trip ALL RCPs.

	BOP	• Check if SG secondary pressure boundaries are intact at 1PM04J. • Check NO SG depressurizing uncontrollably or completely depressurized.

	BOP	• Check if SG tubes are intact.
		  • Check that the following have remained < alert/alarm setpoint at RMS:
		  • 1PR08J, SG Blowdown.
		  • 1PR27J, SJAE/GS Exhaust.
		  • 1AR022/23A-D, 1A-D Main Steam Lines.

	ATC	• Check if RCS is intact – NO.
		  • Cnmt rad monitors > alert/alarm setpoints.
		  • Cnmt pressure < 3.4 psig (1PI-CS934-937).
		  • Cnmt floor drain sump level > 46 inches (1LI-PC002/003).

	US	Transition to 1BwEP-1 "LOSS OF REACTOR OR SECONDARY COOLANT."

Comments: _____

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Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		

Time	Position	Applicant's Actions or Behavior
	US	**1BwEP-1 "LOSS OF REACTOR OR SECONDARY COOLANT"** • Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Request STA evaluation of status trees. • Enter 1BwEP-1 and direct operator actions of 1BwEP-1 to establish the following conditions:
	ATC	• Check if RCPs should be stopped at 1PM05J: • ALL RCPs – STOPPED.

	BOP	• Check if SGs secondary pressure boundaries are intact at 1PM04J:
		  • Check pressure in all SGs:
		  • NO SG pressure dropping in an uncontrolled manner.
		  • NO SG completely depressurized.

	BOP	• Check intact SG levels at 1PM04J:
		  • SG NR levels > 10%(31%).
		  • Control feed flow to maintain SG NR levels between 10%(31%) and 50%.

	BOP	• Check secondary radiation normal.
		  • Reset Phase A.
		  • OPEN 1SD005A-D at 1PM11J.
		  • Contact Chemistry to sample ALL SGs for activity.
		  • Check secondary radiation trends at RMS or PPC:
		  • 1PR27J, SJAE/GS Exhaust.
		  • 1PR08J, SG Blowdown.
		  • 1AR022/23A-D, 1A-D Main Steam Lines.
		  • Secondary activity levels NORMAL (when available).

	ATC	• Check PZR PORVs and isolation valves at 1PM05J:
		  • PORV isolation valves – BOTH ENERGIZED.
		  • PORVs – BOTH CLOSED.
		  • PORV isolation valves – BOTH OPEN.

	ATC	• Check if ECCS flow should be reduced at 1PM05J:
		  ○ RCS subcooling – NOT acceptable (continue with CS step on next page).
		  ○ RCS subcooling – acceptable (meet all criteria to terminate SI):
		  ▪ GO TO 1BwEP ES-1.1 "SI TERMINATION."
		  ▪ Reset SI, if necessary.
		  ▪ Reset Cnmt isolation and establish IA to Cnmt.
		  ▪ Stop 1 CV pump and check RCS pressure stable or rising – NO – GO TO 1BwEP ES-1.2 "POST LOCA COOLDOWN AND DEPRESSURIZATION," (see EXAMINER'S NOTE on bottom of next page).

Comments: _____

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Scenario No:	**NRC 1**	Event No.	8, 9, 10, 11
Event Description:	Rod H-8 drops / ATWS (with auto rod speed failure) / 1RY8010C fails open / 1CV8100 fails to auto close		
Time	Position	Applicant's Actions or Behavior	
	BOP	• Check if CS should be stopped: • NO CS pumps running.	

	ATC	• Check if RH pumps should be stopped:
		  • Reset SI.
		  • Depress both SI reset pushbuttons.
		  • Verify SI ACTUATED permissive light – NOT LIT.
		  • Verify AUTO SI BLOCKED permissive light – LIT.
		  • Check RCS pressure > 325 psig and RCS pressure is stable or rising. If NOT, GO TO step 9.
		  • RH pumps – any running with suction aligned to RWST.
		  • Stop RH pumps and place in standby.	

	BOP	• Check RCS and SG pressures for faulted SG indications **(step 9)**:
		  • Check pressure in ALL SGs stable or rising.
		  • Check RCS pressure stable or dropping.	

	BOP	• Check if DGs should be stopped:
		  • 4 KV busses energized by offsite power.
		  • Stop unloaded DGs and place in standby.	

	CREW	• Initiate evaluation of plant status:
		  • Check cold leg recirculation capability – both RH trains available.
		  • Check Aux Building radiation trends normal for plant conditions (PPC or RMS) – ALL normal.
		  • Obtain samples – place H2 monitors in-service and consult TSC for obtaining samples.
		  • Evaluate plant equipment for long term recovery.
		  • Start additional plant equipment to assist in recovery as directed by US.
		  • Check if Source Range detectors should be energized.	

	US	• Check if RCS cooldown and depressurization is required:
		  • RCS pressure > 325 psig.
		  • Transition to 1BwEP ES-1.2 "POST LOCA COOLDOWN AND DEPRESSURIZATION."	

		EXAMINER'S NOTE: At this point in the scenario, all Critical Tasks are complete and the scenario stop criteria has been reached, with Lead Examiner's concurrence, STOP the scenario.	

(Final)

Comments: _____

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Simulation Facility: Braidwood		Scenario No.: **NRC 2**	Operating Test No.: **17-1 NRC**
Examiners:		Applicant:	SRO
			ATC
			BOP

Initial Conditions: IC-31

Turnover: Unit 1 is operating at 90% power, steady state, equilibrium xenon. 1PT-455 has been OOS for calibration for the past 4 hours. LCO 3.3.1 Conditions A, E and K, 3.3.2 Conditions A and D and 3.3.4 Condition A have been entered. Expect 1PT-455 back in 6 hours. Following completion of turnover, restore Unit 1 to full power at 2 MW/min. EOs have been briefed and are standing by for any local operations required.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IMF RP01 IOR ZDIRT2 NORMAL IMF RD05G13 15 IMF RD05H12 15 IMF RD05H14 24 IMF RD05J13 25 IMF RX21A 1700 IRF RX032A BYPASS IRF RX032B BYPASS IRF RX032C BYPASS IRF RX032D BYPASS IRF RX014A BYPASS IRF RX014B BYPASS IRF RX014C BYPASS IRF RX014D BYPASS		Failure of Rx to auto trip 1PM05J Rx trip switch failed Stuck rod G13 Stuck rod H12 Stuck rod H14 Stuck rod J13 1PT-455 failed low Bypass 1PT-455 functions
1	None	R-ATC, US N-BOP	Ramp Unit 1 to 100% power
2	IMF CV05inc RAISE IMF CV05dec -	I-ATC, US	Failure of 1PK-131 setpoint high
3	IOR ZDI1OG02PA TRIP DOR ZDI1OG02PA NAC	C-BOP, US	1A GS condenser exhauster fan trip
4	IRF EP09 325 200 TRGSET 1 “EDE142==0” TRG 1 “IMF ED07B” IRF EP09 348 390	C-BOP, US TS-US	Degraded bus voltage with a loss of bus 142
5	IMF TH11A 100	C-ATC, US TS-US	PZR PORV 1RY455A fails open
6	IMF TC03remf TRIP	M-ALL	Turbine trip with failure of auto Rx trip
7	Preload	C-ATC, US	Manually trip the reactor
8	Preload	C- ATC, US	Four stuck rods requiring emergency boration
9	IMF ED15C IMF EG08A	M-ALL	Loss of Offsite Power 1A DG Failure Loss of All AC Power

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

SCENARIO OVERVIEW

Unit 1 is operating at 90% power, steady state, equilibrium xenon. 1PT-455 has been OOS for calibration for the past 4 hours. LCO 3.3.1 Conditions A, E and K, 3.3.2 Conditions A and D and 3.3.4 Condition A have been entered. Expect 1PT-455 back in 6 hours. Following completion of turnover, restore Unit 1 to full power at 2 MW/min. EOs have been briefed and are standing by for any local operations required.

After completing shift turnover and relief, the US and ATC will commence a ramp to 100% power per the pre-job brief and ReMA. The BOP will program the turbine to ramp up to restore full power operation. The ATC will dilute the RCS to support the load ramp.

After a sufficient ramp is completed for the evaluation, the 1PK-131 controller setpoint will fail high causing a letdown pressure high alarm and high letdown pressure. The ATC will take manual control of 1PK-131 per hard card 1BwPR 1-9-LD "LETDOWN MALFUNCTION PROMPT RESPONSE" to restore normal letdown parameters.

After the 1PK-131 failure has been addressed, 1A GS condenser exhauster fan trips and the BOP will start the 1B GS condenser exhauster fan per BwAR 1-18-A8/BwOP GS-7 to prevent water intrusion into the main generator oil system.

After the 1A GS exhaust fan failure has been addressed, a degraded bus voltage condition will occur. Bus 141 and 142 voltage will drop to ~3900 volts and will bring in annunciator 1-21/22-C7. This requires the operator to manually open the SAT feed breakers 1412 & 1422. Per BwAR 1-21/22-C7 with voltage below 3990 volts, the operator is required to open the SAT feed breakers to the ESF busses, if no operator action occurs, the bus voltage will remain at 3900 volts for 310 seconds and then the SAT feed breakers will automatically open. When the 4 KV ESF busses are de-energized, the 1A DG will energize bus 141. The 1B DG will start, but bus 142 will be faulted. The US will enter Tech Spec 3.8.1 Condition A and D and 3.8.9 Condition A.

After the degraded bus voltage and associated Tech Specs have been addressed, PZR PORV 1RY455A will fail open. The ATC will attempt to manually close the PZR PORV per hard card 1BwPR 1-12-RY "PZR CONTROL MALFUNCTION PROMPT RESPONSE" and 1RY455A will not close. This will require the block valve, 1RY8000A, to be manually closed. The US will enter Tech Spec 3.4.11 Condition B.

After the PZR PORV failure and Tech Specs have been addressed, a trip of the main turbine will occur. The reactor does not automatically trip and the manual reactor trip switch at 1PM05J is disabled. The crew will trip the reactor from 1PM06J and complete immediate actions of 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION." When the reactor trips, one control bank rod and three shutdown bank rods will not fully insert. The crew will transition to 1BwEP ES-0.1 "REACTOR TRIP RESPONSE" and initiate emergency boration for the 4 stuck rods.

