Scenario No.: 4

Target Quantitative Attributes per Scenario (NRC Form ES-D-1)

Facility: _____Salem_____ Scenario No.: ____4_____ Op-Test No.: __19-01 NRC__

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-204: 2% power, BOL; 21 SGFP I/S. 25 CFCU is in low speed to monitor bearing temperatures following maintenance.

Turnover: The crew is directed to continue power ascension to 10% reactor power IAW S2.OP-IO.ZZ-0003 using control rods, steam dumps, and turbine load control.

Critical Tasks:

1. Isolate feed and stem flow to ruptured SG (see WOG CT-18)
2. Cooldown RCS to target temperature (see WOG CT-19)
3. Close PZR PORV block valve on open PORV (see WOG CT-10)

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	ALL (R)	Continue power ascension to 10% IAW IOP-3
2	RM0207A	CRS (TS)	2R1B Control Room Radiation monitor fails high
3	TU0056	RO (C) CRS (TS)	25 CFCU trips in low speed
4	BF0105A	ALL (C)	21 SGFP trips
5	RC42CX RC42CY RC43CX RC43CY	ALL (M)	23 RCP high shaft vibrations
6	SG0078A	ALL (C)	21 SGTR (650 gpm ramped over 5 minutes)
7	SJ0184A	BOP (I) CRS (I)	21 SI Pump fails to start on SEC signal
8	VL0297 VL0298	ALL (C)	PZR PORV fails to close during RCS depressurization
		ABs	IOP-3 → AB.CN-1 → AB.RCP-1 → AB.SG-1
		EOPs	TRIP-1 → TRIP-2 → TRIP-1 → SGTR-1

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

Scenario No.: 4

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	TRIP-1
6. Entry into a contingency EOP with substantive actions (≥ 1 per scenario set)	0	NA
7. Preidentified critical tasks (≥2)	3	CT-18,CT-19, CT-10
8. Tech Specs exercised (≥ 2)	2	2,3

I. OBJECTIVES

A. Given the order, perform actions to raise reactor power IAW S2.OP-IO.ZZ-0003, Hot Standby to Minimum Load.

B. Given indication of a radiation monitor system malfunction, DIRECT the response to the malfunction in accordance with approved station procedures.

C. Given the order or indications of a CFCU tripping, perform actions as the nuclear control operator to RESPOND to the malfunction, IAW approved station procedures.

D. Given the order or indications of a CFCU tripping, DIRECT the response to the malfunction IAW approved station procedures.

E. Given the failure of SGFP, perform actions as the nuclear control operator to RESPOND to the failure IAW S2.OP-AB.CN-0001.

F. Given the failure of SGFP, perform actions as the nuclear control operator to DIRECT the response to the malfunction IAW S2.OP-AB.CN-0001

G. Given the failure of affecting a Reactor Coolant Pump, DIRECT the response to the failure IAW S2.OP-AB.RCP-0001.

H. 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 2-EOP-TRIP-1.

I. Given indication of a reactor trip, DIRECT the response to the reactor trip in accordance with 2-EOP-TRIP-1.

J. 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.

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

L. Given the order or indications of a steam generator tube rupture, perform actions as the nuclear control operator to RESPOND to the tube rupture in accordance with the approved station procedures.

M. Given the order or indications of a steam generator tube rupture, DIRECT the response to the tube rupture in accordance with the approved station procedures.

N. Given the order or indications of a ECCS pump failing to start, DIRECT the response to the malfunction in accordance with approved station procedures

O. Given the order or indications of a PZR PORV malfunction, DIRECT the response to the malfunction in accordance with approved station procedures.

II. MAJOR EVENTS

A. Power Ascension

B. 2R1B Control Room Radiation Monitor Channel 1 fails high

C. 25 CFCU trips in low speed

D. 21 SGFP trips and failure of Auto AFW start signal

E. 23 RCP high vibration

F. 21 SG Tube Rupture

G. 21 SI Pump fails to start on SEC signal

H. PZR PORV fails to close during RCS depressurization

III. SCENARIO SUMMARY

A. The crew will take the watch with the unit stable at 2% reactor power during a plant startup, BOL. 21 SGFP is in service and 22 SGFP is not in service. 25 CFCU was declared operable last shift following maintenance. 25 CFCU is in low speed to monitor bearing temperatures every hour following maintenance for next 12 hours. Steam dumps are in Main Steam Pressure Control, Automatic, set at 1000 psig. The crew will be instructed to raise power to 10% and enter Mode 1.

