

Facility: Perry

Scenario No.: 1 - 100%

Op-Test No.: 2019-1

Examiners: _____ Operators: _____ (SRO)
 _____ (ATC)
 _____ (BOP)

Initial Conditions: Plant is at 100% power. Stator Water Pump B Pump is tagged out due to oil leak. ESW A & ECC A are running. I&C tech is performing SVI-D23-T1213, Suppression Pool Average Temperature. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal

Planned Activities: Start RCIC in CST to CST Mode for vibration testing. Page Jeff Reeves when RCIC is running. NLO has been briefed and is on station to support pump start. When contacted by SCC, lower power to 93% per the Reactivity Plan and IOI-3 Power Maneuvering, for upcoming surveillances. Make any Narrative Log entries on your note pads.

Critical Tasks: 1) Insert control rods.
 2) Start HPCS to recover RPV level.
 3) Close MSIVs before exceeding 100 °F/Hr. Cooldown rate

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP) N(SRO)	Start RCIC in CST to CST Mode
2		R(ATC) R(SRO)	Lower Power with Rx Recirc flow to 93%
3		C(ATC) C(SRO)	Hotwell Pump A Headloss – Shift Hotwell pumps
4		C(BOP) C(SRO) TS(SRO)	RCIC CST Level instrument fails low – RCIC fails to complete shift to SP from CST. T.S. 3.3.5.2 & T.S. 3.5.3
5		C(BOP) C(SRO) TS(SRO)	Inadvertent HPCS initiation due to failed RPV level transmitters. T.S. 3.5.1 & T.S. 3.3.5.1 & 3.3.6.1
6		M(ALL)	Loss of Feedwater
7	CT-1	C(ATC)	RPS fails in AUTO and MANUAL – ARI fails in AUTO - ARI works in Manual
8	CT-2	C(BOP)	HPCS fails to auto start @ L2 – Start HPCS manually.
9	CT-3	C(ATC)	Bypass valve #1 fails open – Close MSIV before 500 psig

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

Narrative Summary – Scenario #1 – 100% Rx Power

Event

1. The BOP starts RCIC in CST to CST mode.
2. The ATC lowers Rx. Power with Rx. Recirc flow to 93%
3. Hotwell pump A experiences a head-loss issue requiring ATC to determine necessity to shift Hotwell pumps per SOI-N21.
4. RCIC CST instrument fails low. BOP determines that the auto-swap of the water supply to the RCIC pump to the Suppression Pool from the CST failed to occur. BOP takes action to close 1E51-F010 and verifies subsequent actions based on failure of F010 closure to occur. BOP shuts down RCIC as directed. SRO evaluates T.S. 3.3.5.2 & T.S. 3.5.3
5. Failed RPV Level Instruments results in a HPCS inadvertent initiation. The SRO enters ONI-E12-1 and ONI-C51. After SRO concurrence the BOP will override the HPCS pump to stop. SRO evaluates TS 3.3.5.1 and TS 3.5.1 & 3.3.6.1.
6. Low Hot Surge Tank level causes RFBPs to trip resulting in a loss of all Rx Feedwater pumps. This causes a low Reactor Water level scram signal.
7. ATC determines Level 3 scram did not work. ATC determines Manual Scram did not function. Also, if RPV level lowers to L2, automatic ARI will not insert rods. A manual ARI initiation will cause control rods to insert.
8. BOP determines that HPCS failed to Auto start on L2 and must manually initiate HPCS to recover RPV level.
9. ATC determines that #1 Turbine Bypass valve is partially open and that reactor pressure is lowering and cooldown rate could exceed 100 degrees per hour. ATC takes action to close MSIVs to stop excessive cooldown rate and switches pressure control to the SRVs.

EOPs:

EOP-1

ABNORMALs:

ONI-E12-1

ONI-C51

Critical Tasks:

1. Insert control rods.
2. Determines that HPCS failed to Auto start at L2, and manually starts HPCS to recover RPV level.
3. With reactor pressure lowering due to open Bypass Valve, close MSIVs to prevent a RPV cooldown rate in excess of 100 degrees per hour.

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 Event Description: N/A - Driver Instructions

Cue:

Time	Position	Applicant's Actions or Behavior
Driver	Driver	<p><u>Simulator Setup:</u></p> <p>Reset Simulator to IC 58</p> <p>Load Schedule File: NRC-2019.Scen-1.sch</p> <p>Verify Schedule File: NRCinfotags19.sch loads</p> <p>Verify Event File NRC-2019 Scen-1.evt loads</p> <p>Obtain pictures of E51-N635A and B21-N673C & G Trip Units.</p> <p>Remove Requal IOI-3 and Rod Book from horseshoe.</p> <p>Markup Crew Sheet to show who is supporting RCIC run.</p> <p>Add SYM STATUS placard with “1N62-F601 100% open”</p> <p>Remove Info Tags from P870-05B & P680-09C</p>
Driver	Driver	<p><u>Verify Initial Conditions:</u></p> <p>Reactor Power 100%. BOL Pull Sheets, Rods @ Step 81.</p> <p>IOI-3 Section 4.6 is complete.</p> <p>Place yellow switch cap on Stator Water Cooling B pump.</p> <p>Verify APRM gains are adjusted.</p> <p>Green Risk.</p>
Driver	Driver	<p><u>Initial Conditions:</u></p> <p>Plant is at 100% power. Stator Water Pump B Pump is tagged out due to oil leak. ESW A & ECC A are running. I&C tech is performing SVI-D23-T1213, Suppression Pool Average Temperature. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal</p> <p><u>Planned activities:</u></p> <p>Start RCIC in CST to CST Mode for vibration testing. Page Jeff Reeves when RCIC is running. NLO has been briefed and is on station to support pump start. When contacted by SCC lower power to 93% per the Reactivity Plan and IOI-3 Power Maneuvering, for upcoming surveillances. Make any Narrative Log entries on your note pads.</p>

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Event Description: 1 - Start RCIC in CST to CST Mode

