Form 3.3-1 Scenario Outline

Facility:	Salem	Scenario #:	1
Scenario Source:	20-01 ESG-1	Op. Test #:	21-01
Examiners:		Applicants/ Operators:	

Initial Conditions: Salem Unit 2 is at 100% power BOL

Turnover: The crew is directed to reduce power to 89% power at 10% per hour IAW S2.OP-IO.ZZ-0004 using boration, control rods and turbine load control in preparation for Main Turbine Valve testing.

Critical Tasks:

1. Close one Phase A isolation valve before transition out of TRIP-1
2. Transfer to Cold Leg Recirculation before receiving RWST Lo-Lo Alarm or ECCS pump cavitation

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	ATC(R) BOP(R) CRS(N)	Load reduction to 89% at 10%/hr IAW IOP-4 for turbine valve testing
2	VC0087	BOP (C,MC) CRS (C)	24 Vacuum Pump trips
3	NI0193A	ATC(I,MC,R) CRS(I,TS)	2N41 fails HIGH
4	RC0002	ATC (C) CRS (C,TS)	RCS leak (20 gpm) inside containment
5	RC0002 RC0001A	ALL (M)	RCS leak worsens to 350 gpm/ Large Break LOCA **(CT-2)**
6	RP0108	ATC (I,MC) CRS (I)	Automatic SI fails to actuate
7	RP318M1	ALL(I,MC)	#2 ECAC fails to start.
8	VL0045 VL0046	ATC(C,MC) CRS(C)	Two Phase A valves fail to close **(CT-1)**
		ABs	AB.COND-1 → AB.NIS-1 → AB.RC-1
		EOPs	TRIP-1 → LOCA-1 → LOCA-3

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control

I. OBJECTIVES

A. Given the order, perform a turbine load reduction in accordance with station procedures.

B. Given indications of a loss of vacuum, perform actions as the nuclear control operator to RESPOND to the malfunction, IAW approved station procedures.

C. Given indications of a loss of vacuum, DIRECT the response to the malfunction IAW approved station procedures.

D. Given indications of a Power range nuclear instrument failure, perform actions as the nuclear control operator to RESPOND to the malfunction in accordance with approved station procedures.

E. Given indications of a Power range nuclear instrument failure, DIRECT the response to the malfunction in accordance with approved station procedures.

F. Given an RCS leak at power, respond to the event IAW approved station procedures.

G. 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.

H. 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.

I. 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.

J. Given indication of a reactor trip, DIRECT the response to the reactor trip in accordance with the approved station procedures.

K. 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.

L. Given indication of a safety injection DIRECT the response to the safety injection in accordance with the approved station procedures.

M. 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.

N. 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.

O. Given indication of a loss of coolant accident (LOCA), DIRECT the immediate response to the LOCA in accordance with the approved station procedures.

P. Given the order or a loss of coolant accident (LOCA) and plant conditions to support cold leg recirculation, perform actions as the nuclear control operator to TRANSFER to cold leg recirculation in accordance with the approved station procedures.

Q. Given a loss of coolant accident (LOCA) and plant conditions to support cold leg recirculation, DIRECT actions to transfer to cold leg recirculation in accordance with the approved station procedures.

R. 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. 24 Vacuum Pump trips
3. 2N41 Fails High (TS)
4. RCS Leak (20 gpm) (TS)
5. LBLOCA
6. Auto SI fails to actuate
7. #2 ECAC Fails to Start on SEC Signal
8. Two Phase A valves 2CV116, and 284 fail to close