Once the crew has initiated emergency boration, a loss of all offsite power will occur and the 1A DG will trip resulting in a loss of all AC power to Unit 1. The crew will transition to 1BwCA-0.0 "LOSS OF ALL AC POWER." **The crew must restore power to Unit 1 within 10 minutes.** After power is restored to bus 141 and bus 141 loads are energized, a transition will be made to either 1BwCA-0.1 "LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED" or 1BwCA-0.2 "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED."

Completion criteria: The scenario ends following transition to a 1BwCA-0.0 recovery procedure (1BwCA-0.1).

Critical Tasks

1. Perform a manual reactor trip at 1PM06J before transitioning out of 1BwEP-0. (Westinghouse – CT-1) (K/A number - EPE029EA1.08 importance - 4.5/4.5)
2. Crosstie an ESF bus to opposite unit within 10 minutes of Loss of All AC per UFSAR. (Westinghouse – CT-24) (K/A number - EPE055EA1.07 importance – 4.3/4.5)

SIMULATOR SETUP GUIDE

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.
- Establish the conditions of IC-31, 90% power, steady state, equilibrium xenon OR use the IC written below.
- Verify/place OA & OC VA plenums in service, 0B VA plenum in standby.
- Complete items on Simulator Ready for Training Checklist.
- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.
- Place simulator in RUN (allow simulator to run during board walk down and turnover).
- Release **SSF NRC 2 Setup** from disk and verify the following insert:
  - **IMF RP01**
  - **IOR ZDIRT2 NORMAL**
  - **IMF RD05G13 15**
  - **IMF RD05H12 15**
  - **IMF RD05H14 24**
  - **IMF RD05J13 25**
  - **IMF RX21A 1700**
  - **IRF RX032A BYPASS**
  - **IRF RX032B BYPASS**
  - **IRF RX032C BYPASS**
  - **IRF RX032D BYPASS**
  - **IRF RX014A BYPASS**
  - **IRF RX014B BYPASS**
  - **IRF RX014C BYPASS**
  - **IRF RX014D BYPASS**
- Remove 1PT-455 from service in Ovation per 1BwOA INST-2, Attachment B, step 6.
- Flag 1PT-455 meter, bistables and associated annunciators.
- Verify/start the 1A GS condenser exhauster fan, stop the 1B GS condenser exhauster fan.
- Provide examinees with turnover sheets.
- If desired, write an IC after all of the set-up actions are completed. This IC may be used for running the scenario on additional simulator groups.

Event 1: Ramp Unit 1 to 100% power.

If the crew is not commencing/preparing for the ramp after completing their turnover, call as the Shift Manager and ask for an estimated start time for the ramp.

As SM, acknowledge the power ascension to full power.

Event 2: Failure of 1PK-131 setpoint high.

Release **SSF NRC 2 EVENT 2** from disk and verify the following actuates:

- **MF CV05inc RAISE**
- **MF CV05dec –**

Acknowledge as SM, the 1PK-131 failure, on-line risk assessment, requests for maintenance support, and IR request.

If dispatched as EO to investigate the failure, wait three minutes and report no visible damage to 1PT-131.

If dispatched as EO to align excess letdown to the top of the VCT, insert the following:

- **MRF CV26remf 100** - open 1CV8482.
- **MRF CV27 0** - close 1CV8484.

Event 3: 1A GS condenser exhauster fan trip.

Release **SSF NRC 2 EVENT 3** from disk and verify the following actuates:

- **OR ZDI1OG02PA TRIP**
- **DOR ZDI1OG02PA**

Acknowledge as SM, the 1A GS condenser exhauster fan trip, on-line risk assessment, requests for maintenance support, and IR request.

As an EO, as requested, report the following:
- 1B GS condenser exhauster fan had a good start.
- Completed BwOP GS-7, steps F.1.a through F.1.e - NO simulator action required to re-position 1OG028A/B/29A/B.
- Closed 1OG028A (1A GS condenser exhauster fan inlet valve).
- No cause can be determined for the 1A GS condenser exhauster fan trip.
- Main Turbine Turbo-Toc Oil Purifier is already running per BwOP TO-24.

Event 4: Degraded bus voltage with a loss of bus 142.

Release **SSF NRC 2 EVENT 4** from disk and verify the following actuates:

- **RF EP09 325 200**
- **TRGSET 1 "EDE142==0"**
- **TRG 1 "IMF ED07B"**
- **RF EP09 348 390**

If breaker 1412 and 1422 are manually opened, insert the following:

IRF EP09 348 200

Acknowledge as Generation Dispatch that low grid voltage occurred, the cause is under investigation.

If dispatched to the bus 142, report Ground overcurrent flag on breaker 1422.

If dispatched to the DGs, report good start on 1A DG and 1B DG. Reset local alarms on DGs by:

IRF EG06 for 1A D/G.
IRF EG12 for 1B D/G.

If asked about SX flow to 1B DG, report 1SX169B is open.

Acknowledge request for U-2 Admin NSO to perform 1/2BwOSR 3.8.1.1.

If asked as U-2 NSO, report Unit 2 busses are energized from offsite power & the cross-tie breakers are open.

If requested as FS/EO to cross-tie 125 VDC bus 112 to 125 VDC bus 212, insert the following:

IRF ED112 CLOSE on a 5 minute delay.

If dispatched as EO to depress 1B DG emergency stop push button, insert the following:

IRF EG20 TRIP

If requested to reset inverter alarms, insert the following:

IRF ED125 RESET
IRF ED127 RESET

Acknowledge as the Shift Manager, the degraded bus voltage and bus 142 failure, LCO entry, on-line risk assessment, request for maintenance support, IR request, EAL evaluation, proper personnel will be notified, and the TSC will be activated.

Event 5: PZR PORV 1RY455A fails open.

Release **SSF NRC 2 EVENT 5** from disk and verify the following actuates:

- **MF TH11A 100**

Acknowledge as SM, the failure, LCOAR entry, on-line risk assessment, EAL evaluation, request for maintenance support, and IR request.

If ramp is suspended, acknowledge as Power Team, the suspension of ramp.

If asked for direction as the SM for ramping unit, direct crew to re-initiate the ramp when actions for PZR PORV failure are complete.

Event 6, 7 & 8: Turbine trip with failure of auto Rx trip / 4 stuck rods requiring emergency boration.

Release **SSF NRC 2 EVENT 6** from disk and verify the following actuates:

- **RF TC03remf TRIP**

After emergency boration for the 4 stuck rods is commenced, perform the following:

Release **SSF NRC 2 EVENT 9** from disk and verify the following actuates:

- **MF ED15C**
- **MF EG08A**

Acknowledge as SM, procedure transitions, Emergency plan evaluations, request for SDM calculation, and STA request.

Event 9: Loss of offsite power / 1A DG failure / Loss of All AC Power.

Verify the crew has initiated emergency boration prior to initiating the next event.

Release **SSF NRC 2 EVENT 9** from disk and verify the following actuates:

- **IMF ED15C**
- **IMF EG08A**

Record time loss of all AC power occurred: _____:_____:_____

Record time AC power restored to Unit 1: _____:_____:_____

Calculate time to restore AC power: _____:_____:_____

Acknowledge as SM, procedure changes, Emergency Plan evaluations, request for SDM calculation, and STA request.

After STA is requested, as STA perform status tree passes as required and report results to US.

When requested as EO for the U-1 DGs status, report that 1A DG is NOT running, 1B DG was previously emergency tripped.

Acknowledge as EO, request to depress 1A DG emergency stop push button and insert the following:

- **IRF EG19 TRIP**

As Unit 2 NSO, acknowledge request to perform 2BwCA-0.3. Report both Unit 2 4KV ESF buses powered from Unit 2 SATs, and acknowledge request to monitor crosstie current as U-1 loads are started.

After being notified to perform 2BwCA-0.3, wait 4 minutes 19 seconds, then insert the following to perform crosstie preps:

Release **SSF NRC 2 EVENT CROSS TIE UNIT 2 BUS 241** from disk and verify the following actuates:

- **RF ED006 CLOSE**
- **RF ED007 CLOSE**

Acknowledge as EO the request to close 1CV8384A & B, then insert the following to isolate the seal injection filters:

- **IRF CV41 0**
- **IRF CV42 0**

Acknowledge as EO the request to isolate CC surge tank auto makeup, then insert the following to isolate CC surge tank makeup:

- **IRF CC51 0**
- **IRF CC52 0**

Acknowledge as EO the request to drain CC surge tank to normal level, then insert the following as needed to initiate CC surge tank drain:

- **IRF CC15 100 (0 after desired level reached).**
- **IRF CC16 100 (0 after desired level reached).**

Scenario No:	**NRC 2**	Event No.	1
Event Description:	Ramp Unit 1 to 100% power		

Time	Position	Applicant's Actions or Behavior
	CUE	• Turnover requested load ramp to full power.
	US	• Perform actions of 1BwGP 100-3 "POWER ASCENSION." ○ Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.
	US	• Direct raising load to full power at 2 MW/min. • Initiate Load Swing Instruction Sheet, 1BwGP 100-4T2.
	CREW	○ Review applicable Precautions, and Limitations and Actions (may have been done in PJB prior to starting demo). ○ May energize PZR heaters.

	ATC	• Verify rod position and boron concentration.
		• Initiate dilution per BwOP CV-5.
		• Determine desired amount of PW from ReMA.
		• **DILUTE in AUTOMATIC - perform the following at 1PM05J:**
		  • Place MAKE-UP CONT SWITCH in STOP position.
		  • Place MODE SELECT SWITCH in DIL position.
		  • Determine desired PW flow rate.
		  • Note the AS FOUND setpoint on 1FK-111.
		  • Adjust the setpoint on 1FK-111, PW/Total Flow Controller, to the desired flowrate.
		  • Set the PW/MAKEUP TOTALIZER as follows:
		  • SELECT OWS graphic (6003) RMCS.
		  • SELECT soft button SETPOINT ADJUST & RESET for the PW/MAKEUP TOTALIZER.
		  • SELECT the header for the PW/MAKEUP PREDET SETPOINT (cornsilk).
		  • SELECT the RESET soft button to set TOTALIZED field to 0.
		  • VERIFY the TOTALIZED field = 0.
		  • ENTER the desired volume in the PW/MAKEUP PREDET SETPOINT Field (right most digit is gallons).
		  • SELECT ENTER soft button.
		  • VERIFY that the correct volume entered is displayed in PREDETERMINED field of the PW/MAKEUP TOTALIZER and THEN SELECT EXIT soft button.

