Final Submittal

(Blue Paper)

1. As Given Simulator Scenario Operator Actions ES-D-2

VOGTLE EXAM 2002-301
50-424 AND 50-425

NOVEMBER 26, &
DECEMBER 2 - 13, 2002

Facility: VOGTLE Scenario No.: 1 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 95%. RCS boron concentration is at 1308 ppm, BOL conditions. B Train equipment in service.

Turnover:

1. _____Plant Startup is in progress.

2. _____Rx power is 95%.

3. _____ Train "A" MDAFW Pump is OOS due to mechanical seal failure. It has been OOS for 18 hours and is expected to return to service in 11 hours. (T.S. 3.7.5 Condition "B") LCO has been written.

4. _____The NCP has just been returned to service following maintenance PM's.

5. _____The Aux Bldg SO has been dispatched to the NCP and the pre-start checks have been performed. When you assume the shift the SS has directed the NCP be placed in service for engineering.

7. _____After the NCP has been placed in service you are to continue the power increase to 98% per 12004-C. (step 4.1.50) All prerequisites for the power increase were met on the previous shift. The Load Dispatcher has been notified of the power increase.

8. _____The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset by Chemistry.

9. _____ In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist (11889-C) has been completed in the last hour .

Event No.	Malf. No.	Event Type*	Event Description
1		N-RO	Place NCP in service
2		RO-R	Increase power to 98%
3	SG03a	BOP-I	SG Pressure Transmitter fails low
4a 4b 4c	EL13	SRO-C BOP-C RO-C	Loss of 120 VAC vital power 1AY1A (channel I instrumentation), (N41 failure, Steam Generator Control Instrument failure letdown isolation)
5	Panel Draw O/R	RO-C	Following the loss of power to 1AY1A CVCS letdown isolation valve 1LV-0459 will not reopen when normal letdown is being restored. The RO will be required to place CVCS excess letdown in service to allow control of Pressurizer level.
6	FW16	SRO-I RO-I BOP-I	Feedwater Heater 4 level transmitter failure & Feedwater Heater 5A Hi-Hi level ,loss of extraction steam (AOP 18016-C)
7	CO05b Cond Pump O/R AF03b	ALL-M	Condensate Pump "B" trips with the failure of Condensate Pump "C" to start. Crew enters AOP-18016-C; Rapid insertion of control rods, Borate as necessary . Operating Crew recognize the need to manually trip the Reactor due to the feedwater conditions. RO attempts to trip the Reactor- however it cannot be tripped from the Control Room.. Crew enters 19211-C start manual rod insertion, trip the Turbine, initiate emergency boration. Reactor is locally tripped and crew transition to 19000-C after completion of 19211-C. Upon entry into 19000-C the TDAFW pump will trip on overspeed and the Train "B" MDAFW pump will have a broken pump coupling resulting in a loss of heat sink. The Crew will enter 19231 to perform actions for recover of secondary heatsink, after progressing through the procedure the TDAFW Pump will be repaired and the plant will recover.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

PREINSERTS:

Initial Conditions:

- _____ Reset to IC #____ (NRC #1 snap)
- _____ Insure Information Board in Control Room is updated
- _____ Shift sign in and reactivity briefing sheets provided
- _____ RO & BOP Name plates on Panel D
- _____ Check EOP's, AOP's, UOP's, SOP's used in the last scenario clear of red marks
- _____ IPC is Mode 1
- _____ Check Control Rod Group Step Counters
- _____ Unit 2 supplying the Aux Steam Header
- _____ Correct AFD sheet is at the control board

Select to following QMCB positions:

- _____ Steam Seals System "Caution Tag" supplied from Aux Stm Hdr
- _____ Hotwell Makeup Controller "Caution Tag" in manual at 50%
- _____ Train "B" CCP in service
- _____ All Controlling channels selected to channel #1
- _____ All Train "B" Equipment Running
- _____ Align plant for operation with minor S/G tube leak per AOP-18009-C section "B"
- _____ Ensure all QPCP and QHVC recorders running in auto
- _____ Place Clearance Tag on Train "A" AFW Pump (PTL Position)
- _____ Place Clearance Tag on AFW Train "A" Discharge valves (Closed position) (1HS-5139A & 1HS-5137A)

Insert simulator malfunctions:

- _____ (Malfunction SG01e at 20%) 20 GPD tube leak on Steam Generator #1 malfunction (Let run for 11 minutes to stabilize)
- _____ (ES01) Failure of the Automatic Reactor Trip
- _____ (ES02) Failure of the Manual Reactor Trip
- _____ (RD07) Control Rods Fail to move in Automatic
- _____ (AF03b) Broken Pump coupling on Train "B" MDAFW Pump

Simulator Overrides & Remote Functions:

- _____ Condensate Pump "C" fails to start malfunction
  Panel Drawings-B1-AFW-Cond Pump "3"-STOP
- _____ Override Train "A" AFW Pump to off position
  Panel Drawing-B1-AFW-HS5131A-STOP
- _____ Override discharge Valves for Train "A" AFW Pump to shut position
  Remote Function (AF20, AF18 in LOCAL ; AF19, AF21 to 0%)
  Panel Drawings-B1-AFW-HS5131A-Green light-OFF
- _____ ALB50 (CR HI/LO ΔP)
  Panel Drawings-HV1-ALB50-CR Hi/Lo Diff Press-OFF
- _____ ALB20 (Turbine/Gen Trouble)
  Panel Drawings-B2-ALB20-E01-OFF
- _____ ALB62 (Gen Gas Non Sys Alarm)
  Panel Drawings-QPCP2-ALB62-F02-OFF
- _____ ALB36 (1ABB Trouble)
  Panel Drawing-EAB3-ALB36 C02-OFF

Op-Test No.: 1	Scenario No.: 1	Event No.: 1
Event Description:	**Swap CVCS Charging Pumps (Start NCP; Stop CCP "B")**	

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Gives direction for RO to start NCP and stop CCP "B" per SOP 13006-1
	RO	Actions: • Refers to SOP-13006-1 "Section 4.2.1" • Verifies Boron concentration in CCP "B" using control status board • Verifies 1HV-8110 OPEN • Places 1FIC-0121 in manual control • Starts NCP (1HS-0275) • Observe increase in charging flow • Stops CCP "B" (1HS-0274A) • Adjust RCP seal injection between 8-13 GPM • Returns CVCS System controls to automatic after conditions stabilize
	BOP	Actions: • Assists RO in Monitoring plant parameters during pump swap

Op-Test No.: 1	Scenario No.: 1	Event No.: 2

Event Description: **Increase Power to 98%**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Gives crew briefing on the power increase • Directs Operators to increase power to 98% • Refers to UOP 12004-C, Power Operation
	RO	Actions: • Commences dilution • Maintains rods above insertion limits • Maintains Tave within 2 deg Tref • Maintains AFD within target band
	BOP	Actions: • Loads Turbine per SOP.

Op-Test No.: 1	Scenario No.: 1	Event No.: 3
Event Description:	**Steam Generator #1 Controlling Pressure Channel Fails Low**	
Malfunction:	**SG03a at 0% (1PT-514) input upon Examiner CUE**	
Simulator Operator Notes:		

Op-Test No.: 1	Scenario No.: 1	Event No.: 3
Event Description:	**Steam Generator #1 Controlling Pressure Channel Fails Low**	

Time	Position	Applicant's Actions or Behavior
	BOP **Critical Task**	Actions: • Take manual control of Steam Generator #1 MFRV and MFP ΔP controllers to stabilize Steam Generator #1 level and match steam and feed flows. (Immediate Operator Action) • Maintain S/G #1 level between 60-70% NR • Swap controlling channel per USS direction Take 1FS-512C from the 512 position to 513 position • Returns the Feedwater System to automatic
	SRO	Actions: • Enter **AOP-18001-C Section "F"** for failed Steam Generator Pressure channel. • Direct (BOP) to select unaffected controlling channel per Table F2 Take 1FS-512C from the 512 position to 513 position • Return MFRV and MFPs to auto • Notify Operations duty manager • Have Maintenance Work order written • Refer to Technical Specifications ◦ 3.3.2 (SI) Functional Unit 1.e condition D Place channel in trip condition within 72 hours ◦ 3.3.2 (SLI) Functional Unit 4.d(1) condition D Place channel in trip condition within 72 hours ◦ 3.3.4 (Remote S/D) Functional Unit 13 Condition A Restore to operable status within 30 days

Op-Test No.: 1	Scenario No.: 1	Event No.: 4
Event Description:	**Loss of vital AC Bus 1AY1A**	
Simulator operator CUE:	**When SO or maintenance is dispatched report back, 1AY1A normal incoming breaker (02) is tripped and the flag for the ground relay is actuated. Maintenance recommends 1AY1A be inspected because they are unsure where the fault originated.**	
Malfunction:	**EL13A on Examiner CUE**	
Simulator operator:	**Override 1LV-459 CLOSED following the loss of power to 1AY1A to force operating crew to place CVCS Excess Letdown in service.** • **Panel Drawing-A2-LTD-HS459-CLOSED**	

Time	Position	Applicant's Actions or Behavior

	RO/BOP	Actions:
		• Identify loss of 1AY1A.
		  • ARP on electrical panel (RO/BOP)
		  • Recognize failed channel 1 instruments. (RO/BOP)

	18032-C Actions	• Manually Control Steam Generator Levels and MFP speed (RO/BOP) • Swap Steam Generator Controlling channels per USS direction (RO/BOP) • Return Steam Generator Level Control to automatic when conditions are stabilized (RO/BOP) • Recognize CVCS letdown has isolated. (RO/BOP) • Select Non affected controlling channel per USS direction for Pressurizer level control (RO/BOP) • Recognize Train A pressure instrument failure 1-PT-455. (RO/BOP)

Op-Test No.: 1	Scenario No.: 1	Event No.: 4
Event Description:	**Loss of vital AC Bus 1AY1A**	

	RO/BOP **18001-C Section C Actions**	Actions: (PT-455) • Sprays in manual control (RO/BOP) • 1HS-455A in close (RO/BOP) • Operate heaters and spray to maintain Pressurizer pressure between 2220-2250 psig.(RO/BOP) • 1PIC-455A in manual at 25% demand (RO/BOP) • Swap controlling channels(457/456). (RO/BOP) • Return control system to automatic.(RO/BOP) • Place recorder 1PS-455G to channel 457 position (RO/BOP • Verify P-11 status light (RO/BOP)
	18032-C Actions	• Defeat failed channel for Tavg and ΔT as directed by the USS (RO) • When RO attempts to restore Normal CVCS letdown flow 1LV-0459 will not reopen, **refer to event 5 for actions relate to this failure.**
	→	**Return Point following Actions of 18007-C to place excess letdown in service**
	18001-C Section H Actions	Actions (PT-505) • Block Channel 1 rod stop (RO/BOP) • Place Steam Dumps in "Steam Pressure Mode" per USS direction (RO/BOP) (may reference 13601-1) • Verify P-13 BPLP Status light per USS direction (RO/BOP)
	Next Event	**Option for Examiner to move on**
	18032-C Actions	• Maintain Stable Plant Conditions (RO/BOP) • RCS Temperature • Pressurizer Level • Pressurizer pressure • S/G levels

Op-Test No.: 1	Scenario No.: 1	Event No.: 4
Event Description:	**Loss of vital AC Bus 1AY1A**	

	RO/BOP	• Verify NI-41 Interlocks per Tech Spec required actions for T.S.3.3.1-1 Functions (16)a,b,c,d,e,f and 3.3.2-1 function 8b All are 1 hour actions
		• Dispatch Control Building SO and Maintenance to investigate problem (SRO/RO/BOP)
		• Shutdown any standby CCW, NSCW or ACCW pump that automatically started due to the power loss per USS direction (RO/BOP)
		• Block failed NI channel.
		  • Rod stop bypass for failed channel (RO/BOP)
		  • Comparator channel defeat for failed channel (RO/BOP)
		  • Power mismatch bypass for failed channel (RO/BOP)
		  • Upper section for failed channel (RO/BOP)
		  • Lower section for failed channel (RO/BOP)

	SRO	Actions:
		• Enter **AOP 18032-C Section "A"** "Loss of vital instrument panel 1AY1A".
		  • Direct manual control of S/G levels
		  • Direct BOP is selecting unaffected controlling channel for S/G level control
		  • Direct BOP to return S/G level control to automatic
		  Attachment A Table 1
		• Enter **AOP 18001-C Section "C"** "Due to 1PI-455 controlling channel failing low on the power loss".
		  • Direct RO to verify RCS pressure stable or rising
		  • Direct RO to place sprays in manual control

Op-Test No.: 1	Scenario No.: 1	Event No.: 4
Event Description:	**Loss of vital AC Bus 1AY1A**	

	SRO	• Direct RO to place 1HS-455A in close • Direct RO to control operate heaters and spray to maintain Pressurizer pressure between 2220-2250 psig. • Direct RO to place 1PIC-455A in manual at 25% demand • Direct RO to swap controlling channels(457/456). • Direct RO to return control system to automatic Sprays, Heaters, PORV • Check P-11 status light (I hour Tech Spec Action) NOT illuminated is correct indication Return to **AOP 18032-C Section "A"** "Loss of vital instrument panel 1AY1A". • Dispatch operator/maintenance to investigate 120 VAC instrument panel 1AY1A power loss. (Do Not Restore Power until maintenance has investigated cause of the power loss) • Direct RO to defeat Failed loop 1 Tavg and ΔT. • Direct RO to restore CVCS letdown flow to service per SOP-13006-1 When RO attempts to restore Normal CVCS letdown flow 1LV-0459 will not reopen, **refer to event 5 for actions relate to this failure.** **Return Point following Actions of 18007-C to place excess letdown in service** • Enter **AOP 18001-C "Section H"** due to 1PT-505 failure. • Direct BOP to Block Channel 1 rod stop

Op-Test No.: 1	Scenario No.: 1	Event No.: 4
Event Description:	**Loss of vital AC Bus 1AY1A**	

	SRO	• Direct BOP to place Steam Dumps in "Steam Pressure Mode" (may reference 13601-1) • Verify P-13 BPLP Status light per USS direction
	Next Event	**Option for Examiner to move on** ←
		• Verify TS interlocks. • Tech Spec 3.3.1-1 functions 16a,b,c,d,e, and 3.3.2-1 function 8b. (1 hour Tech Spec Actions)
		• Enter **AOP-18002-C** for failed NI. • Direct BOP to block failed NI channel.
		• Notify Operations duty manager.
		• Have Maintenance Work order written.