III. SCENARIO SUMMARY

1. The crew assumes the watch at 100% power, EOL.
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, 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. The 25AR25 will fail to open and the operator will manually open from control room.
4. After the crew addresses the vacuum pump trip, 2N41 Power Range channel will fail high. The operator will respond by placing rod control in Manual. The crew will enter **S2.OP-AB.NIS-0001,** NIS Malfunction**,** and perform actions to remove channel from service. The CRS will evaluate Tech Specs.
5. Once actions for 2N41 Power Range channel are addressed, a RCS leak (20 gpm) will occur resulting in lowering PZR level and rising counts on the 2R11A containment radiation monitor. The CRS will enter **S2.OP-AB.RC-0001, RCS Leak**, and adjust Charging flow to stabilize PZR level. The CRS will evaluate TS and enter TS 3.4.7.2.b, Action b. Once TS has been evaluated, the RCS leak will worsen to 350 gpm. The crew will take CAS actions in S2.OP-AB.RC-0001 and manually trip the reactor, at which time the RCS leak will escalate into a Large Break LOCA.
6. Immediately following the Rx Trip a malfunction will prevent Auto Safety Injection from actuating. The crew will respond by manually initiating SI. The crew will enter **EOP-TRIP-1,** Reactor Trip or Safety Injection.
7. While in EOP-TRIP-1, the crew will recognize that #2 ECAC failed to start on SEC signal. The crew will block and reset 2C SEC, then manually start #2 ECAC, additionally two Phase A valves will fail to close and the crew will take action to close at least one valve in the penetration. [**Critical Task #1**].
8. The crew will perform diagnostics in EOP-TRIP-1 and eventually transition to **EOP-LOCA-1**, Loss of Reactor Coolant and **EOP-LOCA-3**, Transfer to Cold leg recirculation. While in LOCA-3

they will establish cold leg recirculation. [**Critical Task #2 – this CT includes time critical operator actions**].

9. The scenario can be terminated when the crew reduces ECCS to one train, stops all ECCS pumps taking suction from the RWST if the Lo-Lo level alarm is received, or by direction from Lead Examiner.

IV. INITIAL CONDITIONS

____ **IC-240**

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

Initial	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	**Suggested Protected Equipment:** ▪ **none**
____ 8	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: COMMAND: PURPOSE:	kck05anz //25AR25 25 VACUUM PUMP-CONDENSER DMF VL0440 <update as needed>
	2	EVENT ACTION: COMMAND: PURPOSE:	MONP254 < 10. //CONT ROD BANK C < 10 (RX TRIP) <update as needed>
	3	EVENT ACTION: COMMAND: PURPOSE:	kb116tcb //2CV116 SEAL W TO VCT CLOSE DMF VL0045 <update as needed>
	4	EVENT ACTION: COMMAND: PURPOSE:	kb117tcb //2CV284 SEAL W TO VCT CLOSE DMF VL0046 <update as needed>
	5	EVENT ACTION: COMMAND: PURPOSE:	KCK02PBZ //22 VACUUM PUMP-START <update as needed>

MALFUNCTIONS:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Severity
_____ 01	VC0087C TRIP OF VACUUM PUMP 24	N/A	N/A	N/A	RT-1	
_____ 02	VC0087A TRIP OF VACUUM PUMP 22	00:00:15	N/A	N/A	ET-5	
_____ 03	VL0440 25AR25 Fails to Position (0-100%)	N/A	N/A	N/A	N/A	0
_____ 04	NI0193A PR CH N41 FAILS HI/LO	N/A	N/A	N/A	RT-2	150
_____ 05	RC0002 RCS LEAK INTO CONTAINMENT (equiv to 0-4 inches)	N/A	N/A	N/A	RT-3	20
_____ 06	RC0001A RCS RUPTURE OF RC LOOP 21	N/A	N/A	N/A	ET-2	
_____ 07	RP0108 FAILURE OF AUTOMATIC SI	N/A	N/A	N/A	N/A	
_____ 08	RP318M1 EMER Contrl Air Compressor Fails to Start on SEC	N/A	N/A	N/A	N/A	
_____ 09	VL0045 2CV116 Fails to Position (0-100%)	N/A	N/A	N/A	N/A	100
_____ 10	VL0046 2CV284 Fails to Position (0-100%)	N/A	N/A	N/A	N/A	100

REMOTES:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Condition

OVERRIDES:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Condition/ Severity

