

OPERATING TEST NO. **2004301**:

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO / BOP	Reactivity	1	1 / -		6 / -	
	Normal	1	- / 1		- / 1	
	Instrument / Component	4	3,6 / 2,4,7		2,4,5 / 3,4,5,8	
	Major	1	5 / 5		7 / 7	
As RO	Reactivity	1	-		-	
	Normal	0	-		-	
	Instrument / Component	2	-		-	
	Major	1	-		-	
SRO-I (N/A)						
As SRO	Reactivity	0	-		-	
	Normal	1	-		-	
	Instrument / Component	2	-		-	
	Major	1	-		-	
SRO-U	Reactivity	0	-		-	
	Normal	1	1		1	
	Instrument / Component	2	2, 3, 4, 6, 7		2, 3, 4, 5, 8	
	Major	1	5		7	

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 - (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
 - (3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Charles D. Zoia (CERT) / M. Bielby

NRC Reviewer: _____

Facility: Kewaunee Nuclear Plant Scenario No.: 1 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 100% power, BOL, equilibrium Xenon. Testing of the turbine governor and stop valves is scheduled for later in the shift.

Turnover: (1) "A" RHR pump has been OOS for high vibration for 36 hours. (2) "B" motor-driven AFW pump was taken OOS last shift due to a lube oil cooler leak. (3) "B" S/G level channel LT-472 is OOS for a recent transmitter failure. Maintenance has been initiated but is not expected to be completed on this shift

Event No.	Malf. No.	Event Type*	Event Description
1	-	R - RO N - BOP N - SRO	Perform a power reduction to 390 MW _e per N-O-3
2	RX211	I - BOP I - SRO	"A" S/G level controlling channel, LT-461, fails LOW.
3		I - RO I - SRO	Controlling PRZR pressure channel, PT-431, fails HIGH.
4	FW01	C - BOP C - SRO	Loss of condenser vacuum (procedure E-AR-09).
5	RD01	M - RO M - BOP M - SRO	ATWS without manual turbine trip from the control room (procedures E-0 to FR-S.1).
6		C - RO C - SRO	Charging pumps trip (auto-inhibit signal) requiring SI pumps to be started (procedure FR-S.1).
7		C - BOP C - SRO	"A" AFW pump fails to auto-start and must be manually started (procedure FR-S.1).

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

Dynamic Simulator Scenario #1**Simulator Scenario Guide (CONTINUED):**

INITIAL CONDITIONS: 100% power, BOL, equilibrium Xenon. Testing of the turbine governor and stop valves is scheduled for later in the shift.

TURNOVER:

(1) "A" RHR pump has been OOS for high vibration for 36 hours.

(2) "B" motor-driven AFW pump was taken OOS last shift due to a lube oil cooler leak.

(3) "B" S/G level channel LT-472 is OOS for a recent transmitter failure.

In all cases, maintenance has been initiated but is not expected to be completed on this shift.

EVENT 1

With the plant initially at 100% power, power must be reduced to perform a test of the turbine governor and stop valves.

EVENT 2

Once power is reduced, a failure of S/G "A" Level Transmitter LT-461 (LOW) occurs. This causes the S/G "A" Feedwater Flow Control Valve to fully open, requiring Manual control of the valve to stabilize the plant. A-MI-87 is then used to remove the channel from service.

EVENT 3

After the plant has stabilized and A-MI-87 is completed, Pressurizer Pressure Transmitter PT-431 fails high and causes the pressurizer spray valves to fully open and de-energize all heaters. This will require the operator to swap channels or take manual control of the spray valves. After stabilizing the plant, A-MI-87 is then used to remove the channel from service.

EVENT 4

After the plant has stabilized and A-MI-87 is completed, air begins to leak into the condenser, causing a loss of condenser vacuum. Actions of E-AR-09, Loss of Condenser Vacuum are initially successful, but the reactor eventually must be manually tripped due to entering the "DO NOT OPERATE" region of E-AR-09, Figure 1- "Operating Regions Based on Condenser Back Pressure".

EVENT 5-7

After the manual reactor trip is determined to be necessary and ordered, the reactor will not manually trip and a transition to FR-S.1 is made. After working through FR-S.1, the crew will transition back to E-0 and then to ES-0.1, Reactor Trip Response. The scenario is ended at the discretion of the lead examiner after the transition to ES-0.1 has been made.

Op-Test No.: <u>2004301</u> Scenario No.: <u>04-01</u> Event No.: <u>01</u> Page <u>1</u> of <u>2</u>		
Event Description: <u>With the plant initially at 100% power, power must be reduced to perform a test of the turbine governor and stop valves.</u> (REACTIVITY MANIPULATION)		
Time	Position	Applicant's Actions or Behavior
	CRS	Brief crew on performance of N-0-03, Plant Operation Greater than 35% Power. Discuss precautions for commencing down-power.
	CRS	Implement N-0-03, Plant Operation Greater than 35% Power.
	RO	Perform reactivity estimate based on planned load decrease.
	CRS	Direct power reduction to <390MWe
	BOP	<p>Reduce load per N-TB-54, Turbine and Generator Operation:</p> <ul style="list-style-type: none"> ● Review Initial Conditions, Precautions & Limitations ● Perform SHUTDOWN per step 4.3 (<u>Preferred Method</u>): <ul style="list-style-type: none"> ○ Determine maximum unloading rate (figures 2 & 3) ○ Adjust controls to clear Valve Position Limiter (VPL) <ul style="list-style-type: none"> - Reduce setter \leq EH Panel Plaque value - Set loading rate \leq 5% per minute - Depress GO pushbutton - WHEN VPL light goes out, push the HOLD pushbutton. ○ Set setter to desired load ○ Verify/set desired loading rate to 0.25% per minute <p>(Normal Plant Practice)</p> <ul style="list-style-type: none"> ○ Inform Energy Supply and Control of the rate and the amount of the load reduction ○ Depress the GO pushbutton ○ Maintain reactive load within the limits of Figure 5, Generator Capacity Curve...
		(EVENT 1 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 01Page 2 of 2

Event Description: With the plant initially at 100% power, power must be reduced to perform a test of the turbine governor and stop valves.

(REACTIVITY MANIPULATION)

Time	Position	Applicant's Actions or Behavior
	RO	Perform reactivity adjustments as required: Rod Control (rod motion at 1.5°F difference T_{avg} to T_{ref}) AND/OR Boration Concentration Control
	BOP	Adjust Heater Drain Pump speed to maintain equal loading on pumps - AS REQUIRED.
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (02)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 02 Page 1 of 2

Event Description: This event is a failure of S/G "A" Level Transmitter LT-461 (LOW). This causes the S/G "A" Feedwater Flow Control Valve to fully open, requiring Manual control of the valve to stabilize the plant. A-MI-87 is then used to remove the channel from service. (NOTE: The Simulator Booth Operator will trip bistables per A-MI-87 paperwork provided by the CRS and return paperwork to the CRS when the actions are complete)

Time	Position	Applicant's Actions or Behavior
	BOP	Identify and report the failure using available indications: <ul style="list-style-type: none"> ● Annunciator 47062-A, "S/G A Program Level Deviation" ● Annunciator 47062-B, "S/G A Bypass CV Level Deviation" ● Annunciator 47064-A, "S/G A Level Low Low" ● Level Indicator LI-461 failed to zero.
	BOP	Refer to annunciator response procedure, place FW-7A , S/G "A" Main FW Flow Control Valve to MANUAL, and restore level to 44%. NOTE: S/G "A" Level Control must be controlled in MANUAL for the remainder of the scenario when using Main FW.
	CRS	Direct the power decrease to be placed on HOLD.
	CRS	Implement A-MI-87, "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.", to remove LT-461 from service - B/S tripping must be performed within 6 hours per A-MI-87. NOTE: A-FW-05A, Abnormal Feedwater System Operation, may be referenced but requires no additional actions.
	CRS	Direct actions to remove LT-461 from service: <ul style="list-style-type: none"> ● Direct I&C to perform SP 47-316A to check redundant channel B/S contacts for LT-461 removal from service (NOTE: The Control Room will be informed that SP 47-316A has been completed).
	BOP	Perform/verify prerequisite lineup of "Removal from Service": <ul style="list-style-type: none"> ● Ensure FW-7A is in MANUAL. ● Place FW-10A, S/G "A" Bypass FW Flow Control Valve to MANUAL.
	CRS	Direct I&C to trip associated bistables for LT-461.
		(EVENT 2 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 02Page 2 of 2

Event Description: This event is a failure of S/G "A" Level Transmitter LT-461 (LOW). This causes the S/G "A" Feedwater Flow Control Valve to fully open, requiring Manual control of the valve to stabilize the plant. A-MI-87 is then used to remove the channel from service.