		• Refer to Technical Specifications.
		  • Apply TS 3.8.7 Condition A
		  Restore Inverter to service within 24 hours or shutdown required, mode 3 in 6 hours, mode 5 in 36 hours
		  • Apply TS 3.8.9 Condition B
		  Restore power to 1AY1A within 2 hours or shutdown required, mode 3 in 6 hours, mode 5 in 36 hours

Op-Test No.: 1	Scenario No.: 1	Event No.: 5
Event Description:	**Following the loss of power to 1AY1A 1LV-459 will not reopen when the RO is restoring CVCS normal letdown flow. This will require the RO to place Excess Letdown flow in service to control Pressurizer level.**	
Malfunction:	**Panel Drawing-A2-LTD-HS459-CLOSED**	
Simulator Operator:	**Override 1LV-0459 closed following the loss of power to 1AY1A.**	

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 1 Event No.: 5

Event Description: **Following the loss of power to 1AY1A 1LV-459 will not reopen when the RO is restoring CVCS normal letdown flow. This will require the RO to place Excess Letdown flow in service to control Pressurizer level.**

Time	Position	Applicant's Actions or Behavior
	RO	Actions: • Ro will attempt to place normal letdown flow in service using SOP 13006-1 • Recognizes the 1LV-0459 will not reopen. • Refers to SOP-13008-1 to place Excess Letdown in service "Section 4.1" • Notes maximum reactor power with excess letdown in service is limited to 3562 Mwt • Verifies 1HV-8098 Closed • Verifies 1HIC-0123 Closed • Verifies 1HV-8100 & 1HV-8112 Open • Verifies 1HV-8143 is in the VCT Position • Open 1HV-8153 • Open 1HV-8154 • Notes indication on 1PI-0124 & 1TI-0122 on main control board • Slowly raises Excess flow while monitoring temperature and pressure rise on indication. • Limits pressure rise to 50 pisg (added to pressure noted when • 1HV-8153 & 1HV-8154 were opened) • Limits temperature to 165 F

Op-Test No.: 1	Scenario No.: 1	Event No.: 5
Event Description:	**Following the loss of power to 1AY1A 1LV-459 will not reopen when the RO is restoring CVCS normal letdown flow. This will require the RO to place Excess Letdown flow in service to control Pressurizer level.**	

	RO	• Lowers Pressurizer level to normal (requires RO to lower total charging flow to minimum) **Return to event 4 at arrow marking spot.**
	SRO	Actions: • Refers to **AOP 18007-C Section "A"** and directs crew operations • Directs RO to isolate normal letdown flow path when 1LV-0459 fails to open • Directs RO to lower charging flow • Notifies Chemistry Department of CVCS Letdown isolation • Directs (RO) to place excess letdown flow in service • Directs RO to restore Pressurizer level to normal • Initiate maintenance. • Notify Operations duty manager. • Have Maintenance Work Order written. **Return to event 4 at arrow marking spot.**

Op-Test No.: 1	Scenario No.: 1	Event No.: 6
Event Description:	**Loss Of Feedwater Heaters results in Reactor Power increase**	
Malfunction:	**FW16A on Examiner CUE**	
Simulator Operator:	**Override 1HS4302A Feedwater Heater 5A Extraction Steam Stop Valve to the closed position** **Panel Drawing-B2-TUR-HS4302A-CLOSED (5A)** **Panel Drawing-B2-TUR-HS4343A-CLOSED (4A)**	

Simulator Operator Notes:

Op-Test No.: 1	Scenario No.: 1	Event No.: 6
Event Description:	**Loss Of Feedwater Heaters results in Reactor Power increase**	

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Actions: • Reference annunicators received of feedwater heater #4A • Recognizes Reactor Power is increasing due to the lower main feedwater temperature (RO/BOP) • Manual Control rod insertion to lower Reactor Power below 100% as required (RO/BOP) • Lower Main Turbine Load to maintain Reactor Power below 100% (RO/BOP) • Restore Tavg to program. (RO/BOP) • Verify plant parameters are within normal operating range ; Pressurizer Level / Pressure, Steam Generator Levels.
	SRO	Actions: • Refers to **AOP 18016-C Section "C"** and directs crew operations • Directs (RO/BOP) to maintain Reactor Power below 100% by all indications • Determine that power reduction is required due to the loss of feedwater heating • Initiate maintenance. • Notify Operations duty manager. • Have Maintenance Work Order written.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7
Event Description:	**Condendate pump "B" will trips and pump "C" fails to start automatically or manually.**	
Malfunction:	**CO05b on Examiner CUE**	
Simulator Operator:	**Insure malfunctions are in place to prevent automatic, manual reactor trip & automatic rod movement**	

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 1 Event No.: 7

Event Description: **Condendate pump "B" will trips and pump "C" fails to start automatically or manually.**

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Actions: • Recognizes Condensate Pump "B" has tripped and the standby Condensate Pump "C" has failed to start. (RO/BOP) • Attempts to manually start Condensate Pump "C" (RO/BOP) • Recognizes that Condensate Pump "C" failing to start will require a manual reactor trip due lowering S/G levels. (RO/BOP) • Informs the USS of the problem
	SRO	Actions: • Refers to **AOP 18016-C Section "C"** and directs crew operations • Direct RO to start Condensate Pump "C" • Recognizes due to lowering S/G levels the reactor should be manually tripped • Directs RO to manually trip the reactor

Op-Test No.: 1 Scenario No.: 1 Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

Simulator Operator: **Allow crew to progress past step 7 in 19211-C and if a reasonable amount of time has elapsed, insert Reactor trip.**

- **Remove malfunction (ES01) Failure of the Automatic Reactor Trip.**
- **TDAFW Pump trips on overspeed (AF02C)**
- **Remove (AF02C) following TDAFW evaluation to allow operation.**
- **Remote Function (AF22) will be used to reset the T&TV.**

Cue: **Time Dispatched_____**
Report Back_____

- **The Train "B" MDAFW pump motor is running but the pump coupling is broken.**
- **Maintenance engineering report the TDAFW Pump tripped due to a slug of water in the steam line and can be operated after reset.**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 1 Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

Time	Position	Applicant's Actions or Behavior
	RO/BOP	**Entrance into 19211-C - Critical Task** Actions: (19211-C) • Attempt to manually trip the Reactor using BOTH Control Room Handswitches (RO/BOP) • Dispatches the Control Building SO to Locally Manually trip the Unit 1 Reactor (USS/RO/BOP) • Manually insert Control Rods (RO/BOP) Note: When the (RO/BOP) places the Rod Control System in Automatic they must recognize the failure of the system to automatically insert the Control Rods and return to manual insertion • Manually Trip the Main Turbine (RO/BOP) • Verify/Start AFW System (RO/BOP) • Identify that Reactor Power is >5% (RO/SRO) • Initiate Emergency Boration (RO/BOP) • Align CVI per USS direction (RO/BOP) • Dispatch Auxiliary Building SO to locally shut 1-1208-U4-183 (USS/RO/BOP) • Verify Core Exit TC's less than 1200 degrees F.(RO/BOP) • Perform first 16 steps of 19000-C as time permits if Safety Injection is automatically actuated (RO/BOP) Actions: (19000-C) (RO/BOP) will be required to manually align "A" train components due to the loss of 1AY1A) Following the Reactor trip and completion of 19211-C the crew will transition back to 19000-C.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	RO/BOP **E-0** **19000-C** **Actions**	• Verify Rx Trip (RO/BOP) • Verify turbine trip. (RO/BOP) • Verify power to AC emergency busses. (RO/BOP) • Check if SI Actuated. (RO/BOP) • Verify Feedwater isolation. (RO/BOP) • Verify MLB indications for both trains of ECCS equipment aligning for injection phase. (RO/BOP) • Verify containment isolation Phase A actuated. (RO/BOP) • MDAFW Pumps running. (NOTE: operator should recognize the MADFW Pump "B" has no discharge pressure and dispatch an operator to check locally) (RO/BOP) • SG blowdown isolated (RO/BOP)
	19231-C **Actions**	Actions: (19231-C) • Verifies RCS pressure >350 and RHR flow <500 (RO/BOP) • Check CCP status (RO/BOP) No CCP requires feed & bleed • Check RCS pressure <2335 psig (RO/BOP) Pressure >2335 due to loss of heat sink requires feed & bleed • Check S/G levels (RO/BOP) Any 3 S/G levels <29% requires feed & bleed

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	RO/BOP
	
	Feed & Bleed Actions
		Path #1 if any of the conditons above are satisfied then feed & bleed criteria will be required go to step 11 and:
		
		• Stop All RCPs (RO/BOP)
		
		• Manually actuate SI (RO/BOP)
		
		• Verify feed path (RO/BOP)
		  • CCP at least 1 running
		  OR
		  • SI pump at least 1 running
		  • Verify ECCS valve alignment using MLBs
		
		• Establish bleed path (RO/BOP)
		  • Turn off Pressurizer heaters
		  • ARM both trains of COPs
		  • Open both Pressurizer PORVs
		
		Planned End Point for feed & bleed
		
		Path #2 if TDAFW pump is returned to service prior to meeting feed & bleed criteria:
		
		• Try to establish AFW flow (RO/BOP)(Check alignment)
		  • SGBD valves shut (RO/BOP)
		  • S/G sample valves shut (RO/BOP)
		  • Check suction to AFW pumps (RO/BOP)
		  • Check AFW discharge throttle valve open (RO/BOP)
		
		• Check TDAFW Pump:
		
		  • 1HV-5106 open (RO/BOP)
		  • 1PV-15129 is Closed (due to the overspeed)
		  • Governor Valve operating properly.
		