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
1. **Power Reduction to 89%**			
	CRS briefs crew on power reduction to 89% at 10%/hour IAW S2.OP-IO.ZZ-0004, Section 4.3 Power Reduction.		
Note: Turnover states to add 120 gal of boric acid, Crew may decide to do multiple batches or 120 gal at a slow rate.	RO briefs boration plan for load reduction.		
	PO briefs turbine load control plan.		
RO will most likely use boration "hard card" Attachment 3 of S2.OP-SO.CVC-0006	**RO initiates boration IAW S2.OP-SO.CVC-0006.** • **PRESS** Make up mode **STOP** • **ADJUST** 2CV172 boric acid flow setpoint to desired value • **SET** boric acid flow register to desired gallons • **PRESS** Makeup control mode BORATE pushbutton • **PRESS** Makeup control mode START • **ENSURE** boric acid flow register indicates flow		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
PO will most likely use Routine Load Reduction "hard card" Attachment 3 of S2.OP-SO.TRB-0002 **Note: PO must toggle ramp rates from Per minute to per hour**	**PO initiates turbine load reduction IAW S2.OP-SO.TRB-0002, Turbine Generator Shutdown Operation.** • **ENSURE** Main Turb data display on Plant computer • **ADJUST** turbine ramp rate for TIP control to 10%/hr • **ADJUST** setter to 89% • **Select GO** • **ENSURE** setter – actual and Reference displays are updating		
	RO monitors Tavg and control rods for proper response.		
Proceed to next event by direction from Lead Examiner.			
Examiner's Note: The crew may at any time stop the load reduction to respond to the next events.			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
2. 24 Vacuum Pump Trips:			
Simulator Operator: At direction from Lead Evaluator insert **RT-1**. This will trip 24 vacuum pump: **VC0087C, Trip of Vacuum Pump 24**			
	PO reports unexpected trip of 24 Vacuum Pump.		
	CRS enters S2.OP-AB.COND-0001, Loss of Condenser Vacuum.		
	PO initiates Attachment 1 CAS.		
	CRS dispatches operator to perform Attachment 2, Loss of Vacuum Local Checks.		
Role Play: When dispatched to perform Attachment 2, THEN after 2-5 minutes report the following: ***I've completed Attachment 2 and have found no abnormal conditions except for the vacuum pump breaker being tripped open* on 22 and 24 vacuum pumps.**			
	PO reports 24 Vacuum pump is stopped and the 24AR25 is closed.		
	PO reports condenser backpressure is rising rapidly.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO reports rising backpressure is not attributed to CW System malfunctions.		
	PO starts all available (22 and 25) vacuum pumps.		
22 Vacuum Pump trips following start:			
Simulator Operator: Ensure **ET-2** is TRUE IF 22 Vacuum pump is started. This will cause the pump to trip following start.			
	IF 22 Vacuum Pump is started, the PO reports that the pump started then tripped seconds later.		
25AR25 fails to open following start of 25 Vacuum Pump:	PO reports that 25 Vacuum Pump started but the 25AR25 failed to open.		
Role Play: IF requested to check local indications at the Vacuum Pump, THEN report that ***the local gauge reading is within the normal band and all other parameters are within their normal bands.***			
	PO manually opens 25AR25.		
	PO reports that condenser back pressure is improving.		
Proceed to next event at direction from Lead Examiner.			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
3. 2N41 Power Range Channel fails high **Simulator Operator:** Enter **RT-2** on direction of Lead Evaluator. **MALF: NI0193A PR CH41 Fails High Severity: 150**			
	RO reports rods stepping in and no runback in progress		
	RO places rod control in Manual		
	CRS enters S2.OP-AB.NIS-0001, NIS Malfunction.		
Evaluator's Note: The crew may enter S2.OP-AB.ROD-0003 which will transition you to AB.NIS-0001			
	RO reports rod control is in Manual		
	PO reports no turbine load change in progress		
	RO reports that 2N41 channel is failed high		
	RO reports the following OHA alarms are in: ▪ E-15 PR HI RNG FLUX HI ▪ E-31 PR OVRPWR ROD STOP ▪ E-39 PR CH DEV ▪ E-47 PR NEUT FLUX RATE HI		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	CRS directs PO to remove PR channel from service IAW S2.OP-SO.RPS-0001, NI Channel Trip/Restoration		
