

Scenario No.: 2

Target Quantitative Attributes per Scenario (See Section D.5.d)	Actual Attributes	Event No.
1. Total malfunctions (5-8)	7	2-8
2. Malfunctions after EOP entry (1-2)	3	6,7,8
3. Abnormal events (2-4)	3	2,3,4
4. Major transients (1-2)	1	5
5. EOPs entered/requiring substantive actions (1-2)	1	LOCA-1
6. Entry into a contingency EOP with substantive actions (≥ 1 per scenario set)	1	LOCA-5
7. Preidentified critical tasks (≥2)	3	CT-2, CT-5, CT-29
8. Tech Specs exercised (≥ 2)	2	2,4

I. OBJECTIVES

- A. Given the order, perform a turbine load reduction in accordance with station procedures.
- B. Given indications of a Steam Generator instrumentation malfunction, perform actions as the nuclear control operator to RESPOND to the malfunction in accordance with the approved station procedures.
- C. Given indication of a Steam Generator instrumentation malfunction, DIRECT the response to the malfunction in accordance with the approved station procedures.
- D. Given indications of a loss of vacuum, perform actions as the nuclear control operator to RESPOND to the malfunction, IAW approved station procedures.
- E. Given indications of a loss of vacuum, DIRECT the response to the malfunction IAW approved station procedures.
- F. Given indications of a RCS RTD instrument failure, perform actions as the nuclear control operator to RESPOND to the malfunction in accordance with approved station procedures.
- G. Given indications of a RCS RTD instrument failure, DIRECT the response to the malfunction in accordance with approved station procedures.
- H. Given an RCS leak at power, respond to the event IAW approved station procedures.
- I. Given the indications of a reactor coolant system (RCS) malfunction or leak, perform actions as the nuclear control operator to RESPOND to the malfunction in accordance with the approved station procedures.
- J. Given the indications of a reactor coolant system (RCS) malfunction or leak, DIRECT the response to the malfunction in accordance with the approved station procedures.
- K. Given the order or indications of a reactor trip, perform actions as the nuclear control operator to RESPOND to the reactor trip in accordance with the approved station procedures.
- L. Given indication of a reactor trip, DIRECT the response to the reactor trip in accordance with the approved station procedures.

- M.** Given the order or indications of a reactor trip, perform actions as the shift technical advisor to RESPOND to the reactor trip in accordance with the approved station procedures.
- N.** Given the order or indications of a safety injection perform actions as the nuclear control operator to RESPOND to the safety injection in accordance with the approved station procedures.
- O.** Given indication of a safety injection DIRECT the response to the safety injection in accordance with the approved station procedures.
- P.** Given the order or indications of a safety injection, perform actions as the shift technical advisor to RESPOND to the safety injection in accordance with the approved station procedures.
- Q.** Given a safety injection has occurred and equipment has failed to start, START equipment that has failed to automatically start in accordance with station procedures.
- R.** Given the order or indications of a loss of coolant accident (LOCA), complete actions as the nuclear control operator to PERFORM the immediate response to the LOCA in accordance with the approved station procedures.
- S.** Given indication of a loss of coolant accident (LOCA), DIRECT the immediate response to the LOCA in accordance with the approved station procedures.
- T.** Given the order or a loss of coolant accident (LOCA) with indication of a loss of emergency recirculation, perform actions as the nuclear control operator to RESPOND to the loss of emergency recirculation in accordance with the approved station procedures.
- U.** Given a loss of coolant accident (LOCA) and a loss of emergency recirculation, DIRECT actions to respond to the emergency recirculation loss in accordance with the approved station procedures.
- V.** During performance of emergency operating procedures, monitor the critical safety function status trees in accordance the EOP in effect.

II. MAJOR EVENTS

1. Planned Load Reduction to 89% at 10%/hour
2. 23 SG Pressure Channel 3 Fails Low (TS only)
3. 24 Vacuum Pump trips
4. RC Loop 24 Cold Leg RTD Fails High (TS)
5. RCS Leak
6. 22 RHR Pump Fails to Start on SEC Signal
7. Loss of Emergency Recirculation capability (22 RHR Pump Trips)