		• The (RO/BOP) directs the Outside Building SO to locally reset the T&TV when ready

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	RO/BOP	• Trips RCPs (RO/BOP) • Starts TDAFW Pump (RO/BOP) • PLACE TDAFW Pump Steam Admission Valve 1-HV-5106 Handswitch 1-HS-5106A to CLOSE and HOLD (BOP) • PLACE Handswitch 1-HS-15111 to OPEN, then RELEASE (RO/BOP) • When Trip and Throttle Valve 1-PV-15129 is full open, RELEASE Handswitch 1-HS-5106A (RO/BOP) • Establish >570 gpm AFW flow (RO/BOP) • Transition to 19000-C **Planned End Point if AFW flow is established**

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	SRO	Actions: • Directs/Insures the RO has manually tripped the Reactor Using BOTH Control Room Handswitch.
	S.1	• Enters **19211-C** (ATWT). • Directs/Insures the BOP has manually tripped the Main Turbine • Ensures the Control Building Operator Has been dispatched to locally manually trip the Unit 1 Reactor. • Insure AFW in service • Direct the (RO/BOP) to initiate Emergency Boration • Direct BOP to align CVI • Direct isolation of dilution paths • Directs RO to check Reactor Power <5%
	E-0	Actions: **(19000-C)** • Following the Reactor trip and completion of 19211-C the crew will transition back to 19000-C. • Directs RO to Verify Rx Trip • Directs BOP Verify turbine trip. • Directs BOP Verify power to AC emergency busses. • Directs RO Check if SI Actuated.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	SRO	• Directs BOP verify Feedwater isolation. • Verify MLB indications for both trains of ECCS equipment aligning for injection phase. **NOTE: The USS must have the RO/BOP manually align Train "A" equipment due to the power loss on 1AY1A.** • Direct RO to verify proper CIA • Directs BOP to verify MDAFW Pumps running. • Directs BOP to verify SG blowdown isolated
	H-1	Actions: **(19231-C)** • Verifies RCS pressure >350 and RHR flow <500 (RO/BOP) • Check CCP status (RO/BOP) No CCP requires feed & bleed • Check RCS pressure <2335 psig (RO/BOP) Pressure >2335 due to loss of heat sink requires feed & bleed • Check S/G levels (RO/BOP) Any 3 S/G levels <29% requires feed & bleed **Path #1 if any of the conditons above are satisfied then feed & bleed criteria will be required go to step 11 and:** • Stop All RCPs (RO/BOP) • Manually actuate SI (RO/BOP) • Verify feed path (RO/BOP) • CCP at least 1 running OR • SI pump at least 1 running • Verify ECCS valve alignment using MLBs

Op-Test No.: 1	Scenario No.: 1	Event No.: 7

Event Description **Condensate pump "B" will trip with the failure of Condensate pump "C" to start automatically or manually. This will require to operating crew to manually trip the Reactor, it will fail to trip. The crew will enter 9211-C (ATWT) for required actions to shutdown the plant. Following the Reactor trip the crew will transition to back to 19000-C at which time the TDAFW Pump will trip on overspeed (MDAFW Pump "B" will be running with a broken pump coupling).**

	SRO	• Establish bleed path (RO/BOP)
		  • Turn off Pressurizer heaters
		  • ARM both trains of COPs
		  • Open both Pressurizer PORVs
		
		(Planned End Point for feed & bleed)
		
		• Try to establish AFW flow (BOP)(Check alignment)
		
		• Direct the Outside Operator to reset the T&TV when conditions allow
		
		• When >570 GPM AFW is established transition to 19000-C
		
		(Planned End Point if AFW flow is established)
		
		Examiner: Have the SRO (USS) classify the event. The answer key for event classification is on page 29.

Classify the Event answer:

Red path on heat sink is a potential loss of both the clad & RCS barrier which is a SITE AREA EMERGENCY.

Initial Conditions: The plant is at 95%. RCS boron concentration is at 1308 ppm, BOL conditions. B Train equipment in service.

Turnover:

1. Plant Startup is in progress.
2. Rx power is 95%.
3. Train "A" MDAFW Pump is OOS due to mechanical seal failure. It has been OOS for 18 hours and is expected to return to service in 11 hours. (T.S. 3.7.5 Condition "B") LCO has been written.
4. The NCP has just been returned to service following maintenance PM's.
5. The Aux Bldg SO has been dispatched to the NCP and the pre-start checks have been performed. When you assume the shift the SS has directed the NCP be placed in service for engineering.
6. After the NCP has been placed in service you are to continue the power increase to 98% per 12004-C. (step 4.1.50) All prerequisites for the power increase were met on the previous shift. The Load Dispatcher has been notified of the power increase.
7. The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset by Chemistry.
8. In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist (11889-C) has been completed in the last hour .

Facility: VOGTLE Scenario No.: 2 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 45% ramping to 100% at 8%/hr. RCS boron concentration is at 363 ppm, EOL conditions. After shift turnover have the **RO** complete the "B" MFP startup. All activities have been completed in SOP-13615-1 up to step 4.1.4.20. **"A"** Train equipment in service. CCW train B in PTL.

Turnover:

1. _____Plant Startup is in progress.
2. _____Rx power is 45%.
3. _____1PV-0456 is in the shut position due to seat leakage.
4. _____1HV-8000B is shut to comply with Technical Specification 3.4.11 Condition "A".
5. _____ CCW train B pumps in PTL, clearance has just been released. Functional testing scheduled approximately 2 hours from now for response time testing. Tech Spec action of 3.7.7 have been completed.
6. _____ SGBD is OOS due to HIGH failure on 1RE-021. Will be returned to service of the next shift.
7. _____The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.
8. _____ In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.

Event No.	Malf. No.	Event Type*	Event Description
1		N-RO	Place the "B" Main Feedwater Pump in service
2	PR-02A 100% PR-05 5%	RO-I	PRZR pressure channel fails high PORV-455A fails partially open on transient
3	CC01A O/R pmp5	BOP-C	Loss of CCW train B
4	FW14 0%	BOP-I	MFP discharge pressure fails low
5	CV07	RO-C	NCP trips
6	RP06A 15%	ALL-R	RCP #1 seal #1 failure (5.2 gpm) mgmt says S/D in 30 min SRO directs rapid power reduction per 18013-C
7		RO-N	Operating Crew reduces power to be in mode 3 within 1 hour
8	RP06a 100% RC05a 1.5% MS01 100% ES19B SI06a	M-ALL	RCP seal LOCA B train CVI failure SIP-1A fails to start PV-507C fails open (steam Dump) Stop scenario when 19012-C is entered

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

PREINSERTS:

Initial Conditions:

- _____ Reset to IC #__ (NRC #2 snap)
- _____ Insure Information Board in Control Room is updated
- _____ Shift sign in and reactivity briefing sheets provided
- _____ RO & BOP Name plates on Panel D
- _____ Check EOP's, AOP's, UOP's, SOP's used in the last scenario clear of red marks
- _____ IPC is Mode 1
- _____ Check Control Rod Group Step Counters
- _____ Unit 2 supplying the Aux Steam Header
- _____ MFP "B" running on GE pot
- _____ Start second condensate pump
- _____ Ensure C-7 is reset

Select to following QMCB positions:

- _____ 1PV-0456 in shut position with "Caution Tag"
- _____ 1HV-8000B in shut position with "Caution Tag"
- _____ Steam Seals System "Caution Tag" supplied from Aux Stm Hdr
- _____ Hotwell Makeup Controller "Caution Tag" in manual at 50%
- _____ All Controlling channels selected to channel #1
- _____ All Train "A" Equipment Running
- _____ Align plant for operation with minor S/G tube leak per AOP-18009-C section "B"
- _____ Ensure all QPCP and QHVC recorders running in aut

Insert simulator malfunctions:

- _____ (Malfunction SG01E at 20%) 20 GPD tube leak on Steam Generator #1
- _____ (ES19B) CVI Train "B" failure
- _____ (SI06A) SI Pump "A" fails to automatically start on the SI signal
- _____ (RM05G) 1RE-021 failed high causing SGBD to isolate

Simulator Overrides & Remote Functions:

- _____ CCW pump #5 – STOP
  Panel Drawings-AL-CCW-HS1856A-STOP
- _____ ALB50 (CR HI/LO ΔP)
  Panel Drawings-HV1-ALB50-CR Hi/Lo Diff Press-OFF
- _____ ALB20 (Turbine/Gen Trouble)
  Panel Drawings-B2-ALB20-E01-OFF
- _____ ALB62 (Gen Gas Non Sys Alarm)
  Panel Drawings-QPCP2-ALB62-F02-OFF

Op-Test No.: 1 Scenario No.: 2 Event No.: 1

Event Description: **Complete the actions using SOP-13615-1 for placing the "B" Main Feedwater Pump in service**

Time	Position	Applicant's Actions or Behavior
	RO	Actions: SOP 13615-1 Section 4.1.4 selected: • Open 1HV-5209 "B" MFP discharge valve • Verify 1HS-5208 & 1HS5209 are in automatic • Verify MFPT-B TURNING GEAR MOTOR, 1-HS-3164, is in the AUTO/PULL-TO-LOCK position • 1-SIC-0509C, in MAN and set to minimum speed TRANSFER Pump Speed Control to 1-SIC-0509C as follows: a. MONITOR MFPT-B AUTO/MAN Transfer Deviation, 1-SI-3154. b. Slowly ADJUST Motor Speed Changer potentiometer, 1-SC-3152 to obtain zero deviation on 1-SI-3154. c. TRANSFER control by placing MFPT-B Motor Speed Changer, 1-HS-3152, to AUTO. • Verify MFP-A is in AUTO. • OBSERVE the "A" Main Feed Pump's speed and feed water flow rate to verify load sharing while performing the following: (1) Slowly ADJUST MFPT-B Speed controller, 1-SIC-0509C, output to match Master MFPT Speed controller, 1-SIC-0509A, output. (2) PLACE MFPT-B Speed controller, 1-SIC-0509C, in AUTO.

Op-Test No.: 1	Scenario No.: 2	Event No.: 2

Event Description:	**PRZR pressure PT-455 fails high and PORV 455A fails partially open. Also PORV 455A block valve will not automatically close on the 2185 pressure interlock.**
Malfunctions:	**PR02A @ 100%, PR05 @ 10% on Examiner CUE Override block valve 1HV-8000A open remove override when RO places the handswitch to close.**
Simulator operator :	**(Remote Function) PR03 When requested to remove power from 1HV8000A**

Simualtor Operator Notes:

Op-Test No.: 1	Scenario No.: 2	Event No.: 2

Event Description: **PRZR pressure PT-455 fails high and PORV 455A fails partially open. Also PORV 455A block valve will not automatically close on the 2185 pressure interlock.**

	RO	Actions: Immediate actions: • Close Spray valves • Close PORV-455A • Energize PZR Heaters • Control Pressurizer pressure between 2220-2250 psig • Master Controller placed in manual @ 25% • Select 457/456 for control • Return heaters, spray valves, and PORV, master controller to AUTO • Select unaffected channel for panel recorder (457) • Verify P-11 in proper state for plant conditions (1 hr LCO action)
	PORV 455 Fails **Critical Task**	Actions: (PORV-455A failing to fully shut) • Observes dual indication for PORV-455A • Shuts PORV Block Valve 1HV-8000A
	SRO	Actions: 18001-C Section C referenced (PT-455 failure) • Directs RO to close spray valves, PORV-455A, Energize Heaters • Directs RO to Master Controller placed in manual @ 25% • Directs RO to select 457/456 as controlling channels

Op-Test No.: 1	Scenario No.: 2	Event No.: 2

Event Description: **PRZR pressure PT-455 fails high and PORV 455A fails partially open. Also PORV 455A block valve will not automatically close on the 2185 pressure interlock.**

		• Directs RO to return heaters, spray valves, and PORV-455A to automatic • Directs RO to verify P-11 BPLP (1 hour action)
	PORV 455 Fails **Critical Task**	Actions: (PORV-455A failing to fully shut) • Directs RO the close PORV-455A • Directs RO to close PORV-455A block valve 1HV-8000A
	Tech Spec Actions	Notifies duty manager of AOP entry Contacts maintenance to initiate repairs Refers to Tech Specs: • LCO 3.3.1 Functional Unit 6 - Condition E Place channel in trip within 72 hours Functional Unit 8a - Condition M Place channel in trip within 72 hours Functional Unit 8b - Condition E Place channel in trip within 72 hours • LCO 3.3.2 Functional Unit 1d - Condition D Place channel in trip within 72 hours Functional Unit 8b – Condition L Verify P-11 BPLP status within 1 hour • LCO 3.4.11 Condition B Close block valve and remove power within 1 hour • Request SSS to remove power from 1HV-8000A

Op-Test No.: 1 Scenario No.: 2 Event No.: 3

Event Description: ***Loss of CCW train B (pump 1 trips, pump 5 fails to start)***

Malfunction: **CC01A on Examiner Cue**

Simulator Operator CUE: Report Back when dispatched to CCW Pump #1:

Time Called: _____
Report back time: _____

Control Building SO and Maintenance: Phase A,B,C (150 device) Overcurrent Flags are present and the 186 lockout is tripped for CCW Pump #1.

Auxiliary Building SO: There are no obvious problems noted locally at the CCW Pump #1

Simulator Operator CUE: Report Back when dispatched to CCW Pump #5:

Control Building SO and Maintenance: The Breaker to CCW Pump #5 appears to not be racked in completely and the racking mechanism may be damaged.