Evaluator's Note: At the direction of the Lead Evaluator, performing removing of 2N41 from service is optional. Performing these steps takes about **10 minutes**.			
Placing 2N41 in Tripped Condition IAW S2.OP-SO.RPS-0001, Steps 4.1.1 to 4.1.5:			
	PO ensures that tripping of associated bistable(s) will NOT result in an ESF OR RPS actuation		
	PO ensures 2N41 Channel is NOT selected on NIS Recorder 2NR45		
	PO ensures Rod Control is in Manual		
	CRS enters T/S 3.3.1.1, Actions 2 and 6 (72 hours) Reactor Trip System Instrumentation for 2N41		
	At NI Rack No. 81, PO performs the following:		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO places DETECTOR CURRENT COMPARATOR, UPPER SECTION, switch in PRN41 position AND ENSURE the following: ___ CHANNEL DEFEAT lamp illuminates. ___OHA E-38, UPPER SECT DEV ABV 50% PWR, clears. Note: E-38 was not in.		
	PO places DETECTOR CURRENT COMPARATOR, LOWER SECTION, switch in PRN41 position AND ENSURE the following: ___CHANNEL DEFEAT lamp illuminates. ___OHA E-46, LOWER SECT DEV ABV 50% PWR, clears. Note E-46 was not in.		
	PO places POWER MISMATCH BYPASS switch in BYPASS PR N41. (Defeats input to Rod Control)		
	PO places ROD STOP BYPASS switch in BYPASS PR N41AND ENSURE the following: ___ 2RP4 - OVER POWER ROD STOP MANUAL BYPASS, CH I is illuminated. ___ OHA E-31, PR OVERPWR ROD STOP, is clear		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO places COMPARATOR CHANNEL DEFEAT switch in N41 AND ENSURE the following: ___COMPARATOR DEFEAT lamp is illuminated. ___ OHA E-39, PR CH DEV, is clear		
Evaluator's Note: After Step 4.1.5 is complete Maintenance support is needed to complete the rest of the procedure for tripping bistables. Rod control can be placed in Auto at this time if the CRS directs. Leaving Rods in Manual has no effect to the outcome of the scenario.			
	CRS directs Maintenance to remove 2N41 channel from service IAW S2.OP-SO.RPS-0001.		
	RO withdraws rods as required to maintain band prescribed.		
	CRS may elect to restore rod control to Auto or leave in Manual until the bistables are tripped.		
Proceed to next event after rods are withdrawn to ARO or by direction from Lead Evaluator.			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
4. RCS Leak (20 gpm)			
Simulator Operator: Insert **RT-3** by direction from Lead Examiner. **RC0002, RCS Leakage** **Value = 20** **Ramp = None**			
	RO reports counts on the 2R11A containment radiation monitor is rising.		
	RO reports PZR level is lowering and/or RCS pressure is lowering.		
	RO reports RCS leak inside containment.		
	RO determines RCS leak rate.		
Examiners Note: The CRS can also enter S2.OP-AB.RAD-0001, Abnormal Radiation, in response to OHA A-6. If so, the CRS can direct the PO to perform actions of AB.RAD-1 while the CRS directs actions in AB.RC-1.			
	CRS enters S2.OP-AB.RC-0001, RCS Leakage.		
	PO initiates Attachment 1 CAS		
	RO reports RCS temperature is above 350 ˚F.		
	RO reports Unit is not in Mode 3.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports PZR level is lowering.		
	RO swaps to a centrifugal charging pump in service. • **CLOSE** 2CV55 CHARG FLOW CONTR VALVE • **START** 21 or 22 CHG pp • **LOWER** 23 Chg PP speed while **ADJUSTING** 2CV55 • **STOP** 23 Chg pp • **ADJUST** 2CV55 to control PZR lvl • **ENSURE** seal injection flow 6-12 gpm/pump not to exceed 40 total		
	CRS directs RO to adjust charging flow to stabilize PZR level.		
	RO adjusts charging flow to stabilize PZR level and then determines RCS leak rate.		
TS evaluation #2:			
	CRS enters: • **TS 3.4.7.2.b (1 gpm unidentified leakage), action b (reduce leakage rate to within limits within 4 hours or be in Hot Standby)**		
Proceed on to next event after TS has been evaluated or by direction from the Lead Examiner			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
5. RCS leak worsens to 350 gpm and Large Break LOCA (Major Transient):			
Simulator Operator: Modify **RT-3** to 350 at the direction of the Lead Examiner. **RC0002, RCS Leakage** **Value = 350** **Ramp = None**			