III. SCENARIO SUMMARY

1. The crew assumes the watch at 100% power, EOL. 23 Charging Pump is C/T for pulsation damper repairs with 21 Charging Pump in service, 21 RHR is C/T for motor bearing replacement.
2. After assuming the watch, the crew will brief a planned load reduction to 89% at 10%/hour IAW **S2.OP-IO.ZZ-0004**, Power Operation, in preparation for Main Turbine Valve testing next shift.
3. After the power reduction has commenced, 23 SG Pressure Channel 3 will fail low. The crew will respond IAW Alarm Response Procedure and determine that the event has no impact to plant operations. The CRS will enter TS 3.3.2.1.b Action 19.
4. After the 23 SG Pressure Channel has been addressed, 24 condenser vacuum pump will trip. The crew will recognize that condenser backpressure is slowly rising and enter **S2.OP-AB.COND-0001**, Loss of Condenser Vacuum. The crew will start all available vacuum pumps and stabilize condenser back pressure.
5. After the crew addresses vacuum pump trip, 24 Loop Cold Leg RTD will fail high causing control rods to continuously insert. The crew will verify no turbine runback in progress and place rods in manual. The crew will enter **S2.OP-AB.ROD-0003**, Continuous Rod Motion, and place rods to manual, defeat the failed channel, place Charging Flow in manual, then restore rods to Auto. The CRS will enter TS 3.3.1.1, Action 6 and 3.3.2.1.b Action 19.
6. Once actions for 24 Loop RTD failure is addressed, a RCS leak will occur resulting in rapidly lowering PZR level and pressure. The crew will take CAS actions in **S2.OP-AB.RC-0001** and manually trip the reactor. Immediately following the Rx Trip the RCS leak will escalate into a Large Break LOCA and a malfunction will prevent Auto Safety Injection to actuate. The crew will respond by manually initiating SI [**Critical Task #1**]. The crew will enter **EOP-TRIP-1**, Reactor Trip or Safety Injection.
7. While in EOP-TRIP-1, the crew will recognize that 22 RHR Pump failed to start on SEC signal. The crew will block and reset 2B SEC, then manually start 22 RHR Pump [**Critical Task #2**].
8. The crew will perform diagnostics in EOP-TRIP-1 and eventually transition to **EOP-LOCA-1**, Loss of Coolant, based on containment pressure > 4 psig. While in EOP-LOCA-1, the 22 RHR Pump will trip and the crew will determine a loss of emergency recirculation capability and

transition to **EOP-LOCA-5**, Loss of Emergency Recirculation. The crew will perform the following actions in LOCA-5; make-up to RWST, stop Containment Spray Pumps, and then reduce ECCS to a single train [**Critical Task #3**].

9. The scenario can be terminated when the crew stops one Charging pump or by direction from Lead Examiner.

IV. INITIAL CONDITIONS

___ IC-211

PREP FOR TRAINING (i.e. computer setpoints, procedures, bezel covers ,tagged equipment)

<i>Initial</i>	Description
___ 1	2VC1and 2VC4 C/T
___ 2	RCPs (SELF CHECK)
___ 3	RTBs (SELF CHECK)
___ 4	21-24MS167s (SELF CHECK)
___ 5	500 KV SWYD (SELF CHECK)
___ 6	21 and 22 SGFP Trip (SELF CHECK)
___ 7	21 CV Pump (SELF CHECK)
___ 8	21 RHR Pump C/T
___ 9	23 Charging pump C/T
___ 10	Suggested Protected Equipment: <ul style="list-style-type: none">▪ 22 RHR Pump
___ 11	Complete Attachment 2 "Simulator Ready-for-Training/Examination Checklist."

Note: Tables with blue headings may be populated by external program, do not change column name without consulting Simulator Support group

EVENT TRIGGERS:

Initial	ET #	Description
	1	EVENT ACTION: MONP254 < 10. //CONT ROD BANK C < 10 (RX TRIP) COMMAND: PURPOSE: <update as needed>
	2	EVENT ACTION: KCK02PBZ //22 VACUUM PUMP-START COMMAND: PURPOSE: <update as needed>

MALFUNCTIONS:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Severity
___ 01	SG0100C 23 SG PR XMTR (536) PROT CH III FAIL	N/A	N/A	N/A	RT-1	0
___ 02	RC0015D LOOP 24 COLD LEG RTD FAILS HI/L	N/A	N/A	N/A	RT-3	630
___ 03	RC0002 RCS LEAK INTO CONTAINMENT (equiv to 0-4 inches)	N/A	0	00:01:00	RT-4	18000
___ 04	RP0108 FAILURE OF AUTOMATIC SI	N/A	N/A	N/A	N/A	
___ 05	RP318A2 RHR PUMP 22 Fails to Start on SEC	N/A	N/A	N/A	N/A	
___ 06	VC0087C TRIP OF VACUUM PUMP 24	N/A	N/A	N/A	RT-2	
___ 07	RH0026B 22 RHR PUMP TRIP	N/A	N/A	N/A	RT-5	
___ 08	RC0001A RCS RUPTURE OF RC LOOP 21	N/A	N/A	N/A	ET-1	
___ 09	VC0087A TRIP OF VACUUM PUMP 22	00:00:02	N/A	N/A	ET-2	

REMOTES:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Condition
___ 01	CV20A 2CV182 BLENDER ISO VLV	N/A	N/A	N/A	RT-10	100
___ 02	CV21A 2CV184 BLENDER DISC TO RWST	N/A	N/A	N/A	RT-10	100
___ 03	RH26D 21 RHR PUMP BKR CONTROL POWER	N/A	N/A	N/A	N/A	OFF
___ 04	RH27D 21 RHR PUMP RACK OUT	N/A	N/A	N/A	N/A	TAGGED