Simulator Operator Notes:

Op-Test No.: 1	Scenario No.: 2	Event No.: 3
Event Description: ***Loss of CCW train B (pump 1 trips, pump 5 fails to start)***		
	BOP	Actions: • Diagnose only CCW pump #3 is running • Attempt manual start of pump #5 • Stop CCW train A • Place CCW train B in service using SOP-13715-C • Verifies NSCW operation • Dispatch SO to place SFPC train B in service • Dispatch SO to investigate CCW pumps/breakers
	SRO	Actions: • Enters 18020-C Loss of CCW • Directs RO to manually start CCW Pump #5 • Directs RO to stop CCW Pump #3 • Directs RO to place Train "B" CCW in service • Notifies duty manager of AOP entry • Contacts maintenance to initiate repairs • Tech Spec: • LCO 3.7.7 condition B (72 hour shutdown)

Op-Test No.: 1 Scenario No.: 2 Event No.: 4	
Event Description:	**MFP Discharge pressure indication (PT-508) fails low on Examiner CUE**
Malfunction:	**FW14 @ 0% (set ramp time at 11 seconds) on Eximiner Cue**
Simulator Operator Notes:	

Op-Test No.: 1	Scenario No.: 2	Event No.: 4
Event Description: **MFP Discharge pressure indication (PT-508) fails low on Examiner CUE**		
	BOP	Actions: • Diagnose PT-508 failed low • Verify MFPs operating "adjust speed as required to maintain S/G levels using 1SIC-507A/B/C • Restore Tavg to program **(RO/BOP)** • Take manual control of MFP master controller • Match steam and feed flows on all 4 SGs • Verify Pressurizer pressure and level trending on program **(RO/BOP)** • Check all feedwater heaters extraction valves open • Operate Main Feedwater Pump ΔP in manual
	SRO	Actions: • Reference 18016-C section "A" • Verifies BOP is takes manual control of MFP master controller • Directs BOP to adjust MFP speed as required to maintain S/G levels using 1SIC-507A/B/C • Directs operators to restore Tavg to program • Verifies BOP controlling S/G levels within normal bands • Has the BOP maintain manual control of the MFP until repaired • Direscts operators to verify Pressurizer pressure and level trending on program • Notifies duty manager of AOP entry • Contacts maintenance to initiate repairs

Op-Test No.: 1	Scenario No.: 2	Event No.: 4
Event Description: **MFP Discharge pressure indication (PT-508) fails low on Examiner CUE**		
	SRO	• Inform BOP of responsibilities regarding manual control of Main Feedwater Pump ΔP

Op-Test No.: 1 Scenario No.: 2 Event No.: 5

Event Description: **NCP Trips**

Malfunction: **CV07 on Examiner Cue**

Simulator Operator CUE: Report Back when dispatched to NCP

Time Called: _____
Report back _____

Auxiliary Building SO and Maintenance: The NCP Pump appears to be OK. Maintenance suspects a faulty relay caused the problem.

Simulator Operator Notes:

Op-Test No.: 1	Scenario No.: 2	Event No.: 5
Event Description:	**NCP Trips**	

RO

Actions:

- Isolate CVCS letdown (Due to flashing in letdown line)
- Verify Charging Pump lineup
  - OPEN 1-HV-8471A (1-HV-8471B) CCP-A(B) SUCTION
  - OPEN 1-HV-8111A (1-HV-8111B) CCP-A(B) MINIFLOW,
  - OPEN 1-HV-8110 CCP A & B COMMON MINIFLOW,
  - CLOSE 1-HV-0190A (1-HV-0190B) CHARGING THROTTLE,
  - OPEN 1-HV-8485A (1-HV-8485B) CCP-A(B) DISCHARGE ISOLATION,
  - If starting CCP-B, OPEN 1-HV-8438 CCP DISCHARGE HEADER CROSS-CONNECT
  - SET 1-HIC-182 for MAXIMUM Seal Flow (0% demand).
  - ENSURE 1-FIC-0121 CHARGING FLOW in MAN and SET to minimum
  - ENSURE 1-LI-0185 VCT level indicates between 30 and 80%.
- Dispatch SO to investigate NCP and perform CCP prestart checks
- Start CCP 1A or 1B
- Raise charging to 80-90 GPM
- RCP seal injection flow 8-13 GPM/pump
- Go to section 4.4.2 to restore letdown flow
  - CLOSE 1-HV-8149A, 1-HV-8149B, and 1-HV-8149C LETDOWN ORIFICE 45 & 75 gpm,
  - CLOSE 1-LV-0460 AND 1-LV-0459 LETDOWN ISOLATION VLV UPSTREAM and DOWNSTREAM
  - CLOSE 1-HV-8145 PZR AUX SPRAY VALVE,
  - OPEN 1-HV-15214 CVCS LETDOWN PIPE BREAK PROT ISOLATION
  - OPEN 1-HV-8160 RCS LETDOWN LINE ISO VLV IRC,

Op-Test No.: 1	Scenario No.: 2	Event No.: 5
Event Description:	**NCP Trips**	

	RO	• OPEN 1-HV-8152 RCS LETDOWN LINE ISO VLV ORC • 1-PIC-0131 LETDOWN PRESS in MANUAL and output adjusted to 50% to 75%, • 1-TIC-0130 LETDOWN HX OUTLET TEMP in • MANUAL and output adjusted to 50%, • 1-LR-0459 PRESSURIZER LEVEL greater than 17%, • OPEN one of the following • 1HV-8146 or 1HV-8147 • OPEN 1-HV-8106 and 1-HV-8105 CHARGING TO RCS ISOLATIONs • Adjust charging flow to between 80-90 gpm • Maintain RCP seal flow between 8-13 gpm • Open 1LV-459 & 1LV-460 • Open 75 gpm orifice isolation valve • When 1-PI-0131A LETDOWN PRESS stabilizes between 360 and 380 psig, PLACE 1-PIC-0131 in AUTO • Place 1TIC-130 in automatic and verify temperature is maintained <115 degrees F.

	SRO	Actions:
		• Enters 18007-C "Section B"
		  • Have RO isolate CVCS letdown flow
		  • Check ACCW System in service
		  • Check indication that NCP did not trip due to gas binding
		  • Direct starting of CCP (A or B) per SOP-13006-1
		• Dispatches Operator and maintenance to investigate problem
		• Notifies duty manager of AOP entry
		• Has SSS initiate work order
		• (Note Only INFO LCOs for this failure)

Op-Test No.: 1	Scenario No.: 2	Event No.: 6

Event Description: **RCP #1 seal #1 failure (5.2 gpm)**

Malfunction: **RP06A @ ramp slowly @ 15% (watch indication) on Examiner Cue**

Simulator operator Cue: **Duty Manager instructs USS to shutdown unit in next hour and secure RCP #1 when contacted by USS about problem. Load Dispatcher will be notified by duty manager**

Simualtor Operator Notes:

Op-Test No.: 1	Scenario No.: 2	Event No.: 6
Event Description: **RCP #1 seal #1 failure (5.2 gpm)**		
	RO	Actions: Seal Failure: • Diagnose RCP seal failure (Controlled leakage hi/lo flow alarm) • SOP 13003-1 RCP operation with seal abnormality • Use figures 1&2 to determine RCP must be stopped in 8 hours • Monitors RCP data on the IPC
	SRO	Actions: Seal Failure: • Using 13003-1 confirm decision tree • Seal injection > 8 gpm & <130 deg F • Seal leakoff outside normal ops band (figure 2) • Contacts duty manager about problem

Op-Test No.: 1 Scenario No.: 1 Event No.: 7

Event Description: **Reduce Reactor Power per operations Duty Manager to mode 3 within the next hour and remove RCP #1 from service.**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 1 Event No.: 7

Event Description: **Reduce Reactor Power per operations Duty Manager to mode 3 within the next hour and remove RCP #1 from service.**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Gives crew briefing on the power decrease to be off line within 1 hour • Refers to UOP 12004-C, Power Operation • Direct RO to energize Pressurizer B/U heaters
	RO	Actions: • Energize Pressurizer B/U heaters • Commences boration per SOP-13009-1 • Direct BOP of load reductions • Maintains rods above insertion limits • Maintains Tave within 2 deg Tref • Maintains AFD within target band
	BOP	18013-C Actions: • Reduce turbine load • Maintain S/G in normal control band

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

Malfunction:	**(1) RP06A 100%**	**"RCP #1 seal failure"**
	(2) RC05A @ 1.5%	**"Hot Leg Break at 450 GPM"**
	(3) MS01 @ 100%	**" Steam Dump Valve 1PV-507C fails fully open"**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 2 Event No.: 8

Event Description: **RCP seal LOCA**

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Actions: (As seal leak increases) • Diagnose leak increasing • Increases charging flow to maintain PZR level • Determine that Pressurizer level and pressure cannot be maintained. • Manually trips reactor • Manual SI
	19000-C Actions	Actions: (19000-C) • Verify Rx Trip (RO/BOP) • Verify turbine trip. (RO/BOP) • Verify power to AC emergency busses.(RO/BOP) • Check if SI Actuated. (RO/BOP) • Verify Feedwater isolation. (RO/BOP) • Verify MLB indications ECCS equipment aligning for injection phase. (RO/BOP) • Verify containment isolation Phase A actuated. (RO/BOP) • Verify AFW Pumps running. (RO/BOP) • SG blowdown isolated (RO/BOP) • TDAFW pump running. (RO/BOP) • Verify ECCS pumps running: CCP, SI, RHR. **(Manually starts SI Pump "A")** (RO/BOP) • Verify 2 CCW pumps running on each Train. (RO/BOP)

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	RO/BOP	• Verify 2 NSCW pumps running on each Train. (RO/BOP) • Verify containment ventilation isolation (CVI). (RO/BOP) • Check if MSIV should be isolated (RO/BOP) • Check containment spray not required. (RO/BOP) • Verify DG running. (RO/BOP) • Verify ECCS flows. (RO/BOP) • Verify total AFW flow greater than 570 GPM. (RO/BOP) • Verify ECCS alignment on MLBs. (RO/BOP) • Verify RCS temperatures. **(Should find 1PV-507C failed open and actuate MSLI)**(RO/BOP) • Verify PORVs/sprays working correctly (RO/BOP) • Check if RCPs should be stopped (RO/BOP) • Check ACCW pump running (RO/BOP) • Place Hydrogen Monitors in service per SOP-13130-1 Section 4.2.1 & 4.2.2 (RO/BOP) • OPEN the H2 MONITOR A SPLY ISO IRC:1-HV-2792A,1-HV-2792B • OPEN H2 MONITOR A SPLY ISO ORC 1-HV-2791B • OPEN H2 MONITOR A RTN ISO ORC 1-HV-2793B • PLACE Mode Switch 1-HS-22900 in ANALYZE • ENSURE Function Selector Switch • 1-HS-22904 in Sample position • Momentarily DEPRESS Remote Control Selector Pushbutton 1-HS-22944 and VERIFY Sample Light LIT • Same Actions for "B" train monitor

Op-Test No.: 1 Scenario No.: 2 Event No.: 8

Event Description: **RCP seal LOCA**

	RO/BOP	• Check for secondary fault (RO/BOP)
		• Check for SGTR (RO/BOP)
		  • Direct chemistry sample
		  • Use IPC to trend secondary radiation data

	Path 19030-C	**If the crew transitions to 19030-C due to high secondary radiation go to page 25 for the actions.**

	19010-C	Actions: (19010-C)
		• Check if RCPs should be stopped (RO/BOP)
		• Verify ACCW operation (RO/BOP)
		• Place Hydrogen monitors in service (may have been already completed in 19000-C) (RO/BOP)
		• Check for secondary fault (RO/BOP)
		• Check for SGTR (RO/BOP)
		• Check PORV operation (RO/BOP)
		• Check if SI can be terminated (RO/BOP)
		  • Verify RCS subcooling >24 F
		  • Check for secondary heat sink
		  • SG levels >10%
		  • AFW flow >570 gpm
		  • Verify RCS pressure stable or rising
		  • Verify Pressurizer level >9%
		• Check if Containment spray actuated (RO/BOP)
		• Check if RHR pumps can be stopped (RO/BOP)

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	RO/BOP	• Dispatch outside SO to shutdown D/Gs (RO/BOP)
		• Evaluate RHR system (RO/BOP) (both trains)
		  • Power to HV-8811, HV-8809, RHR pumps
		  • RHR HX available
		• Check for LOCA outside Containment (RO/BOP)
		• Transition the 19012-C
		• **Planned end point**

	19030-C Path	Actions:
		• Determine if RCPs should be stopped (RO/BOP)
		  • CCP or SI Pumps at least 1 running
		  • RCS pressure <1375 psig
		• Identify the ruptured S/G (RO/BOP)
		  • Uncontrolled level rise
		  • High radiation in S/G from chemistry sample
		  • High radiation from radiation monitors
		• Isolated the ruptured S/G when identified (RO/BOP)
		  • ARV (1PV-3000) pot set to 7.73 (1160 psig)
		  • TDAFW steam supply valve 1HV-3009 closed
		  • SGBD isolation valve closed (1HV-7603A/B/C/D)
		  • MSIV & Bypass valves for loop 1
		• Check ruptured S/G level >10% (then stop all feed flow) (RO/BOP)
		• Check ruptured S/G pressure >290 psig(RO/BOP)