	RO reports PZR level is lowering rapidly.		
	RO attempts to maintain PZR level by adjusting charging flow.		
	RO reports RCS leak rate exceeds make up capability.		
	CRS implements the Attachment 1 CAS action and briefs the RO to Trip the Reactor and actuate Safety Injection.		
	RO trips the reactor and actuates SI.		
Simulator Operator: Ensure **ET-2** 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
6. Auto SI fails to actuate on both trains:			
	RO may report SI failed to Auto actuate (depending on where RCS pressure is at during time SI is manually actuated)		
	RO manually actuates SI on one Train and verifies the other train actuated.		
	RO continues Immediate Actions of TRIP-1: ▪ Reports the Main Turbine is tripped and backs up Main Turbine trip. ▪ Reports all 4KV vital busses energized. ▪ Reports SI has been initiated.		
	CRS and RO verify Immediate Actions complete.		
	CRS directs initiation of the following EOP-TRIP-1 CAS actions when RCS pressure meets the criteria: • **Stops RCPs (1240(1350 adverse) psig)** • **Close Charging Mini-flows (1500 psig)**		
	PO reports ALL Vital Buses are energized.		
	PO reports SEC loading for 2B and 2C vital bus is NOT complete.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
7. # 2 ECAC fails to start on SEC signal			
	PO reports # 2 ECAC failed to start.		
	PO blocks and resets 2C SEC.		
	RO Starts #2 ECAC.		
	PO throttles AFW flow to no less than 22E4lbm/hr while SG NR levels remain <9%. (15% adverse)		
	RO reports containment pressure has NOT remained <15 psig.		
	RO reports Phase B and Spray actuation Auto initiated.		
	RO reports 21 and 22 CS pumps are running.		
	RO reports MSLI Auto initiated.		
	RO reports all valves groups in Table B are in the safeguards positions.		
	RO Stops all RCPs.		
	PO reports 2RP4 indicates High-High Containment Pressure.		
	RO reports both trains of MSLI has actuated.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	PO reports all valves in Table D are closed.		
	RO reports 2 CCW pumps are running.		
	RO reports both CCW HXs are in Auto.		
	RO reports 2CC131 (Thermal Barrier Return) is closed.		
	RO reports Phase B has occurred and 2CC131 should not be opened.		
	CRS notifies WCC to monitor Spent Fuel Pool temperature and level.		
	RO reports RWST Lo Level Alarm has not actuated (this is a CAS step)		
	PO reports 2CV116 and 284 in Table E are NOT in the safeguards positions.		
	Critical task #1 - RO closes the 2CV116 and 284 from the 2CC2 console pushbuttons		
Critical Task-1 (CT-11): Close at least one valve on each phase A penetration before transition out of EOP-TRIP-1, Reactor Trip or Safety Injection. **SAT_____ UNSAT_____**			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports 21 and 22 CA330s are closed.		
	RO reports CAV is in Accident Pressurize Mode.		
	RO reports CAV is not in Maintenance Mode Alignment		
	RO reports two switchgear fans and one switchgear exhaust fan are running		
	RO reports Charging, SI pump and RHR pump flows are 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%.		
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 <1240(1350 adverse) psig with ECCS flow established. [TRIP-1 CAS]		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports RCP status, and CRS determines whether a MSLI for temperature control is required.		
	RO reports PZR spray valves response are normal.		
	RO reports RCS pressure < 1240(1350 adverse) psig and ECCS flow established.		
Examiner's Note: SG pressure could be lowering slowly based on the break flow from the LBLOCA.			
	PO reports NO indications of a Faulted SG exist.		
	PO reports NO indications of a SGTR exist.		
	RO reports two or more channels in Table J are NOT indicating normal on the P250 computer **OR** reports Containment Pressure > 4 psig.		
Evaluator's Note: **IF** RWST low level (15.2 ft.) is reached during TRIP-1, **THEN** go to **page 27 for LOCA-3 steps**.			
EOP-LOCA-1 steps here:			
	CRS transitions to 2-EOP-LOCA-1, Loss of Reactor Coolant.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Examiner's Note: During LOCA-1, the crew will reach the low RWST alarm (15.2 feet) and then transition to EOP-LOCA-3.			