OVERRIDES:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Condition/Severity
___ 01	AH03 C1 LO QAH03HRK RWST HEATER PUMP START	00:00:02	N/A	N/A	RT-11	ON

02	AH03 C2 LO QAH03KGK RWST HEATER PUMP STOP	N/A	N/A	N/A	RT-11	OFF
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OTHER CONDITIONS:

Description

1. None

V. SEQUENCE OF EVENTS

- A. State shift job assignments.
- B. Hold a shift briefing, detailing instruction to the shift: (provide crew members a copy of the shift turnover sheet)
- C. Inform the crew “The simulator is running. You may commence panel walkdowns at this time. SM please inform me when your crew is ready to assume the shift”.
- D. Allow sufficient time for panel walk-downs. When informed by the SM that the crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>1. Power Reduction to 89%</p> <p>CRS briefs crew on power reduction to 89% at 10%/hour IAW S2.OP-IO.ZZ-0004, Section 4.3 Power Reduction.</p> <p>RO briefs boration plan for load reduction.</p> <p>PO briefs turbine load control plan.</p> <p>RO initiates boration IAW S2.OP-SO.CVC-0006.</p> <p>PO initiates turbine load reduction IAW S2.OP-SO.TRB-0002, Turbine Generator Shutdown Operation.</p> <p>RO monitors Tavg and control rods for proper response.</p> <p>Proceed to next event by direction from Lead Examiner.</p>			
<p>Examiner's Note: The crew may at any time stop the load reduction to respond to the next events.</p>			
<p>2. 23 SG Pressure Channel 3 Fails Low</p>			
<p>Simulator Operator: Insert RT-1 on direction from Lead Examiner.</p>			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
SG0100C, 23 SG PRESS CH 3 FAILS H/L Value: 0			
	PO reports unexpected OHA alarms for G-17 LOOP 23 STM LN DP LO and G-33 STM LN PRESS LO, and console alarm for PRESS LO.		
	PO reports the following bistables are lit on 2RP4 for STM LINE DIFFERENTIAL LOOP 23 and LOW STEAMLINE PRESSURE LOOP 23.		
	PO reports 23 SG Pressure Channel 3 has failed low.		
	Crew reviews ARP and determines no operator is required and no impact to plant operation due to failed channel.		
	CRS directs support for removing failed channel from service IAW S2.OP-SO.RPS-0004, Placing SG Channel in Trip Condition.		
TS evaluation #1:			
	CRS enters TS 3.3.2.1.b, Action 19 (72 hours).		
Proceed to next event when Tech Spec has been evaluated or at Lead Examiners direction.			
3. 24 Vacuum Pump Trips:			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Simulator Operator: At direction from Lead Evaluator insert RT-5. This will trip 24 vacuum pump:</p> <p>VC0087C, Trip of Vacuum Pump 24</p>			
	<p>PO reports unexpected trip of 24 Vacuum Pump.</p>		
	<p>CRS enters S2.OP-AB.COND-0001, Loss of Condenser Vacuum.</p>		
	<p>PO initiates Attachment 1 CAS.</p>		
	<p>CRS dispatches operator to perform Attachment 2, Loss of Vacuum Local Checks.</p>		
<p>Role Play: When dispatched to perform Attachment 2, THEN after 2-5 minutes report the following: <i>I've completed Attachment 2 and have found no abnormal conditions except for the breaker being tripped open.</i></p>			
	<p>PO reports 24 Vacuum pump is stopped and the 24AR25 is closed.</p>		
	<p>PO reports condenser backpressure is rising rapidly.</p>		
	<p>PO reports rising backpressure is not attributed to CW System malfunctions.</p>		
	<p>PO starts all available vacuum pumps.</p>		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>22 Vacuum Pump trips following start:</p>			
<p>Simulator Operator: Ensure ET-2 is TRUE IF 22 Vacuum pump is started. This will cause the pump to trip following start.</p>			
<p>25AR25 fails to open following start of 25 Vacuum Pump:</p>	<p>IF 22 Vacuum Pump is started, the PO reports that the pump started then tripped seconds later.</p>		
	<p>PO reports that 25 Vacuum Pump started but the 25AR25 failed to open.</p>		
<p>Role Play: IF requested to check local indications at the Vacuum Pump, THEN report that <i>the local gauge reading is SAT and all other parameters are in the SAT range.</i></p>			
	<p>PO manually opens 25AR25.</p>		
	<p>PO reports that condenser back pressure is improving.</p>		
<p>Proceed to next event at direction from Lead Examiner.</p>			
<p>4. 24 Loop Cold Leg RTD Fails High</p>			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Simulator Operator: Insert <u>RT-2</u> on direction from Lead Examiner.</p> <p>RC0015D, 24 Cold Leg RTD Fails H/L Value = 630</p>			
<p>Examiner's Note: RO may request to take manual control of Master Flow Controller prior to direction provided in S2.OP-AB.ROD-0003.</p>	<p>RO reports unexpected continuous rod insertion with no turbine runback in progress.</p>		
<p>Examiner's Note: RO could place MFC in Manual at anytime or wait until directed in AB.ROD-0003.</p>	<p>RO places rod control in Manual.</p>		