Cue: Turnover – planned activity

Time	Position	Applicant's Actions or Behavior
	Driver	<ol style="list-style-type: none"> 1. Role play as an NLO and Jeff Reeves as directed. 2. For SOI-E51 step 4.5.6 opening 1E51-F022 for 2 seconds will be 10%. Use InSight point RCVP1E51F0022 to determine valve position. 3. If asked to open E51-F022 locally, inform operator that we usually open from Control Room and NLO gives “mark” at 10% open.
	Evaluator	Should discuss “expected alarm” for RCIC Pump start.
00:00	SRO	Direct BOP to perform a RCIC Manual Startup from Standby Readiness (CST to CST) IAW SOI-E51.
	BOP	<p>Perform SOI-E51 Section 4.5 to start RCIC in CST to CST Mode</p> <p>4.5.1 Initiate an evacuation from the following:</p> <ul style="list-style-type: none"> • Reactor Building Annulus • Containment. <p>4.5.2 Refer to SVI-D23-T1213, Suppression Pool Average Temperature, and commence monitoring suppression pool temperature.</p> <p>4.5.4 Confirm RCIC suction on the CST.</p> <p>4.5.6 Throttle RCIC First Test Valve to CST 10% open as follows:</p> <p>4.5.6.a Determine full closed position indication from the local indicator.</p> <p>4.5.6.b Throttle RCIC First Test Valve to CST open until local indicator reads 10% higher than initial value. 1E51-F022</p> <p>4.5.7 Take the RCIC Turbine Gland Seal Comp to start. 1E51-C004</p> <p>4.5.8 Take the RCIC Second Test Valve to CST to open to provide a discharge path to the CST. 1E51-F059</p> <p>4.5.9 Simultaneously perform the following:</p> <ul style="list-style-type: none"> • Take the RCIC Steam Shutoff to open to roll the RCIC Turbine. 1E51-F045 • Hold the RCIC First Test Valve to CST control switch in open until the valve is open. 1E51-F022 <p>4.5.10 When RCIC flow is < 120 gpm and RCIC Pump discharge pressure is > 125 psig, then verify the RCIC Pump Min Flow Valve opens. 1E51-F019</p>

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Event Description: 1 - Start RCIC in CST to CST Mode			
Cue: Turnover – planned activity			
Time	Position	Applicant's Actions or Behavior	
		4.5.11 When the RCIC Steam Shutoff is open, verify the following valves automatically close:	1E51F045
		• RCIC Turb Cnds to CRW First Shutoff	1E51F004
		• RCIC Turb Cnds to CRW Second Shutoff	1E51F005
		• RCIC ST Supp First Drn Shutoff	1E51F025
		• RCIC ST Supp Second Drn Shutoff	1E51F026
	Driver	If NLO is directed to operate 1E51-F534 to clear Drain Pot Hi Level alarm, wait until alarm P601-21-D3 resets then report as completed.	
	BOP	4.5.12 Adjust RCIC flow until the desired flow is reached with the RCIC Pump Flow Control.	1E51-R600
		4.5.13 Prior to lowering RCIC flow to < 350 gpm, place the RCIC Pump Flow Control in manual.	1E51-R600
		4.5.14 Throttle RCIC First Test Valve to CST to achieve a RCIC Pump discharge pressure approximately 100 psig above reactor pressure.	1E51-F022
	BOP	Report to SRO that pump start is complete and contact Jeff Reeves.	
	Evaluator	Crew may set a Suppression Pool temperature limit to start RHR A in Suppression Pool cooling.	

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 Event Description: 2 - Lower Power with Rx Recirc flow to 93%
 Cue: Turnover – SCC request

Time	Position	Applicant's Actions or Behavior
	Driver	Role-play as SCC and contact Control Room SRO to request lowering power to 93%. Shift Manager may need to intervene if crew is hesitant to perform power maneuver with RCIC running.
	SRO	Direct ATC to lower power to 93% per the Reactivity Plan and IOI-3 Power Maneuvering.
	Evaluator	It is expected that the ATC will use Recirculation flow to lower power. ATC should maintain flow mismatch < 5%. Target Rx power is 3495 MWT (~1236 MWE).
	ATC	Notify RP and Chemistry of the intended power change.
	ATC	Perform SOI-B33, Reactor Recirculation System Section 7.7, Rcirc Flow Control in Loop Manual 7.7.1 Confirm RCIRC LOOP FLOW CONTROL is in MAN. 1B33K603A 7.7.2 Confirm RCIRC LOOP FLOW CONTROL is in MAN. 1B33K603B 7.7.3 Adjust the following as required for the desired Recirc Flow while maintaining recirculation loop flow mismatch within limits: <ul style="list-style-type: none"> RCIRC LOOP FLOW CONTROL 1B33K603A RCIRC LOOP FLOW CONTROL 1B33K603B 7.7.4 When Rcirc Flow Control valves are full open, 1B33K603A/ 1B33K603B then verify that the RCIRC LOOP FLOW CONTROL is not in saturation (approximately 0%/SEC) by monitoring the ICS point RECIRC FCV VEL CONT OUTPUT. B33 EA015/ B33 EA016
	ATC	Report to SRO that Reactor power has been lowered to 93% power by lowering Rx Recirc flow.
	SRO	Report to SCC that power is at 93%

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Event Description: 3 - Hotwell Pump A Headloss – Shift Hotwell pumps		
Cue: ARI-H13-P680-0002-D5 and D6		
	Driver	When directed initiate Event 3 . Role play as needed. If directed to investigate Condensate Filter trouble alarm (ARI-H13-P680-07-D12) report that there was a momentary Hi-Hi Filter Differential Pressure. Use Xtreme view to acknowledge (multiple alarms)
	ATC	Announce unexpected alarms and give stability report.
	ATC	Announce CBP DISCH HDR PRESS LO and HOTWELL PUMP DISCH PRESS LO alarms. Walkdown H13-P680 and determine that Hotwell discharge header pressure is <136 psig and HW Pump A amps are lower than other running Hotwell pump. Determines that there are no Automatic or Immediate Actions for either annunciator.
	ATC	Perform subsequent actions for ARIs: ARI-H13-P680-0002-D5/ ARI-H13-P680-0002-D6: 4.1 Monitor Hot Surge Tank Level & Cnds To Htr 4 Flow.
	ATC	Direct NLO to walkdown Hotwell pumps to look for problems with HW Pump A. Make determination based on indications that Hotwell pump A is not working properly and that Hotwell pumps should be shifted.
	Driver	If asked to walkdown HW Pumps, wait 10 minutes after initiation of Event 3 to report HW pump A is making abnormal noise.
	SRO	Direct ATC to shift Hotwell pumps from A and B running to B and C running.
	ATC	Direct NLO to standby for shifting Hotwell pumps. Make plant announcement.
	ATC	Perform SOI-N21, Condensate System, Section 7.2 Shifting Hotwell Pumps: 7.2.1 If condensate filtration is in service, then refer to SOI-N23 and verify at least one Condensate Filter in Manual. 7.2.2 If two Hotwell Pumps are in operation, then perform the following: 7.2.2.a Take the oncoming Hotwell Pump control switch to start on 1H13-P680. 1N21C001C 7.2.2.b Take the offgoing Hotwell Pump control switch to stop. 1N21C001A 7.2.4 When Condensate flows have stabilized, then verify only one RFP Seal Injection Pump is running on P870.
	ATC	Determine alarms have reset and Hotwell pump C parameters are normal. Report to SRO that pump shift is complete.
	SRO	Notify Workweek Manager of problem with Hotwell Pump A.