Comments: _____

Scenario No:	**NRC 2**	Event No.	1
Event Description:	Ramp Unit 1 to 100% power		

Time	Position	Applicant's Actions or Behavior
		• Control VCT level, if desired: o VERIFY/PLACE 1LK-112 in AUTO, and ADJUST the setpoint to desired value; - OR - o PLACE 1LK-112 in MANUAL & depress RAISE pushbutton to desired demand. • Place MAKEUP CONT Switch to START. • Verify proper operation of valves and PW makeup pump (1CV111B open, 1CV111A throttled, 1CV110B open (ALT DIL only), PW pump running, PW flow on recorder 1FR-110). • When desired amount of primary water added: • Place MAKEUP CONT switch to STOP. • Verify/Close 1CV111A. • Verify/Close 1CV111B. • Verify/Close 1CV110B. OR • **BATCH DILUTE - perform the following at 1PM05J:** • Control VCT level, if desired: o VERIFY/PLACE 1LK-112 in AUTO, and ADJUST the setpoint to desired value; - OR - o PLACE 1LK-112 in MANUAL & depress RAISE pushbutton to desired demand. • If desired, to reset the PW/MAKEUP TOTALIZER to 0, perform the following: • SELECT OWS graphic (6003) RMCS. • SELECT soft button SETPOINT ADJUST & RESET for the PW/MAKEUP TOTALIZER. • SELECT the header for the PW/MAKEUP PREDET SETPOINT (cornsilk). • SELECT the RESET soft button to set TOTALIZED field to 0. • VERIFY the TOTALIZED field = 0. • SELECT EXIT soft button. • Open 1CV110B. • Open 1CV111A. • When desired amount of primary water added: • Close 1CV111A (switch in AUTO). • Verify/Close 1CV110B (switch in AUTO). • Verify/Close 1CV111B (switch in AUTO).

Comments: _____

Scenario No:	**NRC 2**	Event No.	1
Event Description:	Ramp Unit 1 to 100% power		

Time	Position	Applicant's Actions or Behavior

	BOP	• Raise turbine load at 1PM02J or OWS drop 210 by performing the following:
		  • Select SETPOINT.
		  • Enter desired MW into REF DEMAND window.
		  • Select left ENTER.
		  • Verify correct value appears in REFERENCE DEMAND window (5501).
		  • Enter 2 MW/min into the RATE window.
		  • Select right ENTER.
		  • Verify correct value appears in RATE window (5501).
		  • Select EXIT.
		  • Notify US and ATC of pending ramp.
		  • Select GO/HOLD.
		  • Verify GO/HOLD illuminates orange.
		  • Verify HOLD illuminates RED.
		  • Select GO.
		  • Verify GO illuminates RED.
		  • Verify main turbine load begins to rise.

	ATC/ BOP	• Monitor reactor power and load ascension.
		• Monitor NIs, Tave, ΔI, PZR pressure/level at 1PM05J or PPC.
		• Monitor MW and DEHC system response at 1PM02J or OWS drop 210.
		• During dilution, monitor the following at 1PM05J or PPC:
		  ○ VCT level.
		  ○ RCS Tave.
		  ○ PW/MAKEUP TOTALIZER responding correctly.
		  ○ Verify dilution auto stops at predetermined value.
		  ○ Return RMCS to automatic.
		  ○ Perform periodic control rod steps to maintain Tave and Delta I within limits.

		EXAMINER'S NOTE: After Rx power is raised to an adequate level and with Lead Examiner's concurrence, enter next event.

Comments: _____

Scenario No:	**NRC 2**	Event No.	2
Event Description:	Failure of 1PK-131 setpoint high		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-8-B5 LTDWN HX OUTLT PRESS HIGH lit. • 1PI-131, letdown line pressure, rising. • 1PK-131 output demand lowering.
	ATC	• Determine 1PK-131 failed/not operating properly. • Place 1PK-131 in manual and adjust letdown pressure to pre-failed value per hard card 1BwPR 1-9-LD "LETDOWN MALFUNCTION PROMPT RESPONSE" at 1PM05J. ○ Refer to BwARs, as time permits.
	US	• Direct/ensure ATC takes manual control of 1PK-131 and restore letdown pressure to normal. • Inform SM of 1PK-131 failure.
	ATC	Perform the following at 1PM05J: • Maintain letdown pressure by operating 1PK-131 in manual.
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct controller failure.
		EXAMINER'S NOTE: (1) The crew may elect to isolate letdown based on the letdown relief valve lifting. Following letdown isolation, the crew may elect to establish excess letdown or re-establish normal letdown. The steps for restoring normal letdown are in italics below. **(2) The crew may use hard card 1BwPR 1-9-LD to isolate letdown.**
	ATC	○ ***Establish normal letdown per BwOP CV-17 "ESTABLISHING AND SECURING NORMAL AND RH LETDOWN."*** ○ *Verify/close 1CV8149A/B/C.* ○ *Verify CC aligned to letdown HX (was previously aligned).* ○ *Place 1CV131 controller in manual at 40% demand.* ○ *Place 1CC130 controller in manual at 60% demand.* ○ *Verify/open 1CV8152/8160.* ○ *Verify/open 1CV459/460.* ○ *Verify/open 1CV8324A & 1CV8389A.* ○ *Verify/open 1CV381B (BTRS Mode Selector Switch OFF light LIT).* ○ *Verify/close 1CV381A (BTRS Mode Selector Switch OFF light LIT).* ○ *Verify/open 1CV8401A.* ○ *Verify/close 1CV8145.* ○ *Verify/open 1CV8147.*

Comments: _____

Scenario No:	**NRC 2**	Event No.	2
Event Description:	Failure of 1PK-131 setpoint high		
Time	Position	Applicant's Actions or Behavior	
		○ *Open 1CV8105/8106.* ○ *Adjust charging flow to approx. 100 gpm w/ seal injection 8-10 gpm per RCP.* ○ *Open 1CV8149A/B/C and control 1CV131 to maintain letdown pressure 360-380 psig.* ○ *Adjust 1CC130 controller to maintain letdown temperature 90-115°F.* ○ *Place controllers in auto (1PK-131 failed).* ○ *Verify 1PR06J in service.* ○ *Verify proper operation of RMCS during VCT makeup.* ○ *Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-0110) on recorder 1FK-110.* ○ *Restore PZR level to program level.*	
		EXAMINER'S NOTE: The steps for establishing excess letdown are in italics below.	
	ATC/ BOP	○ ***Establish excess letdown per BwOP CV-15 "EXCESS LETDOWN OPERATIONS."*** ○ *Prerequisite if excess letdown is placed in service, reactor power is maintained less than or equal to 99.8%.* ○ *Verify open 1CV8100/8112.* ○ *Open 1CC9437A/B.* ○ *Verify/close 1CV123.* ○ *Verify 1CV8143 C/S in VCT position.* ○ *Open 1RC8037A/B/C/D.* ○ *Open 1CV8153A(B).* ○ *Slowly open 1CV123 while maintaining excess letdown outlet temperature <165 F.*	
		EXAMINER'S NOTE: After the actions for the 1PK-131 failure are complete and with Lead Examiner's concurrence, insert next event.	

Comments: _____

Scenario No:	**NRC 2**	Event No.	3
Event Description:	1A GS condenser exhauster fan trip		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-18-A8 GS CNDSR AIR EXHAUSTER TRIP lit.
	US	• Notify SM of 1A GS condenser exhauster fan trip.

	BOP	• Refer to BwAR 1-18-A8.
		• Start 1B GS condenser exhauster fan per BwOP GS-7:
		  • Dispatch EO to perform steps F.1.a through F.1.e.
		  • Start the 1B GS condenser exhauster fan at 1PM02J.
		  • Dispatch EO to close 1OG028A (1A GS condenser exhauster fan inlet valve).
		• Monitor condenser vacuum.
		• Dispatch EO to determine cause of the tripped fan.
		• Dispatch EO to verify/start the Main Turbine Turbo-Toc Oil Purifier per BwOP TO-24.
		• Dispatch EO to verify 1B GS condenser exhauster fan had a good start.
		o Place the 1A GS condenser exhauster fan in PTL.

	US	• Acknowledge report of GS condenser exhauster fan status. • Notify SM of start of 1B GS condenser exhauster fan. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
		EXAMINER'S NOTE: After the actions for starting the 1B GS condenser exhauster fan are complete and with Lead Examiner's concurrence, insert next event.

Comments: _____

Scenario No:	**NRC 2**	Event No.	4
Event Description:	Degraded bus voltage with a loss of bus 142		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-21-C7 BUS 141 OVERLOAD OR VOLT LOW lit. • Annunciator 1-22-C7 BUS 142 OVERLOAD OR VOLT LOW lit. • Low voltage on all three phases on bus 141 and 142.

	BOP	• Determine low voltage exists on bus 141 and 142 at 1PM01J.
		  • Report failure to US.
		• Reference BwARs 1-21-C7 & 1-22-C7.
		• Verify voltage on ALL 3 phases of each 4 KV bus are > 3990 volts (NO), then OPEN the affected bus SAT Feed Breaker (breakers 1412 & 1422).
		  • Verify the DGs start and power bus 141/142 (bus 141 is energized).
		  • 1B DG starts, but bus 142 is de-energized.
		○ Inform the US to refer to LCO 3.8.1 / 3.8.9.
		• Monitor bus 141 voltage.

	CREW	• Monitor bus 141 ESF equipment sequencing on.
	CUE	• Annunciator 1-22-A7 BUS 142 FD BRKR 1422 TRIP lit. • Bus 142 bus alive light not lit.
	CREW	• Determine bus 142 de-energized. ○ Reference BwARs, as time permits. • Identify entry conditions for 1BwOA ELEC-3 "LOSS OF 4KV ESF BUS."
	US	• Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter 1BwOA ELEC-3 and direct operator actions to establish the following conditions: • Determine affected bus (142), GO TO Attachment C.

	ATC/ BOP
	
	BOP
		• Verify required ESF loads energized on bus 141:
		  • Bus 131X
		  • 1A CV pump.
		  • 1A/C RCFCs.
		  • 1A CC pump.
		  • 1A SX pump.
		  • 0A VC train (start Supply and Return fans).
		• Isolate bus 142 by placing the following breakers in PTL:
		  • ACB 1423 FIRST, then:
		  • ACB 1421, 1422, 1424.

Comments: _____

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Scenario No:	**NRC 2**	Event No.	4
Event Description:	Degraded bus voltage with a loss of bus 142		
Time	Position	Applicant's Actions or Behavior	
		• Bus 142 lockout alarm (1-22-A7) LIT. • Check DC crosstie required – 125V DC Batt Chgr 112 Trouble alarm (1-22-E8) LIT. • Dispatch operator to crosstie ESF DC Bus 112 with ESF DC Bus 212 within 1 hour.	