Time	Position	Applicant's Actions or Behavior
	BOP	Complete the verification steps of A-MI-87 after B/S tripping: <ul style="list-style-type: none"> ● Ensure the following annunciator/status lights are ON: <ol style="list-style-type: none"> 1. Annunciator 47064-A, "S/G A Level Low Low" 2. Annunciator 47064-B, "S/G A Level High" 3. Status Light 44907-1101, "S/G A Low-Low Level" 4. Status Light 44908-0801, "S/G A Hi-Hi Level"
	CRS	Review Technical Specifications 3.5.b <u>and</u> 3.5.c: <ul style="list-style-type: none"> ● Table 3.5-2 <ol style="list-style-type: none"> 1. No. 12 - LO-LO S/G Water Level 2. Continued operation is acceptable (2 channels per loop required to be OPERABLE) ● Table 3.5-3 <ol style="list-style-type: none"> 1. No. 4.a - MDAFW Pumps - Either S/G LO-LO level 2. No. 5.a - TDAFW Pumps - Both S/G LO-LO level 3. Continued operation is acceptable (2 channels per loop required to be OPERABLE) ● Table 3.5-4 <ol style="list-style-type: none"> 1. No. 4.a - HI-HI S/G Level Main Feedwater Isolation 2. Continued operation is acceptable (2 channels required to be OPERABLE)
	CRS	Direct I&C to investigate S/G level channel LT-461 failure/status.
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (03)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 03Page 1 of 2

Event Description: Pressurizer Pressure Transmitter PT-431 fails high and causes the pressurizer spray valves to fully open and de-energize all heaters. This will require the operator to swap channels or take manual control of the spray valves. After stabilizing the plant, A-MI-87 is then used to remove the channel from service.

(NOTE: The Simulator Booth Operator will trip bistables per A-MI-87 paperwork)

Time	Position	Applicant's Actions or Behavior
	RO	Identify and report the failure using available indications: <ul style="list-style-type: none"> ● Annunciator 47041-C, "Pressurizer Pressure 2385" ● Ann. 47043-C, "Pressurizer Control Press Abnormal" ● Status Light 44907-0307, "Pressurizer 2385 psig" ● Pressurizer Pressure Indicator PI-431 failing high.
	RO	Refer to annunciator response procedure and place the Pressurizer Pressure Control Selector to position 2-1 , to remove the failed instrument. <p>NOTE: Alternative acceptable actions include placing <u>both</u> Pressurizer Spray Valve Controllers in Manual <u>and</u> shutting them OR placing the Master Pressurizer Pressure Controller in manual and adjusting to control pressure.</p>
	CRS	Direct the power decrease to be placed on HOLD.
	CRS	Implement A-MI-87, "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.", to remove PT-431 from service - B/S tripping must be performed within 6 hours per A-MI-87.
	CRS	Direct actions to remove PT-431 from service: <ul style="list-style-type: none"> ● Direct I&C to perform SP 47-316C to check redundant channel B/S contacts for PT-431 removal from service (NOTE: The Control Room will be informed that SP 47-316C has been completed).
	RO	Perform/verify prerequisite lineup of "Removal from Service": <ul style="list-style-type: none"> ● Place the Pressurizer Pressure Control Selector to position 2-1 (to place PT-429 as the controlling channel). ● Place the Pressurizer Pressure Recorder Input Selector switch to position "1".
	CRS	Direct I&C to trip associated bistables for PT-431.
		(EVENT 3 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 03Page 2 of 2

Event Description: Pressurizer Pressure Transmitter PT-431 fails high and causes the pressurizer spray valves to fully open and de-energize all heaters. This will require the operator to swap channels or take manual control of the spray valves. After stabilizing the plant, A-MI-87 is then used to remove the channel from service.

(NOTE: The Simulator Booth Operator will trip bistables per A-MI-87 paperwork)

Time	Position	Applicant's Actions or Behavior
	RO	Complete the verification steps of A-MI-87 after B/S tripping: <ul style="list-style-type: none"> ● Ensure the following annunciator/status lights are ON: <ol style="list-style-type: none"> 1. Annunciator 47041-D, "PZR Press SI Channel Alert" 2. Annunciator 47033-C, "OTΔT High" 3. Annunciator 47041-C, "Pressurizer Pressure 2385" 4. Annunciator 47042-D, "Pressurizer Pressure <1900" 5. Ann. 47041-R, "OTΔT Channel Rnback/Rdstp ALERT" 6. Status Light 44908-0203, "Pressurizer 1815 psig" 7. Status Light 44908-0103, "Pressurizer > 2000" 8. Status Light 44907-0507, "Loop B OTΔT" 9. Status Light 44907-0207, "Pressurizer 1900 psig" 10. Status Light 44907-0307, "Pressurizer 2385 psig" 11. Status Light 44904-0202, "Loop B Channel 3 OTΔT"
	CRS	Review Technical Specifications 3.5.b <u>and</u> 3.5.c: (HSD within 6 hours IF bistables not tripped) <ul style="list-style-type: none"> ● Table 3.5-2 <ol style="list-style-type: none"> 1. No. 5 - Overtemperature ΔT 2. No. 7 - Low Pressurizer Pressure 3. No. 8 - High Pressurizer Pressure 4. Continued operation is acceptable (3 channels for No. 5 & 7 - 2 channels for No. 8 are required OPERABLE) ● Table 3.5-3 <ol style="list-style-type: none"> 1. No. 1.d - Pressurizer Low Pressure 2. Continued operation is acceptable (2 channels required OPERABLE)
	CRS	Direct I&C to investigate Pressure Transmitter PT-431 failure/status.
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (04)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 04 Page 1 of 2

Event Description: Air begins to leak into the condenser, causing a loss of condenser vacuum. Actions of E-AR-09, Loss of Condenser Vacuum are **initially** successful, but the reactor eventually must be manually tripped due to entering the "DO NOT OPERATE" region of E-AR-09, Figure 1- "Operating Regions Based on Condenser Back Pressure".

Time	Position	Applicant's Actions or Behavior
	BOP	Identify and report the failure using available indications: <ul style="list-style-type: none"> ● Annunciator 47051-W, "Condenser Vacuum Low" ● Annunciator 47054-I, "Cond Drain Tank Level High/Low" ● Condenser vacuum indicating low. ● Generator electrical output indicating low.
	CRS	Implement procedure E-AR-09, Loss of Condenser Vacuum.
	CRS	Direct announcement " Losing Condenser Vacuum " via Gai-tronics
	BOP	Verify safe operation of the turbine per Figure 1, "Operating Regions Based on Condenser Back Pressure" <ul style="list-style-type: none"> ● TRIP the reactor IF EITHER of the following occur: <ul style="list-style-type: none"> ○ Turbine operates in the "Avoid Operation" region for > 10 minutes OR ○ Turbine operates in the "Do Not Operate" region <p>NOTE: These criteria will not <u>initially</u> require a trip, but after vacuum stabilizes briefly, a manual reactor trip will be required due to eventual operation in the "DO NOT OPERATE" region of Figure 1.</p>
	BOP	VERIFY the following: <ul style="list-style-type: none"> ● Normal Circulating Water (CW) System operation: <ol style="list-style-type: none"> 1. CW Pump(s) RUNNING <u>and</u> Disch. Check Valve(s) - OPEN. 2. Condenser inlet water box isolation valves - OPEN. ● Gland Steam Supply Pressure (4101002) at 2.5 - 4.0 psig
		(EVENT 4 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 04 Page 2 of 2

Event Description: Air begins to leak into the condenser, causing a loss of condenser vacuum. Actions of E-AR-09, Loss of Condenser Vacuum are **initially** successful, but the reactor eventually must be manually tripped due to entering the "DO NOT OPERATE" region of E-AR-09, Figure 1- "Operating Regions Based on Condenser Back Pressure".