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Event Description: 4 - RCIC CST level instrument fails low – RCIC fails to complete shift to SP from CST. TS 3.3.5.2		
Cue: ARI-H13-P601-0021-F3 and H5		
	Driver	Prior to initiating Event 4 , place picture of E51-N635A picture on P629.
	Driver	When directed initiate Event 4 . Role play as needed.
	ATC	Announce unexpected alarms and give stability report.
	BOP	Announce RCIC SUPR POOL SUCT VLV OPEN CST LVL LOW alarm. Walkdown H13-P601 and determine that RCIC PUMP SUPR PL SUCT ISOL, 1E51-F031, is opening but RCIC PUMP CST SUCTION VALVE, 1E51-F010, did not close. Announces that Immediate Actions did not occur and closes 1E51-F010. Verifies that 1E51-F010 closes. Verifies that 1E51-F022 and 1E51-F059 are closed and 1E51-F019 opens.
	Evaluator	1E51-F010 gets a close signal from the open limit switch of the 1E51-F031 valve.
	BOP	Observes CST level indications and reports that levels are within normal band.
	SRO	Directs BOP to either trip or shutdown RCIC.
	BOP	Trips or Shutdowns RCIC
	Evaluator	Tripping RCIC would be the preferred method.
	Evaluator	SRO may direct BOP to shutdown RCIC to standby. If so, 1E51-F510 will lose power when its control switch is taken to OPEN.
	BOP	Perform SOI-E51 Section 6.2 Manual Shutdown from Operating to Standby Readiness: 6.2.1 MOMENTARILY DEPRESS the RCIC INIT – MN & FDW TB TRIP - SEAL IN RESET. 1E51A-S18 6.2.2 CONFIRM the following: <ul style="list-style-type: none"> • The initiation signal has reset. • The white seal in light goes off. 6.2.3 REDUCE the turbine speed to 2000 rpm with the RCIC PUMP FLOW CONTROL in MANUAL. 1E51-R600

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Event Description: 4 - RCIC CST level instrument fails low – RCIC fails to complete shift to SP from CST. TS 3.3.5.2		
Cue: ARI-H13-P601-0021-F3 and H5		
	BOP	<p>6.2.4 IF the RCIC FIRST TEST VALVE TO CST is open, THEN HOLD the RCIC FIRST TEST VALVE TO CST in CLOSE UNTIL the valve is closed. 1E51-F022</p> <p>6.2.5 IF the RCIC SECOND TEST VALVE TO CST is open, THEN TAKE the RCIC SECOND TEST VALVE TO CST to CLOSE. 1E51-F059</p> <p>6.2.6 RECORD the appropriate Maintenance Rule status in the Plant Narrative Log.</p> <p>6.2.7 MOMENTARILY DEPRESS the RCIC TURBINE REMOTE TRIP to Trip the turbine. 1E51-S17</p> <p>6.2.8 VERIFY the following valves close:</p> <ul style="list-style-type: none"> • TRIP THROTTLE VLV POSITION indication • RCIC INJECTION VLV 1E51-F013 • RCIC INJ CHECK VLV 1E51-F066 <p>6.2.9 VERIFY the RCIC PUMP MIN FLOW VALVE is closed. 1E51-F019</p> <p>6.2.10 TAKE the RCIC STEAM SHUTOFF to CLOSE. 1E51-F045</p> <p>6.2.11 WHEN the RCIC STEAM SHUTOFF is closed, VERIFY the following valves automatically open.</p> <ul style="list-style-type: none"> • RCIC TURB CNDS TO CRW FIRST SHUTOFF 1E51-F004 • RCIC ST SUPP FIRST DRN SHUTOFF 1E51-F025 • RCIC ST SUPP SECOND DRN SHUTOFF 1E51-F026 <p>6.2.12 HOLD the RCIC TURBINE TRIP THRT V LATCH in CLOSE UNTIL the valve is closed to reset the trip latch. 1E51-F510</p>
	Evaluator	The next step (6.2.13) will result in a loss of power to E51-F510 Trip/Throttle Valve.
	BOP	6.2.13 HOLD the RCIC TURBINE TRIP THRT V LATCH in Open UNTIL the valve opens. 1E51-F510
		BOP reports 1E51-F510 lost power and directs NLO to investigate.
	Driver	If asked to investigate loss of power to E51-F510, report both mainline fuses are blown.

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Event Description: 4 - RCIC CST level instrument fails low – RCIC fails to complete shift to SP from CST. TS 3.3.5.2			
Cue: ARI-H13-P601-0021-F3 and H5			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs BOP to investigate back panels for indication of CST level indication problem.	
	Driver	If requested report as I&C Tech that I&C will begin preparing a work package to investigate.	
	BOP	Investigates back panels and informs SRO that 1E51-N635A is pegged low, tripped and has a gross fail light illuminated on panel P629.	
	SRO	<p>Evaluate Technical Specifications</p> <p><u>TS 3.3.5.2 Action</u></p> <p>A.1 – Enter the Condition referenced in Table 3.3.5.2-1 – Immediately</p> <p><u>TS 3.5.3 Action</u></p> <p>A.1 Verify by administrative means that HPCS is operable – 1 hour</p> <p>And</p> <p>A.2 Restore RCIC System to operable status – 14 days</p>	
	Evaluator	<p>TS 3.3.5.2 Action D requirements are already met since RCIC pump is now aligned to Suppression Pool. RCIC is inoperable after crew trips system.</p> <p>RCIC 3.5.3 entered if RCIC is tripped or when 1E51-F510 blows fuses.</p>	