	US	• Refer to Tech Specs:
		  • Enter Tech Spec 3.8.1 Conditions A & D (applicable since no SAT feed to Bus 142 from either Unit).
		  • Enter Tech Spec 3.8.9 Condition A (applicable since bus 142 is faulted).
		• 1B DG local emergency start with jumpers NOT ATTEMPTED.
		• Check bus 142 status:
		  • Bus 142 lockout alarm (1-22-A7) LIT.
		  • Dispatch EO to emergency trip 1B DG.
		  • Check offsite power available.
		  • SAT 142-2 energized and NO SI signal present.
		  • Start 1A Cnmt chiller per BwOP VP-1.
		• Unit 2 contacted to perform 2BwOSR 3.8.1.1 within 1 hour.
		• Dispatch EOs to locally investigate bus 142.
		• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.	

		EXAMINER'S NOTE: After the actions for the degraded bus voltage and loss of bus 142 are complete and with Lead Examiner's concurrence, insert next event.	

Comments: _____

Scenario No:	**NRC 2**	Event No.	5
Event Description:	PZR PORV 1RY455A fails open		
Time	Position	Applicant's Actions or Behavior	
	CUE	• Annunciator 1-12-B2 PZR PORV OR SAF VLV OPEN lit. • Annunciator 1-12-C1 PZR PRESS CONT DEV LOW HTRS ON lit. • Annunciator 1-12-C6 PZR PORV DSCH TEMP HIGH lit. • PZR PORV 1RY455A open. • PZR pressure dropping.	

	ATC	Perform the following at 1PM05J:
		• Determine PZR PORV 1RY455A has opened prior to reaching its auto open setpoint.
		• Report failure to US.
		• Perform actions per 1BwPR 1-12-RY "PZR CONTROL MALFUNCTION PROMPT RESPONSE":
		  • Verify PZR pressure normal - NO.
		  • Attempt to close 1RY455A (place 1RY455A, PZR PORV, C/S to CLOSE).
		  • Close 1RY455A block valve, 1RY8000A.
		  • Verify PZR pressure is at 2235 psig or trending to normal.
		o Recognize/report DNB LCO 3.4.1 pressure exceeded (<2209 psig) if applicable.
		o Report when DNB LCO can be exited, if applicable.	

	BOP	o Refer to BwARs, as time permits.	
	US	• Acknowledge PZR PORV failure and concur with actions to close PZR PORV and/or PZR PORV block valve. • Enter Tech Spec 3.4.11 Condition B. o Determine that TRM 3.4.d does not apply. o Enter Tech Spec 3.4.1 Condition A (if applicable) (DNB Tech Spec - < 2209 psig). • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.	
		EXAMINER'S NOTE: After the actions for the PZR PORV failure are complete and with Lead Examiner's concurrence, insert next event.	

Comments: _____

Scenario No:	**NRC 2**	Event No.	6, 7 & 8
Event Description:	Turbine trip with failure of auto Rx trip / 4 stuck rods requiring emergency boration		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-11-A9 TURB TRIP ABOVE P8 RX TRIP lit. • Annunciator 1-18-A4 TURB STOP VLV CLOSED ALERT lit.
	US	• Enter 1BwEP-0 "REACTOR TRIP OR SI" and direct operator actions of 1BwEP-0 to establish the following conditions:

	ATC
	
	[CT-1]
		Perform immediate operator actions of 1BwEP-0 at 1PM05J:
		• Verify reactor trip:
		  • Rod bottom lights – NOT LIT.
		Perform a manual reactor trip at 1PM06J before transitioning out of 1BwEP-0. (Westinghouse – CT-1) (K/A number - EPE029EA1.08 importance - 4.5/4.5)
		  • **Manually trip the reactor (1PM06J)** (1PM05J Rx trip switch will not work).
		  • Reactor trip & Bypass breakers – OPEN.
		  • Neutron flux – DROPPING.
		• PR channels < 5%.
		• IR SUR is negative.

	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J:
		• Verify turbine trip:
		  • All Turbine throttle valves – CLOSED.
		  • All Turbine governor valves – CLOSED.

	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J: • Verify power to 4 KV busses: • ESF Buses – Bus 141 ENERGIZED, Bus 142 DEAD.

	CREW	Determine SI NOT actuated/required.
		• Check SI status:
		  • SI First OUT annunciators NOT lit (1-11-B1, 1-11-C1, 1-11-D1, 1-11-E1).
		  • SI ACTUATED permissive light NOT lit (1-BP-4.1).
		  • SI equipment NOT automatically actuated (no SI pump running, 1SI8801A/B not open).
		• Check if SI is required:
		  • PZR pressure > 1829 psig.
		  • Steamline pressure > 640 psig.
		  • CNMT pressure < 3.4 psig.

Comments: _____

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Scenario No:	**NRC 2**	Event No.	6, 7 & 8
Event Description:	Turbine trip with failure of auto Rx trip / 4 stuck rods requiring emergency boration		

Time	Position	Applicant's Actions or Behavior
	US	• Determine SI not required. • Notify SM of plant status (auto reactor trip failure & 4 stuck rods) and procedure entry. • Request evaluation of Emergency Plan conditions. • Request STA evaluation of status trees. • Transition to 1BwEP ES-0.1 "REACTOR TRIP RESPONSE" and direct operator actions of 1BwEP ES-0.1 to establish the following conditions:

	ATC	• Check RCS temperatures:
		  • Check RCPs – RUNNING.
		  • Verify RCS average temperature stable at or trending to 557°F.

	ATC	• Verify ALL control rods fully inserted.
		  • Rod at bottom lights – NOT ALL LIT (4 stuck rods).
		  • Initiate emergency boration of 5280 gallons per 1BwOA PRI-2 "EMERGENCY BORATION."
		  • Calculate shutdown margin within one hour (request U-2 NSO to perform SDM calculation).
		  • Check RCPs – ANY RUNNING.

	ATC /BOP	• Initiate emergency boration per 1BwOA PRI-2 "EMERGENCY BORATION":
		  • Check CV pump status.
		  • 1A CV pump running.
		  • Emergency borate RCS.
		  • Establish boration flow from BAT.
		  ○ Open 1CV8104 (de-energized).
		  • Open 1CV110A & 1CV110B.
		  • Start boric acid transfer pump.
		  • Check emergency boration flow > 30 gpm (1FR-0110).
		  • Verify CV pump discharge flow path aligned with proper flow.
		  • 1CV8105 & 1CV8106 open.
		  • 1CV8324A open.
		  • 1CV8146/7 open.
		  • Throttle 1CV121 to establish 1FI-121A flow > 30 gpm (BAT is source of borated water).
		  • Equalize RCS and PZR boron.
		  • Energize PZR backup heaters.
		  • Continue boration until required gallons of boron added.

Comments: _____

Scenario No: **NRC 2**		Event No. 6, 7 & 8
Event Description:		Turbine trip with failure of auto Rx trip / 4 stuck rods requiring emergency boration
Time	Position	Applicant's Actions or Behavior
		EXAMINER'S NOTE: Once the crew has initiated emergency boration, the next event will be inserted by the simulator operator (timing is required for Event 9).
	ATC/ BOP	○ Check PZR level control: • Level > 17% and trending to 25%. • Charging and letdown – IN SERVICE.
	ATC/ BOP	○ Check PZR pressure control: • Pressure > 1829 psig and stable/trending to 2235 psig.
	ATC/ BOP	○ Check FW status - check FW isolation: • Isolation monitor lights – LIT. • Trip running FW pumps. • Check total feed flow to SGs > 500 GPM.
	ATC/ BOP	○ Check SG levels: • Levels maintained between 10% and 50%.
	ATC/ BOP	○ Verify generator trip. • Main transformer output breakers – OPEN: • OCB 1-8. • OCB 7-8. • PMG output breaker – OPEN. • Verify ALL AC busses energized (bus 142 DEAD).

Comments: _____

Scenario No:	**NRC 2**	Event No.	9
Event Description:	Loss of offsite power / 1A DG failure / Loss of All AC Power		

Time	Position	Applicant's Actions or Behavior
	CUE	• Loss of Offsite power indicated by overhead lights initially going out. • Annunciator 1-20-A1 LOSS OF OFFSITE POWER lit. • BOTH ESF buses DEAD.
		EXAMINER'S NOTE: For evaluation of critical task, CT-24, record the time the Loss of All AC Power occurred. _____:_____:_____
	CREW	• Identify Loss of All AC Power.
	ATC	○ Determine emergency boration has stopped.
	US	• Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter 1BwCA-0.0 "LOSS OF ALL AC POWER" and direct operator actions to establish the following conditions:

	ATC	Perform immediate operator actions of 1BwCA-0.0:
		• Verify reactor trip:
		  • Reactor trip & Bypass breakers – OPEN.
		  • Neutron flux – DROPPING.

	BOP	Perform immediate operator actions of 1BwCA-0.0:
		• Isolate Steamlines:
		  • Actuate main steamline isolation.
		  • Verify all MSIVs and MSIV Bypass valves – CLOSED.

	BOP	• Verify AF flow:
		  • 1B AF pump running.
		  • Total AF flow >500 gpm.

	ATC	• Verify RCS isolated:
		  • Close letdown isolation valves:
		  • 1CV8149A-C.
		  • 1CV459/460.
		  • PZR PORVs closed:
		  • 1RY455A (failed open, 1RY8000A closed)
		  • 1RY456.

Comments: _____

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Scenario No:	**NRC 2**	Event No.	9
Event Description:	Loss of offsite power / 1A DG failure / Loss of All AC Power		

Time	Position	Applicant's Actions or Behavior
		• Excess letdown isol valves closed: • 1CV8153A/B. • RCPs – NOT RUNNING.

	BOP	• Try to restore power to any/both Unit 1 4 KV ESF buses:
		  • Attempt to manually start both DGs (1B DG emergency tripped).
		  • Report neither DG running.
		  • Actuate SI from 1PM05J and 1PM06J.
		  • Report neither DG running.

	BOP/ US	• Prepare for ESF bus crosstie:
		  • Dispatch EOs to depress emergency stop push buttons on 1A & 1B DGs.
		  • Reset SI.

	US	• Check status of Unit 2 ESF buses:
		  • Both Unit 2 4 KV ESF buses energized from SAT.
		  • Notify Unit 2 to perform 2BwCA-0.3 "RESPONSE TO OPPOSITE UNIT LOSS OF ALL AC POWER."
		  • Both U-2 4 KV ESF buses energized.