(NOTE: The Simulator Booth Operator will provide the required local actions below)

Time	Position	Applicant's Actions or Behavior
	BOP	<p>VERIFY/PERFORM the following LOCALLY:</p> <ol style="list-style-type: none"> 1. Normal water level in the Condensate Drain Tank. 2. Steam supply air ejectors (PI-11052) 118-125 psig. 3. CLOSE AR-35, Condenser Air Inleakage Throttle Valve. 4. Proper air ejector jet operation: <ol style="list-style-type: none"> 1. IF jet(s) are <u>NOT</u> functioning properly, SHIFT to standby jet as follows (2nd Stage air ejector): <ol style="list-style-type: none"> 1. ISOLATE Faulty ejector: <ol style="list-style-type: none"> 1. CLOSE AR-4A(B)(C), 2nd Stage Ejector Inlet. 2. Close MS-520A(B)(C), 2nd Stage Ejector Steam Inlet. 2. PLACE Standby Ejector in service: <ol style="list-style-type: none"> 1. OPEN MS-520A(B)(C) 2. OPEN AR-4A(B)(C) <p>NOTE: <i>The 2nd Stage air ejector jets will <u>not</u> be functioning properly, and placing the standby jets in service will be partially effective. Ultimately, the reactor will <u>have</u> to be tripped due to operation in the "DO NOT OPERATE" region of Figure 1.</i></p> <ol style="list-style-type: none"> 5. At 5" backpressure, start hogging pumps. 6. AT 5.5" backpressure, TRIP TURBINE.
	BOP	Identifies reactor trip criteria is imminent and reports to the CRS, recommending a manual reactor trip.
	CRS	Acknowledges report and orders reactor to be tripped.
	CRS	Transitions to E-0, "Reactor Trip or Safety Injection"
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENTS (05-07)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 05-07 Page 1 of 3

Event Description: After a manual reactor trip is determined to be necessary and ordered, the reactor will not manually trip and a transition to FR-S.1 is made. After working through FR-S.1, the crew will transition back to E-0 and then to ES-0.1, Reactor Trip Response.

(*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	RO	Manual trip initiated - the reactor does NOT trip.
	BOP	Manual trip initiated using 2 nd reactor trip pushbutton - the reactor does NOT trip.
	RO	(*) Manually inserts control rods.
	BOP	Attempts to open Bus 33 and 43 supply breakers - THIS ACTION WILL NOT BE SUCCESSFUL.
	CRS	With power > 5%, a transition is made to FR-S.1, "Response to Nuclear Power Generation/ATWS" from E-0.
	BOP	<p>PERFORM FR-S.1 IMMEDIATE ACTIONS</p> <ul style="list-style-type: none"> ● RE-VERIFY FR-S.1, step 1 Immediate Actions and Contingency Actions previously performed in E-0. ● (*)Operator is dispatched to locally open reactor trip breakers and locally position rod drive MG set motor and generator switches to TRIP- THIS IS SUCCESSFUL. ● VERIFY Turbine Trip <ul style="list-style-type: none"> ○ A Manual Trip will be required and attempted but UNSUCCESSFUL. <ul style="list-style-type: none"> - (*)Manually run back Turbine <u>AND</u> stop both EH Oil Pumps. - <u>IF</u> Turbine Control Valves cannot be closed, <u>THEN</u> manually initiate Main Steamline Isolation.
	BOP	<p>CHECK AFW Pumps RUNNING:</p> <ul style="list-style-type: none"> ● "A" M/D Pump must be Manually started. ● Check NR S/G level < 17% ● Check T/D AFW Pump running.
		(EVENTS 5-7 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 05-07 Page 2 of 3

Event Description: After a manual reactor trip is determined to be necessary and ordered, the reactor will not manually trip and a transition to FR-S.1 is made. After working through FR-S.1, the crew will transition back to E-0 and then to ES-0.1, Reactor Trip Response.

(*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK SI Pumps - ALL STOPPED
	RO	<p>(NOTE: INSERT Charging pump trip @ entry into FRS.1)</p> <p>ESTABLISH Charging Flow:</p> <ul style="list-style-type: none"> ● Charging pumps have tripped and WILL NOT start due to an auto-inhibit signal. ● IF no charging pump can be started, GO TO Step 7.
	RO	<p>VERIFY Boration Flow:</p> <ul style="list-style-type: none"> ● CHECK PRZR pressure - LESS THAN 2335 psig ● VERIFY charging flow > 40 GPM (NOT MET) <ol style="list-style-type: none"> 1. Manually start SI Pumps. 2. OPEN PRZR PORVs and block valves as necessary to obtain SI flow > 100 gpm <p>CONTINUE Boration to Cold Shutdown Conc. per RD-6.7</p> <p>NOTE: The Cold Shutdown Boron Concentration should be determined per RD-6.7 and RCS sampling initiated.</p>
	BOP	<p>VERIFY Containment Vent Isolation:</p> <ol style="list-style-type: none"> 1. Cntmt Purge/Vent Supply & Exhaust - CLOSED <ol style="list-style-type: none"> a. RBV-1 b. RBV-2 c. RBV-3 d. RBV-4 e. RBV-5 f. TAV-12 2. Post LOCA Hydrogen Valves - CLOSED <ol style="list-style-type: none"> a. LOCA-2B b. LOCA-100B c. LOCA-201B d. SA-7003B
		(EVENTS 5-7 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-01 Event No.: 05-07 Page 3 of 3

Event Description: After a manual reactor trip is determined to be necessary and ordered, the reactor will not manually trip and a transition to FR-S.1 is made. After working through FR-S.1, the crew will transition back to E-0 and then to ES-0.1, Reactor Trip Response.

(*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	RO	CHECK if the following Trips have occurred: 1. Reactor - TRIPPED 2. Turbine - TRIPPED
	BOP	CHECK S/G Levels: 1. NR Level in at least one S/G > 4% 2. Control feed flow to maintain NR level between 4% & 50%
	BOP	Verify all dilution paths ISOLATED: 1. MU-1022 , Reactor M/U Water to Blender - CLOSED. 2. (AO) MU-1025, M/U Water to Alt. Suction - CLOSED. 3. (AO) MU-1024 and CVC-423, Chem. Mixing Tank - CLOSED. 4. (AO) MU-1031A and B, M/U Water to BA Pumps - CLOSED.
	BOP	CHECK for Reactivity Insertion from Uncontrolled Cooldown: 1. RCS Temp. - Decreasing in an Uncontrolled Manner OR 2. Any S/G Press - Decreasing in an Uncontrolled Manner 3. BOTH ARE NO - Stop any CONTROLLED Cooldown AND GO TO Step 18
	BOP	1. CHECK Core Exit TCs < 1200°F 2. VERIFY Reactor Subcritical 1. Power Range < 5% 2. Intermediate Range - Negative SUR
	CRS	Transition <u>back</u> to E-0, Reactor Trip or Safety Injection
	CRS	Transition to ES-0.1 once E-0 Immediate Actions (steps 1 - 4) are verified <u>and</u> it is determined that SI is <u>NOT</u> required.
		AT THE DISCRETION OF THE LEAD EXAMINER, THE SCENARIO MAY BE TERMINATED.