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Event Description: 5 - Inadvertent HPCS initiation due to failed RPV level transmitters.		
Cue: ARI-H13-P601-0016 -A1, A5, and C5		
	Driver	Prior to initiating Event 5 , place pictures of B21-N673 C & G on P625
	Driver	When directed initiate Event 5 . Role play as needed
	Evaluator	Instruments 1B21-N673C and G trip. C will fail low and G will give spurious trip. When operator does back-panel review will find 'C' failed low and 'G' instrument providing unstable readings.
	ATC	Announce unexpected alarms and give stability report.
	BOP	Make announcement that HPCS has started and is injecting. Looks at 2 independent sources of Reactor Water level and Drywell pressure to verify HPCS initiation was inadvertent. Informs SRO of entry conditions for ONI-C51 and ONI-E12-1
	BOP	ONI-E12-1 Immediate Actions Unit Supervisor concurrence is required to override safety system. An ECCS system shall not be manually overridden unless one of the following is confirmed <ul style="list-style-type: none"> • Initiation is proven incorrect (beyond a reasonable doubt by two independent indications • Continued operation is no longer necessary • Misoperation in automatic is confirmed.
	SRO	Announce and enter ONI-C51 and ONI-E12-1
	SRO	Concur with the override of the HPCS pump to stop.
	Evaluator	The BOP operator must receive concurrence from the SRO prior to stopping the HPCS pump. ONI Immediate Actions are from memory.
	BOP	ONI-E12-1 Immediate Actions 3.1 IF HPCS Initiation is incorrect or misoperation in automatic is confirmed, then take the HPCS pump to stop.
	ATC	Monitors Rx power, pressure and level
	BOP	Walkdown P601 and observe and report that the D/G has started and HPCS ESW has started. Makes plant announcement concerning HPCS and Division 3 D/G start.

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Event Description: 5 - Inadvertent HPCS initiation due to failed RPV level transmitters.

Cue: ARI-H13-P601-0016 -A1, A5, and C5

Time	Position	Applicant's Actions or Behavior
	SRO	Contact I&C to investigate cause of low RPV Level 2 signal to HPCS.
	Driver	If requested report as I&C Tech that I&C will begin preparing a work package to investigate.
	SRO	Direct Supplemental Actions for ONI-E12-1 4.2 If HPCS Initiation is incorrect or misoperation in automatic is confirmed, then verify closed HPCS injection valve
	BOP	When directed, Close the HPCS injection valve 1E22-F004
	SRO	Direct ONI-C51 Actions: ATC: Monitor Nuclear instruments for oscillations Confirm Jet Pump operation within established limits BOP: Perform ONI-SPI-G-4 Power verification
	ATC	When directed <ul style="list-style-type: none"> • Monitor Nuclear instruments for oscillations • Confirm Jet Pump operation within established limits
	BOP	When directed <ul style="list-style-type: none"> • Perform ONI-SPI-G-4 Power verification

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Event Description: 5 - Inadvertent HPCS initiation due to failed RPV level transmitters.

Cue: ARI-H13-P601-0016 -A1, A5, and C5

Time	Position	Applicant's Actions or Behavior
	Evaluator	Loss of instruments B21-N673 C & G does not result in loss of safety function. Instruments B21-N673 L & R are available to perform required functions. TS 3.1.5, Condition D, RAs D.1 and D.2 identification is required if scenario runs \geq 1 hour past loss of HPCS.
	SRO	Evaluate Technical Specifications <u>T.S. 3.3.6.1 Actions</u> A.1 – Place channel in trip – 24 hour <u>T.S. 3.5.1 Actions</u> B.1 – Evaluate by administrative means RCIC System is operable when RCIC is required to be operable – 1 hour And B.2 – Restore HPCS System to operable status – 14 days And D.1 – Be in MODE 3 – 12 hours And D.2 – Be in MODE 4 – 36 hours <u>T.S. 3.3.5.1 Actions</u> A.1 – Enter the Condition referenced in Table 3.3.5.1-1 – Immediately And B.2 – Declare HPCS inoperable – 1 hour from discovery of loss of HPCS initiation capability B.3 – Place channel in trip – 24 hours
	Driver	After this event is complete, remove the pictures from P625 and P629.

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 Event Description: 6 - Loss of Feedwater
 Cue: ARI-H13-P680-0002-E3, ARI-H13-P680-003-D1 through D4

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 6 . Role play as needed
	Evaluator	Initiating event is a low Hot Surge Tank level which will trip all RFBPs. If all RFBPs tripped due to low Hot Surge Tank level, then RFP A, RFP B and the MFP will trip.
	ATC	Announce unexpected alarms and give stability report.
	ATC	Announces Low Hot Surge Tank Level followed by loss of all RFBPs Determines that Reactor Water Level is below Level 3 and that Scram did not occur
	BOP	Make Plant announcement for the Scram and evacuate containment
	ATC	Locks the Mode Switch in Shutdown Determines that scram did not occur.
	Evaluator	Actions continue in subsequent sequences.

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Event Description: 7 - RPS fails in AUTO and MANUAL – ARI fails in AUTO - ARI works in Manual

Cue: Reactor Scram Hardcard

Time	Position	Applicant's Actions or Behavior
	Driver	Role play as needed.
	Evaluator	Automatic and manual scram actions will not work. Also, if RPV level lowers to L2, automatic ARI will not insert rods. A manual ARI initiation will cause control rods to insert.
	ATC	Recognizes failure of Mode Switch and RPS pushbuttons and initiates ARI. (Critical Task 1) Recognizes manual ARI inserts all control rods.
	ATC	Performs Scram Hard Card Actions: 1. VERIFY the following actions completed: <ul style="list-style-type: none"> • Mode Switch Locked in Shutdown. • RPS Initiated, if all control rods are not fully inserted. • ARI Initiated, if RPS failed to Scram the reactor.
		2. IF Reactor Recirc Pumps are running in fast speed: THEN Simultaneously Take RCIRC PUMP A BRKR 5A AND RCIRC PUMP B BRKR 5B to XFER.
		3. IF Reactor power is above 4%, THEN PERFORM the following: <ul style="list-style-type: none"> • START SLC A and SLC B pumps. • INHIBIT ADS with US Concurrence
		4. STABILIZE Reactor level using Feedwater / RCIC / HPCS: 5. STABILIZE Reactor pressure using Turbine / Turbine Bypass valves / SRV's
		6. PERFORM crew update with the following information: <ul style="list-style-type: none"> • The Mode Switch is locked in shutdown and failed • If RPS was initiated, then RPS is initiated and failed • If ARI was initiated, then ARI is initiated and failed • "All Control Rods (are/are not) inserted" • Reactor Power is _____ % ↑ ↔ ↓ • Reactor Pressure is _____ psig ↑ ↔ ↓ • Reactor Level is _____ inches ↑ ↔ ↓ • Reactor Recirc Pumps (Running in Slow Speed / Tripped) EOP-01 Entry (only if condition met): PWR >4% or Unknown
	SRO	Enters EOP-1, RPV Control