B. The crew will initiate power ascension to 10%, and enter Mode 1, using Main Steam Dumps and control rods IAW **S2.OP-IO.ZZ-0003**, Hot Standby to Minimum Load and S2.OP-SO.MS-0002, Steam Dump System Operation, Attachments 3 or 4.

C. After the crew enters Mode 1 (about 6% Rx power), the 2R1B Channel 1 Control Room Radiation Monitor will fail high. This will result in Control Room Ventilation actuating in Accident Pressurized Mode of operation. The crew will enter **S2.OP-AB.RAD-0001**, Abnormal Radiation. The crew will recognize that the 2R1B channel has failed high and is invalid. The CRS will enter TS 3.3.3.1 Action 28.

D. After the 2R1B channel failure has been addressed, the 25 CFCU operating in low speed will trip on overcurrent protection. The crew will respond by starting the standby CFCU in high speed. The crew will remove control power to the CFCU breakers to comply with Tech Spec containment integrity requirements. The CRS will enter TS 3.6.1.1 and 3.6.2.3 Action a.

E. After the 25 CFCU is addressed, 21 SGFP will trip on high thrust bearing oil pressure. The crew will respond IAW **S2.OP-AB.CN-0001**, Main Feedwater/Condensate System Abnormality. The crew will reduce Rx power to less than 4%. The AFW pumps will fail to Auto start on low SG levels and the crew will respond by manually starting both motor driven AFW pumps or 23 AFW pump. The crew will throttle AFW flow as necessary to maintain SG narrow range levels between 19-33%. Note: the crew may take a conservative action to trip the Rx at this point due to lowering SG narrow range levels. If so, then the next event will occur during EOP-TRIP-2.

F. After the crew addresses the loss of 21 SGFP, 23 RCP will experience elevated shaft vibrations. The CRS will enter **S2.OP-AB.RCP-0001**, RCP Abnormality, and imitate

Attachment 2 for stopping 23 RCP due to exceeding shaft vibrations. The crew will trip the Rx, confirm the Rx is tripped, and stop 23 RCP.

G. The crew will perform immediate actions in **EOP-TRIP-1**, Reactor Trip or Safety Injection, and then transition to **EOP-TRIP-2**, Reactor Trip Response, based on no SI required.

H. Shortly after transition to EOP-TRIP-2, 21 SG will rupture (650 gpm ramped over 5 minutes) and the crew will manually initiate SI and **return to EOP-TRIP-1**. While in EOP-TRIP-1, the crew will identify that 21 SI Pump failed to start. The crew will block and reset 2A SEC and manually start 21 SI Pump.

I. The crew will identify that 21 SG has a tube rupture based on SG narrow range levels rising, and 2R15, Condenser Off gas radiation monitor in alarm, and transition to **EOP-SGTR-1**, Steam Generator Tube Rupture.

J. While in EOP-SGTR-1, the crew will isolate feed and steam flow to the ruptured 21 SG [**Critical Task #1**] and initiate a RCS cooldown [**Critical Task #2**] using steam dumps to the RCS target temperature. The crew will stop the cooldown when the hottest CETs are less than the required RCS cooldown temperature.

K. Following the RCS cooldown to target temperature, the crew will commence depressurization of the RCS using PZR PORVs due to normal spray unavailable (23 RCP stopped). After the crew reaches the depressurization stop criteria, they will close the PZR PORV and recognize that the PORV will not close. The crew will respond by closing the associated PZR PORV block valve [**Critical Task #3**].