Dynamic Simulator Scenario #1

Simulator Shift Turnover:

Per Scenario Outline

SIMULATOR SCENARIO SETUP

1. STEP COUNTERS - ON _____
2. INITIALIZE into IC _____
3. Communicator Telephone Log - AVAILABLE _____
4. Simulator Setup Checklist - COMPLETED _____
5. Simulator Book Prep. Checklist - COMPLETED _____
6. Simulator Scenario Briefing Sheet - COMPLETED _____
7. Simulator Security Checklist - COMPLETED _____

Dynamic Simulator Scenario #1

Simulator Scenario Guide:

NOTE: The Normal @ 100% IC is snapped with:

SER 0966 - Block (Bank D Rod Withdrawal High Limit annunciator 47043-P)

SER 1670 - Block (Source Range High Flux at Shutdown Annunciator 47034-O)

SER 0812 - Crywolf (AMSAC in Test annunciator 47065-F)

Overrides:

Meter: AO-41052-02 LI-472 SG B level value = 0

Light: DO-47033:0401 TLA-16 AMSAC CHANNEL ABNORMAL ON

RHR Pump A control switch in PULLOUT

AFW Pump B control switch in PULLOUT

NOTE: Apply UFMD Limits, Page 60 of PPCS Graphics prior to coming out of freeze.

Preloads:

ATWS Conditions

Reactor Trip breakers fail to open

IMF RD11

Turbine fails to trip (Auto & Manual)

IMF TC07

AMSAC Actuation Override

IMF RP03

Failure of Transformer / Bus Breakers to operate Bus 301 & 401

Breaker 1-308

IOR DI-46621-NA-CLOSE ON

IOR DI-46621-NA-TRIP OFF

IOR DI-46621-TRIP OFF

IOR DI-46621-PTL OFF

Breaker 13301

IOR DI-46624-NA-CLOSE ON

IOR DI-46624-NA-TRIP OFF

IOR DI-46624-TRIP OFF

IOR DI-46624-PTL OFF

Breaker 14301

IOR DI-46630-NA-CLOSE ON

IOR DI-46630-NA-TRIP OFF

IOR DI-46630-TRIP OFF

IOR DI-46630-PTL OFF

Breaker 1-402

IOR DI-46633-NA-CLOSE ON

IOR DI-46633-NA-TRIP OFF

IOR DI-46633-TRIP OFF

IOR DI-46633-PTL OFF

Dynamic Simulator Scenario #1

Simulator Scenario Guide (CONTINUED):

SG A level LT-461 fails to ZERO. Set up on TRIGGER 1
IMF RX211 (1) 0.0

LT-461 A-MI-87 I&C actions for removal from service
461B SG Hi Level Logic trip & 461A SG Lo/Lo Level Logic trip. Set up on TRIGGER 10
IRF RP170 (10) TRIP
IRF RP169 (10 5) TRIP

PRZR Pressure Control channel PT-431 fails to 2500. Set up on TRIGGER 2
IMF RX203 (2) 2500

PT-431 A-MI-87 I&C Actions for removal from service
407C Over Temp Trip, 407D Rod Stop, 431A High Press Trip, 431J Lo Press Trip
431I Unblock SI, 431G SI. Set up on TRIGGER 11
IRF RP141 (11) TRIP
IRF RP142 (11 5) TRIP
IRF RP164 (11 15) TRIP
IRF RP167 (11 20) TRIP
IRF RP166 (11 25) TRIP
IRF RP165 (11 30) TRIP

Loss of Condenser vacuum to 10% (100 scfm @ 29") over 10 minute ramp
Set up on TRIGGER 3.
IMF FW01 (3) 10 10:00

Local action to place Hogging Air Ejector in service when directed. Set up on
TRIGGER 12
IRF FW101 (12)

Local Operator actions to open reactor trip breakers (Simulator operator must delete
Malfunction RD11)
Opening the Rod Drive MG Set Motor and Generator breakers by Remote Function
(Local action - No indication changes for Control Room). Set up on TRIGGER 13
IRF RD102 (13) STOP
IRF RD103 (13) STOP

All Charging Pumps trip / fail to start during ATWS. Set up on TRIGGER 4
IMF CV12D (4)

AFW Pump A fails to AUTO Start. Manual start available (Preloaded)
IMF FW16A

OPERATING TEST NO. **2004301**:

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO / BOP	Reactivity	1	1 / -		6 / -	
	Normal	1	- / 1		- / 1	
	Instrument / Component	4	3,6 / 2,4,7		2,4,5 / 3,4,5,8	
	Major	1	5 / 5		7 / 7	
As RO	Reactivity	1	-		-	
	Normal	0	-		-	
	Instrument / Component	2	-		-	
	Major	1	-		-	
SRO-I (N/A)						
As SRO	Reactivity	0	-		-	
	Normal	1	-		-	
	Instrument / Component	2	-		-	
	Major	1	-		-	
SRO-U	Reactivity	0	-		-	
	Normal	1	1		1	
	Instrument / Component	2	2, 3, 4, 6, 7		2, 3, 4, 5, 8	
	Major	1	5		7	

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 - (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
 - (3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Charles D. Zoia (CERT) / M. Bielby

NRC Reviewer: _____

Facility: Kewaunee Nuclear Plant Scenario No.: 3 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 60% power, BOL, with a power reduction in progress.
Maintenance has determined that the time to repair the "A" RHR pump will be at least another 45 hours.

Turnover: (1) "A" RHR pump has been OOS for high vibration for 36 hours. (2) "B" motor-driven AFW pump was taken OOS last shift due to a lube oil cooler leak.
Maintenance has been initiated but is not expected to be completed on this shift

Event No.	Malf. No.	Event Type*	Event Description
1	----	N - BOP N - SRO	Perform a power reduction to 50% power per N-O-3.
2	CV203	I - RO I - SRO	VCT level transmitter, LT-141, fails HIGH (DIVERT).
3	CW04A	C - BOP C - SRO	Trip of running CW pump.
4		C - RO C - BOP C - SRO	Loss of Bus 6 requiring EDG manual starting and loading.
5	SG02B	C - RO C - BOP C - SRO	"B" S/G tube leak leading to a manual reactor trip.
6		R - RO	Fast Reactor Shutdown after SGTL determined to be greater than 100 gpd.
7		M - RO M - BOP M - SRO	"B" S/G tube leak increases to a SGTR after leak is quantified and power has been reduced.
8		I - BOP I - SRO	"B" S/G PORV fails open due to PS-16113 failing HIGH

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

Dynamic Simulator Scenario #3

Simulator Scenario Guide (CONTINUED):

INITIAL CONDITIONS: 60% power, BOL, with a power decrease in progress, but currently on hold for turnover. Maintenance has determined that the repairs to the “A” RHR pump will take an additional 45 hours.

TURNOVER:

(1) “A” RHR pump has been OOS for high vibration for 36 hours.

(2) “B” motor-driven AFW pump was taken OOS last shift due to a lube oil cooler leak.

In all cases, maintenance has been initiated but is not expected to be completed on this shift.

EVENT 1

With the plant initially at 60% power, power is ordered to be reduced to 50% per N-0-3. The maintenance planned for the “A” RHR Pump was determined need an additional 45 hours to perform, thus the plant needs to be shut down (NORMAL OPERATIONS).

EVENT 2

After the plant has reached the desired power level, VCT Level Transmitter LT-141 fails high and causes letdown to divert to the hold-up tanks. This will require implementation of A-CVC-35C and manual control of LD-27.

EVENT 3

After the plant has stabilized and A-CVC-35C is completed, the running CW Pump (A) trips on overcurrent. This requires the operator to locally align and start CW Pump B per E-CW-04 and investigate to determine the reason for the pump trip. The following conditions for the CW will exist when asked by the crew - the tripped pump motor appears normal, the forebay level is normal and there are no indications of problems with the traveling screens.