	<p>RO reports rod motion has stopped.</p>		
	<p>CRS enters S2.OP-AB.ROD-0003, Continuous Rod Motion.</p>		
	<p>RO reports that 24 RC Loop Tavg Channel has failed high. (may also report DT is reading zero indicating failed high Cold Leg input)</p>		
<p>RO places Master Flow Controller (MFC) to Manual</p>			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports various 2CC2 console alarms in for: RC Loop Tavg Deviation, Tavg-Tref Deviation, RC Tavg Hi or Lo-Lo, RC Loops DT Dev.		
	CRS confirms control rods are in manual and rod motion has stopped.		
	CRS directs RO to adjust rods in manual to maintain Tavg within 1.5 deg of T program. Any rod manipulation is pre-announced, and the RO monitors control board indications for plant response to rod motion.		
	RO reports rod motion was in the inward direction and a NIS channel has NOT failed.		
	CRS directs RO to stop any dilution in progress.		
	RO reports 24 loop Tavg channel has failed High.		
	CRS directs RO to return PZR level to program.		
	RO places Charging System Master Flow Controller in manual (if not previously performed).		
	RO adjusts charging flow to restore PZR level to program IAW Attachment 2.		
	RO defeats 24 loop Reactor Coolant Differential Temperature and 24 loop Reactor Coolant Average Temperatures on 2CC2.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>TS evaluation #2:</p>	<p>RO selects channel other than 24 loop for Reactor Coolant Differential Temperature and Reactor Coolant Average Temperature.</p>		
	<p>When PZR level has been restored to program, RO places Charging System Master Flow Controller in auto.</p>		
	<p>RO reports control rods are above the rod insertion limit.</p>		
	<p>RO restores control rods to previous position at time of load reduction.</p>		
	<p>RO places rod control in Auto after ensuring Tavg is within 1.5 degrees of Tref.</p>		
<p>Examiner's Note: Operator actions already performed in AB.ROD-0003, no additional actions in control room, I&C Maintenance is required to complete S2.OP-SO.RPS-0002.</p>	<p>CRS enters TS: 3.3.1.1 Action 6 (72 hours) and 3.3.2.1.b Action 19* (72 hours).</p>		
<p>Proceed to next event after Tech Specs has been evaluated or by direction from Lead Examiner.</p>			
	<p>CRS initiates S2.OP-SO.RPS-0002 to place 24 loop Tavg in tripped condition.</p>		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
5. RCS Leak			
Simulator Operator: Insert RT-4 by direction from Lead Examiner. RC0002, RCS Leakage Value = 18000 Ramp = 1 minute			
	RO reports unexpected OHA E-28 PZR HTR ON PRESS LO and Console Alarms for PZR LEVEL LO and CONT PRESS HI.		
	RO reports rapidly lowering PZR level and RCS Pressure.		
	RO reports 2R11A is rising.		
	CRS enters S2.OP-AB.RC-0001, RCS Leakage.		
	CRS initiates Attachment 1 CAS and directs RO to: <ul style="list-style-type: none"> • Trip the Rx • Confirm the Rx is tripped • Initiate Safety Injection 		
6. Large Break LOCA			
Simulator Operator: Ensure ET-1 is TRUE following Rx Trip. This will insert LBLOCA malfunction. RC0001A, RCS rupture on RC loop 21			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Auto SI fails to actuate on both trains:</p>	<p>RO may report SI failed to Auto actuate (depending on where RCS pressure is at during time SI is manually actuated)</p>		
<p>Critical Task-1 (CT-2): Manually actuate SI before transition out of EOP-TRIP-1.</p> <p>SAT _____ UNSAT _____</p>			
	<p>RO manually actuates SI on one Train and verifies the other train actuated. [Critical Task #1]</p>		
	<p>RO continues Immediate Actions of TRIP-1:</p> <ul style="list-style-type: none"> ▪ Reports the Main Turbine is tripped and backs up Main Turbine trip. ▪ Reports all 4KV vital busses energized. ▪ Reports SI has been initiated. 		
	<p>CRS and RO verify Immediate Actions complete.</p>		
	<p>CRS directs initiation of the following EOP-TRIP-1 CAS actions when RCS pressure meets the criteria:</p> <ul style="list-style-type: none"> • Stops RCPs (1350 psig) • Close Charging Mini-flows (1500 psig) 		
	<p>RO announces Rx Trip and Safety Injection on the station PA.</p>		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
7. 22 RHR Pump fails to start on SEC signal (21 RHR Pump is C/T):	PO reports ALL Vital Buses are energized.		
	PO reports SEC loading for 2B vital bus is NOT complete.		
	PO reports 22 RHR pump failed to start.		
	PO blocks and resets 2B SEC.		
	RO starts 22 RHR pump. [Critical Task-2]		
Critical Task-2 (CT-5): Manually start one low head ECCS pump before transition out of EOP-TRIP-1. SAT _____ UNSAT _____			
	PO throttles AFW flow to no less than 22E4lbm/hr while SG NR levels remain <9%. (15% adverse)		
	PO reports all valve groups in Table B are in their safeguards positions.		
	RO reports containment pressure has NOT remained <15 psig.		