L. The scenario may be terminated when the PZR PORV block valve is closed or by direction from the Lead Examiner.

IV. INITIAL CONDITIONS

____ IC-204

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

Initial	Description
____ 1	VC1and VC4 C/T
____ 2	RCPs (SELF CHECK)
____ 3	RTBs (SELF CHECK)
____ 4	MS167s (SELF CHECK)
____ 5	500 KV SWYD (SELF CHECK)
____ 6	SGFP Trip (SELF CHECK)
____ 7	23 CV PP (SELF CHECK)
____ 8	**21 SGFP is in service**
____ 9	**IOP-3 open and complete up to step 4.3.18, Power Operation. Attachment 4 is marked up.**
___ 10	**Steam Dumps are in MS Pressure Mode and Auto, and S2.OP-SO.MS-0002 is open and marked up to step 5.4.1**
___ 11	**Rod control in manual.**
___ 12	**25 CFCU running in LOW speed. (System Engineering monitoring remotely using PI)**
___ 13	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:	KA501DOA //TRAIN "A" - SI OPERATE KEYSWITCH <update as needed>
	2	EVENT ACTION: COMMAND: PURPOSE:	KA701DOA //TRAIN B - SI OPERATE KEYSWITCH <update as needed>
	3	EVENT ACTION: COMMAND: PURPOSE:	KB201PNI //2PR1 RELIEF VALVE-OPEN <update as needed>
	4	EVENT ACTION: COMMAND: PURPOSE:	KB202PNI //2PR2 RELIEF VALVE-OPEN <update as needed>
	5	EVENT ACTION: COMMAND: PURPOSE:	ET_array(1) .OR. ET_array(2) DMF AF0353A <update as needed>
	6	EVENT ACTION: COMMAND: PURPOSE:	ET_array(1) .OR. ET_array(2) DMF AF0353B <update as needed>

MALFUNCTIONS:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Severity
_____ 01	RM0207A PROCESS RAD MON 2R1B FAILS HIGH	N/A	N/A	N/A	RT-1	
_____ 02	VC0173E 25 CNTMT FAN COIL UNIT TRIP	N/A	N/A	N/A	RT-2	
_____ 03	BF0105A 21 STM GEN FEED PUMP TRIP	N/A	N/A	N/A	RT-3	THRUST BEARING PRESSURE HIGH
_____ 04	SG0078A 21 STEAM GENERATOR TUBE RUPTURE	N/A	50	00:05:00	RT-5	650
_____ 05	VL0297 2PR1 Fails to Position (0-100%)	00:00:05	N/A	N/A	ET-3	100
_____ 06	VL0298 2PR2 Fails to Position (0-100%)	00:00:05	N/A	N/A	ET-4	100
_____ 07	RP318R1 21 SI PMP FAILS TO START ON SEC	N/A	N/A	N/A	N/A	
_____ 08	AF0353A 21 AFP FAILURE TO AUTO START ON ANY (ALL) SIGNALS	N/A	N/A	N/A	N/A	
_____ 09	AF0353B 22 AFP FAILURE TO AUTO START ON ANY (ALL) SIGNALS	N/A	N/A	N/A	N/A	

REMOTES:

SELF-CHECK	Description	Delay Time	Initial Value	Ramp Time	Trigger	Condition
_____ 01	CT195-1D 25 CFCU BKR #1 High Speed 125VDC	N/A	N/A	N/A	RT-10	OFF
_____ 02	CT195-2D 25 CFCU BKR #2 High Speed 125VDC	00:00:05	N/A	N/A	RT-10	OFF
_____ 03	CT195-3D 25 CFCU BKR #3 Low Speed 125VDC	00:00:10	N/A	N/A	RT-10	OFF
_____ 04	RC42CX 23 RCP NOMINAL SHAFT x Vibration Reading	N/A	13	00:04:00	RT-4	25
_____ 05	RC42CY 23 RCP NOMINAL SHAFT y Vibration Reading	N/A	5	00:10:00	RT-4	12
_____ 06	RC43CX 23 RCP NOMINAL MOTOR x Vibration Reading	N/A	.5	00:04:00	RT-4	2.5
_____ 07	RC43CY 23 RCP NOMINAL MOTOR y Vibration Reading	N/A	.5	00:10:00	RT-4	2

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. CRS please inform me when your crew is ready to assume the shift”.