EVENT 4

After the plant has stabilized and E-CW-04 is completed, a loss of Bus 6 occurs, which is addressed by A-EHV-39, Abnormal 4160V AC Supply and Distribution System. The undervoltage condition will not be sensed by the “B” EDG, so it will have to be manually started and loaded per A-DGM-10B, Abnormal Diesel Generator B Operation.

EVENT 5-8

After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14, are being performed, i.e. the leak has been quantified (>100 gpd) and a fast power reduction has begun (RO Reactivity), the leak increases to a rupture at 300 gpm. The crew must then manually trip AND SI. After performing the required steps in E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and SD-2B must be manually closed. The scenario ends when SI Flow is terminated in E-3.

Op-Test No.: <u>2004301</u> Scenario No.: <u>04-03</u> Event No.: <u>01</u> Page <u>1</u> of <u>2</u>		
Event Description: <u>With the plant initially at 60% power, power must be reduced to 50% due to expected RHR "A" repair time.</u>		
Time	Position	Applicant's Actions or Behavior
	CRS	Brief crew on performance of N-0-03, Plant Operation Greater than 35% Power. Discuss precautions for commencing down-power.
	CRS	Implement N-0-03, Plant Operation Greater than 35% Power.
	RO	Perform reactivity estimate based on planned load decrease.
	CRS	Direct power reduction to <390MWe
	BOP	<p>Reduce load per N-TB-54, Turbine and Generator Operation:</p> <ul style="list-style-type: none"> ● Review Initial Conditions, Precautions & Limitations ● Perform SHUTDOWN per step 4.3 (<u>Preferred Method</u>): <ul style="list-style-type: none"> ○ Determine maximum unloading rate (figures 2 & 3) ○ Adjust controls to clear Valve Position Limiter (VPL) <ul style="list-style-type: none"> - Reduce setter \leq EH Panel Plaque value - Set loading rate \leq 5% per minute - Depress GO pushbutton - WHEN VPL light goes out, push the HOLD pushbutton. ○ Set setter to desired load ○ Verify/set desired loading rate to 0.25% per minute <p>(Normal Plant Practice)</p> <ul style="list-style-type: none"> ○ Inform Energy Supply and Control of the rate and the amount of the load reduction ○ Depress the GO pushbutton ○ Maintain reactive load within the limits of Figure 5, Generator Capacity Curve...
		(EVENT 1 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 01Page 2 of 2

Event Description: With the plant initially at 60% power, power must be reduced to 50% due to expected RHR "A" repair time.

Time	Position	Applicant's Actions or Behavior
	RO	Perform reactivity adjustments: Rod Control (rod motion at 1.5°F difference T_{avg} to T_{ref}) AND/OR Boration Concentration Control
	BOP	Adjust Heater Drain Pump speed to maintain equal loading on pumps - AS REQUIRED.
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (02)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 02 Page 1 of 2

Event Description: After the plant has reached the desired power level, VCT Level Transmitter LT-141 fails high and causes letdown to divert to the hold-up tanks. This will require implementation of A-CVC-35C and manual control of LD-27

Time	Position	Applicant's Actions or Behavior
	RO	IDENTIFY and REPORT the failure using available indications: <ul style="list-style-type: none"> Level Indicator LI-141 - Failed HIGH Annunciator 47043-L, "VCT level High/Low" - LIT
	RO	REFER to annunciator response procedure and INFORM CRS of required actions (<u>GO TO</u> A-CVC-35C).
	CRS	IMPLEMENT A-CVC-35C, Abnormal VCT Control.
	RO	REVIEW Symptoms and Automatic Actions of A-CVC-35C.
	RO	CHECK at least one operable VCT level channel (CAS): <ul style="list-style-type: none"> VCT level channel LI-112 is determined to be operable based on plant conditions.
	RO	CHECK operable VCT level channel > 5% (CAS): <ul style="list-style-type: none"> VCT level channel LI-112 is operable and indicates > 5%.
	RO	CHECK VCT level channel LI-112 - OPERABLE (YES).
	RO	CHECK VCT level channel LI-141 - OPERABLE (NO). <ul style="list-style-type: none"> POSITION LD-27, VCT/Holdup Tank Divert Valve to "VCT" MANUALLY CONTROL VCT level <56% with LD-27. <p>NOTE: The crew should realize that the automatic swap of Charging Pump suction to the RWST when VCT level is < 5% will NOT occur with LT-141 failed high.</p>
	RO	CHECK VCT Level \geq 17% <ul style="list-style-type: none"> Manual Makeup as required IF VCT Level < 17%
	RO	CHECK Actual VCT Level < 28% <ul style="list-style-type: none"> Manual Makeup is STOPPED IF Actual VCT Level \geq 28% Charging Pump speed adjusted to maintain PRZR level.
		(EVENT 2 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 02 Page 2 of 2

Event Description: After the plant has reached the desired power level, VCT Level Transmitter LT-141 fails high and causes letdown to divert to the hold-up tanks. This will require implementation of A-CVC-35C and manual control of LD-27

Time	Position	Applicant's Actions or Behavior
	RO	CHECK Actual VCT Level < 56% <ul style="list-style-type: none"> ● Manual Makeup is STOPPED IF Actual VCT Level \geq 56%. ● IF Actual VCT Level \geq 56%, DIVERT to the CVC Holdup Tank with LD-27.
	RO	CHECK Reactor Make-up Control - OPERATING PROPERLY <ul style="list-style-type: none"> ● Proper Reactor Make-up Control is unaffected by the failure of LT-141.
	CRS	RETURN to procedure and step in effect (N-0-03, Plant Operation Greater than 35% Power).
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (03)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 03 Page 1 of 2

Event Description: After the plant has stabilized and A-CVC-35C is completed, the running CW Pump (A) trips on overcurrent. This requires the operator to locally align and start CW Pump B and investigate the reason for the pump trip. The following conditions for the CW will exist - the tripped pump motor appears normal, the forebay level is normal and there are no problems with the traveling screens.

(NOTE: The Simulator Booth Operator provides any required local actions below)

Time	Position	Applicant's Actions or Behavior
	BOP	IDENTIFY and REPORT the trip of CW Pump A using available indications: <ul style="list-style-type: none"> ● Annunciator 47082-C, "Bus 3 Feeder Bkr Trip" ● Annunciator 47083-C, "Bus 3 Feeder Bkr Overload" ● Annunciator 47033-45, "TLA-20 - 4160V Stator Temp Hi" ● White disagreement light on CW Pump A.
	RO/BOP	REFER to annunciator response procedure and INFORM CRS of required actions (<u>GO TO</u> E-CW-04; N-CW-04 & A-CW-04 are <u>also</u> referred to and may be referenced for additional actions).
	CRS	IMPLEMENT procedure E-CW-04, Loss of Circulating Water based on current plant conditions.
	BOP	CHECK Annunciator 47051-M, "CW Pumps Low Low Level Trip" - <u>NOT</u> LIT (CAS): <ul style="list-style-type: none"> ● YES - Annunciator 47051-M is <u>NOT</u> LIT
	BOP	VERIFY at least one CW Pump is RUNNING (CAS): <ul style="list-style-type: none"> ● NO CW Pumps are running. ● START standby Pump B
	BOP	CHECK number of CW Pumps running - <u>NOT</u> CHANGED (CAS) <ul style="list-style-type: none"> ● The crew has <u>NOT</u> been informed about any liquid discharge at this time. Any discharge would have to be secured due the change in CW flow caused by the pump trip.
	BOP	CHECK condenser vacuum - NORMAL (CAS): <ul style="list-style-type: none"> ● NO Condenser Vacuum PPCS ALARMS. ● Condenser Back Pressure - WITHIN FIGURE 1 LIMITS NOTE: IF a condenser PPCS alarm is received due to timing of procedural actions, a slight reduction of turbine load MAY be required.
		(EVENT 3 IS CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 03 Page 2 of 2

Event Description: After the plant has stabilized and A-CVC-35C is completed, the running CW Pump (A) trips on overcurrent. This requires the operator to locally align and start CW Pump B and investigate the reason for the pump trip. The following conditions for the CW will exist - the tripped pump motor appears normal, the forebay level is normal and there are no problems with the traveling screens.