Examiners Note: A CFST PURPLE Path on Thermal Shock may exist during LOCA-1, if so, the crew will enter and exit FRTS-1 with no actions performed.			
	RO reports all RCPs are stopped.		
	PO reports no indications of faulted SGs.		
	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%.		
	RO resets Phase A.		
	RO opens 21 and 22 CA330s.		
	RO resets SG B/D Sample Isolation Bypass		
	RO opens 21 thru 24 SS94s (SG B/D Sample Valves)		
	PO reports ALL secondary radiation monitors in Table B are indicating Normal.		
	RO reports both PZR PORVs are Closed and Block valves are Open.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
FRTS-1 steps here:	RO reports subcooling is NOT greater than 0 F.		
	RO reports both CS Pumps are running.		
	RO resets both trains of SI.		
	PO resets each SECs.		
	RO reports RCS pressure is not greater than 300 psig.		
	Crew stops unloaded EDG's		
	Crew determines LOCA 5 and 6 transition not required and consult with the TSC		
	Crew will now loop back around to Step 11 or transition to LOCA-3.		
	CRS enters 2-EOP-FRTS-1, Response to Imminent Pressurized Thermal Shock Conditions.		
	STA verifies procedure transition.		
	RO reports RCS pressure is < 420 psig and RHR flow is at least 300 gpm.		
	CRS returns to procedure in effect (LOCA-1).		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Record Time RWST Lo Level Alarms Actuated: **Time:_____:_____:_____**			
8. Transfer to Cold Leg Recirculation (EOP-LOCA-3) **Evaluator's Note**: A predetermined Critical Task which includes Time Critical Operator Actions			
	RO reports Containment Sump CH A (B) Level > 62% is illuminated.		
	RO depresses SUMP AUTO ARMED PB for 21 and 22 SJ44s.		
	PO removes lockouts from 2SJ67, 2SJ68, 2SJ69.		
	RO reports 21 and 22 SJ44s open.		
	RO reports both RHR pumps running.		
	RO closes 2SJ69.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Mark time 2SJ69 close PB depressed. _____:_____:_____ **≤ 3.7 mins after RWST lo level**			
	RO verifies or performs SI reset actions.		
	RO resets SECs and 230V MCCs.		
	RO stops 22 Containment Spray Pump.		
Mark time 22 CS pump stopped. _____:_____:_____ **≤ 5.5 mins after RWST Lo Level**			
	RO closes 21 and 22 RH19s.		
	RO stops 23 charging pump.		
	CRS goes to **Step 11** based on all Vital Buses energized.		
	RO reports 3 SW pumps running.		
	PO reports both CCHXs are in service OR being restored to service per EOP-APPX-1.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
	RO reports that 22 CS pump is NOT running.		
	RO reports that 21 and 22 CC16 are open.		
	RO performs the following: ▪ **Closes 2SJ67 and 2SJ68.** ▪ **Reports 2RH1 and 2RH2 are closed.**		
	RO opens 21 and 22 SJ45s.		
	RO reports 21 and 22 SJ113's are open.		
	RO reports 21 and 22 SI pumps <u>and</u> 21 and 22 Charging pumps are running.		
Mark time ECCS pumps verified in operation. **_____:_____:_____** **≤ 11.2 mins after RWST Lo Level**			
	PO removes lockout for 2SJ30		
	RO closes 2SJ30, 2SJ1, and 2SJ2		
	RO places 21RH29 and 22RH29 in MANUAL and reports both valves are closed.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
<u>Critical Task-2 (CT-36):</u> Transfer to Cold Leg Recirculation before RWST Lo-Lo Level (1.2 feet) is reached or ECCS pump cavitation. This CT also includes accomplishing operator time critical actions as specified below: **Time Critical Operator Actions:** Transfer to Cold Leg Recirculation such that at least one train of ECCS is in operation in the recirculation mode within the following time frames: **1. From RWST lo level alarm to initiating closed on 2SJ69 - ≤3.7 minutes** **2. From RWST lo level alarm to one containment spray pump stop ≤5.5 minutes** **3. From RWST lo level alarm to switchover completion (includes restarting ECCS pumps if stopped on RWST lo-lo level)** **≤ 11.2 minutes.** **SAT_____ UNSAT_____**			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comments
Terminate scenario when the crew initiates close or verifies closed for RH29s or at Lead Evaluator direction.			