D. Allow sufficient time for panel walk-downs. When informed by the CRS 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	Comment
1. Power Ascension			
Examiner's Note: The crew will be using S2.OP-IO.ZZ-0003, Hot Standby to Minimum Load, to perform the power ascension. Step 4.3.16 provides guidance on raising reactor power using Steam Dumps IAW S2.OP-SO.MS-0002. The crew can use Attachments 3 or 4 of S2.OP-SO.MS-0002 to operate Steam Dumps. The intent is for the crew to enter Mode 1, ≈ 6% Rx power, THEN; proceed to next event.			
Examiner's Note: Console alarm **RC LOOPS Tavg – Tref DEVIATION** will be in at the time the crew takes the watch. The crew will be provided instructions during turnover that verification of Tavg is 541 F once per 30 minutes until alarm is reset in Control Room Narrative Log is being performed by the extra NCO. This alarm will clear during the power ascension into Mode 1.			
	CRS directs power ascension using Main Steam Dumps in MS Pressure Control and control rods.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
Examiner's Note: The CRS will direct the crew in the order in which to raise Rx power by withdrawing control rods or raising steam dump demand first.			
	PO raises steam dump demand IAW S2.OP-SO.MS-0002, section 5.4 using Attachments 3 or 4.		
	RO withdraws control rods at the specified increments to maintain Tave on program.		
Examiner's Note: Program Tavg at 10% Rx power is about 549 F. During simulator runs, Steam Dump pressure setting was about 982 psig for a Rx Power of 5.4%.			
	RO announces when NIS indicates 5% Reactor Power and RECORDs time of Mode 1 entry in Control Room Narrative Log.		
Proceed on to next event when Reactor Power is 6% or by direction from Lead Examiner.			
2. 2R1B Channel 1 Control Room Intake Radiation Monitor fails high:			
Simulator Operator: Insert **RT-1** on direction from Lead Examiner. **RM0207A, 2R1B fails H/L** **Value = high**			
	RO announces unexpected OHA alarm for A-6 RMS HI		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	RAD OR TRBL.		
	CRS places power ascension on hold.		
	RO reports control room ventilation is in Accident Pressurized mode.		
	CRS enters S2.OP-AB.RAD-0001, Abnormal Radiation.		
	RO reports 2R1B Channel 1 is failed high.		
	RO reports alarm is invalid.		
	PO calls Unit 1 operator to check 1R1B Channel 2 reading.		
Role Play: As the Unit 1 PO report the following: ***both 1R1B Channel 1 and 2 are reading normal.***			
	CRS reviews Tech Specs.		
TS evaluation #1:			
Examiner's Note: When in Accident Pressurized Mode, the intake dampers for 2R1B Ch. 1 and 1R1B Ch. 2 radiation detectors are isolated and therefore, both channels are inoperable. When CAV is reset and dampers are re-opened, the 1R1B Ch. 2 will be Operable and TS Action 27 is then entered for only 2R1B Ch. 1.			
	CRS enters TS 3.3.3.1.b Action 28 (immediately		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	place in Accident Pressurized mode or Recirculation mode of operation)		
	CRS requests assistance in troubleshooting failed RMS channel.		
Proceed to next event after CRS evaluates Tech Specs or by direction from Lead Examiner.			
3. 25 CFCU trips in LOW speed:			
Simulator Operator: Insert **RT-2** on direction from Lead Examiner. **VC0173E, 25 CFCU trips**			
	RO reports 25 CFCU tripped in low speed.		
Role Play: If requested to why the CFCU tripped then report after 1 minute: ***the low speed breaker is open and the overcurrent flag is up.*** Location: 84 ft. switchgear room			
	CRS may direct starting 23 CFCU in high speed, if necessary.		
	CRS may review S2.OP-SO.SW-0005, Attachment 5 for operability guidance.		
TS evaluation #2:			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	CRS enters TS 3.6.2.3 Action a (14 days) and 3.6.1.1 (1 hour containment integrity until control power is removed)		
	CRS directs WCC to open control power for 25 CFCU high and low speed breakers.		
Simulator Operator: Insert **RT-10** when directed by CRS to open control power to high and low speed 460 V breakers**.** **CT195-1D, 25 CFCU breaker # 1high speed 125 VDC** **CT195-2D, 25 CFCU breaker #2 high speed 125 VDC** **CT195-3D, 25 CFCU breaker #3 low speed 125 VDC**			
Proceed on to next event after control power is removed or by direction from Lead Examiner. **4. 21 SGFP Trips:**			
Simulator Operator: Insert RT-3 on direction from Lead Examiner. **BF0105A, 21 SGFP trips on thrust bearing oil pressure high**.			
	RO reports console alarm for 21 SGFP thrust bearing oil bearing oil pressure high.		
	RO reports 21 SGFP tripped.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
Role Play: If requested to why feedpump tripped then report after 1 minute: ***first out annunciator has thrust bearing oil pressure high trip locked in and will not clear.***			
Examiner's Note: The crew may take the actions in Step 4.3.18 IAW IOP-3 to reduce Rx power to < 4% and start AFW Pumps which are similar to actions performed in AB.CN-0001.			
	CRS enters S2.OP-AB.CN-0001, Main Feedwater/Condensate System Abnormality		
	CRS determines immediate actions of AB.CN-0001 is not met.		
	PO initiates Attachment 1 CAS.		
	PO reports 21 SGFP tripped.		
	RO reports Reactor Power is 6% or less than P-10 (10%).		
Examiner's Note: Monitor the crew's actions to lower Reactor Power when inserting control rods to observe if reactor goes subcritical.			
	RO reduces Reactor Power to less than 4% by inserting control rods.		
	CRS continues on with procedure.		
	PO reports Aux Feedwater is not in operation.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	PO sets 21-24 AF21 demands to 0%.		
	PO starts 21 and 22 AFW Pumps.		
	PO adjusts 21-24 AF21's as necessary to maintain SG levels between ± 5% of program.		
Examiner's Note: Depending how the crew feeds the SGs using AFW flow, the CRS may direct to trip the reactor based on SG NR levels approach the Auto Rx Trip setpoint (13%).			
Simulator Operator: IF the crew trips the reactor here, **THEN** insert **RT- 4** for the RCP High Vibration malfunction in **EOP-TRIP-2**.			
Proceed to next event after AFW flow is established or by direction from Lead Examiner.			
5. 23 RCP High Vibration (Major Transient):			
Simulator Operator: Insert **RT-4** on direction from Lead Examiner. **RC42CX, 23 RCP shaft x vibration Value = 5-25** **RC42CY, 23 RCP shaft y vibration Value = 5-12** **RC43CX, 23 RCP motor x vibration Value = 0.5-2.5**			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
RC43CY, 23 RCP motor y vibration Value = 0.5-2.0			
	RO reports unexpected OHA alarm D-36 for RCP VIB HI.		
	RO reports 23 RCP vibration is elevated on 2RP3 monitor.		
	CRS enters S2.OP-AB.RCP-0001, RCP Abnormality		
	RO reports 23 RCP shaft vibration exceeds 20 mils.		
	CRS implements the CAS action.		
	RO Trips the Rx.		
	RO Confirms the Rx Trip.		
	RO stops 23 RCP.		
	CRS enters 2-EOP-TRIP-1, Reactor Trip of Safety Injection.		
	RO continues on with immediate actions of TRIP-1.		
	CRS and RO review immediate actions.		
	CRS and RO perform immediate action steps of EOP-TRIP-1 and confirm no Safety Injection is required.		
	PO throttles AFW flow to no less than 22E4		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	lbm/hr.		