(NOTE: The Simulator Booth Operator provides any required local actions below)

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY CW Pump Discharge Valve Position: <ol style="list-style-type: none"> 1. RUNNING CW Pump Discharge Check Valve - OPEN. 2. IDLE CW Pump Discharge Check Valve - CLOSED
	BOP	VERIFY Condenser Waterbox Inlet Valves - OPEN . <ul style="list-style-type: none"> ● CW-2A1 <u>and</u> CW-2A2. ● CW-2B1 <u>and</u> CW-2B2.
	BOP	VERIFY Traveling Screens - CLEAR: <ul style="list-style-type: none"> ● Annunciator 47054-Q, "Traveling Water Screen DP High" - NOT LIT. ● Locally CHECK Traveling Screens DP < 6 inches H₂O. ● Locally MONITOR Traveling Screens.
	BOP	Locally VERIFY Forebay Level - STABLE <u>OR</u> INCREASING: <ul style="list-style-type: none"> ● LI-26829 <u>through</u> LI26832 are STABLE <u>OR</u> INCREASING
	BOP	<u>GO TO</u> Step 12
	BOP	CHECK Forebay Level - NORMAL: <ul style="list-style-type: none"> ● Forebay Level > 64% ● Forebay Level STABLE <u>OR</u> INCREASING
	CRS	RETURN to procedure and step in effect (N-0-03, Plant Operation Greater than 35% Power). <p>NOTE: N-CW-04 <u>and</u> A-CW-04 are referenced by the Alarm Response Books and may be suggest additional actions. These actions include opening SW-143B, Thrust Bearing Cooler Isolation and verifying proper seal water flows and oil levels.</p>
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENT (04)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 04 Page 1 of 2

Event Description: After the plant has stabilized and E-CW-04 is completed, a loss of Bus 6 occurs, which is addressed by A-EHV-39, Abnormal 4160V AC Supply and Distribution System. The undervoltage condition will not be sensed by the "B" EDG, so it will have to be manually started and loaded per A-DGM-10B, Abnormal Diesel Generator B Operation.
(NOTE: The Simulator Booth Operator provides any required local actions below)

Time	Position	Applicant's Actions or Behavior
	BOP	<p>IDENTIFY and REPORT the loss of Bus 6 using available indications:</p> <ul style="list-style-type: none"> • Annunciator 47091-L, "Bus 6 Voltage Below 93.6%" • Annunciator 47091-K, "Bus 6 Voltage Low" • Emergency Lighting is energized. • Loss of voltage to Bus 6 with no Lockout and "B" EDG does not auto start and load.
	RO/BOP	<p>REFER to annunciator response procedure and INFORM CRS of required actions (<u>GO TO</u> A-EHV-39). Since "B" EDG does not auto start and load, A-DGM-10B, Abnormal Diesel Generator B Operation, will also be needed.</p>
	CRS	<p>IMPLEMENT procedures A-EHV-39, Abnormal 4160V AC Supply and Distribution System <u>AND</u> then A-DGM-10B, Abnormal Diesel Generator B Operation based on current plant conditions.</p>
	CRS	<p>PERFORM A-EHV-39 Subsequent Actions:</p> <ul style="list-style-type: none"> • Step 4.9.3 - Bus 6 Voltage Below 93.6% due to Low Voltage and EDG is <u>NOT</u> supplying the bus, <u>GO TO</u> A-DGM-10B.
	RO/BOP	<p>PERFORM A-DGM-10B Subsequent Actions:</p> <ul style="list-style-type: none"> • POSITION Bus 6 Restoring Mode Selector to MAN. • POSITION <i>ONE</i> Train B SW Pump Breaker to CLOSED. • POSITION remaining Bus 6 Load Control Switches to PULLOUT:
	BOP	<p>PERFORM A-DGM-10B Subsequent Actions:</p> <ul style="list-style-type: none"> • START EDG "B"

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 04Page 2 of 2

Event Description: After the plant has stabilized and E-CW-04 is completed, a loss of Bus 6 occurs, which is addressed by A-EHV-39, Abnormal 4160V AC Supply and Distribution System. The undervoltage condition will not be sensed by the "B" EDG, so it will have to be manually started and loaded per A-DGM-10B, Abnormal Diesel Generator B Operation.
(NOTE: The Simulator Booth Operator provides any required local actions below)

Time	Position	Applicant's Actions or Behavior
	BOP	LOAD Diesel Generator B: <ul style="list-style-type: none"> • CLOSE Breaker 1-603, DG B to Bus 6: <ul style="list-style-type: none"> • VERIFY SW cooling to DG B as follows: <ul style="list-style-type: none"> • One Train B SW Pump - OPERATING • SW-301B/CV-31089, SW from DG 1B Heat Exchanger - OPEN • POSITION Bkr 1-603 Synch Switch to OFF. • POSITION Bkr 1-603 43 Switch to AUTO. • Sequentially START safeguards equipment as required. • REFER to A-EHV-39.
	CRS	REFER to Technical Specifications: <ul style="list-style-type: none"> • <u>TS 3.7.a.1</u> - RAT • <u>TS 3.7.a.3</u> - Bus 1-6 must be energized to go critical • <u>TS 3.7.a.4</u> - Bus 62 • <u>TS 3.7.a.5</u> - Bus 61 • TS 3.0.c - (Limiting LCO) due to items below NOT MET: <ul style="list-style-type: none"> • <u>TS 3.7.b.6</u> - 4KV Bus 1-6 may be inoperable for 24 hours IF Bus 1-5 is operable <u>and</u> its loads are operable (RHR Pumps inoperable). • <u>TS 3.7.b.2</u> - Allows RAT OOS for 7 days provided TAT and EDGs are operable. • <u>TS 3.7.b.2</u> - EDG "B" Inoperability (Fail to start) <ul style="list-style-type: none"> • Can be OOS for 7 days IF EDG A tested daily. • <u>TS 3.7.a.7</u> - EDG "B" inoperable.
		AT THE DISCRETION OF THE LEAD EXAMINER, PROCEED TO THE NEXT EVENTS (05-08)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08 Page 1 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

(NOTE: The Simulator Booth Operator provides the required local verification below)

Time	Position	Applicant's Actions or Behavior
	RO	IDENTIFY and REPORT the S/G B tube leak using available indications: <ul style="list-style-type: none"> ● Annunciator 47011-B, "Radiation Indication High" ● Annunciator 47012-B, "Radiation Indication Alert" ● Annunciator 47033-35, "TLA-15 - RMS Above Normal"
	RO/BOP	REFER to annunciator response procedure and INFORM CRS of required actions (<u>GO TO</u> A-RM-45).
	CRS	IMPLEMENT A-RM-45, "Abnormal Radiation Monitoring System"
	BOP	PERFORM A-RM-45 ACTIONS (Note, the radiation levels may not get high enough to cause these actuations) <ul style="list-style-type: none"> ● VERIFY Monitor R-15/R-19 Automatic Actions occur: <ul style="list-style-type: none"> ○ AR-6/CV-31168, Air Ejector Disch Vent, positions to DUCT. ○ The following valves CLOSE: <ul style="list-style-type: none"> - BT-2A&B, S/G A Blowdown Isolation A1&B1 - BT-3A&B, S/G A Blowdown Isolation A2&B2 - BT-31A&32A, S/G Sample Isolation - BT-31B&32B, S/G Sample Isolation - HS-17-1, Humidification Steam Inlet CV ● <u>GO TO</u> to E-0-14, Steam Generator Tube Leak
	CRS	TRANSITION to E-0-14, Steam Generator Tube Leak.
	CREW (R-RO)	<u>Quickly</u> REDUCE power per Action Level 3 of E-0-14, steps 9-13: <ul style="list-style-type: none"> ● INFORM GENCO, SET setter to 45% load AND rate to 3%. ● DEPRESS Go pushbutton AND PERFORM plant ann. ● ADJUST speed on HD Pumps as required. (CAS) ● ENERGIZE all PRZR heaters. ● ADJUST VARS as required (CAS). ● PERFORM Reactivity adjustments as required (CAS).
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08 Page 2 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