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Event Description: 7 - RPS fails in AUTO and MANUAL – ARI fails in AUTO - ARI works in Manual

Cue: Reactor Scram Hardcard

Time	Position	Applicant's Actions or Behavior
		Directs ATC/BOP to: <ul style="list-style-type: none"> • Monitor and Control Rx Power • Stabilize Reactor Water Level • Stabilize Reactor Pressure
	Evaluator	SRO may direct an expanded level band since level control will be on HPCS.
	SRO	Directs RPV Level Band (normally >178" to <219")
	ATC	Maintains RPV level in directed band
	ATC	Perform Feedwater hard card (OAI-1703 Att. 11) (FW Hardcard will not be useful)

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Event Description: 9 - Bypass valve #1 fails open – Close MSIV before 500 psig.

Cue: Pressure Control Hardcard

Time	Position	Applicant's Actions or Behavior
	SRO	Directs RPV Pressure band (normally 800 to 1000 psig)
	Evaluator	SRO may direct an expanded pressure band since pressure will be lowering.
	ATC	Announces that Pressure is lowering and cannot be maintained in given pressure band. Determines that #1 Bypass valve is partially open.
	ATC/BOP	Reactor Scram Hardcard (continued) 12. STABILIZE reactor pressure using one or more of the following: a) Turbine / Turbine Bypass valves: <ul style="list-style-type: none"> • Refer to the Pressure Control Hardcard b) SRVs: <ul style="list-style-type: none"> • Evacuate Containment • Refer to the Pressure Control Hardcard • Evaluate placing RCIC in pressure Control Mode
	ATC	Perform Pressure Control hardcard.
	ATC	Inform SRO of inability to stop RPV pressure decrease without closing MSIVs.
	SRO	Direct ATC to close MSIV' prior to RPV pressure lowering to <500 psig. (Critical Task 3)
	ATC	Prior to exceeding a cooldown rate of 100°F/hr, then perform the following: (1) NOTIFY the Unit Supervisor that the MSIVs are being closed. (2) VERIFY the following control switches in CLOSE: <ul style="list-style-type: none"> • INBD MSIV, 1B21-F022B • INBD MSIV, 1B21-F022D • INBD MSIV, 1B21-F022A • INBD MSIV, 1B21-F022C • OTBD MSIV, 1B21-F028B • OTBD MSIV, 1B21-F028D • OTBD MSIV, 1B21-F028A • OTBD MSIV, 1B21-F028C (Critical Task 3)

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Event Description: 9 - Bypass valve #1 fails open – Close MSIV before 500 psig.

Cue: Pressure Control Hardcard

Time	Position	Applicant's Actions or Behavior
	Evaluator	When MSIVs are closed pressure control may need to be transferred to SRVs. If pressure control is transferred to SRVs, the SRO should direct an expanded level band of 150 to 219 inches. And, the SRO should adjust the pressure band between 500 and 1000 psig.
	SRO	Direct ATC/BOP to maintain pressure band using the SRVs /MSIV drains and to maintain reactor level from 150 inches to 219 inches per EOP-1
	ATC/BOP	Maintain directed level and pressure bands.

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Event Description: Scenario Termination Criteria

Cue:

Time	Position	Applicant's Actions or Behavior
		1. All control rods inserted to position 00.
		2. RPV pressure maintained between 405* to 1000 psig.
		3. RPV level maintained between 150 to 219 inches
		* Lower pressure of 100 °F per hour cooldown rate

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Event Description: Critical Task #1

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>With a reactor scram required and the reactor not shutdown, take action to reduce power by initiating ARI to cause control rod insertion.</p> <ol style="list-style-type: none"> 1. Safety Significance: <ul style="list-style-type: none"> Shutting down reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant. Correct reactivity control. 2. Cues: <ul style="list-style-type: none"> Reactor power indication. Procedural compliance. 3. Measured by: <ul style="list-style-type: none"> Observation - ARI pushbuttons armed and depressed to cause control rod insertion prior to RPV level lowering to Level 1. 4. Feedback: <ul style="list-style-type: none"> Reactor power trend. Rod status indication

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Event Description: Critical Task #2

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>Prior to Reactor Level lowering to ADS automatic initiation setpoint (RPV Level 1), crew restores HPCS to control Reactor Level.</p> <ol style="list-style-type: none"> 1. Safety Significance: <ul style="list-style-type: none"> With the Main Condenser is available as a heat sink for depressurization of the Reactor, initiation of ADS will unnecessarily increase the energy released to the primary containment. 2. Cues: <ul style="list-style-type: none"> Procedural compliance. Reactor Level trend. 3. Measured by: <ul style="list-style-type: none"> Observation - Reactor Level maintained greater than 16.5". Observation – ADS valves do not open on low reactor level. 4. Feedback: <ul style="list-style-type: none"> Reactor level trend HPCS pump status HPCS Injection Valve position indication

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Event Description: Critical Task #3

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>With reactor pressure lowering due to open Bypass Valve, initiate action to prevent a RPV cooldown rate in excess of 100 degrees per hour.</p> <ol style="list-style-type: none"> 1. Safety Significance: Preclude exceeding Tech. Spec RPV cool down rate limit. 2. Cues: Procedural compliance. RPV pressure trending down. 3. Measured by: Observation - RPV cooldown rate does not exceed 100 degrees/hour, by crew performance of Pressure Control Hardcard actions and / or manual closure of the MSIVs. 4. Feedback: RPV pressure / temperature trend. MSIV status indication
		<p>NOTE: RPV pressure lowering to < 405 psig in ≤ 1 hour will exceed 100 °F/hr. cooldown rate.</p>