Op-Test No.: 1 Scenario No.: 2 Event No.: 8

Event Description: **RCP seal LOCA**

	RO/BOP
	
	May Exit to 19131-C
		• Initiate RSC cooldown to target core exit TC temperature of 518 degrees F. (RO/BOP)
		  • Place steam dumps in steam pressure mode (RO/BOP)
		  • Block steam line isolation/SI when below P-11 (RO/BOP)
		  • Slowly raise cooldown rate to maximum (Note if steam lines isolate the ARVs on loops 2,3 & 4 will be used) (RO/BOP)
		  • Stabilize core exit TCs at or below target temperature. (RO/BOP)
		• Control intact S/G levels between 10 to 65% (RO/BOP)
		• Check for proper PORV operation (RO/BOP)
		• Reset SI signal (RO/BOP)
		• Reset CIA signal (RO/BOP)
		• Establish instrument air to containment (RO/BOP)
		• Stop both RHR pumps (RO/BOP)
		• Check ruptured S/G pressure at least 250 psig > intact S/Gs (RO/BOP)
		• Check RCS subcooling at least 44 degrees F. (RO/BOP)
		• Depressurize the RCS to refill the Pressurizer(RO/BOP)
		  • Open loop #4 spray valve to maximum until:
		  • Pressurizer level >9% AND RCS pressure < ruptured S/G pressure
		  • RCS subcooling <24 degrees F.
		  • Pressureizer level >69%
		• When one of the above criteria is met close loop #4 spray valve (RO/BOP)
		• Check if ECCS flow can be reduced
		  • RCS subcooling >24 degrees F. (RO/BOP)

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	RO/BOP	• Heat sink available (RO/BOP)
		  • AFW flow >570 gpm
		  • 1 S/G level >10%
		• RCS pressure stable or rising (RO/BOP)
		• Pressurizer level >9% (RO/BOP)
		
		• Stop 1 CCP (RO/BOP)
		
		• Stop both SI pumps (RO/BOP)
		
		• Establish normal charging (RO/BOP)
		
		  • Open normal miniflow valves (1HV-8111A/B, 1HV-8110)
		  • Closed RWST miniflow valves (1HV-8508A/B)
		  • White lights off on (1HV-8508A/B)
		  • Close BIT valves (1HV-8801A/B)
		  • Set 1HC-0181 to maximum seal flow (0% demand)
		  • Open 1HV-8105 & 1HV-8106 (normal charging)
		
		• Control normal charging flow to maintain Pressurizer level (RO/BOP)
		
		• Verify ECCS flow not required: (RO/BOP)
		  • RCS subcooling >44 degrees F.
		  • Pressurizer level >9%
		
		If this path is taken the crew should transition at this point to 19131-C "SGTR with loss of reactor coolant: subcooled recovery desired"
		
		Planned End Point

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO	Actions: • Directs RO to maintain PZR level • Directs RO to manually trip reactor and initiate manual SI • Enters 19000-C, Reactor trip/SI
	E-0	Actions: (19000-C) • Directs RO to verify Rx Trip • Directs BOP to verify turbine trip. • Directs BOP to verify power to AC emergency busses. • Directs RO to check if SI Actuated. • Direst BOP to verify proper Feedwater isolation. • Direct RO to verify MLB indications ECCS equipment aligning for injection phase. • Directs RO to verify containment isolation Phase A actuated. • Directs BOP to verify AFW Pumps running. • Direct BOP to verify SG blowdown isolated • Directs BOP to verify TDAFW pump running. • Directs RO to verify ECCS pumps running: CCP, SI, RHR. **(Has RO manually starts SI Pump "A")** • Directs RO to verify 2 CCW pumps running on each Train. • Directs RO to verify 2 NSCW pumps running on each Train. • Directs RO to verify containment ventilation isolation (CVI). **Train "B" CVI will need to be manually aligned due to failure.** • Directs RO/BOP to check if MSIV should be isolated • Directs RO to check if containment spray is required.

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO	• Directs BOP to verify DG running.
		• Directs RO to verify ECCS flows.
		• Directs BOP to verify total AFW flow greater than 570 GPM.
		• Directs RO to verify ECCS alignment on MLBs.
		• Directs RO/BOP to verify RCS temperatures. **(Directs actions to restore RCS temperature to 557 F. Should find 1PV-507C failed open and actuate MSLI)**
		• Verify PORVs/sprays working correctly
		• Determine if RCPs should be stopped
		  • CCP or SI Pumps at least 1 running
		  • RCS pressure <1375 psig
		• Check ACCW pump running
		• Have BOP place Hydrogen Monitors in service per SOP13130-1
		• Check for secondary fault
		• Check for SGTR

	Path 19030-C S/G Tube Rupture	**If the crew transitions to 19030-C due to high secondary radiation go to page 31 for the actions.**

	19010-C Primary LOCA	• Diagnose Primary LOCA
		Actions: 19010-C
		• Enter 19010-C, Response to LOCA
		• Determine if RCPs should be stopped
		  • CCP or SI Pumps at least 1 running
		  • RCS pressure <1375 psig

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO	• Directs RO to verify ACCW operation
		• Directs BOP to place Hydrogen monitors in service (may have been already completed in 19000-C)
		• Check for secondary fault
		• Check for SGTR
		• Check PORV operation
		• Check if SI can be terminated
		  • Verify RCS subcooling >24 F
		  • Check for secondary heat sink
		  • SG levels >10%
		  • AFW flow >570 gpm
		  • Verify RCS pressure stable or rising
		  • Verify Pressurizer level >9%
		• Check if Containment spray actuated
		• Check if RHR pumps can be stopped
		• Direct BOP to shutdown D/Gs
		• Evaluate RHR system (both trains)
		  • Power to HV-8811, HV-8809, RHR pumps
		  • RHR HX available
		• Check for LOCA outside Containment
		• Transition to 19012-C Post LOCA cooldown/depressurization
		Planned end point

	SRO Classify Path #1	**Examiner: Have the SRO (USS) classify the event. The answer key for event classification is on page 34.**

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO 19030-C Actions	Actions:
		• Determine if RCPs should be stopped
		  • CCP or SI Pumps at least 1 running
		  • RCS pressure <1375 psig
		• Identify the ruptured S/G
		  • Uncontrolled level rise
		  • High radiation in S/G from chemistry sample
		  • High radiation from radiation monitors
		• Isolated the ruptured S/G when identified
		  • ARV (1PV-3000) pot set to 7.73 (1160 psig)
		  • TDAFW steam supply valve 1HV-3009 closed
		  • SGBD isolation valve closed (1HV-7603A/B/C/D)
		  • MSIV & Bypass valves for loop 1
		• Check ruptured S/G level >10% (then stop all feed flow)
		• Check ruptured S/G pressure >290 psig
		• Initiate RSC cooldown to target core exit TC temperature of 518 degrees F.
		  • Place steam dumps in steam pressure mode
		  • Block steam line isolation/SI when below P-11
		  • Slowly raise cooldown rate to maximum (Note if steam lines isolate the ARVs on loops 2,3 & 4 will be used)
		  • Stabilize core exit TCs at or below target temperature.
		• Control intact S/G levels between 10 to 65%
		• Check for proper PORV operation
		• Reset SI signal
		• Reset CIA signal

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO
	
	May go To 19131-C
		• Establish instrument air to containment
		• Stop both RHR pumps
		• Check ruptured S/G pressure at least 250 psig > intact S/Gs
		• Check RCS subcooling at least 44 degrees F.
		• Depressurize the RCS to refill the Pressurizer
		  • Open loop #4 spray valve to maximum until:
		  • Pressurizer level >9% AND RCS pressure < ruptured S/G pressure
		  • RCS subcooling <24 degrees F.
		  • Pressureizer level >69%
		• When one of the above criteria is met close loop #4 spray valve
		• Check if ECCS flow can be reduced
		  • RCS subcooling >24 degrees F.
		  • Heat sink available
		  • AFW flow >570 gpm
		  • 1 S/G level >10%
		  • RCS pressure stable or rising
		  • Pressurizer level >9%
		• Stop 1 CCP
		• Stop both SI pumps
		• Establish normal charging
		  • Open normal miniflow valves (1HV-8111A/B, 1HV-8110)
		  • Closed RWST miniflow valves (1HV-8508A/B)
		  • White lights off on (1HV-8508A/B)
		  • Close BIT valves (1HV-8801A/B)
		  • Set 1HC-0181 to maximum seal flow (0% demand)

Op-Test No.: 1	Scenario No.: 2	Event No.: 8

Event Description: **RCP seal LOCA**

	SRO	• Open 1HV-8105 & 1HV-8106 (normal charging)
		• Control normal charging flow to maintain Pressurizer level
		• Verify ECCS flow not required:
		  • RCS subcooling >44 degrees F.
		  • Pressurizer level >9%
		If this path is taken the crew should transition at this point to 19131-C "SGTR with loss of reactor coolant: subcooled recovery desired"

	SRO Classify Path #2	**Planned End Point** **Examiner: Have the SRO (USS) classify the event. The answer key for event classification is on page 34.**

Classify the Event answer:

Path 1# for the RCP seal LOCA is an **ALERT EMERGENCY** due to, non isolable RCS leak greater than the capactity of one charging pump in the normal charging mode.

Path 2# SGTR with LOCA in progress is an **ALERT EMERGENCY** due to, non isolable RCS leak greater than the capactity of one charging pump in the normal charging mode.

Crew Turnover Sheet

Initial Conditions: The plant is at 45% ramping to 100% at 8%/hr. RCS boron concentration is at 363 ppm, EOL conditions. After shift turnover have the **RO** complete the "B" MFP startup. All activities have been completed in SOP-13615-1 up to step 4.1.4.20. **"A"** Train equipment in service.

Turnover:

1. Plant Startup is in progress.
2. Rx power is 45%.
3. 1PV-0456 is in the shut position due to seat leakage.
   HV-8000B is shut to comply with Technical Specification 3.4.11 Condition "A".
4. CCW train B pumps in PTL, clearance has just been released. Functional testing scheduled approximately 2 hours from now for response time testing. Tech Spec action of 3.7.7 have been completed.
5. SGBD is OOS due to HIGH failure on 1RE-021. Will be returned to service of the next shift.
6. The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.
7. In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.

Facility: VOGTLE Scenario No.: 3 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 95%. RCS boron concentration is at 1194 ppm, BOL conditions. Shutdown in progress due to Tech Spec action requirement.

Shift Turnover:

1. _____Plant Shutdown is in progress.
2. _____ Current Reactor power is 95%.
3. _____Train "A" MDAFW Pump is OOS due to mechanical seal failure. It has been OOS for 48 hours and not expected to return to service within the remaining LCO time due to parts unavailability, LCO has been written.
4. _____Also affecting AFW is a severe packing leak has occurred on the high pressure side of 1-1301-U4-051, a chemical cleaning isolation valve on the Steam Header from S/G #1 to the TDAFW Pump. As a result, 1HV-3009, steam supply to the TDAFW Pump from S/G #1 is tagged shut and power has been removed from the valve. The manual upstream isolation valve, 1- 1304-U4-005 is also tagged shut to allow maintenance to repack the valve.
5. _____As a result of this work, Unit 1 is in a 6 hour shutdown requirement per Tech. Spec. 3.7.5 Condition "C" due to 2 inoperable AFW Trains.
6. _____Air Compressor #2 is tagged out for motor replacement.
7. _____Plant Management has directed Unit 1 be in Mode 3 within the next 3.5 hours.
8. _____The System Operator has been notified of the pending power reduction.
9. _____The SS has directed you to have the RO increase CVCS letdown flow to 120 GPM per chemistry department request.
10. _____The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.
11. _____In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.