(*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY PRZR Level STABLE or INCREASING: <ul style="list-style-type: none"> ● PRZR Level will be DECREASING due to the leak - the following actions are required CONTINGENCY ACTIONS: <ul style="list-style-type: none"> ○ INCREASE Charging flow. ○ TURN PRZR heaters ON. ○ VERIFY Reactor Makeup is OPERABLE. ○ ISOLATE Letdown. ○ * MANUALLY TRIP AND SI (GO TO E-0).
	CRS	IMPLEMENT E-0, "Reactor Trip or Safety Injection"
	RO	VERIFY Reactor Trip (IMMEDIATE ACTIONS): <ul style="list-style-type: none"> ● Reactor Trip and Bypass Breakers - OPEN. ● Rod Position Indicators - ZERO. ● Rod Bottom Lights - LIT. ● Neutron Flux - DECREASING.
	BOP	VERIFY turbine trip (IMMEDIATE ACTIONS): <ul style="list-style-type: none"> ● HP Turbine Impulse Pressure PI-485/486 - TRENDING TO ZERO. ● All turbine stop valves - CLOSED. VERIFY Power to Emergency AC Buses (IMMEDIATE ACTIONS): <ul style="list-style-type: none"> ● Bus 5 - ENERGIZED. ● Bus 6 - ENERGIZED.
	RO	CHECK SI Status (IMMEDIATE ACTIONS): <ul style="list-style-type: none"> ● CHECK if SI is ACTUATED: <ul style="list-style-type: none"> ○ Annunciator 47021-A, "SI Train A Actuated" - LIT OR ○ Annunciator 47021-B, "SI Train B Actuated" - LIT ● VERIFY both SI Trains - ACTUATED: <ul style="list-style-type: none"> ○ BOTH Annunciators 47021-A AND 47021-B - LIT
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08 Page 3 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Feedwater isolation: <ul style="list-style-type: none"> ● FW-7A & FW-7B Main FW Flow Control Valves CLOSED. ● FW-10A & FW-10B Main FW Bypass Flow Control Valves CLOSED. ● FW-12A & FW-12B FW to S/G A/B Isol. Valves CLOSED.
	RO	MAKE plant announcement for Safety Injection.
	BOP	CHECK Main Steamline Isolation: <ul style="list-style-type: none"> ● Isolation is <u>NOT</u> required - <u>GO TO</u> Step 8 AND OBSERVE CAUTION prior to Step 8.
	RO	VERIFY Containment Spray is <u>NOT</u> required: <ul style="list-style-type: none"> ● Containment Spray is <u>NOT</u> required - Containment Pressure HAS remained below 23 PSIG.
	BOP	VERIFY Containment Cooling: <ul style="list-style-type: none"> ● Fan Coil Units - RUNNING. ● SW-903A, B, C AND D - OPEN. ● RBV-150A, B, C AND D - CLOSED (NOTE: Containment Pressure DOES <u>NOT</u> exceed 4 PSIG at this time).
	BOP	VERIFY Auxiliary Building Special Ventilation RUNNING: <ul style="list-style-type: none"> ● Annunciator 47052-G, "ZONE SV BNDRY DAMPER NOT CLOSED" - NOT LIT ● Zone SV Fans - RUNNING
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08Page 4 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Service Water Alignment: <ul style="list-style-type: none"> • VERIFY all SW Pumps - RUNNING. • VERIFY selected SW Header > 82.5 psig.
	BOP	VERIFY AFW Pumps RUNNING: <ul style="list-style-type: none"> • VERIFY "A" M/D Pump - RUNNING • Since BOTH M/D pumps are <u>NOT</u> available, the TDAFWP is <u>NOT</u> secured at this time (the TDAFWP is secured when RCS temperature control is checked in step 18 of E-0).
	RO	VERIFY Containment and Containment Ventilation Isolation: <ul style="list-style-type: none"> • All CI Active Status Panel Lights - LIT
	RO	VERIFY ESF Equipment RUNNING: <ul style="list-style-type: none"> • Both SI Pumps - RUNNING. • "B" RHR pump - RUNNING. • Both CC Pumps - RUNNING • SI Active Status Panel Lights - LIT (for operating equipment).
	RO	VERIFY SI Flow: <ul style="list-style-type: none"> • RCS Pressure - < 2200 psig • SI Cold Leg - F925 INDICATES FLOW
	BOP	VERIFY Total AFW Flow > 200 gpm
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08Page 5 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

Time	Position	Applicant's Actions or Behavior
	RO	CHECK RXCP Seal Cooling: <ul style="list-style-type: none"> ● CC Supply to Thermal Barriers - NORMAL: <ul style="list-style-type: none"> ○ CC-600, CC-601A(B), CC-610A(B) AND CC-612A(B) - OPEN ○ Thermal Barrier Temperatures T614 AND T610 - NORMAL ○ RXCP Bearing Temperatures T132 AND T125 - NORMAL
	RO	CHECK RCS Temperatures: <ul style="list-style-type: none"> ● DECREASING due to SI AND AFW flow.
	BOP	PERFORM the following due to decreasing RCS Temperature: <ul style="list-style-type: none"> ● STOP dumping steam. ● PLACE TDAFWP to PULLOUT. ● IF S/G levels > 4%, REDUCE AFW FLOW ● MSIVs & MSIV Bypass valves - May be CLOSED IF Cooldown Continues.
	RO	CHECK PRZR PORVs and Spray Valves CLOSED : <ul style="list-style-type: none"> ● Both PORVs - CLOSED. ● Normal PRZR Spray Valves - CLOSED. ● CVC-15, Aux Spray Valve - CLOSED.
	RO	CHECK if RXCPs should be TRIPPED: <ul style="list-style-type: none"> ● RXCPs should NOT require tripping.
	BOP	CHECK if S/Gs are Faulted - NO FAULTED S/Gs <ul style="list-style-type: none"> ● GO TO step 22.
	CREW	CHECK that S/G Tubes are NOT Ruptured: NO <ul style="list-style-type: none"> ● Multiple indications of S/G Tube Rupture ARE available. ● GO TO E-3, "Steam Generator Tube Rupture"
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08 Page 6 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3. (*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	CRS	TRANSITIONS to E-3, "Steam Generator Tube Rupture"
	RO	CHECK if RXCPs should be TRIPPED: <ul style="list-style-type: none"> ● RXCPs should <u>NOT</u> require tripping.
	CREW	IDENTIFY Ruptured Steam Generator(s): <ul style="list-style-type: none"> ● S/G "B" should be identified as the ruptured steam generator based on several indications.
	BOP	*ISOLATE the Ruptured Steam Generator: <ul style="list-style-type: none"> ● VERIFY BT-2B <u>AND</u> BT-3B, S/G B Blowdown Isolation Valves - CLOSED. ● SET Steam Generator B PORV Controller to 1050 PSIG. ● <u>WHEN</u> ruptured S/G pressure < 1050 PSIG, <u>THEN</u> VERIFY Steam Generator B PORV is CLOSED - NO <ul style="list-style-type: none"> ○ The PORV is failed OPEN due to PS-16113 failing high and must be ISOLATED: <ul style="list-style-type: none"> - PLACE PORV Controller in MANUAL. - CLOSE PORV. ● CLOSE MS-100B, S/G B Supply to T/D AFW Pump. ● Locally CLOSE Main Steam Header B Trap 9 inlet and bypass valves: <ul style="list-style-type: none"> ○ TD-1-9 ○ TD-3-9 ● CLOSE S/G B Main Steamline Isolation Valves: <ul style="list-style-type: none"> ○ MS-1B, S/G B Main Steamline Isolation Valve ○ MS-2B, S/G B MSIV Bypass Valve
	BOP	CHECK Ruptured Steam Generator Level: <ul style="list-style-type: none"> ● NR Level > 4%: <ul style="list-style-type: none"> ○ <u>IF YES</u> - STOP AFW Flow to Ruptured S/G ○ <u>IF NO</u> - MAINTAIN AFW Flow to Ruptured S/G until Level > 4%, <u>THEN</u> STOP AFW Flow to Ruptured S/G.
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08Page 7 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3. (*) = CRITICAL TASK