	RO reports Phase B and Spray actuation Auto initiated.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports 22 CS pumps is running.		
	RO reports MSLI Auto initiated.		
	RO reports all valves groups in Table D are in the safeguards positions.		
	PO reports no indication of High Steam flow on 2RP4.		
	PO reports All vital busses are energized.		
	RO reports control room ventilation is in Accident Pressurized Mode.		
	RO reports proper switchgear room ventilation.		
	RO reports 2 CCW pumps are running.		
	RO reports both CCW HXs are in Auto.		
	RO reports RCS pressure is less than 300 psig (420 psig Adverse)		
	RO reports BIT flow >100 gpm, and expected SI pump and RHR pump flows consistent with RCS pressure.		
	PO maintains total AFW flow >22E4 lbm/hr until at least one SG NR level is > 9% (15% adverse), then maintains SG NR levels between 19% and 33%.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Examiner's Note: Based on the pace of the crew, they may perform the following CAS steps sooner or later in EOP-TRIP-1.			
	RO closes charging pump mini flows IAW TRIP-1 CAS when RCS pressure is < 1500 psig with BIT flow established. [TRIP-1 CAS]		
	RO stops RCPs IAW TRIP-1 CAS when RCS pressure is <1350 psig with ECCS flow established. [TRIP-1 CAS]		
	RO reports RCP status, and CRS determines whether a MSLI for temperature control is required.		
	RO reports both RTBs are open.		
	RO reports both PZR PORVs are closed and their block valves are open.		
	Crew identifies when containment pressure rises to 4 psig and adverse numbers are to be used.		
	RO reports RCP status and PZR spray consistent with number of operating RCPs.		
	RO reports RCS pressure < 1350 psig and ECCS flow established.		
	RO trips all RCPs IAW EOP CAS.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Examiner's Note: SG pressure could lowering slowly based on the break flow from the LBLOCA.	RO maintains seal injection to all RCPs.		
EOP-LOCA-1 steps here:			
	PO reports normal expected SG pressures for current conditions and CRS determines no faulted SGs exist.		
	PO reports no indications of a SGTR exist.		
	RO reports two or more channels in Table F are NOT warning or alarm using P250 computer OR reports Containment Pressure > 4 psig.		
Examiner's Note: During LOCA-1, the crew may reach the low RWST alarm (15.2 feet) and then transition to EOP-LOCA-3. IF so, the CAS in LOCA-3 will direct transition to LOCA-5 following the trip of the last remaining RHR Pump.	CRS transitions to 2-EOP-LOCA-1, Loss of Reactor Coolant.		
Simulator Operator: IF the crew transitions to LOCA-3, THEN insert RT-6 to trip the 22 RHR Pump.			
	PO reports no indications of faulted SGs.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO maintains total AFW flow >22E4 lbm/hr until at least one SG NR level is > 9% (15% adverse), then maintains SG NR levels between 19% and 33%.		
	PO reports no indications of a SGTR exist.		
	RO resets SI and Phase A isolation.		
	RO resets Phase B isolation.		
	RO opens 21 and 22CA330s.		
	PO resets all SECs.		
	PO reports 230V control centers reset.		
	RO resets SGBD Sample Isolation Bypass and opens 21-24 SS94s.		
	CRS directs chemistry to sample 21-24 SGs for boron and activity.		
	RO reports both PZR PORVs are Closed and Block valves are Open.		
	RO reports subcooling is NOT greater than 0 F.		
	RO reports RHR is not aligned for Cold Leg Recirculation.		
	RO reports RHR flow is > 300 gpm.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Proceed to next event following status of 4KV Vital Buses</p>	<p>RO reports All 4KV vital buses are energized from offsite power.</p> <p>PO stops all unloaded EDGs.</p>		
<p>Role Play: IF requested to verify EDG is reset to Auto, THEN state the following: <i>EDG is reset for Auto start IAW EOP-APPX-9.</i></p> <p>Verify OHA J-4, J-12 and J-20 for associated EDG is cleared.</p> <p>Simulator Operator: No Actions.</p>			
<p>8. Trip of 22 RHR Pump (Loss of Emergency Recirculation Capability):</p>			
<p>Simulator Operator: Insert RT-6 at direction from Lead Examiner to trip the last running RHR Pump.</p> <p>This malfunction will result in the crew entering EOP-LOCA-5.</p> <p>RH0026B, 22 RHR Pump Trip Value = TRUE</p>			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports that 22 RHR Pump tripped.		
	RO reports NO RHR pumps are available.		
<p>Role Play: IF an operator is dispatched to investigate why 22 RHR pump trip, THEN report the following: <i>the breaker tripped on overcurrent (relay flag is dropped).</i></p>			
<p>EOP-LOCA-5 steps here:</p>	<p>CRS determines that no RHR Pumps are available and transitions from Step 16 to EOP-LOCA-5, Loss of Emergency Recirculation</p>		