	BOP	• Crosstie bus 141 to Unit 2:
		  • Bus 241 energized from SAT.
		  • Check Bus 141 – NOT FAULTED.
		  • ACB 1413 (DG feed) in PULL OUT.
		  • ACB 1411 (Non-ESF bus tie) in PULL OUT.
		  • ACB 1412 (SAT feed) in PULL OUT.
		  • ACB 1414 (Reserve feed) in PULL OUT.
		  • Check Bus 141 alarms NOT LIT:
		  • Annunciator BUS 141 FD BRKR ACB 1412 TRIP (1-21-A7).
		  • Annunciator BRKR 1414 CROSS-TIE OVERCURRENT (1-21-B8).
		  • Annunciator DG 1A OVERLOAD (1-21-B9).

	BOP/ ATC	• Verify loads fed from Bus 141 available:
		  • Bus 131X.
		  • CENT CHG pump 1A.
		  • CC pump 1A or 0.
		  • SX pump 1A.
		  • MCR chiller 0A.

Comments: _____

Scenario No:	**NRC 2**	Event No.	9
Event Description:	Loss of offsite power / 1A DG failure / Loss of All AC Power		

Time	Position	Applicant's Actions or Behavior

	[CT-24]	• Place loads in PULL OUT:
		  • CENT CHG pumps.
		  • RH pumps.
		  • SI pumps.
		  • AF pump 1A.
		  • RCFCs (HI and LO).
		  • CS pumps.
		  • CC pumps (1A, 1B and 0).
		  • SX pumps.
		  • MCR chillers.
		• Check ACB 2414 closed (reserve feed).
		Crosstie an ESF bus to opposite unit within 10 minutes of Loss of All AC per UFSAR. (Westinghouse – CT-24) (K/A number - EPE055EA1.07 importance – 4.3/4.5)
		• Sync and Close Bus 141/241 reserve feeder breaker.
		  • **Close ACB 1414.**
		• Check Bus 141 energized.
		• Check Bus 131X energized.

	[CT-24]	**EXAMINER'S NOTE: For evaluation of critical task, CT-24, record time AC power restored: _____:_____:_____** **Time power restored – time power lost = _____:_____:_____ (≤10 minutes).**

	BOP	• Restore Unit 1 SX cooling:
		  • Check valves for 1A SX pump – OPEN.
		  • 1SX001A.
		  • 1SX016A.
		  • 1SX027A.
		  • Start 1A SX pump.
		  • Check SX crosstie valves OPEN - 1SX033 and 1SX034.
		  • Monitor crosstied power source load capacity.

	ATC /BOP	• Verify following equipment loaded on energized 4 KV ESF Bus:
		  • Check Battery Charger 111 energized:
		  • Annunciator 125V DC BATT CHGR 111 TROUBLE (1-21-E8) - NOT LIT.
		  • Dispatch EO to check instrument inverter 111/113 status.

Comments: _____

Scenario No:	**NRC 2**	Event No.	9
Event Description:	Loss of offsite power / 1A DG failure / Loss of All AC Power		

Time	Position	Applicant's Actions or Behavior

	BOP/ ATC	• Align equipment for Unit 1 restoration.
		  • Verify 1B AF pump – RUNNING.
		  • Check both Unit 2 ESF buses – ENERGIZED FROM SAT.
		  • Check Bus 142 – NOT FAULTED:
		  • ACB 1423 (DG feed) in PULL OUT.
		  • ACB 1421 (Non-ESF bus tie) in PULL OUT.
		  • ACB 1422 (SAT feed) in PULL OUT.
		  • ACB 1424 (Reserve feed) in PULL OUT.
		  • Verify Bus 142 alarms status (Bus 142 is faulted):
		  • Annunciator BUS 142 FD BRKR ACB 1422 TRIP (1-22-A7) – **LIT.**
		  • Annunciator BRKR 1424 CROSS-TIE OVERCURRENT (1-22-B8) - NOT LIT.
		  • Annunciator DG 1B OVERLOAD (1-22-B9) - NOT LIT.
		  • Dispatch EOs to start DGs per 1BwOA ELEC-3 "LOSS OF 4KV ESF BUS."
		  • Dispatch EOs to close 1CV8384A & B.
		  • Close CC from RCP Thermal Barrier isol valve – 1CC9438.
		  • Close RCP seal water return isol valve – 1CV8100.
		  • Check energized S/G PORVs in AUTO.
		  • Check VC fans – ONE TRAIN RUNNING (Supply Fan, Return Fan, M/U Fan).

	US	• Select proper recovery procedure.
		  • Check RCS subcooling acceptable.
		  • Check PZR level > 14%.
		  • Check if any ECCS equipment ACTUATED UPON AC POWER RESTORATION:
		  • 1FI-917 > 100 gpm.
		  • 1FI-918/922 > 200 gpm.
		  • 1FI-618/619 > 1000 gpm.
		  • GO TO 1BwCA-0.1 "LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED."

		EXAMINER'S NOTE: At this point in the scenario, all Critical Tasks are complete and the scenario stop criteria has been reached, with Lead Examiner's concurrence, STOP the scenario.

(Final)

Comments: _____

Simulation Facility: Braidwood		Scenario No.: **NRC 3**	Operating Test No.: **17-1 NRC**
Examiners:		Applicant:	SRO
			ATC
			BOP

Initial Conditions: IC-31

Turnover: Unit 1 is at 90% power, steady state, equilibrium xenon, BOL. Online risk is green. Following completion of turnover, the crew will perform a 1B SG PORV PMT using 1BwOSR 3.7.4.1 "MAIN STEAM SYSTEM ISOLATION 1MS018A/B/C/D VALVE TRAVEL AND INDICATION 18 MONTH SURVEILLANCE." EOs are briefed and standing by at the 1B SG PORV, 1MS019B is closed.

Event No.	Malf. No.	Event Type*	Event Description
	IMF CV32B TRGSET 1 "ZDISIA2 = = T" IMF CV01A (1 0) IMF FW35B IRF RP51 OUT IRF MS52 0		1B CV pump auto start failure 1A CV pump trips on SI signal 1B HD pump fails to start 1A and 1C RCFC low speed auto-start failure Close 1MS019B
1	Normal	N-BOP TS-US	Perform PMT on 1MS018B (1B SG PORV)
2	IMF d6mod131c12f ALARM IMF CV19	C-ATC	1CV112A diverts to the HUT
3	IMF CV02A	C-BOP, US	0A PW pump trips
4	IMF RH05C 0	TS-US	RWST level channel, 1LT-932, fails low
5	IMF FW35C	C-BOP, US	1C HD pump trip
6	Preload	R-RO, US	HD turbine runback
7	IMF RX15dec LOWER	I-ATC, US TS-US	1PK-455A setpoint fails low
8	IOR ZDI1MS001B CLS IMF MS03B 100 IMF MS03F 100 IMF MS03J 100	M-ALL	1B MSIV fails closed, 1B SG safety valves fail open
9	Preload	C-ATC	1A CV pump trips / 1B CV pump fails to auto start
10	Preload	C-BOP	1A and 1C RCFCs do not auto-start in low speed

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

SCENARIO OVERVIEW

Unit 1 is at 90% power, steady state, equilibrium xenon, BOL. Online risk is green. Following completion of turnover, the crew will perform a 1B SG PORV PMT using 1BwOSR 3.7.4.1 "MAIN STEAM SYSTEM ISOLATION 1MS018A/B/C/D VALVE TRAVEL AND INDICATION 18 MONTH SURVEILLANCE." EOs are briefed and standing by at the 1B SG PORV, 1MS019B is closed.

After completing shift turnover and relief, the BOP performs a 1B SG PORV PMT using 1BwOSR 3.7.4.1. The 1B SG PORV, 1MS018B, will fail the test due to sticking open at 15% when the valve is attempted to be stroked closed. The Unit Supervisor will enter Tech Spec 3.7.4 Condition A and Tech Spec 3.6.3 Condition C. 1MS019B will remain closed to comply with Tech Spec 3.6.3 Condition C. 1MS018B will remain unavailable for the remainder of the scenario.

After the 1MS018B failure has been addressed, 1CV112A will fail to the HUT position requiring the ATC to place the control switch for 1CV112A to the VCT position. If VCT level lowers to the automatic make-up set point before action is taken, the automatic make-up will not occur and manual make-up will be required to maintain VCT level at desired level.

After the 1CV112A failure has been addressed, the 0A PW pump will trip. The BOP will respond and start the 0B PW pump per BwAR 0-38-A5. The 0B PW pump will be required for stabilizing the plant (RCS dilution) after the runback.

After the 0A PW pump failure is addressed, RWST level channel, 1LT-932, will fail low. The US will enter 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL." The US will enter Tech Spec 3.3.2 Conditions A and K.

After addressing the Tech Spec for the RWST level channel, the 1C HD pump will trip. The standby 1B HD pump will not start and a HD runback will be initiated by the BOP. The ATC will add negative reactivity per the operator aid for a HD runback. The US will enter 1BwOA SEC-1 "SECONDARY PUMP TRIP."

After a sufficient change in power is completed for the evaluation, 1PK-455A, Master Pressurizer Pressure Controller, setpoint will fail causing a high output demand. Both pressurizer spray valves, 1RY455B and C, will open and pressurizer pressure will drop. The ATC will take manual action to control 1PK-455A or both PZR spray valve controllers per hard card 1BwPR 1-12-RY and lower demand to close the pressurizer spray valves and energize the PZR heaters. Tech Spec 3.4.1 Condition A will apply if pressurizer pressure drops below 2209 psig.

After the 1PK-455A failure is addressed, the 1B MSIV fails closed causing three SG safety valves on the 1B SG to stick open resulting in a faulted SG. SG pressure will drop and a manual reactor trip will be required. The crew will enter 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION." When safety injection is actuated, the 1A CV pump will trip. The 1B CV pump must be manually started to establish high head ECCS flow. After determining the 1B SG secondary pressure boundary is not intact, the crew will transition to 1BwEP-2 "FAULTED STEAM GENERATOR ISOLATION." The crew will complete isolation of 1B SG and transition to 1BwEP-1.1 "SI TERMINATION" based on meeting the criteria for reducing ECCS flow.

Completion criteria is termination of ECCS injection in 1BwEP ES-1.1.