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.NIS-0001,Nuclear Instrumentation System Malfunctions
G. S2.OP-AB.RC-0001, RCS Leak
H. 2-EOP-TRIP-1, Reactor Trip or Safety Injection
I. 2-EOP-LOCA-1, Loss of Reactor Coolant
J. 2-EOP-LOCA-3, Transfer to Cold leg recirculation

MODE: 1 POWER: 100% RCS BORON: 967 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 120 gallons of boric acid along with inserting control rods to maintain Tavg 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:

- None

CONTROL ROOM:

- Hope Creek and Salem 1 are at 100% power.

PRIMARY:

- none

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 ECG 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: 21-01 NRC Scenario #1 REVIEWER: K. Hantho

Initials		Qualitative Attributes
K	1.	The scenario has clearly stated objectives in the scenario.
K	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.
K	3.	The scenario consists mostly of related events.
K	4.	Each event description consists of: • 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
K	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.
K	6.	The events are valid with regard to physics and thermodynamics.
K	7.	Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
K	8.	The simulator modeling is not altered.
K	9.	All crew competencies can be evaluated.
K	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.
K	12.	ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

ATTACHMENT 5
ESG CRITICAL TASKS

20-01 NRC Scenario #1

CT-1 (CT-11)

Critical Task

Close containment isolation valves such that at least one valve is closed on each Phase A penetration before transition out of TRIP-1.

Safety Significance

The containment isolation system preserves the ability of the containment boundary to minimize the release of fission products following a LOCA or a fuel handling accident within the containment. The Phase A containment isolation signal serves to actuate the containment isolation system following a LOCA. The Phase A containment isolation signal actuates all power operated valves that are not required to be open for the operation of essential equipment during an accident and that can be immediately closed without increasing the potential for damage to the containment equipment.

Cues:

- Indication and/or annunciation that SI is actuated

AND

- One or more of the following:
  - Absence of annunciation that Phase A isolation is actuated
  - Absence of closed valve position indication on all (both) containment isolation valves on one or more Phase A penetrations
  - Open valve position indication on all (both) containment isolation valves on one or
  - more Phase A penetrations
  - ESF system status lamps show that all (both) containment isolation valves on
  - one or more Phase A penetrations are not closed

Measurable Performance Indicator

Manipulation of controls as required to close at least one containment isolation valve on each Phase A penetration

- Closed valve position indication for at least one containment isolation valve on each Phase A penetration

Feedback

- ESF system status lamps show that at least one containment isolation valve is closed on each Phase A penetration

CT-2 (CT-36)

Critical Task

Transfer to cold leg recirculation before receiving the RWST Lo-Lo alarm or cavitation to ECCS Pumps (this CT includes time critical operator actions per OP-SA-102-106-F1)

Safety Significance

Failure to transfer to cold leg recirculation before the RWST inventory is totally depleted results in the loss of all pumped safety injection and containment spray when the RWST empties.

Cues:

- Indication and/or annunciation that safety injection is actuated

AND

- Indication and/or annunciation that RWST level is at or below the Low Level Alarm

AND

- Indication that containment sump level is at or above the minimum level (62%) required for transfer to cold leg recirculation

Measurable Performance Indicator

Manipulation of controls as required to transfer to cold leg recirculation and establish ECCS recirculation flow that at least meets the assumptions of the plant-specific LOCA analyses:

- Valve position indication that the cold leg recirculation flow path is established
- Control switch indication that the circuit breakers or contactors for the low-head injection pumps (and other ECCS injection pumps as necessary) are closed
- These operator time critical actions are accomplished as follows from the time from RWST Lo Level:
  - Initiating close on 2SJ69 ≤ 3.7 minutes
  - Stopping one Containment Spray Pump ≤ 5.5 minutes
  - Switch over to recirculation complete ≤ 11.2 minutes

Feedback

- Flow indication of the recirculation of containment sump water through the RHR heat exchangers and into the RCS

ATTACHMENT 6

ESG – PSA RELATIONSHIP EVALUATION

EVENTS LEADING TO CORE DAMAGE

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

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

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

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

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

SIMULATOR
EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC-2 [AB.CVC, AR.ZZ-11, AB.SW-1, AB.CN-1, AB.LOAD-1, TRIP-1, LOSC-1, TRIP-3]

SCENARIO NUMBER: 21-01 NRC ESG-2

EFFECTIVE DATE: See Approval Below

EXPECTED DURATION: 75 minutes

REVISION NUMBER: 03

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **STA**

[ ] **OTHER** _____

Revision Summary:

- 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. [Note: not used on 19-01 NRC exam]
- Rev. 02, Modified for 20-01 ILOT NRC Exam.
- Rev. 03 Modified for 21-01 ILOT NRC exam

PREPARED BY:	K. Hantho	9-15-22
	Lead Regulatory Exam Author	**Date**
APPROVED BY:	M. Wadusky	
	Operations Training Manager or designee	**Date**
APPROVED BY:	M. Winkelspecht	
	Facility Representative	**Date**

SCAN OF SIGNED SCENARIO COVER SHEET