<p>Examiner's Note: IF crew transitions to EOP-LOCA-3 at this point, THEN LOCA-3 CAS will direct them to EOP-LOCA-5.</p>	<p>RO depresses close pushbuttons for 21 and 22 CC16's (CCW to RHR HX outlet valves).</p>		
	<p>CRS transitions to 2-EOP-LOCA-5, Loss of Emergency Coolant Recirculation.</p>		
	<p>CRS verifies safeguards reset and all unloaded EDGs stopped.</p>		
	<p>RO reports containment sump level >62% light are illuminated.</p>		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports NO train of Emergency Recirculation is available due to no RHR Pumps available.		
	CRS directs investigation into both RHR pump trips.		
	RO reports all <u>available</u> CFCUs are running in low speed.		
<p>Examiner's Note: Critical Task-3 is broken down into a series of three (3) actions to conserve RWST inventory.</p> <p>Part 1 is stopping CS Pumps Part 2 is RWST makeup. Part 3 is reducing SI to one train.</p>			
<p>Examiner's Note: During validations, RWST level was 14.2 ft., Cntmt Pressure was 17 psig, and 4 CFCUs were running.</p>			
	CRS determines <u>NO</u> CS pumps are required to be running at Step 9 IAW Table C.		
<p>Critical Task-3 (CT-29): Makeup to RWST and minimize RWST outflow before ECCS pumps cavitate.</p> <p>SAT_____ UNSAT_____</p> <p>Part 1 is stopping CS Pumps</p> <p>Steps shaded are required to complete the CT.</p>			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Part 1 - Stopping CS pumps:			
	RO resets Spray actuation.		
	RO stops 21 AND 22 CS pump. [Critical Task-2, Part 1 complete]		
Part 2 – Make-up to RWST:			
RO initiates makeup to the RWST IAW S2.OP-SO.CVC-0006.			
S2.OP-SO.CVC-0006 Section 5.8 steps start here:			
GO TO Page 29 to continue on with LOCA-5 steps.			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Simulator Operator: Insert RT-11 to simulate RWST Heater Recirc Pump in service bezel illuminated:</p> <p>AH03 C2: RWST Heater Pump Stop Final = Override OFF</p> <p>AH03 C1: RWST Heater Pump Start Final = Override ON Delay = 2 seconds</p> <p>NOTIFY control room when RWST heater recirc pump is in service.</p>			
	PO ensures VCT level is adequate.		
	PO obtains Boric Acid flow setpoint from REM Figure 100B or 100D. (at least ≥ 20 gpm)		
	PO resets COUNT A on makeup flow register to zero IAW Exhibit 1.		
	PO places makeup control mode select in stop		
	PO places 2CV179 in Manual (goes full open)		
	PO places 2CV172 in Manual.		
	PO dispatches field operator to locally check 2BR170 is closed.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<p>Role Play: After 1-2 minutes report 2BR170 is CLOSED. No action needed by Simulator Operator.</p>			
	<p>PO notifies CRS to evaluate TS for applicability.</p>		
	<p>PO starts 22 Primary Water pump.</p>		
<p>Simulator Operator: Insert RT-10 when crew requests 2CV182 and 2CV184 to be locally opened in support of RWST makeup.</p> <p>CV20A, 2CV182 Blender Isol Valve (ramp 30 secs) CV21A, 2CV184 Blender Isol Valve (time delay 30 secs, ramp 30 secs) Value = 100</p> <p>NOTIFY control room when valves are open.</p>			
<p>Examiner's Note: When the 2CV182 and 2CV184 are opened the Primary Water flow counter will start.</p>			
	<p>PO places 22 Boric Acid Pump in Manual/Fast start</p>		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO adjusts 2CV172 flow to the value recorded previously. (at least ≥ 20 gpm)		
	PO closes 21 and 22 CV160 if flow not achieved.		
	PO adjusts 2CV179 to 50 gpm using open/close pushbuttons. [Critical Task-3, Part 2 complete]		
	PO reports makeup to RWST has been initiated.		
<p>Critical Task-3 (CT-29): Makeup to RWST and minimize RWST outflow before ECCS pumps cavitate.</p> <p>SAT _____ UNSAT _____</p> <p>Part 2 is RWST makeup.</p> <p>Steps shaded are required to complete the CT.</p>			
<p>LOCA-5 continued here:</p>			
	PO maintains total AFW flow $>22E4$ lbm/hr until at least one SG NR level is $> 9\%$ (15% adverse), then maintains SG NR levels between 19% and 33%.		
<p>RCS cooldown at 100 F/hr:</p>	CRS directs performance of SDM.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Part 3 - SI flow reduction to one train:	PO plots RCS cooldown.		
	PO reports intact SGs available for cooldown		
	PO reports steam dumps NOT available due to MSLI.		
	PO dumps steam using intact available MS10's		
	RO reports BIT flow is established.		
Critical Task-3 (CT-29): Makeup to RWST and minimize RWST outflow before ECCS pumps cavitate. SAT _____ UNSAT _____ Part 3 is reducing SI to one train. Steps shaded are required to complete the CT.	RO stops all but <u>one</u> charging pump. [Critical Task-3, Part 3 complete]		
	RO runs <u>only one</u> SI pump.		
	RO reports No flow on 21 or 22 SJ49 flow meters.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Terminate the scenario when the crew stops all but one Charging Pump or at Lead Examiners direction.	RO reports no RHR pumps are running.		