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK Ruptured Steam Generator Pressure > 200 PSIG .
	RO	RESET SI.
	CREW	INITIATE RCS Cooldown: <ul style="list-style-type: none"> ● DETERMINE required CET temperature <ul style="list-style-type: none"> ○ S/G B pressure _____ psig. ○ Required CET Temperature _____ °F. ● DUMP steam to condenser from intact S/G: <ul style="list-style-type: none"> ○ SET Steam Dump to STM PRESS mode. ○ DUMP Steam at maximum rate. ○ At 540°F, SET Steam Dump to BYPASS INTLK. ● CET Temperature < Required Temperature: <ul style="list-style-type: none"> ○ <u>IF YES</u> - STOP RCS Cooldown <u>AND</u> MAINTAIN Temperature < Required Temperature. ○ <u>IF NO</u> - CONTINUE with Step 8 until CET Temperature < Required Temperature, <u>THEN</u> STOP RCS Cooldown <u>AND</u> MAINTAIN Temperature < Required Temperature.
	BOP	CHECK "A" Steam Generator Level > 4%: <ul style="list-style-type: none"> ● <u>IF YES</u> - CONTROL AFW Flow to A S/G to MAINTAIN level between 4% and 50% ● <u>IF NO</u> - MAINTAIN Total AFW Flow > 200 gpm <u>UNTIL</u> "A" Steam Generator Level > 4%.
	RO	CHECK Pressurizer PORVs <u>and</u> Block Valves: <ul style="list-style-type: none"> ● Both Pressurizer PORVs should be shut <u>AND</u> both block valves open.
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08Page 8 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

Time	Position	Applicant's Actions or Behavior
	RO	ISOLATE Letdown - DONE previously.
	RO	RESET SI - DONE previously.
	RO	RESET Containment Isolation:
	BOP	VERIFY Instrument Air to Containment - ESTABLISHED: <ul style="list-style-type: none"> ● At least one air compressor - RUNNING. ● Air header pressure > 60 psig. ● Instr. Air to Containment Isolation IA-101 - OPEN.
	RO	CHECK if RHR Pumps should be STOPPED - NO .
	RO	ESTABLISH Charging Flow: <ul style="list-style-type: none"> ● 2 Charging Pumps should be started AND flow MAXIMIZED. NOTE: This requires aligning Charging to the RWST.
	RO	CHECK if RCS Cooldown should be STOPPED: <ul style="list-style-type: none"> ● The crew must WAIT until CET Temperature < Required Temperature. No further steps in E-3 can be performed.
	BOP	CHECK Ruptured Steam Generator Pressure - STABLE OR INCREASING. <ul style="list-style-type: none"> ● S/G B Pressure should be relatively stable.
	RO	CHECK RCS Subcooling > 50°F .
		(EVENTS 5-8 ARE CONTINUED ON THE NEXT PAGE)

Op-Test No.: 2004301 Scenario No.: 04-03 Event No.: 05-08Page 9 of 9

Event Description: After A-DGM-10B is completed, S/G B tubes begin leaking at about 30 gpm. As the actions of E-0-14 are performed and power is reduced, the leak increases to a rupture at 300 gpm. The crew must manually trip and SI. From E-0, the crew transitions to E-3. While in E-3, a PORV fails open on S/G B due to PS-16113 failing high, and the operator must take manual control of the PORV and close the valve. The scenario ends when SI Flow is terminated in E-3.

Time	Position	Applicant's Actions or Behavior
	RO	DEPRESSURIZE RCS to minimize break flow and refill PRZR: <ul style="list-style-type: none"> ● PRZR heaters Manually controlled to MAINTAIN saturated conditions in the PRZR. ● BOTH spray valves FULLY OPENED until ONE of the following conditions is met, <u>THEN</u> CLOSE spray valves: <ul style="list-style-type: none"> ○ PRZR Level > 74%. ○ RCS Subcooling < 30°F. ○ RCS Pressure < Ruptured S/G Pressure. ● <u>GO TO</u> Step 22.
	CREW	CHECK if SI Flow Should be Terminated: <ul style="list-style-type: none"> ● RCS Subcooling > 30°F. ● RCS Pressure - STABLE <u>OR</u> INCREASING. ● PRZR Level > 5%. ● Total Feed Flow > 200 gpm AVAILABLE <u>OR</u> ● Narrow Range Level in S/G A > 4% NOTE: ALL of the conditions above should be MET : <ul style="list-style-type: none"> ● BOTH SI Pumps - STOPPED. ● BOTH SI Pumps - PLACED in AUTO.
		AT THE DISCRETION OF THE LEAD EXAMINER, THE SCENARIO MAY BE TERMINATED.

Dynamic Simulator Scenario #3

Simulator Shift Turnover:

Per Scenario Outline

SIMULATOR SCENARIO SETUP

- 1. STEP COUNTERS - ON _____
- 2. INITIALIZE into IC _____
- 3. Communicator Telephone Log - AVAILABLE _____
- 4. Simulator Setup Checklist - COMPLETED _____
- 5. Simulator Book Prep. Checklist - COMPLETED _____
- 6. Simulator Scenario Briefing Sheet - COMPLETED _____
- 7. Simulator Security Checklist - COMPLETED _____

Dynamic Simulator Scenario #3

Simulator Scenario Guide:

NOTE: The IC is snapped with:

SER 1670 - Block (Source Range High Flux at Shutdown Annunciator 47034-O)
Normal at Power

Overrides:

RHR Pump A control switch in PULLOUT
AFW Pump B control switch in PULLOUT
CW Pump A running
CW Pump B control switch in PULLOUT
PRZR Heater Group E - ON

VCT Level transmitter LT-141 fails to 100%. Set up on Trigger 1
IMF CV203 (1) 100

Trip of running CW Pump A [timed with input value of 90 between (2 & 3 minutes) to trip].
Set up on TRIGGER 2
IMF CW04A (2) 90

Loss of Offsite Power to Bus 6 (Feeder Breaker 1-601 trips) without automatic Voltage Restoration. DG must be manually started and loaded. Set up on TRIGGER 3. The SER1295 override blocks the alarm function of 47092-K which would be in with the Bus 6 Voltage Restoration switch failed to MAN (second entry).

IMF SER1295 (3) 0
IOR DI-46685-MAN (3 2) ON
IOR DI-46673-NA-CLOSE (3) OFF
IOR DI-46673-CLOSE (3) OFF
IOR DI-46673-TRIP (3 5) ON

NOTE: Simulator operator will DELETE SER1295 override when NCO takes Bus 6 Voltage Restoration switch to MANUAL. [This will allow alarm 47092-K to actuate as expected]

SG B tube leak of approximately 30 gpm. Set up on TRIGGER 4
IMF SG02B (4) 75

SG B tube leak increases to approximately 300 gpm over 2 minutes. Set up on TRIGGER 5.
IMF SG01B (5) 6 2:00

SG PORV SD-3B fails open due to controller failure. Manual operation is available. Controller override fails SD-3B setpoint adjust to ZERO. Set up on TRIGGER 6
IOR AI-43013-02-R1 (6) 0