Critical Tasks

1. Manually start the 1B CV pump prior to completion of step 6 of 1BwEP-0.
   (Westinghouse – CT-6) (K/A number - 013000A4.01 importance 4.5/4.8)

2. Isolate 1B Steam Generator prior to completing step 4 of 1BwEP-2.
   (Westinghouse – CT-17) (K/A number - APE040AA1.10 importance 4.1/4.1)

SIMULATOR SETUP GUIDE

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.

- Establish the conditions of IC-31, 90% power, steady state, equilibrium xenon OR use the IC written below.

- Verify/place 0A and 0C VA plenums in service, 0B VA plenum in standby.

- Complete items on Simulator Ready for Training Checklist.

- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.

- Place simulator in RUN (allow simulator to run during board walk down and turnover).

- Release **SSF NRC 3 SETUP** from disk and verify the following insert:

  - **IMF CV32B**
  - **TRGSET 1 "ZDISIA2 = = T"**
  - **IMF CV01A (1 0)**
  - **IMF FW35B**
  - **IRF RP51 OUT**
  - **IRF MS52 0**

- Provide examinees with turnover sheets and a marked up copy of 1BwOSR 3.7.4.1 "MAIN STEAM SYSTEM ISOLATION 1MS018A/B/C/D VALVE TRAVEL AND INDICATION 18 MONTH SURVEILLANCE."

- If desired, write an IC after all of the set-up actions are completed. This IC may be used for running the scenario on additional simulator groups.

Event 1: 1BwOSR 3.7.4.1 with 1MS018B valve failure (Tech Spec).

Release **SSF NRC 3 EVENT 1** from disk and verify the following actuates:

- **Verify MF MS04B 15** is inserted after 1MS018B is full open and then stroked closed.
- **Verify ZLO1MS018B2 ON** is inserted after 1MS018B is full open and then stroked closed.

If asked as the EO, report 1MS019B closed.

When requested, report that 1MS018B stopped closing at ~15% open.

As SM, acknowledge the failure of 1MS018B, LCO 3.6.3 Condition C and LCO 3.7.4 Condition A entry, and request for on-line risk assessment, maintenance support and IR initiation. If asked, 1BwOSR 3.6.3.5.MS-1 is NOT required to be performed.

If asked as the EO, report 1MS018B has a broken hydraulic line and a small puddle of hydraulic fluid is present beneath the valve. The hydraulic pump is running. If asked, 1MS018B is ~15% open.

After the BOP takes the 1MS018B C/S to CLOSE, if asked as the EO, report 1MS018B is ~15% open & its hydraulic pump is NOT running.

As WEC supervisor, acknowledge request for EST for 1MS018B C/S, if EST is requested.

Event 2: 1CV112A diverts to the HUT.

Release **SSF NRC 3 EVENT 2** from disk and verify the following actuates:

- **MF d6mod131c12f ALARM**
- **MF CV19**

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation.

Event 3: Trip of the 0A PW pump.

Release **SSF NRC 3 EVENT 3** from disk and verify the following actuates:

- **MF CV02A**

When dispatched as the EO, report the 0A PW pump is hot to the touch and its feed breaker is tripped open.

When asked as the EO, the 0B PW is ready for a start and report a good start when started.

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation.

Event 4: RWST level channel, 1LT-932, fails low.

Release **SSF NRC 3 EVENT 4** from disk and verify the following actuates:

- **MF RH05C 0**

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation. If asked for personnel to bypass bistables, inform the US that 2 NSOs will be available in 1 hour.

Event 5/6: 1C HD pump trip / HD turbine runback.

Release **SSF NRC 3 EVENT 5** from disk and verify the following actuates:

- **MF FW35C**

As SM, acknowledge the failure and requests for on-line risk assessment, maintenance support and IR initiation. Acknowledge HD runback actions.

If requested as the EO, report that a ground overcurrent flag is dropped at the 1C HD pump breaker. There are no abnormal conditions at the 1B HD pump breaker. If requested to inspect the 1B and/or 1C HD pump locally, report no abnormal conditions exist.

Acknowledge as Chemistry and RP, the sampling requests.

Event 7: 1PK-455A setpoint fails low.

Release **SSF NRC 3 EVENT 7** from disk and verify the following actuates:

- **MF RX15dec LOWER**

As SM acknowledge the failure of 1PK-455A, LCO 3.4.1 Condition A entry, and requests for on-line risk assessment, maintenance support and IR initiation.

Event 8: 1B MSIV fails closed / 1B SG safety valves fail open.

Release **SSF NRC 3 EVENT 8** from disk and verify the following actuates:

- **OR ZDI1MS001B CLS**
- **MF MS03B 100**
- **MF MS03F 100**
- **MF MS03J 100**

After the faulted SG is diagnosed by the crew OR 2 minutes after 1B MSIV closes, report as Security that steam flow from 1B/1C MSIV room safety valve tailpipes is occurring.

Acknowledge as SM, procedure transitions, Emergency Plan evaluations and STA request.

When requested as an EO to establish 8000 gpm SX flow to the U-0/U-1 CC HXs, perform the following:

- **RF SW01 52**
- **RF SW02 52**

Event 9: 1A CV pump trips / 1B CV pump fails to auto start (preload).

Verify that the 1A CV pump trips when SI actuates.

Acknowledge as SM, procedure transitions, Emergency Plan evaluations, and STA request.

After STA is requested, as STA perform status tree passes as required and report results to US.

Event 10: 1A and 1C RCFCs do not auto-start in low speed (preload).

Acknowledge as SM, procedure transitions, Emergency Plan evaluations, and STA request.

After STA is requested, as STA perform status tree passes as required and report results to US.

Scenario No:	**NRC 3**	Event No.	1
Event Description:	Perform 1BwOSR 3.7.4.1 “MAIN STEAM SYSTEM ISOLATION 1MS018A/B/C/D VALVE TRAVEL AND INDICATION 18 MONTH SURVEILLANCE”		

Time	Position	Applicant’s Actions or Behavior
	CUE	• From turnover, perform 1BwOSR 3.7.4.1 for a 1B SG PORV PMT.
	US	• Direct BOP to perform 1BwOSR 3.7.4.1 for a 1B SG PORV PMT.
	BOP	• Refer to 1BwOSR 3.7.4.1. • Verify/initial step 1.1, Prerequisites, Precautions, and Limitations and Actions are addressed. • Contact the EO at 1MS019B for initial position and record initial valve positions. • Direct the EO to close 1MS019B (turnover lists 1MS019B status as closed). • OPEN 1B SG PORV (1MS018B) at 1PM04J. • Respond to 1B SG PORV not fully closing. • Contact operator at 1MS018B for valve status. o Place 1MS018B C/S in close to stop hydraulic pump. o Request Equipment Status Tag for 1MS018B C/S & 1MS019B handwheel.
	US	• Enter Tech Spec 3.7.4 Condition A. • Enter Tech Spec 3.6.3 Condition C. o Direct operator to maintain 1MS019B closed. • Inform SM of 1MS018B status, Tech Spec entry, IR request, on-line risk assessment, maintenance support, and clearance order/EST for 1MS018B.
		EXAMINER’S NOTE: (1) 1B S/G PORV LVDT meter de-energizes when its control switch is placed in close. **(2) After the actions for 1MS018B failure are complete and with Lead Examiner’s concurrence, insert next event.**

Comments: _____

Scenario No:	**NRC 3**	Event No.	2
Event Description:	1CV112A diverts to the HUT		

Time	Position	Applicant's Actions or Behavior
	CUE	• 1CV112A diverts to HUT. • VCT level lowering at 1PM05J. • Automatic VCT makeup does NOT actuate at 37%. ○ Annunciator 1-9-A2 VCT LEVEL HIGH-HIGH LOW lit (if VCT level < 20%).
	ATC/ BOP	• Determine 1CV112A has re-positioned to the HUT. ○ Dispatch EOs to investigate 1CV112A.
	US	• Notify SM of plant status.
	ATC	• Take manual control of VCT level at 1PM05J: • Place 1CV112A control switch in the VCT position. ○ If required, manually makeup to the VCT.
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
		EXAMINER'S NOTE: After the actions for the 1CV112A failure are complete and with Lead Examiner's concurrence, insert next event.

Comments: _____

Scenario No:	**NRC 3**	Event No.	3
Event Description:	0A PW pump trip		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 0-38-A5 PW PUMP TRIP OR AUTO START lit.
	US	• Acknowledge annunciator 0-38-A5 alarm. • Report failure to the SM.
	BOP	• Refer to BwAR 0-38-A5. • Determine 0A PW pump is tripped. • Dispatch EO to investigate the tripped 0A PW pump. • Recommend and place the 0A PW pump in PTL. o Dispatch EO to verify 0B PW pump ready for operation. • Start the 0B PW pump.
	US	• Acknowledge PW pump status. • Notify SM of 0A PW pump trip and subsequent start of 0B PW pump. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
		EXAMINER'S NOTE: After the actions for starting the 0B PW Pump are complete and with Lead Examiner's concurrence, insert next event.

Comments: _____

Scenario No:	**NRC 3**	Event No.	4
Event Description:	RWST level channel, 1LT-932, fails low		
Time	Position	Applicant's Actions or Behavior	
	CUE	• Annunciator 1-6-A7 RWST LEVEL LO-3 lit. • Annunciator 1-6-B7 RWST LEVEL LO-2 lit. • Annunciator 1-6-C7 RWST LEVEL LOW lit. • RWST level meter, 1LI-932, fails low.	
	CREW	• Identify entry conditions for 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL."	
	ATC/ BOP	• Determine 1LT-932 has failed low. ○ Reference BwARs, as time permits. ○ Dispatch EOs to investigate 1LT-932.	
	US	• Enter 1BwOA INST-2 ATTACHMENT S "RWST LEVEL – LOW LOW COINCIDENT WITH SAFETY INJECTION" and direct operator actions of 1BwOA INST-2 to establish the following conditions: • Locally bypass RWST level channel 932 bistables (delayed). • Enter Tech Spec 3.3.2 Conditions A and K. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.	
		EXAMINER'S NOTE: After the actions for the RWST level channel failure are complete and with Lead Examiner's concurrence, insert next event.	