Event No.	Malf. No.	Event Type*	Event Description
1		RO-N	Increase CVCS letdown flow to 120 GPM per chemistry request (SS direction during shift turnover)
2		RO-R	Decrease power to Mode 3
3	OR	BOP-C	Air Compressor #1 Trips
4	CV13 CV01	RO-I	VCT level transmitter 1LT-185 fails HIGH, with auto M/U failure
5	FW02b 0%	BOP-I	Controlling feedwater flow channel fails low on S/G #2 (1FT-520)
6	PR02a 100%	RO-I	Controlling Pressurizer level channel fails high (1LT-459)
7	SG01a 50%	ALL-M	500 GPM S/G #2 tube rupture

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

PREINSERTS:

Initial Conditions:

- _____ Reset to IC # Snap for NRC _____)
- _____ Insure Information Board in Control Room is updated
- _____ Shift sign in and reactivity briefing sheets provided
- _____ RO & BOP Name plates on Panel D
- _____ Check EOP's, AOP's, UOP's, SOP's used in the last scenario clear of red marks
- _____ IPC is Mode 1
- _____ Check Control Rod Group Step Counters
- _____ Unit 2 supplying the Aux Steam Header
- _____ Correct AFD sheet

Select to following QMCB positions:

- _____ All Controlling channels selected to channel #1
- _____ Align plant for operation with minor S/G tube leak per AOP-18009-C section "B"
- _____ Ensure all QPCP and QHVC recorders running in auto
- _____ Place Clearance Tag on Train "A" AFW Pump (PTL Position)
- _____ Place Clearance Tag on AFW Train "A" Discharge valves (Closed position) (1HS-5139A & 1HS-5137A)
- _____ Place Clearance Tag on Air Compressor #2 (Stop position) Panel Drawing-AL-NSW-HS9383-stop(Also turn off RED/AMBER/GREEN light indication for A/C #2.
- _____ Place Clearance Tag on TDAFW Pump steam supply isolation Valve 1HV-3009 (Closed position)
- _____ Steam Seals System "Caution Tag" supplied from Aux Stm Hdr
- _____ Hotwell Makeup Controller "Caution Tag" in manual at 50%

Insert simulator Malfunctions:

- _____ (Malfunction SG01e at 20%) 20 GPD tube leak on Steam Generator #1 malfunction
- _____ (ES01) Failure of the Automatic Reactor Trip
- _____ (CV01) VCT automatic makeup failure
- _____ (AF05B) MDAFW Pump "B" fails to automatically start

Simulator Overrides & Remote Functions:

- _____ Reactor Trip Handswitch on "C" to CLOSE position
  Panel Drawings-C-NIM-HS40007-CLOSE
- _____ Air Compressor #4 Handswitch to Stop
  Panel Drawings-A1-NSW-HS9381-STOP
- _____ Override 1HV-3009 shut and remove light indication
  Panel Drawings-B1-AFW-HS3009-CLOSE (Use Panel Drawings to turn off RED & GREEN light indication)
- _____ Override Train "A" AFW Pump to off position
  Panel Drawing-B1-AFW-HS5131A-STOP
- _____ Override discharge Valves for Train "A" AFW Pump to shut position
  Remote Function (AF20, AF18 in LOCAL ; AF19, AF21 to 0%)
  Panel Drawings-B1-AFW-HS5131A-Green light-OFF
- _____ ALB50 (CR HI/LO ΔP)
  Panel Drawings-HV1-ALB50-CR Hi/Lo Diff Press-OFF
- _____ ALB20 (Turbine/Gen Trouble)
  Panel Drawings-B2-ALB20-E01-OFF
- _____ ALB62 (Gen Gas Non Sys Alarm)
  Panel Drawings-QPCP2-ALB62-F02-OFF

Op-Test No.: 1	Scenario No.: 3	Event No.: 1
Event Description: **Increase CVCS letdown flow to 120 GPM**		

Time	Position	Applicant's Actions or Behavior
	RO	Actions: • SOP-13006-1 Section 4.2.4 • Raise charging flow to between 120-130 GPM • Main RCP seal injection flow between 8-13 GPM • Place 1-PIC-0131 in manual and lower pressure between 100-120 psig • Open 45 GPM orifice valve • Adjust 1-PIC-0131 to between 360-380 psig • Return system to automatic

Op-Test No.: 1	Scenario No.: 3	Event No.: 2
Event Description:	**Decrease Reactor Power (Mode 3 in 3.5 hours)**	

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Gives crew briefing on the power decrease • Directs Operators to decrease power (Mode 3 in 3.5 hours) • Refers to UOP 12004-C, Power Operation
	RO	Actions: • Commences boration per 13009-1 • Maintains rods above insertion limits • Maintains Tave within 2 deg Tref • Maintains AFD within target band •
	BOP	Actions: • Loads Turbine per SOP.

Op-Test No.: 1	Scenario No.: 3	Event No.: 3

Event Description: **Air Compressor #1 Trips (Air Compressor #4 fails to automatically start)**

Malfunction/Override: **Trigger the following: on Examiner CUE**

1. **Panel Drawings-A1-NSW-HS19338-STOP**
2. **Panel Drawings-A1-NSW-A/C #1 RED light OFF**
3. **Panel Drawings-A1-NSW-A/C #1 GREEN light ON**
4. **Panel Drawings-A1-NSW-A/C #1 AMBER light ON**
5. **Panel Drawings-EAB1-ALB33-A06-ON**
6. **Note: must remove Panel Drawings-A1-NSW-HS9381-STOP, when BOP places AC #4 handswitch to start.**

Simulator Operator Notes:

Op-Test No.: 1	Scenario No.: 3	Event No.: 3
Event Description:	**Air Compressor #1 Trips (Air Compressor #4 fails to automatically start)**	

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Reference ARP for low service air ALB01 C06 • Enters AOP-18028-C Section "A" • Directs RO to Start Air Compressor #4 • • Dispatches operator to locally investigate problem • Dispatch Operator & Maintenance to investigate • Have SSS write Work Order and make notifications
	BOP	Actions: • Reference ARP for low service air ALB01 C06 • Trend air pressure on IPC • Starts Air Compressor #4 • Dispatch Operator to investigate problem

Op-Test No.: 1 Scenario No.: 3 Event No.: 4

Event Description **VCT level transmitter 1LT-185 fails high. Result in letdown flow being diverted to the RHUT. VCT level will lower to the automatic makeup setpoint of 30% if not noticed by the operators.**

Malfunction: **Check (CV01) active then insert (CV12) on Examiner Cue**

Simulator Operator Note

Op-Test No.: 1 Scenario No.: 3 Event No.: 4

Event Description **VCT level transmitter 1LT-185 fails high. Result in letdown flow being diverted to the RHUT. VCT level will lower to the automatic makeup setpoint of 30% if not noticed by the operators.**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Directs operator to place 1-LV-0112A to the VCT position • Directs operator to Monitor VCT level using 1-LT-0112 (IPC) • Alerts operator that the automatic swap-over on low VCT level is not functional. • Caution the operators of the possible loss of suction to the CCP's • Have Maintenance Work order written.
	RO **Critical Task**	Actions: • Identify failed VCT level channel (1-LT-185) • Trend 1-LT-115 on the IPC computer. • Place 1-LV-0112A to the VCT position. • Be aware of the possible loss of suction potential to the CCP's. **Critical that the CCP do not lose suction during scenario**

Op-Test No.: 1	Scenario No.: 3	Event No.: 5
Event Description:	**Controlling Feedwater Flow channel fails low on S/G #2 (1FT-520)**	
Malfunction:	**FW02b at 0% on Examiner Cue**	
Simulator Operator Notes:		

Op-Test No.: 1 Scenario No.: 3 Event No.: 5

Event Description: **Controlling Feedwater Flow channel fails low on S/G #2 (1FT-520)**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Enters AOP-18001-C Section "G" • Directs BOP to control S/G #2 flow in manual • Directs BOP swap controlling channel • Directs BOP to return to automatic when system stabilizes • Have SSS notify Maintenance to investigate • Have SSS write Work Order and make notifications
	BOP	Actions: • Determine failure of 1LT-520 (controlling channel) Immediate actions: • Take manual control of S/G #2 MFRV and MFP control level between 60-70% • Select non affected controlling channel • Return system to automatic

Op-Test No.: 1	Scenario No.: 3	Event No.: 6
Event Description:	**Controlling Pressurizer level channel fails high (LT-459)**	
Malfunction:	**PR03A at 100% on Eximiner Cue**	
Simulator Operator Notes:		

Op-Test No.: 1 Scenario No.: 3 Event No.: 6

Event Description: **Controlling Pressurizer level channel fails high (LT-459)**

Time	Position	Applicant's Actions or Behavior

	SRO	Actions:
		• Enters 18001-C section "D"
		• Directs RO to control CVCS charging flow in manual
		• Directs RO to select new controlling channel (461/460)
		• Verify letdown in service
		• Verify Pressurizer heater operation
		• Direct RO to restore to automatic when conditions allow
		• Notifies duty manager of AOP entry
		• Contacts maintenance to initiate repairs
		• Refers to Tech Specs:
		  • LCO 3.3.1
		  Functional unit 9 - Condition M
		  Place channel in trip within 72 hours
		  • LCO 3.3.2
		  Function unit 5c – Condition I
		  Place channel in trip within 72 hours
		  Function unit 6b – Condition D
		  Place channel in trip within 72 hours
		  • LCO 3.3.3 Info LCO
		  No required action
		  • LCO 3.3.4
		  Function 8 condition A
		  Restore within 30 days

Op-Test No.: 1	Scenario No.: 3	Event No.: 6
Event Description:	**Controlling Pressurizer level channel fails high (LT-459)**	
	RO	Actions: • Determine 1LT-459 has failed high • Place CVCS changing flow in manual and restore flowrate to normal • Select unaffected controlling channel (461/460) • Return Pressurizer level control to automatic

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description: **500 GPM Tube Rupture On S/G #1**		
Malfunction: **SG01a @ 50% on Examiner Cue**		
Simulator Operator Notes:		

Op-Test No.: 1 Scenario No.: 3 Event No.: 7

Event Description: **500 GPM Tube Rupture On S/G #1**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Identifies from indications of high radiation on secondary and lowering Pressurizer level & Pressure that a S/G tube rupture is in progress • Directs operator actions to maintain Pressurizer level & pressure • May enter 18009-C if time allows for actions relate to the loss of RCS inventory • Directs operator the manually trip the Unit One Reactor due to the decreasing Pressurizer Level & pressure
	19000 Actions E-0	Actions: (19000-C) • Directs RO to verify Rx Trip • Directs BOP to verify turbine trip. • Directs BOP to verify power to AC emergency busses. • Directs RO to check if SI Actuated. • Direst BOP to verify proper Feedwater isolation. • Direct RO to verify MLB indications ECCS equipment aligning for injection phase. • Directs RO to verify containment isolation Phase A actuated. • Directs BOP to verify AFW Pumps running. • Direct BOP to verify SG blowdown isolated • Directs BOP to verify TDAFW pump running. • Directs RO to verify ECCS pumps running: CCP, SI, RHR. • Directs RO to verify 2 CCW pumps running on each Train. • Directs RO to verify 2 NSCW pumps running on each Train.

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description:	**500 GPM Tube Rupture On S/G #1**	

	SRO	• Directs RO to verify containment ventilation isolation (CVI). • Directs RO/BOP to check if MSIV should be isolated • Directs RO to check if containment spray is required. • Directs BOP to verify DG running. • Directs RO to verify ECCS flows. • Directs BOP to verify total AFW flow greater than 570 GPM. • Directs RO to verify ECCS alignment on MLBs. • Directs RO/BOP to verify RCS temperatures. • Verify PORVs/sprays working correctly • Check if RCPs should be stopped • Check ACCW pump running • Have BOP place Hydrogen Monitors in service per SOP13130-1 • Check for secondary fault • Check for SGTR

	19030 Actions	Transition the 19030-C based on high secondary radiation
		Actions: 19030
		• Check if RCPs should be stopped
		  • CCP or SI pumps at least 1 running
		  • RCS pressure <1375 psig
		• Identifies SG #1 as ruptured
		  • Uncontrolled level rise

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description:	**500 GPM Tube Rupture On S/G #1**	

	SRO	• Directs the isolation of S/G #2 per 19030-C
		  • ARV (PV-3010) pot set at 7.73 and in automatic controlling at **1160 psig**
		  • Directs BOP shut 1HV-3009
		  • Directs BOP to verify SGBD is isolated
		  • Directs BOP to shut MSIVs & Bypass valve for loop #2
		  • Directs BOP to maintain S/G #2 level >10% (should isolate flow if level is above 10% NR)
		  •
		• Verifies S/G #2 pressure >290 psig
		
		• Directs RSC cooldown to target core exit TC temperature of 518 degrees F. (RO/BOP)
		  • Place steam dumps in steam pressure mode (RO/BOP)
		  • Block steam line isolation/SI when below P-11 (RO/BOP)
		  • Slowly raise cooldown rate to maximum (Note if steam lines isolate the ARVs on loops 2,3 & 4 will be used) (RO/BOP)
		• Stabilize core exit TCs at or below target temperature.
		