	CRS transitions to 2-EOP-TRIP-2, Reactor Trip Response.		
Examiner's Note: CFSTs are in effect when transition out of EOP-TRIP-1 occurs. STA will report to control room 10 minutes after being summoned via page to monitor CFSTs.			
	CRS directs RO and PO to implement the CAS of EOP-TRIP-2.		
Proceed on to next event when crew transitions to EOP-TRIP-2 or by direction from Lead Examiner.			
6. SG Tube Rupture (ramped):			
Simulator Operator: Insert **RT-5** on direction from Lead Examiner. This will insert a SG Tube Leak starting at 50 gpm then escalating to 650 gpm over a 5 minute period. **SG0078A, 21 SGTR** **Value = 50-650 gpm** **Ramp = 5 minutes**			
Record Time SGTR is inserted: **_____**			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	RO reports RCS pressure and PZR level are lowering.		
	RO reports unexpected OHA alarm A-6 RMS HI RAD OR TRBL.		
	RO reports 2R15 is in Alarm.		
Examiner's Note: Crew can initiate SI without going to AB.SG-1.			
	CRS enters S2.OP-AB.SG-0001, Steam Generator Tube leak		
	CRS implements the CAS action of AB.SG-0001		
	RO initiates Safety Injection.		
	CRS returns to EOP-TRIP-1.		
	RO initiates SI and performs immediate actions of EOP-TRIP-1		
	CRS re-enters EOP-TRIP-1.		
	CRS performs immediate actions of EOP-TRIP-1.		
	CRS directs RO and PO to implement the CAS.		
	PO reports that SEC loading is NOT complete for energized ALL Vital Buses.		
21 SI Pump fails to start on SEC signal:			
	PO reports 21 SI Pump failed to start.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	PO blocks 2A SEC.		
	PO resets 2A SEC.		
	RO starts 21 SI Pump.		
	PO reports that 21 and 22 AFW pumps are running.		
	PO reports 21 SG NR levels are rising.		
	PO closes 21AF21 and 21AF11 valves. [Critical Task #1, Part 1]		
Critical Task #1, Part 1 (CT-18): Isolate feed flow to ruptured SG within 10 minutes. **SAT _____ UNSAT _____** **Record Time AFW flow isolated:** **_____**			
	If the ruptured SG is known at this point, the PO may request to close the 21AF21 and 21AF11 to isolate feed flow to the ruptured SG.		
	RO reports all valve groups are in safeguards positions.		
	RO reports that containment pressure has remained less than 15 psig.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	PO reports that 2RP4 does NOT indicate high steam flow coincident with low steam pressure or low-low Tavg.		
	PO reports all 4KV vital buses are energized.		
	RO reports control room ventilation is in Accident Pressurized mode.		
Role Play: When directed to open data logging room doors, state that you will direct an NEO to perform this task.			
	RO reports 2 switchgear supply and 1 exhaust fan are running.		
	RO reports 2 CCW pumps running.		
	RO reports ECCS flow as expected for current RCS pressure.		
	PO maintains total AFW flow greater than 22E4 lbm/hr until at least one SG NR level is >9%, then maintains SG NR level 19-33%.		
	RO reports 21, 22, 24 RCPs are running.		
	RO reports RCS Tcolds are stable or tending to 547 F.		
	RO reports both RTBs are open.		
	RO reports both PZR PORVs are closed.		
	RO reports PZR PORV block valves are open.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	RO reports 21, 22, 24 RCPs are running (23 RCP stopped previously).		
	RO reports both PZR spray valves are closed.		
	RO reports that RCS pressure is > 1350 psig.		
	RO maintains seal injection flow to all RCPs.		
	PO reports NO SG pressures are dropping in an uncontrolled manner or completely depressurized.		
Examiner's Note: After stopping 23 RCP, NR levels in 23 SG may be also rising. The crew should recognize that this is due to loss of forced circulation in that RC loop and reduced steaming effect in that SG.			
	RO reports that NR level in 21 SG is rising in an uncontrolled manner.		
	CRS transitions to EOP-SGTR-1, Steam Generator Tube Rupture.		
	PO reports NR levels rising in 21 SG.		
	PO sets 21MS10 to 1045 psig.		
	PO reports 21MS18, 21MS7, and 21GB4 are closed.		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
Critical Task #1, Part 2 (CT-18): Isolate steam flow to ruptured SG. **SAT _____ UNSAT _____**			
	PO closes 21MS167 [Critical Task #1, Part 2]		
	PO reports 21MS167, 21MS18, and 21MS7 are closed.		
	PO reports that 21 SG is ruptured.		
	PO reports 23 AFW Pump is not the only source of feed flow.		
	PO lowers 23 AFW speed to minimum.		
	PO Trips 23 AFW Pump.		
	CRS directs WCC to close 21MS45.		
Simulator Operator: Use **Remote MS05A** to simulate closing 21MS45. Notify CRS when valve is closed.			
	CRS directs WCC to close 2SS321.		
	CRS dispatches operator to shift gland sealing steam to alternate source IAW S2.OP-SO.GS-0001.		
	CRS determines RCS target temperature using Table B (SG press at >1000 psig = 503 F CETs).		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
Examiner' Note: Depending on the pace of the crew during EOP-TRIP-2, the crew may have determined that RCS temperature was not being controlled and initiated MSLI. IF this was performed, THEN, the crew will report that NO steam dumps are available and cooldown with intact MS10s. During validation using MS10's it took about 6 mins to reach CET of 503 F.			
	PO reports steam dumps are available.		
	PO places steam dumps in Manual.		
	PO places steam pressure valve demand to 0%.		
	PO places steam dumps in MS PRESS CONTROL.		
	PO adjusts steam pressure valve demand to 25%.		
	When Tavg low-low is reached, PO depresses "Bypass Tavg" pushbuttons.		
	PO dumps steam using steam dumps on intact SGs. [Critical Task #2, Part 1]		
CT#2 (CT-19): Control initial RCS cooldown so that transition from EOP-SGTR-1 does not occur. This CT is broken down into two (2)			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
Parts; establishing RCS cooldown and then maintaining RCS temperature. **SAT_____ UNSAT_____**			
	CRS continues on in EOP-SGTR-1.		
	RO reports hottest CETs are not less than RCS cooldown target temp.		
	PO maintains AFW flow > 22E4 lbm/hr until one SG NR level is > 9%, then maintain between 19% and 33%.		
	RO reports power is available to both PZR PORV stop valves.		
	RO reports both PZR PORVs are closed.		
	RO resets SI, Phase A, and Phase B isolation.		
	RO opens 21 and 22 CA330s.		
	PO resets each SEC and associated control centers.		
	RO reports RHR suction is aligned to the RWST.		
	RO stops both RHR pumps.		
	RO reports hottest CETs are not less than RCS target temp.		
	Crew **waits** until hottest CETs are less than RCS		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	target cooldown temp.		
	RO reports hottest CETs less than RCS target cooldown temp.		
Examiner's Note: It will take approx. **5 mins** to reach the RCS target temperature.			
	PO stops the cooldown by placing MS Pressure Control in Auto. [Critical Task #2 - Part 2]		
	CRS directs PO to dump steam to maintain CET temp. less than required.		
	PO reports ruptured SG pressure is stable or rising.		
	RO reports RCS subcooling is greater than 20 F.		
	RO reports normal PZR spray is **NOT** available (23 RCP stopped)		
RCS depressurization using PZR PORVs:			
	RO reports PZR PORV are available.		
	CRS reviews depressurization termination criteria IAW Table E.		
Examiner's Note: Table E Depressurization Criteria below:			