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Event Description: Procedures to verify clean

Procedure Number	Check	IV	Procedure Number	Check	IV
ARI-H13-P601-0016-A1			SOI-B33 P&Ls and Sect 7.7		
ARI-H13-P601-0016-A5			SOI-E51 P&Ls and Sects 4.5 & 6.2		
ARI-H13-P601-0016-C5			SOI-N21 P&Ls and Sects 4.3, 6.3 & 7.2		
ARI-H13-P601-0016-D1			TS 3.3.5.1 & Bases		
ARI-H13-P601-0021-D3			TS 3.3.5.2 & Bases		
ARI-H13-P601-0021-F3			TS 3.5.1 & Bases		
ARI-H13-P601-0021-H5			TS 3.5.3 & Bases		
ARI-H13-P680-0002-D5					
ARI-H13-P680-0002-D3					
ARI-H13-P680-0002-D6					
ARI-H13-P680-0003-A9					
ARI-H13-P680-0003-B7					
ARI-H13-P680-0003-D1					
ARI-H13-P680-0002-E3					
ARI-H13-P680-0003-D2					
ARI-H13-P680-0003-D3					
ARI-H13-P680-0003-D4					
ARI-H13-P680-0007-D12					
EOP CHARTS					
Flip-chart hardcards					
Hardcards (horseshoe & back-panel)					
IOI-18					
ONI-C51 Chart					
ONI-E12-1					
ONI-SPI-G-4					

Facility: Perry

Scenario No.: 2 - 85%

Op-Test No.: 2019-1

Examiners: _____ Operators: _____ (SRO)
 _____ (ATC)
 _____ (BOP)

Initial Conditions: Plant is at 85% power. Containment pressure transmitter 1E12-N062D, CONTAINMENT PRESSURE – HIGH failed its Surveillance as it could not be adjusted within the allowable value yesterday. PLCO (P19-E12-010) has been generated. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal.

Planned Activities: Shift Fuel Handling Building Exhaust Fans A/C to B/C for planned work. When contacted by SCC raise power to 93% per the Reactivity Plan and IOI-3 Power Maneuvering and hold there for upcoming surveillances. Make any Narrative Log entries on your note pads.

Critical Tasks: 1) Isolate leak into Sec. Containment.
 2) Isolate Main Steam to SJAE.
 3) Inhibit ADS (Potential)

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP) N(SRO)	Shift Fuel Handling Building Exhaust fans
2		TS(SRO)	CONTAINMENT PRESSURE – HIGH transmitter (E12-N662B) failure. T.S. 3.3.6.2
3		C(BOP) C(SRO) TS(SRO)	AEGT A Controller failure T.S. 3.6.4.1 and 3.6.4.3
4		C(ATC) C(SRO)	APRM D fails downscale
5	CT-1	C(ATC) C(BOP) C(SRO)	RWCU leak into A Pump room – Enter EOP-3
6	CT-2	M(All)	Earthquake < OBE causes failure of SJAE. Enter ONI-D51, ONI-D17, ONI-N11, ONI-C51
7		R(ATC) R(SRO)	On failure of SJAE, lower power with flow and insert Manual Rx Scram.
8	CT-3	M(ALL)	ATWS (<4%) Enter EOP-1 & EOP-1A - Manually insert rods.
9		C(ATC) C(SRO)	CRD pump trips. Restart CRD pump to insert rods.
10		C(ATC) C(SRO)	Generator field breaker fails to automatically trip on generator trip.

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

Narrative Summary – Scenario #2 – 85% Rx Power

Event

1. The BOP shifts the Fuel Handling Building Exhaust fans.
2. Containment Spray pressure (Containment Pressure transmitter) fails high. BOP reports pressure instrument has failed and that there may be T.S. implications. SRO evaluates T.S. 3.3.6.2.
3. AEGT system controller fails. BOP determines that Annulus Δp has degraded and places AEGT A controller in Manual to control Δp . SRO evaluates T.S. 3.6.4.1 and T.S. 3.6.4.3.
4. Receives an APRM Downscale Rod Block for APRM D. SRO directs ATC to bypass APRM D. SRO evaluates T.S. 3.3.1.1-1 Item 2. (No active LCOs applicable)
5. A leak starts in RWCU pump A room. SRO enters EOP-03 Secondary Containment Control. Crew determines that RWCU pump A failed to automatically isolate. ATC trips RWCU pumps and BOP isolates RWCU containment isolation valves.
6. An earthquake ($< OBE$) causes multiple indications of entry conditions for ONI-D17 and ONI-N11 due to damage in Offgas system. SRO directs BOP/ATC to isolate SJAE within 15 minutes of Offgas failure. May also enter ONI-D51 and ONI-C51.
7. ATC lowers recirc flow to 58 Mlbm/hr and scrams the reactor as directed. Mode Switch and RPS & ARI pushbuttons fail to insert all control rods.
8. SRO enters EOP-01 and then transitions into EOP-01A. SRO directs ATC to insert control rods per EOP-SPI-1.1 through 1.7. ATC/BOP performs EOP-SPI 1.3 to insert control rods. When all control rods inserted SRO transitions back to EOP-01.
9. ATC determines that CRD pump has tripped. SRO directs CRD Pump Trip Recovery IAW SOI-C11(CRDH). ATC performs CRD Pump Trip Recovery.
10. While performing Scram Hard Card actions ATC determines that Generator Field Breaker failed to trip open following generator trip. ATC manually trips open the Generator Field Breaker.