		Planned end point

	SRO Classify	**Examiner: Have the SRO (USS) classify the event. The answer key for event classification is on page 23.**
	RO/BOP **19000-C Actions**	Actions: (19000-C) • Identifies from indications of high radiation on secondary and lowering Pressurizer level & Pressure that a S/G tube rupture is in progress (RO/BOP) • Increases Charging (start additional charging pump if time permits) to maintain Pressurizer level and pressure. (RO/BOP)
	Critical Task	• Actuates manual Reactor Trip (NOTE: QMCB panel "C" Handswitch will not function and the RO will be required to us Panel "A" Handswitch) (RO/BOP) • Verify Rx Trip (RO/BOP)

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description:	**500 GPM Tube Rupture On S/G #1**	

	RO/BOP	• Verify turbine trip. (RO/BOP) • Verify power to AC emergency busses. (RO/BOP) • Check if SI Actuated. (RO/BOP) • Verify Feedwater isolation. (RO/BOP) • Verify MLB indications for both trains of ECCS equipment aligning for injection phase. (RO/BOP) • Verify containment isolation Phase A actuated. (RO/BOP) • MDAFW Pumps running. (NOTE: operator must manually start MDAFW Pump "B") (RO/BOP) • SG blowdown isolated (RO/BOP) • TDAFW pump running. (RO/BOP) • Verify ECCS pumps running: CCPs, SI, RHR. (RO/BOP) • Verify 2 CCW pumps running on each train. (RO/BOP) • Verify 2 NSCW pumps running on each train. (RO/BOP) • Verify containment ventilation isolation (CVI). (RO/BOP) • Check if MSIVs should be isolated. (RO/BOP) • Check containment spray not required. (RO/BOP) • Verify DG running. (RO/BOP) • Verify ECCS flows. (RO/BOP) • Verify total AFW flow greater than 570 GPM. (RO/BOP) • Verify ECCS alignment on MLBs. (RO/BOP) • Verify RCS temperatures. (RO/BOP)

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description:	**500 GPM Tube Rupture On S/G #1**	

	RO/BOP	• Verify PORVs/sprays working correctly
		• Check if RCPs should be stopped
		  • CCP or SI pumps at least 1 running
		  • RCS pressure <1375 psig
		• Check ACCW pump running
		• Place Hydrogen Monitors in service per SOP-13130-1 Section 4.2.1 & 4.2.2 (RO/BOP)
		  • OPEN the H2 MONITOR A SPLY ISO IRC:1-HV-2792A,1-HV-2792B
		  • OPEN H2 MONITOR A SPLY ISO ORC 1-HV-2791B
		  • OPEN H2 MONITOR A RTN ISO ORC 1-HV-2793B
		  • PLACE Mode Switch 1-HS-22900 in ANALYZE
		  • ENSURE Function Selector Switch
		  • 1-HS-22904 in Sample position
		  • Momentarily DEPRESS Remote Control Selector Pushbutton 1-HS-22944 and VERIFY Sample Light LIT
		  • Same Actions for "B" train monitor
		• Check for secondary fault
		• Check for SGTR

	19030-C Actions	• Identify ruptured S/G on uncontrolled level rise or secondary high radiation (RO/BOP)
		
		Actions:
		• Determine if RCPs should be stopped (RO/BOP)
		  • CCP or SI pumps at least 1 running
		  • RCS pressure <1375 psig
		• CCP or SI Pumps at least 1 running

Op-Test No.: 1	Scenario No.: 3	Event No.: 7
Event Description:	**500 GPM Tube Rupture On S/G #1**	

	RO/BOP	• RCS pressure <1375 psig
		• Identify S/G #2 ruptured based on uncontrolled level rise (RO/BOP)
		• Isolated the ruptured S/G when identified (RO/BOP)
		  • ARV (1PV-3000) pot set to 7.73 (1160 psig)
		  • TDAFW steam supply valve 1HV-3009 closed
		  • SGBD isolation valve closed (1HV-7603A/B/C/D)
		  • MSIV & Bypass valves for loop 2
		• Check ruptured S/G level >10% (then stop all feed flow) (RO/BOP)
		• Check ruptured S/G pressure >290 psig(RO/BOP)
		• Initiate RSC cooldown to target core exit TC temperature of 518 degrees F. (RO/BOP)
		  • Place steam dumps in steam pressure mode (RO/BOP)
		  • Block steam line isolation/SI when below P-11 (RO/BOP)
		  • Slowly raise cooldown rate to maximum (Note if steam lines isolate the ARVs on loops 1,3 & 4 will be used) (RO/BOP)
		Stabilize core exit TCs at or below target temperature.
		Planned end point

Classify the Event answer:

SGTR in progress is an <u>ALERT EMERGENCY</u> due to, non isolable RCS leak greater than the capactity of one charging pump in the normal charging mode.

Initial Conditions: The plant is at 100%. RCS boron concentration is at 1194 ppm, BOL conditions. Shutdown in progress due to Tech Spec action requirement.

Shift Turnover:

1. Plant Shutdown is in progress.
2. Current Reactor power is 100%.
3. Train "A" MDAFW Pump is OOS due to mechanical seal failure. It has been OOS for 48 hours and not expected to return to service within the remaining LCO time due to parts unavailability, LCO has been written.
4. Also affecting AFW is a severe packing leak has occurred on the high pressure side of 1-1301-U4-051, a chemical cleaning isolation valve on the Steam Header from S/G #1 to the TDAFW Pump. As a result, 1HV-3009, steam supply to the TDAFW Pump from S/G #1 is tagged shut and power has been removed from the valve. The manual upstream isolation valve, 1- 1304-U4-005 is also tagged shut to allow maintenance to repack the valve.
5. As a result of this work, Unit 1 is in a 6 hour shutdown requirement per Tech. Spec. 3.7.5 Condition "C" due to 2 inoperable AFW Trains.
6. Plant Management has directed Unit 1 be in Mode 3 within the next 3.5 hours.
7. Air Compressor #2 is tagged out for motor replacement.
8. The System Operator has been notified of the pending power reduction.
9. The SS has directed you to have the RO increase CVCS letdown flow to 120 GPM per chemistry department request.
10. The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.
11. In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.

Facility: VOGTLE Scenario No.: 4 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 95%. RCS boron concentration is at 1308 ppm, BOL conditions. B Train equipment in service.

Turnover:

1 _____Plant Startup is in progress.

2 _____Rx power is 95%.

3 _____1PV-0456 is in the shut position due to seat leakage.

4 _____1HV-8000B is shut to comply with Technical Specification 3.4.11 Condition "A".

5 _____ ECCS Accumulator #2 level is low due to a minor leak. After assuming the shift raise the accumulator level per SOP-13105-C

6 _____ After Accumulator #2 has been filled you are to continue the power increase to 98% per 12004-C. (step 4.1.50) All prerequisites for the power increase were met on the previous shift. The Load Dispatcher has been notified of the power increase. The SS has requested that Control Rods be placed in automatic when reactor power is at 98% for engineering testing, notify him.

7 _____The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.

8 _____ In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.

Event No.	Malf. No.	Event Type*	Event Description
1		RO-N	Raise #2 accumulator level
2		RO-R	Increase power to 98%
3		RO-I	Letdown HX temperature controller fails resulting in high letdown flow temperature. The demin divert valve 1TV-129 will fail to operate, requiring the RO to take manual action to protect the demin resin and RCS chemistry.
4	RC10c 100%	RO-I	Loop #3 NR Tavg fails high (TE-431B)
5	SG02h 100%	BOP-C	Controlling S/G #4 level transmitter (1LT-549) fails high
6	MS03b 100%	BOP-C	ARV #2 (1PV-3010) fails open due to controlling pressure transmitter failure
7	GE01 EL02, 03 EL01a 15Sec/ TD MS04c 100% SY01A, B, D, E, G, H, J, K, M	M-ALL	• Loss of offsite power • DG 1B trips after starting • Faulted S/G #3 (IRC)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

PREINSERTS:

Initial Conditions:

- _____ Reset to IC #__ (NRC #4 snap)
- _____ Insure Information Board in Control Room is updated
- _____ Shift sign in and reactivity briefing sheets provided
- _____ RO & BOP Name plates on Panel D
- _____ Check EOP's, AOP's, UOP's, SOP's used in the last scenario clear of red marks
- _____ IPC is Mode 1
- _____ Check Control Rod Group Step Counters
- _____ Unit 2 supplying the Aux Steam Header

Select to following QMCB positions:

- _____ 1PV-0456 in shut position with "Caution Tag"
- _____ 1HV-8000B in shut position with "Caution Tag"
- _____ All Controlling channels selected to channel #1
- _____ All Train "B" Equipment Running
- _____ Align plant for operation with minor S/G tube leak per AOP-18009-C section "B"
- _____ Ensure all QPCP and QHVC recorders running in auto

Insert simulator malfunctions:

- _____ (Malfunction SG01e at 20%) 20 GPD tube leak on Steam Generator #1
- _____ SI02B at 100% until low level is received for accumulator #2 alarm then remove malfunction

Simulator Overrides & Remote Functions:

- _____ ALB50 (CR HI/LO ΔP)
  Panel Drawings-HV1-ALB50-CR Hi/Lo Diff Press-OFF
- _____ ALB20 (Turbine/Gen Trouble)
  Panel Drawings-B2-ALB20-E01-OFF
- _____ ALB62 (Gen Gas Non Sys Alarm)
  Panel Drawings-QPLP2-ALB62-F02-OFF
- _____ DRPI aligned to ABE

Op-Test No.: 1 Scenario No.: 4 Event No.: 1 Page 3 of 9

Event Description: **Raise #3 ECCS accumulator Level**

Time	Position	Applicant's Actions or Behavior
	RO	Actions: • SOP 13105-1 Section 4.2.1 selected: • Check miniflow path for SI pump aligned • Start SI pump • Open 1HV-8888 • Open 1HV-8871 • Open 1HV-8878B • Monitor Accum #2 level • When desired level is reached close valves **Tech Spes required level is between 29.2 to 70.7%**

Op-Test No.: 1 Scenario No.: 4 Event No.: 2 Page 3 of 9

Event Description: **Increase Reactor Power to 98%**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Gives crew briefing on the power increase • Directs Operators to increase power to 98% • Refers to UOP 12004-C, Power Operation
	RO	Actions: • Commences dilution per SOP-13009-1 • Maintains rods above insertion limits • Maintains Tave within 2 deg Tref • Maintains AFD within target band
	BOP	Actions: • Loads Turbine per SOP.

Op-Test No.: 1 Scenario No.: 4 Event No.: 3

Event Description: **Letdown HX temperature controller fails resulting in high letdown flow temperature. The demin divert valve 1TV-129 will fail to operate, requiring the RO to take manual action to protect the demin resin and RCS chemistry.**

Malfunction: **Pot fails to 10 on 1TIC-0130 and override 1TV-129 to the VCT position** on **Examiner Cue**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 4 Event No.: 3

Event Description: **Letdown HX temperature controller fails resulting in high letdown flow temperature. The demin divert valve 1TV-129 will fail to operate, requiring the RO to take manual action to protect the demin resin and RCS chemistry.**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Recognize that letdown flow temperature is increasing • Direct the RO the take manual control of 1TIC-0131 and lower temperature to normal • Realize that 1TC-129 failed to operate • Direct RO to place 1TV-129 to the VCT position • Call chemistry and alert them of the problem • Call SSS to initiate maintenance work order
	RO **Critical Task**	Actions: • Recognize that letdown flow temperature is increasing • Take manual control of 1TIC-0131 and lower temperature to normal • Realize that 1TC-129 failed to operate • Place 1TV-129 to the VCT position • Reference ARPs and insure all actions are completed.

Op-Test No.: 1 Scenario No.: 4 Event No.: 4

Event Description: **Loop #3 NR temperature instrument fails high. Control rods would move in if controls were in automatic, however with power ramp in progress they should be in manual control.**

Malfunction: **RC10c @ 100% on Examiner Cue**

Simulator operator: **Ensure Control Rods have been placed in automatic prior to This failure.**

Simutlator Operator Actions:

Op-Test No.: 1 Scenario No.: 4 Event No.: 4

Event Description: **Loop #3 NR temperature instrument fails high. Control rods would move in if controls were in automatic, however with power ramp in progress they should be in manual control.**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Enters AOP 18001-C Section "B" • Has operator place rod control in manual • Have operator verify Tavg is on program • Defeat failed channel • Place Tavg defeat switches (1TS-412T & 1TS-411F) to Loop #3 position • Notify Operations duty manager. • Have Maintenance Work order written.