Comments: _____

Scenario No:	**NRC 3**	Event No.	5 & 6
Event Description:	1C Heater Drain pump trip / HD turbine runback		

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-17-D2 HD PUMP TRIP lit. • HD tank level rising. • HD pump discharge valves opening.
	BOP	• Recognize 1C HD pump tripped. ○ Refer to BwARs, as time permits. • Report failure to US. • Recognize only one HD pump running.
	CREW	• Identify entry conditions for 1BwOA SEC-1 "SECONDARY PUMP TRIP."
	US	• Acknowledge 1C HD pump trip. • Enter 1BwOA SEC-1 "SECONDARY PUMP TRIP," ATTACHMENT C "HD PUMP TRIP" and direct operator actions of 1BwOA SEC-1 to establish the following conditions:

	BOP	• Restore HD pump flow – 1B HD pump will NOT start.
		• Check HD pump status:
		  • ONLY 1A HD pump running.
		  • Initiate turbine load reduction to 780 MW at 20 MW/min.
		  • Initiate HD runback on OWS graphic 5512.
		  • Verify turbine load lowering.

	US	• Notify SM of the HD runback.

	BOP	• Check HD tank level:
		  • Level > 72% and rising.
		  • Maintain HD tank level between 28-72%:
		  ○ Verify 1HD046A &B opening in AUTO.
		  ○ Open 1CB113A-D.
		  ○ Manually adjust 1HD117, HD tank overflow valve.
		• Check 1HD117, HD tank overflow valve, in auto and closed.
		  ○ Lower turbine load as necessary to close 1HD117 (load ramp in progress).
		• Check 1A HD pump parameters:
		  • 1A HD pump amps < 168 amps.
		  • 1A HD pump flow < 2950 KLB/HR.
		  ○ Lower turbine load as necessary to restore 1A HD pump parameters.
		• Deactivate turbine runback (when 1HD117 is closed).

	ATC	• Check PDMS operable:
		  • Annunciator 1-10-E8 PDMS INOPERABLE not lit.
		  • 1BwOS PDMS-1a not implemented.
		  • Annunciator 1-10-D7 PDMS LIMIT EXCEEDED not lit.

Comments: _____

Scenario No:	**NRC 3**	Event No.	5 & 6
Event Description:	1C Heater Drain pump trip / HD turbine runback		

Time	Position	Applicant's Actions or Behavior

	ATC	• Control ΔI near target.
		  • Reposition control rods to restore ΔI near target.
		• Monitor RCS parameters.
		  o If PZR pressure lowers < 2209 psig, notify US to enter Tech Spec 3.4.1.

	ATC	• Initiate RCS boration.
		• Determine required boric acid volume.
		  o Determine from Op Aid (ramp starts from 90%).
		Borate in Automatic (BwOP CV-6 hard card, step 2):
		  o Turn on PZR backup heaters to equalize boron concentration.
		  • Set the Boric Acid Totalizer to desired value.
		  • Place MAKE-UP CONT SWITCH in STOP position.
		  • Place MODE SELECT SWITCH in BORATE position.
		  • Place MAKE-UP MODE CONT SWITCH to START.
		  • Verify the following occurs:
		  • 1CV110B opens.
		  • 1CV110A modulates open.
		  • BA pump starts.
		  • Proper BA flow on recorder 1FR-110.
		  o If desired, control VCT level by adjusting 1LK-112 controller setpoint to desired value.
		  • When desired boration is achieved, place MAKE-UP CONT SWITCH to STOP.
		  • Verify the following occurs:
		  • 1CV110B closes.
		  • 1CV110A closes.
		  • BA pump stops.
		  • Record time and amount of BA addition.
		  • Perform appropriate step of BwOP CV-7 to return RMCS to AUTO following the final boration.
		  o May flush boric acid lines per BwOP CV-6 step F.5.
		
		OR
		
		Batch addition of Boric Acid (BwOP CV-6 hard card, step 1):
		  o Turn on PZR backup heaters to equalize boron concentration.
		  o If desired to reset the Boric Acid Totalizer to 0, select soft button RESET for Boric Acid Blender Predet Setpoint.
		  • Open 1CV110B.
		  • Open 1CV110A.
		  • Start the BA Transfer Pump.
		  o If desired, control VCT level by adjusting 1LK-112 controller setpoint to desired value.
		  • When desired amount of BA has been added, stop the BA Transfer Pump.

Comments: _____

Scenario No:	**NRC 3**	Event No.	5 & 6
Event Description:	1C Heater Drain pump trip / HD turbine runback		
Time	Position	Applicant's Actions or Behavior	
		• Close 1CV110A. • Close 1CV110B. • Verify VCT level/pressure at desired value and adjust 1LK-112 setpoint to desired corresponding level setpoint. • Place 1CV110A/1CV110B in AUTO. • Record time and amount of BA addition. • Perform appropriate step of BwOP CV-7 to return RMCS to AUTO following the final boration. o May flush boric acid lines per BwOP CV-6 step F.5.	
	BOP	• Verify running CB pump recirc valves in auto. • 1CB113A-D on running pumps. • Dispatch operators to perform BwOP HD-2 for 1C HD pump. • Shutdown 4th CD/CB pump (if started during procedure performance).	
	US	• Notify Chemistry to monitor secondary plant chemistry. • Check reactor power change > 15% in one hour: o Notify Chemistry to perform Tech Spec 3.4.16 required sampling. o Notify Rad Protection to perform RETS 12.4.1.A required sampling. o Determine Tech Spec 3.1.6 Condition A entry required if control rods below LO-2 rod insertion limit. o Determine Tech Spec 3.4.1 Condition A entry if PZR pressure lowers < 2209 psig. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.	
		EXAMINER'S NOTE: After Rx power is reduced to an adequate level and with Lead Examiner's concurrence, insert next event.	

Comments: _____

Scenario No:	**NRC 3**	Event No.	7
Event Description:	Master PZR Pressure Controller (1PK-455A) output fails high (setpoint fails low)		

Time	Position	Applicant's Actions or Behavior
	CUE	• BOTH PZR spray valves open. • PZR pressure, 1PI-455A/456/457/458, lowering. • Master PZR Pressure Controller demand rising.

	ATC	• Identify/report failure of Master Pressurizer Pressure Controller.
		• Perform actions per hard card 1BwPR 1-12-RY:
		  • Verify PZR pressure normal - NO.
		  • Place PZR spray valve controllers in manual and adjust PZR pressure to pre-failed value.
		  • Verify PZR pressure is at 2235 psig or trending to normal.
		  o Take manual control to restore PZR pressure - place 1PK-455A in manual and lower demand as necessary.
		• Control PZR pressure manually for the remainder of the scenario.

		EXAMINER'S NOTE: (1) The crew should establish a normal pressure control band to maintain (approximately 2235 psig +/- 15 psig). (2) Manual control of either the Master PZR Pressure Controller or the PZR spray valve controllers will control PZR pressure.
	CREW	o Refer to BwARs, as time permits.
	US	• Enter Tech Spec 3.4.1 Condition A if PZR pressure drops below 2209 psig. • Notify SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
		EXAMINER'S NOTE: After the actions for the Master Pressurizer Pressure Controller failure are complete and with Lead Examiner's concurrence, insert next event.

Comments: _____

Scenario No:	**NRC 3**	Event No.	8, 9, 10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open / 1A CV pump trips / 1B CV pump fails to auto start / 1A/1C RCFC low speed auto-start failure		

Time	Position	Applicant's Actions or Behavior
	CUE	• 1B MSIV indicates closed. • Annunciator 1-15-B4 S/G 1B FLOW MISMATCH FW FLOW LOW lit. • PZR pressure lowering.
	ATC	• Recommend/initiate a manual reactor trip.
	CREW	• Recognize indications of faulted SG. o Dispatch operators to look for steam leak. o When report is received that 1B SG safeties are open, recognize that SG pressure is below SG safety valve lift setpoint.
	US	• Direct a manual Rx trip. • Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Enter 1BwEP-0 "REACTOR TRIP OR SI" and direct operator actions of 1BwEP-0 to establish the following conditions:
	ATC	Perform immediate operator actions of 1BwEP-0 at 1PM05J: • Verify reactor trip: • Rod bottom lights - ALL LIT. • Reactor trip & Bypass breakers - OPEN. • Neutron flux - DROPPING.
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J: • Verify turbine trip: • All Turbine throttle valves - CLOSED. • All Turbine governor valves - CLOSED.
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J: • Verify power to 4 KV busses: • ESF Buses – BOTH ENERGIZED (141 & 142).
	CREW	Recognize and respond to conditions requiring a Safety Injection in accordance with 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION," step 4: • SG pressure cannot be maintained > 640 psig.
	CREW	• Check SI Status: • SI First OUT annunciator - LIT. • SI ACTUATED Permissive Light - LIT. • SI Equipment – AUTOMATICALLY ACTUATED. o Either SI pump - RUNNING. o Either CV pump to cold leg isolation valve OPEN – 1SI8801A/B. • Manually actuate SI from 1PM05J and 1PM06J.

Comments: _____

Scenario No:	**NRC 3**	Event No.	8, 9, 10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open / 1A CV pump trips / 1B CV pump fails to auto start / 1A/1C RCFC low speed auto-start failure		

Time	Position	Applicant's Actions or Behavior
	CREW	○ May decide to isolate 1B SG immediately due to possible personnel safety considerations. ○ Isolate AF to 1B SG – CLOSE 1AF013B/F. ○ Actuate Main Steamline Isolation.
	US	• Direct BOP to perform Attachment B of 1BwEP-0.
		EXAMINER'S NOTE: US and ATC will continue in 1BwEP-0 while BOP is performing Attachment B.
	BOP	**1BwEP-0 ATTACHMENT B:** • Verify FW isolated at 1PM04J: • FW pumps – TRIPPED. • FW isolation monitor lights – LIT. • FW pumps discharge valves – CLOSED (or going closed) 1FW002A-C. • Verify DGs running at 1PM01J: • DGs – BOTH RUNNING. • 1SX169A/B OPEN. • Dispatch operator locally to monitor D/G operation. • Verify Generator Trip at 1PM01J: • OCB 1-8 and 7-8 open. • PMG output breaker open. • Verify SX pumps running. • 1CC9473A/B open. • Both SX pumps running. • Dispatch EO to establish 8000 gpm SX flow to the U-0 & U-1 CC HXs. • Verify Control Room ventilation aligned for emergency operations at 0PM02J: • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT. • Operating VC train equipment – RUNNING. • 0B Supply fan. • 0B Return fan. • 0B M/U fan. • 0B Chilled water pump. • 0B Chiller. • Operating VC train dampers – ALIGNED. • M/U fan outlet damper – 0VC08Y – NOT FULLY CLOSED. • 0B VC train M/U filter light – LIT. • 0VC09Y - OPEN. • 0VC313Y - CLOSED. • Operating VC train Charcoal Absorber aligned for train B. • 0VC44Y - CLOSED. • 0VC05Y - OPEN. • 0VC06Y - OPEN. • Control Room pressure greater than +0.125 inches water on 0PDI-VC038.