EOPs:

EOP-01

EOP-01A

EOP-03

ABNORMALs:

ONI-D51

ONI-C51

ONI-D17

ONI-N11

Critical Tasks:

1. Isolation leak (RWCU) into Secondary Containment.
2. Isolation of Main Steam to SJAE within 15 minutes of Offgas failure.
3. Inhibit ADS (Potential)

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Event Description: N/A - Driver Instructions		
Cue:		

Time	Position	Applicant's Actions or Behavior
Driver	Driver	<p><u>Simulator Setup:</u></p> <p>Reset Simulator to IC 59</p> <p>Load Schedule File: NRC-2019 Scen-2.sch</p> <p>Verify Schedule Files: NRCinfotags19.sch, NRC-2019-S2-Seismic LT-OBE.sch, NRC-2019-S2 SJAE-Failure.sch, and NRC-2019-S2 SJAE-Fix.sch load.</p> <p>Verify Event File: NRC-2019 Scen-2.evt loads</p> <p>Load the ATWS rod position patch file RaysLoATWS.dat from PSIMA computer in the computer room as follows:</p> <p style="padding-left: 40px;">Login using RYAN – password = “ryan_2008”</p> <p style="padding-left: 40px;">On the executive window:</p> <ol style="list-style-type: none"> 1. Place simulator in FREEZE 2. Click on the Run Patch (pumpkin) icon 3. Double click on the RaysLoATWS.dat file 4. Click on the Messages icon – check for error messages in the popup window 5. Close the Messages popup window if no error messages 6. Place the simulator in RUN <p>Remove Requal IOI-3 and Rod Book from horseshoe.</p> <p>Obtain pictures of back panel Trip Units.</p> <p>Remove yellow switch cap from FHB ‘B’ heater switch.</p> <p>Remove yellow switch cap from G33-F042 valve switch.</p> <p>Markup Crew Sheet to show who is supporting FHB fan shift run.</p> <p>Add SYM STATUS placard with “1N62-F601 100% open”</p> <p>Remove Info Tags from P870-05B & P680-09C</p> <p>Verify AFDL set properly.</p>
Driver	Driver	<p><u>Verify Initial Conditions:</u></p> <p>Reactor Power 85%. BOL Pull Sheets, Rods @ Step 81.</p> <p>IOI-3 Step 4.6 is complete.</p> <p>Green Risk.</p>

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Event Description: N/A - Driver Instructions

Cue:

Time	Position	Applicant's Actions or Behavior
Driver	Driver	<p><u>Initial Conditions:</u></p> <p>Plant is at 85% power. Containment Pressure transmitter 1E12-N062D failed its Surveillance as it could not be adjusted within the allowable value yesterday. PLCO (P19-E12-010) has been generated. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal</p> <p><u>Planned activities:</u></p> <p>Shift Fuel Handling Building Exhaust Fans A/C to B/C for planned work. When contacted by SCC raise, power to 93% per the Reactivity Plan and IOI-3 Power Maneuvering, and hold there for upcoming surveillances. Make any Narrative Log entries on your note pads.</p>

Time	Position	Applicant's Actions or Behavior
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Event Description: 3 - AEGT A Controller Failure		
Cue: Alarm H13-P800-01-A2 & D2		
	Driver	When directed initiate Event 3 . Role play as needed
	Evaluator	Alarm comes in about one minute after initiating event.
	ATC	Announce unexpected alarms and give stability report.
	BOP	Walkdown H13-P800 and announce ANNULUS DIFF PRESS LOW alarm. Determine and announce Annulus ΔP has degraded.
	Evaluator	From NOP-OP-1002, Conduct of Operations: 4.10.3 <u>Automatic System Response Versus Manual Actions</u> 2. The need and intent to place a controller into manual operation shall be communicated to the Command SRO prior to taking this action. <ul style="list-style-type: none"> When operating systems in manual control, a clear owner is assigned. Control operating bands and rates to create and maintain sufficient operating margins. (OF - Conservatism) Whenever a controller associated with a Technical Specification system or support system which is required to be in auto to satisfy the Technical Specification is taken to manual the system or support system will be declared inoperable, unless evaluation has shown that continued operability is supported.
	BOP	Inform SRO of need to place AEGT A controller in MANUAL.
	SRO	Direct BOP to take manual control of annulus ΔP and assign band. Direct increased monitoring or assign monitoring frequency of Annulus ΔP .
	BOP	Place AEGT A controller in MANUAL and control annulus ΔP within assigned band.
	BOP	Review ARI-H13-P800-01-A2 / D2. Confirm proper SUBSEQUENT OPERATOR ACTION and inform SRO of Tech Spec references.
	Evaluator	SRO may direct shifting AEGT trains. If so BOP will use SOI-M15 Section 7.1 and has no effect on remainder of scenario. If shift is completed, will need to adjust M15A controller to allow M15B to control ΔP
	Evaluator	Annunciator alarms @ -0.69" H ₂ O. If operator does not restore annulus ΔP and it reaches -0.66" H ₂ O, T.S. 3.6.4.1 RA is entered.

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Event Description: 3 - AEGT A Controller Failure

Cue: Alarm H13-P800-01-A2 & D2

Time	Position	Applicant's Actions or Behavior
	SRO	Evaluate Tech Specs <u>T.S. 3.6.4.1 Action</u> A.1 – Restore secondary containment to OPERABLE status. – 4 hours <u>T.S. 3.6.4.3 Action</u> A.1 – Restore AEGT subsystem to OPERABLE status. – 7 days

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Event Description: 4 - APRM D fails downscale

Cue: Alarm H13-P680-06-D4 (ROD BLOCK APRM DOWNSCALE)

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 4 . Role play as needed including jumper installation.
	ATC	Announce unexpected ROD BLOCK APRM DOWNSCALE alarm and give stability report.
	ATC	Determine APRM D has failed downscale and inform crew.
	BOP	Walks down back panel H13-P672 and informs crew that APRM D DOWNSCALE light is on.
	ATC	Review ARI-H13-P680-06-D4 and inform SRO that APRM D should be bypassed.
	SRO	Direct ATC to bypass APRM D.
	ATC	Perform SOI-C51(APRM) Section 7.4 to Bypass APRM D 7.4.1 REFER TO Technical Specification Table 3.3.1.1-1 Item 2 for applicability. 7.4.3 PLACE the NEUTRON MONITOR BYPASS, APRM joystick on 1H13-P680, in the BYPASS position for the APRM Channel being bypassed.
	BOP	7.4.4 CONFIRM that the APRM Bypass status light comes on at the selected APRM's Power Range Neutron Mon Panel.
	ATC	Directs I&C to connect jumper for APRM D per Step 7.4.7.
	Driver	As I&C, inform operator that jumper is installed and verified.
	SRO	Evaluate Tech Specs No Active LCOs applicable.