VI. SCENARIO REFERENCES

- A. Alarm Response Procedures (various)
- B. Technical Specifications
- C. Emergency Plan (ECG)
- D. S2.OP-AB.COND-0001, Loss of Condenser Vacuum
- E. S2.OP-AB.ROD-0003, Continuous Rod Motion
- F. S2.OP-AB.RC-0001, RCS Leak
- G. 2-EOP-TRIP-1, Reactor Trip or Safety Injection
- H. 2-EOP-LOCA-1, Loss of Reactor Coolant
- I. 2-EOP-LOCA-5, Loss of Emergency Recirculation

**ATTACHMENT 1
UNIT TWO PLANT STATUS
TODAY**

MODE: 1 POWER: 100% RCS BORON: 27 ppm MWe 1220

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED):

NA

REACTIVITY PARAMETERS:

- Rx Plan: To lower Rx power to 89% at 10%/hour add 168 gallons of boric acid along with inserting control rods to maintain Tav_g on program. Reactor Engineering directs the crew to perform a boration first. Expect D bank at 193 steps when load reduction is complete.

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

- None

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

- Load reduction to 89% at 10%/hour in preparation for Main Turbine valve testing.

ABNORMAL PLANT CONFIGURATIONS:

CONTROL ROOM:

Hope Creek and Salem 1 are at 100% power.

PRIMARY:

- 23 Charging Pump C/T for pulsation damper replacement.
- 21 RHR Pump C/T for motor bearing inspection.

SECONDARY:

- Heating Steam is aligned to Unit 1
- Polisher is in service
- Blowdown is 35K per loop to 23 Condenser / Flashtank

RADWASTE:

No discharges in progress

CIRCULATING WATER/SERVICE WATER:

ATTACHMENT 2

SIMULATOR READY-FOR-TRAINING CHECKLIST

- 1. Verify simulator is in "TRAIN" Load
- 2. Simulator is in RUN
- 3. Overhead Annunciator Horns ON
- 4. All required computer terminals in operation
- 5. Simulator clocks synchronized
- 6. All tagged equipment properly secured and documented
- 7. TSAS Status Board up-to-date
- 8. Shift manning sheet available
- 9. Procedures in progress open and signed-off to proper step
- 10. All OHA lamps operating (OHA Test) and burned out lamps replaced
- 11. Required chart recorders advanced and ON (proper paper installed)
- 12. All printers have adequate paper AND functional ribbon
- 13. Required procedures clean
- 14. Multiple color procedure pens available
- 15. Required keys available
- 16. Simulator cleared of unauthorized material/personnel
- 17. All charts advanced to clean traces and chart recorders are on.
- 18. Rod step counters correct (channel check) and reset as necessary
- 19. Exam security set for simulator
- 20. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter
With Baseline Data filled out
- 21. Shift logs available if required
- 22. Recording Media available (if applicable)
- 23. Ensure ECG classification is correct
- 24. Reference verification performed with required documents available
- 25. Verify phones disconnected from plant after drill.
- 26. Verify EGC paperwork is marked "Training Use Only" and is current revision.
- 27. Ensure sufficient copies of EGC paperwork are available.

ATTACHMENT 3 CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgment of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant. The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

- I. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...
 - degradation of any barrier to fission product release
 - degraded emergency core cooling system (ECCS) or emergency power capacity
 - a violation of a safety limit
 - a violation of the facility license condition
 - incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
 - a significant reduction of safety margin beyond that irreparably introduced by the scenario
- II. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...
 - effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
 - recognize a failure or an incorrect automatic actuation of an ESF system or component.
 - take one or more actions that would prevent a challenge to plant safety.
 - prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) or ESF actuation).