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
TABLE E RCS DEPRESSURIZATION TERMINATION CRITERIA • BOTH OF THE FOLLOWING: RCS PRESSURE LESS THAN RUPTURED SG PRESSURE AND PZR LEVEL GREATER THAN 11% (19% ADVERSE) OR • PZR LEVEL GREATER THAN 77% (74% ADVERSE) OR • RCS SUBCOOLING 0°F			
	RO opens **ONLY** one PZR PORV.		
	RO reports RCS pressure is lowering.		
	RO reports when depressurization termination criteria is met IAW Table E.		
PZR PORV fails to close:			
	RO closes PZR PORV.		
Simulator Operator: Ensure **ET-3** or **ET-4** is TRUE for the PZR PORV opened. This will insert malfunction to prevent PORV from closing. **ET-3, 2PR1 fails open** **ET-4, 2PR2 fails open**			
	RO reports opened PZR PORV failed to close.		
	RO closes the associated PZR PORV block valve		

Evaluator/Instructor Activity	Expected Plant/Student Response	SBT LOG	Comment
	for the open PORV. [Critical task #3]		
Critical Task # 3 (CT-10): Close PZR PORV block valve by completion of step in SGTR-1 that directs closing PZR PORV Block valve. **SAT _____ UNSAT _____**			
	RO reports RCS pressure rising.		
The scenario maybe terminated when the PZR PORV block valve is closed or as directed by the Lead Examiner.			