	Tech Spec Actions	• Refer to Technical Specifications.
		  • 3.3.1 Function 6 Condition E
		  Place channel in trip within 72 hours
		  • 3.3.1 Function 7 Condition E
		  Place channel in trip within 72 hours
		  • 3.3.2 Function 5b Condition I
		  Place channel in trip within 72 hours

	RO	Actions: • Identify the failed channel is Loop #3 • Place control rods in manual control (immediate action) • Adjust Tavg to Tref if required • Place Tavg defeat switches (1TS-412T & 1TS-411F) to Loop #3 position

Op-Test No.: 1 Scenario No.: 4 Event No.: 5

Event Description: **Controlling S/G #4 level transmitter (1LT-554) fails high. Results in the Loop #4 MFRV going in the shut direction to lower feedwater flow.**

Malfunction: **SG02D @ 100% on Examiner Cue**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 4 Event No.: 5

Event Description: **Controlling S/G #4 level transmitter (1LT-554) fails high. Results in the Loop #4 MFRV going in the shut direction to lower feedwater flow.**

Time	Position	Applicant's Actions or Behavior

	SRO	Actions:
		• Enters AOP 18001-C Section "E"
		• Has operator control S/G #4 MFRV in manual to restore level between 60-70%
		• Have operator select unaffected controlling channel
		• Directs operator to restore system to automatic when conditions have stabilized.
		• Notify Operations duty manager.
		• Have Maintenance Work order written.
		• Refer to Technical Specifications.
		  • 3.3.1 Function 13 Condition E Place channel in trip within 72 hours
		  • 3.3.2 Function 5c Condition I Place channel in trip within 72 hours
		  • 3.3.2 Function 6b Condition D Place channel in trip within 72 hours
		  • 3.3.3 Info LCO

	BOP **Critical Task**	Actions: • Identify the failed channel is Loop #4 (1LT-549) • Place MFRV on Loop #4 in manual control and control level between 60-70%

Op-Test No.: 1	Scenario No.: 4	Event No.: 5

Event Description: **Controlling S/G #4 level transmitter (1LT-554) fails high. Results in the Loop #4 MFRV going in the shut direction to lower feedwater flow.**

	BOP	• Select an unaffected controlling channel • Restore system to automatic when conditions allow

Op-Test No.: 1 Scenario No.: 4 Event No.: 6

Event Description: **ARV on Loop #3 (1PV-3020) fails open due to controlling transmitter failing high. The operate should identify the condition when the alarm is received on high tailpipe temperature and Reactor Power is observed to be increasing with Main Turbine Load lowering.**

Malfunction: **MS03b @ 100% on Examiner Cue**
Insert Steam leak MS02C start at 3% and increase until
Operators are required to lower reactor power below 100%

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 4 Event No.: 6

Event Description: **ARV on Loop #3 (1PV-3020) fails open due to controlling transmitter failing high. The operate should identify the condition when the alarm is received on high tailpipe temperature and Reactor Power is observed to be increasing with Main Turbine Load lowering.**

Time	Position	Applicant's Actions or Behavior

	SRO	Actions:
		• May enters AOP 18008-C for secondary leakage
		• Alert operator keep Reactor Power below 100% by all indications
		• Directs operator that manually shut 1PV-3010 (using 1PIC-3020)
		• When 1PV-3010 fails to respond contact SSS to dispatch SO to locally isolate the failed ARV.
		• Notify Operations duty manager
		• Have Maintenance Work order written
		• Refer to Technical Specifications.
		  • 3.3.4 (Info only)
		  • 3.3.4 (info only)

	BOP	Actions: • Identify the failed open ARV on Loop #3 • Keep Reactor Power below 100% by all indications • Place 1PIC-3020 in manual control and attempt to lower output (ARV will fail to respond)

Op-Test No.: 1 Scenario No.: 4 Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

Malfunction: List:: **On Examiner Cue**

1. **GE01 (Main Generator Trip)**
2. **EL02, (Loss of RAT "A")**
3. **MS04c @ 100% (S/G #3 faulted IRC)**
4. **EL01A @ 15 second time delay (D/G 1A Trip on OS)**

Simulator Operator Notes:

Op-Test No.: 1 Scenario No.: 4 Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

Time	Position	Applicant's Actions or Behavior
	SRO	Actions: • Identifies Automatic Reactor Trip
	19000-C Actions	• Enters 19000-C Actions: (19000-C) • Directs RO to verify Rx Trip • Directs BOP to verify turbine trip. • Directs BOP to verify power to AC emergency busses. (Notes that 1AA03 is de-energized) • Directs RO to check if SI Actuated. • Direst BOP to verify proper Feedwater isolation. • Direct RO to verify MLB indications ECCS equipment aligning for injection phase. • Directs RO to verify containment isolation Phase A actuated. • Directs BOP to verify AFW Pumps running. • Direct BOP to verify SG blowdown isolated • Directs BOP to verify TDAFW pump running. • Directs RO to verify ECCS pumps running: CCP, SI, RHR. • Directs RO to verify 2 CCW pumps running on each Train. • Directs RO to verify 2 NSCW pumps running on each Train. • Directs RO to verify containment ventilation isolation (CVI). • Directs RO/BOP to check if MSIV should be isolated

Op-Test No.: 1	Scenario No.: 4	Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	SRO	• Directs RO to check if containment spray is required.
		• Directs BOP to verify DG running.
		• Directs RO to verify ECCS flows.
		• Directs BOP to verify total AFW flow greater than 570 GPM.
		• Directs RO to verify ECCS alignment on MLBs.
		• Directs RO/BOP to verify RCS temperatures.
		• Verify PORVs/sprays working correctly
		• Check if RCPs should be stopped
		  • CCP or SI pump at least 1 running
		  • RCS pressure <1375 psig
		• Check ACCW pump running
		• Place Hydrogen Monitors in service per SOP-13130-1 Section 4.2.1 & 4.2.2 (RO/BOP)
		  • OPEN the H2 MONITOR A SPLY ISO IRC:1-HV-2792A,1-HV-2792B
		  • OPEN H2 MONITOR A SPLY ISO ORC 1-HV-2791B
		  • OPEN H2 MONITOR A RTN ISO ORC 1-HV-2793B
		  • PLACE Mode Switch 1-HS-22900 in ANALYZE
		  • ENSURE Function Selector Switch
		  • 1-HS-22904 in Sample position
		  • Momentarily DEPRESS Remote Control Selector Pushbutton 1-HS-22944 and VERIFY Sample Light LIT
		  • Same Actions for "B" train monitor

Op-Test No.: 1	Scenario No.: 4	Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	SRO	• Check for secondary fault • Transitions to 19020-C due to S/G #3 low pressure

	19020-C Actions	Actions: 19020-C
		• Verifies MSIVs & Bypasses are closed
		• Identifies that S/G # 3 is faulted (the other 3 are not faulted)
		• Verify all feedwater is isolated to S/G#3
		• Verify SGBD and S/G sample valve is isolated for S/G #3
		• Verify CST level >15%
		• Have BOP check for secondary radiation
		• Check if SI can be terminated
		  • Verify RCS subcooling >24 F
		  • Check for secondary heat sink
		  • SG levels >10%
		  • AFW flow >570 gpm
		  • Verify RCS pressure stable or rising
		  • Verify Pressurizer level >9%
		• Transitions to either 19011-C or 19010-C depending on conditions at the time (how fast the crew moves through the procedures compared to how fast S/G #3 depressurizes)
		• When time permits should dispatch personnel to 1AA03 and RAT "A" to invertigate problem.

	Path #1 19010-C Actions	Actions: 19010-C
		• Check if RCPs should be stopped
		  • CCP or SI pump at least 1 running
		  • RCS pressure <1375 psig
		• Verify ACCW operation

Op-Test No.: 1	Scenario No.: 4	Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	SRO	• Place Hydrogen monitors in service (may have been already completed in 19000-C)
		• Check for "another" secondary fault
		• Check for SGTR
		• Check PORV operation
		  • May required COPs to be placed in service
		• Check if SI can be terminated
		  • Verify RCS subcooling >24 F
		  • Check for secondary heat sink
		  • SG levels >10%
		  • AFW flow >570 gpm
		  • Verify RCS pressure stable or rising
		  • Verify Pressurizer level >9%

	19011-C Actions	Actions: 19011-C • Direct RO to reset SI • Direst RO to reset CIA • Direct RO to align instrument air to containment • Direct RO to stop 1 CCP • Verify RCS pressure stable or rising

Op-Test No.: 1	Scenario No.: 4	Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	SRO
	
	SRO Classify
		• Direct Ro to place normal charging in service
		  • Open 1HV-8111A/B & 1HV-8110
		  • Close 1HV-8508A/B
		  • Close 1HV-8801A/B
		  • Set 1HC-0182 to maximum seal flow
		  • Open 1HV-8105 & 1HV-8106
		  • Control RCP seal injection between 8-13 gpm
		  • Check RCS pressure trend
		  • Stop SI & RHR pumps
		
		Planned end point
		
		Examiner: Have the SRO (USS) classify the event. The answer key for event classification is on page 25.

	RO/BOP **19000-C Actions**	Actions: (19000-C) • Verify Rx Trip (RO/BOP) • Verify turbine trip. (RO/BOP) • Verify power to AC emergency busses. (alert the operating crew on the loss of power to 1AA03) (RO/BOP) • Check if SI Actuated. (RO/BOP) • Verify Feedwater isolation. (RO/BOP) • Verify MLB indications "B" Train ECCS equipment aligning for injection phase. (RO/BOP) • Verify containment isolation Phase A actuated. (RO/BOP) • Train "B" MDAFW Pump running. (RO/BOP) • SG blowdown isolated (RO/BOP)

Op-Test No.: 1 Scenario No.: 4 Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	RO/BOP	• TDAFW pump running. (RO/BOP) • Verify ECCS pumps running: Train "B" CCP, SI, RHR. (RO/BOP) • Verify 2 CCW pumps running on "B" Train. (RO/BOP) • Verify 2 NSCW pumps running on "B" Train. (RO/BOP) • Verify containment ventilation isolation (CVI). (RO/BOP) • Check if MSIVs should be isolated. (BOP should recognize that S/G #3 is faulted and isolate all AFW flow to that S/G) (RO/BOP) • Check containment spray not required. (RO/BOP) • Verify DG Train "B" running. (RO/BOP) • Verify ECCS flows. (RO/BOP) • Verify total AFW flow greater than 570 GPM. (RO/BOP) • Verify ECCS alignment on (Train "B") MLBs. (RO/BOP) • Verify RCS temperatures. (RO/BOP) • Verify PORVs/sprays working correctly (RO/BOP) • Check if RCPs should be stopped (RO/BOP) • Check ACCW pump running (RO/BOP)

Op-Test No.: 1 Scenario No.: 4 Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	RO/BOP	• Place Hydrogen Monitors in service per SOP-13130-1 Section 4.2.1 & 4.2.2 (RO/BOP) • OPEN the H2 MONITOR A SPLY ISO IRC:1-HV-2792A,1-HV-2792B • OPEN H2 MONITOR A SPLY ISO ORC 1-HV-2791B • OPEN H2 MONITOR A RTN ISO ORC 1-HV-2793B • PLACE Mode Switch 1-HS-22900 in ANALYZE • ENSURE Function Selector Switch 1-HS-22904 in Sample position • Momentarily DEPRESS Remote Control Selector Pushbutton 1-HS-22944 and VERIFY Sample Light LIT • Same Actions for "B" train monitor •
		Check for secondary fault (RO/BOP)
	19020-C Actions	Actions 19020-C • Verifies MSIVs & Bypasses are closed (RO/BOP) • Identifies that S/G # 3 is faulted (the other 3 are not faulted) (RO/BOP) • Verify all feedwater is isolated to S/G#3 (RO/BOP) • Verify SGBD and S/G sample valve is isolated for S/G #3 (RO/BOP) • Verify CST level >15% (RO/BOP) • Checks for secondary radiation (RO/BOP)

Op-Test No.: 1	Scenario No.: 4	Event No.: 7

Event Description: **Main Generator Trip results in automatic reactor trip, following fast bus transfer power is lost to RAT A, D/G 1A will start tie on to 1AA02 and then trip on overspeed during load sequencing followed by a major secondary fault outside Containment on S/G #3.**

	RO/BOP	• Check if SI can be terminated (RO/BOP)
		  • Verify RCS subcooling >24 F (RO/BOP)
		  • Check for secondary heat sink (RO/BOP)
		  • SG levels >10% (RO/BOP)
		  • AFW flow >570 gpm (RO/BOP)
		  • Verify RCS pressure stable or rising (RO/BOP)
		  • Verify Pressurizer level >9% (RO/BOP)
		
		• Transitions to either 19011-C or 19010-C depending on conditions at the time (how fast the crew moves through the procedures compared to how fast S/G #3 depressurizes)

	19011-C Actions	Actions 19011-C
		
		• Reset SI (RO/BOP)
		
		• Reset CIA (RO/BOP)
		
		• Align instrument air to containment (RO/BOP)
		
		• Stops 1 CCP (RO/BOP)
		•
		• Verify RCS pressure stable or rising (RO/BOP)
		
		• Places normal charging in service (RO/BOP)
		  • Opens 1HV-8111A/B & 1HV-8110
		  • Closes1HV-8508A/B
		  • Closes 1HV-8801A/B
		  • Sets 1HC-0182 to maximum seal flow
		  • Opens 1HV-8105 & 1HV-8106
		  • Controls RCP seal injection between 8-13 gpm
		  • Checks RCS pressure trend
		  • Stops SI & RHR pumps
		
		Planned end point

Classify the Event answer:

Uncontrolled depressurization of one or more steam generators is an NOUE EMERGENCY

Initial Conditions: The plant is at 95%. RCS boron concentration is at 1308 ppm, BOL conditions. B Train equipment in service.

Turnover:

1. Plant Startup is in progress.
2. Rx power is 95%.
3. 1PV-0456 is in the shut position due to seat leakage.
4. 1HV-8000B is shut to comply with Technical Specification 3.4.11 Condition "A".
5. ECCS Accumulator #2 level is low due to a minor leak. After assuming the shift have the RO raise the accumulator level per SOP-13105-C
6. After Accumulator #2 has been filled you are to continue the power increase to 98% per 12004-C. (step 4.1.50) All prerequisites for the power increase were met on the previous shift. The Load Dispatcher has been notified of the power increase. The SS has requested that Control Rods be placed in automatic when reactor power is at 98% for engineering testing, notify him.
7. The last shift entered AOP 18009-C due to a 20 GPD tube leak on Steam generator #1. All actions of Section "B" have been completed with the exception of the radiation monitors which still need to be reset.
8. In addition a tornado alert has been issued for Burke and Richmond Counties. There are heavy thunderstorms occurring at this time. The severe weather checklist has been completed in the last hour.