**ATTACHMENT 4
SIMULATOR SCENARIO REVIEW CHECKLIST**

SCENARIO IDENTIFIER: 19-01 NRC Scenario #2 REVIEWER: R. Chan

Initials	Qualitative Attributes
R	1. The scenario has clearly stated objectives in the scenario.
R	2. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.
R	3. The scenario consists mostly of related events.
R	4. Each event description consists of: <ul style="list-style-type: none"> • the point in the scenario when it is to be initiated • the malfunction(s) that are entered to initiate the event • the symptoms/cues that will be visible to the crew • the expected operator actions (by shift position) • the event termination point
R	5. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.
R	6. The events are valid with regard to physics and thermodynamics.
R	7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
R	8. The simulator modeling is not altered.
R	9. All crew competencies can be evaluated.
R	10. The scenario has been validated.
NA	11. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.
R	12. ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

**ATTACHMENT 5
ESG CRITICAL TASKS**

19-01 NRC Scenario #2

CT #1 (CT-2):

Critical Task: Manually actuate SI before transition out of EOP-TRIP-1.

Basis: See WOG Rev. 2.

CT #2 (CT-5):

Critical Task: Manually start one low head ECCS pump before transition out of EOP-TRIP-1.

Basis: See WOG Rev. 2.

CT #3 (CT-29):

Critical Task: Makeup to the RWST and minimize RWST outflow to the RWST before ECCS pumps cavitate.

This CT is satisfied when the following series of actions are completed to conserve RWST inventory:

- 1. Stopping Containment Spray (CS) Pumps**
- 2. Initiating RWST make up,**
- 3. Reducing SI to one train**

BASIS: See WOG Rev. 2

ATTACHMENT 6

ESG – PSA RELATIONSHIP EVALUATION

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>Event</u>	<u>Y/N</u>	<u>Event</u>
<u>N</u>	TRANSIENTS with PCS Unavailable	<u>N</u>	Loss of Service Water
<u>N</u>	Steam Generator Tube Rupture	<u>N</u>	Loss of CCW
<u>N</u>	Loss of Offsite Power	<u>N</u>	Loss of Control Air
<u>N</u>	Loss of Switchgear and Pen Area Ventilation	<u>N</u>	Station Black Out
<u>Y</u>	LOCA		

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
<u>N</u>	Containment Sump Strainers	<u>N</u>	Gas Turbine
<u>N</u>	SSWS Valves to Turbine Generator Area	<u>N</u>	Any Diesel Generator
<u>N</u>	RHR Suction Line valves from Hot Leg	<u>N</u>	Auxiliary Feed Pump
<u>N</u>	CVCS Letdown line Control and Isolation Valves	<u>N</u>	SBO Air Compressor

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
<u>N</u>	Restore AC power during SBO
<u>N</u>	Connect to gas turbine
<u>N</u>	Trip Reactor and RCPs after loss of component cooling system
<u>N</u>	Re-align RHR system for re-circulation
<u>N</u>	Un-isolate the available CCW Heat Exchanger
<u>N</u>	Isolate the CVCS letdown path and transfer charging suction to RWST
<u>N</u>	Cooldown the RCS and depressurize the system
<u>N</u>	Isolate the affected Steam Generator that has the tube rupture(s)
<u>N</u>	Early depressurize the RCS
<u>N</u>	Initiate feed and bleed

SIMULATOR EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC-3 [AB.CVC, AR.ZZ-2, AB.SW-1, AB.CN-1, AB.LOAD-1, TRIP-1, LOSC-1, TRIP-3]
SCENARIO NUMBER: 19-01 NRC-3
EFFECTIVE DATE: See Approval Below
EXPECTED DURATION: 75 minutes
REVISION NUMBER: 01
PROGRAM: L.O. REQUAL
 INITIAL LICENSE
 STA
 OTHER _____

Revision Summary:

- ❖ **New issue** for 16-01 ILOT NRC exam. Incorporated comments from validation. Added 2SW191 unsat valve stroke time (21 charging pump) and 21 ABV Exhaust Fan trip to allow CRS to exercise Tech Specs. Note: Based on the minor changes to the scenario and no expected impact to the major event flowpaths and critical tasks, a full re-validation and SBT was not deemed necessary. A partial re-validation was performed on only the added Tech Spec changes on 11-8-17.
- ❖ Rev. 01: Modified for 19-01 ILOT NRC Exam. Incorporated NRC comment on 6-4-20 to swap RC Wide Range Pressure fails low with 21 SW Accumulator pressure low from ESG-1 to prevent overlap concerns with SRO Admin JPM task in ESG-1. Added comments from NRC Prep Week.

PREPARED BY:	R. Chan <hr/> Lead Regulatory Exam Author	6-18-20 <hr/> Date
APPROVED BY:	N/A <hr/> Operations Training Manager	<hr/> Date
APPROVED BY:	N/A <hr/> Operations Department	<hr/> Date

SCAN OF SIGNED SCENARIO COVER SHEET