VI. SCENARIO REFERENCES

A. Alarm Response Procedures (Various)
B. Technical Specifications
C. Emergency Plan (ECG)
D. OP-AA-101-111-1003, Use of Procedures
E. S2.OP-IO.ZZ-0003, Hot Standby to Minimum Load
F. S2.OP-AB.RAD-0001, Radiation System Abnormality
G. S2.OP-SO.MS-0002, Steam Dump System Operation
H. S2.OP-ST.CBV-0003, Containment Systems – Cooling Systems
I. S2.OP-AB.CN-0001, Main Feedwater/Condensate System Abnormality
J. S2.OP-AB.RCP-0001, Reactor Coolant Pump Abnormality
K. 2-EOP-TRIP-1, Reactor Trip or Safety Injection
L. 2-EOP-TRIP-2, Reactor Trip Response
M. 2-EOP-SGTR-1, Steam Generator Tube Rupture

ATTACHMENT 1
UNIT TWO PLANT STATUS
TODAY

MODE: 2 POWER: 2% RCS BORON: 1584 MWe 0

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

N/A

REACTIVITY PARAMETERS

- Control Bank D at 114 steps.
- Reactor Engineering directs use of control rods and steam dumps to raise power to 10%. No Fuel Conditioning Limits are imposed until 50%.