Comments: _____

Scenario No:	**NRC 3**	Event No.	8, 9, 10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open / 1A CV pump trips / 1B CV pump fails to auto start / 1A/1C RCFC low speed auto-start failure		

Time	Position	Applicant's Actions or Behavior

		• Verify Auxiliary Building ventilation aligned for emergency operations at 0PM02J:
		  • Two inaccessible filter plenums aligned.
		  • Plenum A:
		  • 0VA03CB - RUNNING.
		  • 0VA023Y - OPEN.
		  • 0VA436Y - CLOSED.
		  • Plenum C:
		  • 0VA03CF - RUNNING.
		  • 0VA072Y - OPEN.
		  • 0VA438Y - CLOSED.
		• Verify FHB ventilation aligned for emergency operation at 0PM02J:
		  • 0VA04CB - RUNNING.
		  • 0VA055Y - OPEN.
		  • 0VA062Y - OPEN.
		  • 0VA435Y - CLOSED.
		• Trip all running HD pumps.
		• Initiate periodic monitoring of Spent Fuel Cooling.
		• Notify US Attachment B complete/manual actions taken.

	ATC
	
	[CT-6]
		• Verify ECCS pumps running:
		  • CV pumps - NONE RUNNING.
		Manually start the 1B CV pump prior to completion of step 6 of 1BwEP-0. (Westinghouse – CT-6) (K/A number - 013000A4.01 importance 4.5/4.8)
		  • **Manually start the 1B CV pump.**
		  • Both RH pumps - RUNNING.
		  • Both SI pumps - RUNNING.

	ATC	• Verify RCFCs running in Accident Mode.
		  • Group 2 RCFC Accident Mode lights – 1A/1C lights NOT LIT.
		  • Stop 1A/1C high speed RCFCs.
		  • Close 1SX112A/114A.
		  • Open 1SX147A.
		  • Open 1SX016A/027A.
		  • Start 1A/1C low speed RCFCs.
		• Verify Phase A isolation.
		  • Group 3 Cnmt Isol monitor lights - LIT.
		• Verify Cnmt Vent isolation.
		  • Group 6 Cnmt Vent Isol monitor lights - LIT.
		• Verify AF system:
		  • BOTH AF pumps – RUNNING.
		  • AF isolation valves – 1AF013A-H OPEN (1AF013B/F may already be closed).
		  • AF flow control valves – 1AF005A-H THROTTLED OPEN (1AF005B/F may

Comments: _____

Scenario No:	**NRC 3**	Event No.	8, 9, 10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open / 1A CV pump trips / 1B CV pump fails to auto start / 1A/1C RCFC low speed auto-start failure		

Time	Position	Applicant's Actions or Behavior

		already be full open).
		• Verify CC pumps running:
		  • BOTH CC pumps – RUNNING.
		• Verify SX pumps running:
		  • BOTH SX pumps – RUNNING.

	ATC/ BOP	• Check if Main Steamlines should be isolated:
		  • Check SG pressures:
		  • SG pressures < 640 psig – verify MSIVs and MSIV bypass valves closed.
		  ○ SG pressures > 640 psig – continue in 1BwEP-0 (next step).
		  • CNMT pressure < 8.2 psig.

	BOP	• Check if CS is required. • CNMT pressure remained < 20 psig.

	BOP	• Verify total AF flow:
		  • AF flow > 500 gpm.
		  • Check S/G NR levels – NOT rising in an uncontrolled manner.

	ATC/ BOP	• Verify ECCS valve alignment:
		  • Group 2 Cold Leg Injection monitor lights required for injection – LIT.
		• Verify ECCS flow:
		  • High head SI flow >100 gpm (1FI-917).
		  • RCS pressure < 1700 psig.
		  • SI pump discharge flows > 200 gpm.
		  • RCS pressure > 325 psig.

	ATC	• Check PZR PORVs and spray valves:
		  • PORVs – BOTH CLOSED.
		  • PORV isolation valves – BOTH ENERGIZED.
		  • PORV relief paths – BOTH PORVs in AUTO, PORV isolation valves OPEN.
		  • Normal spray valves – CLOSED.

	ATC	• Check RCS temperatures:
		  ○ ANY RCP running.
		  • RCS Tave stable at or trending to 557°F - NO.
		  ○ Throttle AF flow.
		  ○ Isolate AF flow to 1B SG.
		  ○ NO RCPs running.
		  • RCS cold leg temperature stable at or trending to 557°F - NO.
		  ○ Throttle AF flow.
		  ○ Isolate AF flow to 1B SG.

Comments: _____

Scenario No:	**NRC 3**	Event No.	8, 9, 10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open / 1A CV pump trips / 1B CV pump fails to auto start / 1A/1C RCFC low speed auto-start failure		

Time	Position	Applicant's Actions or Behavior

	ATC	• Check status of RCPs:
		  • ALL RCPs - RUNNING.
		  • Check RCP trip criteria.
		  • Verify high head SI flow (1FI-917) > 100 gpm.
		  ○ RCS pressure > 1425 psig – continue in 1BwEP-0 (next step).
		  ○ RCS pressure < 1425 psig:
		  • Trip ALL RCPs.

	BOP	• Check if SG secondary pressure boundaries are intact:
		  • Check NO SG depressurizing uncontrollably or completely depressurized.
		  • 1B SG pressure dropping in an uncontrolled manner/completely depressurized.

	US	Transition to 1BwEP-2 "FAULTED STEAM GENERATOR ISOLATION."

Comments: _____

Scenario No:	**NRC 3**	Event No.	10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open		

Time	Position	Applicant's Actions or Behavior
	US	**1BwEP-2 "FAULTED STEAM GENERATOR ISOLATION"** • Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Direct operator actions of 1BwEP-2 "FAULTED STEAM GENERATOR ISOLATION" to establish the following conditions:
	BOP	• Check Main Steamline isolation: • ALL MSIVs and MSIV bypass valves closed.

	BOP	• Check if any SG secondary pressure boundaries is intact:
		  • 1A/1C/1D SG pressures stable.
		  • 1B SG pressure dropping in an uncontrolled manner/completely depressurized.
		• Identify faulted SG.
		  • 1B SG pressure dropping in an uncontrolled manner/completely depressurized.

	BOP **[CT-17]**	• Isolate faulted SG. **Isolate 1B Steam Generator prior to completing step 4 of 1BwEP-2.** **(Westinghouse – CT-17) (K/A number - APE040AA1.10 importance 4.1/4.1)** • **Close 1AF013B and 1AF013F.**

	BOP	Check FW to faulted SG isolated.
		  • Associated row on FW ISOLATION MONITOR LIGHTS panel - LIT for 1B SG (1PM04J).
		• Verify 1B SG PORV closed (failed 15% open, locally isolated).
		• Verify SG blowdown isol valves on faulted SG closed (1PM06J/11J).
		  • 1SD002E/F closed.
		• Verify SG blowdown sample isol valves on faulted SG closed (1PM06J/11J).
		  • 1SD005C closed.
		• Verify faulted SG MSIV and bypass valves closed (1PM06J).

	BOP	Check AF pump suction pressure at 1PM06J: • AF PUMP SX SUCT VLVS ARMED alarm (1-3-E7) – NOT LIT.
	BOP	Check secondary radiation. • Reset Phase A at 1PM06J. • Periodically sample all SGs for activity. • Open 1SD005A-D at 1PM11J.
	US	• Request Chemistry periodically sample all SGs for activity.

Comments: _____

Scenario No:	**NRC 3**	Event No.	10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open		

Time	Position	Applicant's Actions or Behavior

	BOP	• Check secondary radiation trends (PPC or RMS) - NORMAL FOR PLANT CONDITIONS.
		  • 1PR08J, SG Blowdown.
		  • 1PR27J, SJAE/GS Exhaust.
		  • 1AR022/23A-D, 1A-D Main Steam Lines.
		• Secondary activity samples normal (when available).

	CREW	• Check if ECCS flow should be reduced:
		  • RCS subcooling acceptable (Iconics or Attachment A).
		  • Secondary heat sink:
		  o Total FW flow to intact SGs > 500 gpm.
		  o NR level in at least 1 intact SG > 10%.
		  • RCS pressure stable or rising.
		  • PZR level > 14%.

	US	Transition to 1BwEP ES-1.1 "SI TERMINATION."
	US	**1BwEP ES-1.1 "SI TERMINATION"** • Notify SM of plant status and procedure entry. • Request SM evaluation of Emergency Plan conditions. • Enter 1BwEP ES-1.1 and direct operator actions of 1BwEP ES-1.1 to establish the following conditions:
	BOP	• Reset SI. • Depress both SI reset pushbuttons.
	ATC	• Verify SI ACTUATED light – NOT LIT. • Verify AUTO SI BLOCKED light – LIT.

	BOP	• Reset containment isolation.
		  • Phase A, if necessary.
		• Establish IA to containment.
		  • Check SACs – any running.
		  • Open 1IA065 & 1IA066.

	ATC	• Realign CV pumps. • Only ONE CV pump currently running.
	ATC	• Check RCS pressure stable or rising.

Comments: _____

Scenario No:	**NRC 3**	Event No.	10
Event Description:	1B MSIV closes causing 1B SG safety valves to stick open		

Time	Position	Applicant's Actions or Behavior

	BOP	• Terminate high-head ECCS.
		  • CV pump suction aligned to RWST.
		  • Reset SI recirc sump isol valves.
		  • 1SI8811A.
		  • 1SI8811B.

	ATC	• Reset CV pump miniflow isol valves.
		  • 1CV8114.
		  • 1CV8116.
		  • Verify CV pump miniflow isol valves open.
		  • 1CV8110.
		  • 1CV8111.
		  • 1CV8114.
		  • 1CV8116.
		  • Close CV pumps to cold legs injection isol valves.
		  • 1SI8801A.
		  • 1SI8801B.

	ATC	• Establish charging flow.
		  • Place 1CV182 controller at 0% demand.
		  • Open charging line cnmt isol valves.
		  • 1CV8105.
		  • 1CV8106.
		  • Establish desired charging flow using 1CV121 and 1CV182.
		  • Maintain RCP seal injection flow between 8-13 gpm per RCP.
		• Control charging flow to maintain PZR level stable.

		EXAMINER'S NOTE: At this point in the scenario, all Critical Tasks are complete and the scenario stop criteria has been reached, with Lead Examiner's concurrence, STOP the scenario.

(Final)

Comments: _____