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

None

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

- 25 CFCU was declared Operable last shift following return from maintenance. The CFCU is running in low speed to monitor bearing temperatures for the next 12 hours per System Engineering request. System Engineering will monitor temperatures remotely.
- S2.OP-IO.ZZ-0003, Hot Standby to Minimum Load complete up to Section 4.3, step 4.3.18 and S2.OP-SO.MS-0002, Steam Dump System Operation is open at (5.4.1)
- Monitoring Tavg > 541 F once per 30 minutes due to RC Loop Tavg – Tref Deviation console alarm in (extra NCO to log).
- Creew to continue Power ascension to 10% using control rods and steam dumps, and enter Mode 1.
- Reactor Engineering is standing by to support power ascension.
- Mode 1 entry is authorized.

ABNORMAL PLANT CONFIGURATIONS:

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.

PRIMARY:

SECONDARY:

- On main feedwater using 21 SGFP; 22 SGFP O/S in standby

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: 19-01 NRC Scenario #4 REVIEWER: R. Chan

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

ATTACHMENT 5

ESG CRITICAL TASKS

19-01 NRC Scenario #4

1. **Critical Task #1 (CT-18):** Isolate feed and steam flow to ruptured SG before a transition to SGTR-3 occurs.

   Bases: See WOG Rev 2

2. **Critical Task #2 (CT-19):** Control initial RCS cooldown so that transition from EOP-SGTR-1 does not occur due to low subcooling, or severe challenge on CFST Thermal Shock or Shutdown Margin.

   Note: This CT is broken down into two (2) parts that include establishing RCS cooldown and then maintaining RCS temperature.

   Bases: See WOG Rev 2

3. **Critical Task #3 (CT-10):** Close PZR PORV block valve of stuck open PZR PORV by completion of MCA step in SGTR-1 that directs closing PZR PORV block valve.

Note: CT numbers in parentheses are the corresponding Westinghouse ERG Rev. 2- based Critical Tasks procedure WCAP-17711-NP

ATTACHMENT 6

ESG-PRA RELATIONSHIP EVALUATION

EVENTS LEADING TO CORE DAMAGE

Y/N	Event	Y/N	Event
N	TRANSIENTS with PCS Unavailable	N	Loss of Service Water
Y	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
N	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
N	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
Y	Cooldown the RCS and depressurize the system
Y	Isolate the affected Steam Generator that has the tube rupture(s)
N	Early depressurize the RCS
N	Initiate feed and bleed

Complete this evaluation form for each ESG

SIMULATOR
EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC-5 [IOP-4, AB.ROD-3, AR.ZZ-11, TRIP-1, FRHS-1 w/Condensate Recovery using S/Ds]

SCENARIO NUMBER: 19-01 NRC ESG-5

EFFECTIVE DATE: See Approval Below

EXPECTED DURATION: 60 minutes

REVISION NUMBER: 12

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **STA**

[ ] **OTHER** _____

Revision Summary:

- For previous revision summaries see ESG-1512
- Rev. 10 (5-1-19) (formerly ESG-1811) Modified for 2019 Annual Exam. Deleted Containment pressure malfunction and 2B SEC failure. Added 23 charging pump trip and PZR spray valve failure. Changed initial condition for 21 charging pump C/T to support TS call on 23 charging pump trip.
- Rev. 11 (last used on 2019 Annual ESG-1908). Modified for 19-01 NRC exam.
- Rev. 12 Incorporated NRC comments from 2-14-20 working mtg to reduce the scenario duration. Removed starting 23 CN Pump, 24MS29 failing closed (note: 5%/min ramp rate no longer applicable), 2PT-506 failure, failure of Phase A to actuate, and moved Loss of 2B 4KV bus following Rx Trip. Added 22 ABV Exhaust fan damper failure and 2PT-505 failure. Changed CT-12 to CT-13 MT failure to Auto Trip no MSLI required. Added comments from NRC Prep Week 6-17-20.

PREPARED BY:	R. Chan	7-6-20
	Lead Regulatory Exam Author	**Date**
APPROVED BY:	N/A	
	Operations Training Manager or designee	**Date**
APPROVED BY:	N/A	
	Operations Department	**Date**

SCAN OF SIGNED SCENARIO COVER SHEET