Time	Position	Applicant's Actions or Behavior
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Event Description: 5 - RWCU leak into A Pump room – Enter EOP-3		
Cue: Alarm H13-P680-01-C5		
	Driver	When directed initiate Event 5 . Role play as needed
	Evaluator	It takes approximately 4 minutes for first alarm to come in after event is initiated.
	ATC	Announce unexpected RWCU AREAS LD TEMP P632 alarm and give stability report.
	BOP	Walkdown back panel H13-P632 / P642 and informs crew that RWCU Pump A Room temperature is rising. Monitors area temperatures using EOP-03 Condition Monitoring Hardcard
	ATC	Announce unexpected RWCU ISOL PUMP A/B RM TEMP HI alarm and give stability report. Inform crew that this is a potential EOP-03 entry condition.
	Driver	If asked to investigate RWCU rooms for leakage: Before isolation - Report steam coming from RWCU rooms and can't get closer for a better look. After isolation - Report steam visible in RWCU rooms but diminishing and don't feel safe to get closer for a better look. If asked to investigate RCIC room, report no visible leakage.
	SRO	Announce entry into EOP-03, Secondary Containment Control. Directs BOP to Monitor and Control SC area Temperatures and Water Levels. Directs BOP to isolate all systems discharging into the affected area. (Critical Task 1)
	Evaluator	Crew may trip RWCU pumps and isolate RWCU prior to reaching isolation setpoint.
	Crew	Identifies that RWCU failed to automatically isolate.
	Evaluator	RWCU valves F001, F004, F039, F040, F053, & F054 fail to isolate.
	ATC	Trips RWCU pumps as directed.
	BOP	Isolates RWCU as directed. (Critical Task 1)
	BOP	Continues to monitor area temperatures using EOP-03 Condition Monitoring Hardcard to determine if isolation actions were effective.

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 Event Description: 6 - Earthquake < OBE causes failure of SJAE. Enter ONI-D51, ONI-D17, & ONI-N11
 Cue: Alarm H13-P680-08-C3 and sound and SEISMIC ALARM light P969

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 6 . Role play as needed
	Driver	Immediately after initiating Event 6, call the Control Room as the Security Shift Supervisor and report multiple Security Officers reported feeling an earthquake.
	Driver	If directed to report indications from local panel H51-P021, Seismic Monitoring Control Center within the <u>first 5 minutes</u> , report that the amber TRIGGER light is on. If asked to report indication <u>after 5 minutes</u> report that the amber TRIGGER light is on.
	Evaluator	Mark time of initiation of Event 6 _____ and mark time of closure of N62-F020A _____ for evaluation of Critical Task . Time should not exceed 15 minutes.
	Evaluator	Shortly after the earthquake the Control Room will receive multiple indications (Offgas alarms, radiation levels rising and area temperatures rising) of damage to the Offgas system.
	ATC	Announce multiple unexpected alarms including SEISMIC ALARM P969 and give stability report.
	BOP	Walks down back panel H13-P969 and informs crew that TRIGGER (amber) alarm light is on and possible entry into ONI-D51
	SRO	Announce entry into ONI-D51, Earthquake. Directs BOP to perform ONI-D51 SUPPLEMENTAL ACTIONS.
	BOP	Performs ONI-D51 SUPPLEMENTAL ACTIONS including assigning Attachments 1, 2, & 3
	Evaluator	NOTE: Actions to isolate SJAEs are specific in ONI-D17 and ONI-D51 rather than general in ONI-N11. Therefore, the SRO may not enter ONI-N11.
	Crew	Identifies multiple indications of entry conditions for ONI-D17, High Radiation Levels Within Plant and ONI-N11, Pipe Break Outside Containment

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Event Description: 7 - On failure of SJAE, lower power with flow and insert Manual Rx Scram

Cue: ONI-D17 Supplemental Actions

Time	Position	Applicant's Actions or Behavior
	SRO	IAW ONI-D17 or ONI-D51: <ul style="list-style-type: none"> • Directs ATC to CLOSE both RCIRC Loop Flow Control Valves simultaneously UNTIL total core flow is approximately 58 Mlbm/hour. • SCRAM the reactor.
	ATC	Lowers Recirc flow to ~58 Mlbm/hr and scrams the reactor as directed.
	ATC	Recognizes failure of Mode Switch to insert any rods. Arms and depresses RPS pushbuttons and ARI pushbuttons to insert all control rods. Recognizes failure of RPS and ARI to insert all control rods.

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Event Description: 8 - ATWS (<4%) Enter EOP-1 & EOP-1A - Manually insert rods.

Cue: EOP-1A direction

Time	Position	Applicant's Actions or Behavior
	Evaluator	Rx power will be <4% following scram and ARI. Step 3 (below) will not be necessary.
	ATC	Performs Scram Hard Card Actions: <ol style="list-style-type: none"> 1. VERIFY the following actions completed: <ul style="list-style-type: none"> • Mode Switch Locked in Shutdown. • RPS Initiated, if all control rods are not fully inserted. • ARI Initiated, if RPS failed to Scram the reactor.
		<ol style="list-style-type: none"> 2. IF Reactor Recirc Pumps are running in fast speed: THEN Simultaneously Take RCIRC PUMP A BRKR 5A AND RCIRC PUMP B BRKR 5B to XFER.
		<ol style="list-style-type: none"> 3. IF Reactor power is above 4%, THEN PERFORM the following: <ul style="list-style-type: none"> • START SLC A and SLC B pumps. • INHIBIT ADS with US Concurrence
		<ol style="list-style-type: none"> 4. STABILIZE Reactor level using Feedwater / RCIC / HPCS: 5. STABILIZE Reactor pressure using Turbine / Turbine Bypass valves / SRV's
		<ol style="list-style-type: none"> 6. PERFORM crew update with the following information: <ul style="list-style-type: none"> • The Mode Switch is locked in shutdown and failed • If RPS was initiated, then RPS is initiated and failed • If ARI was initiated, then ARI is initiated and failed • "All Control Rods (/are not) inserted" • Reactor Power is _____ <4% _____ % ↑ ↔ ↓ • Reactor Pressure is _____ psig ↑ ↔ ↓ • Reactor Level is _____ inches ↑ ↔ ↓ • Reactor Recirc Pumps (Running in Slow Speed / Tripped) • EOP-01 Entry (only if condition met): PWR >4% or Unknown
	SRO	Enters EOP-1, RPV Control. Marks EOP-1 chart to Step RC-2 and identifies transition to EOP-1A, Level/Power Control

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Event Description: 8 - ATWS (<4%) Enter EOP-1 & EOP-1A - Manually insert rods.

Cue: EOP-1A direction

Time	Position	Applicant's Actions or Behavior
	SRO	Enters EOP-1A, Level/Power Control. Directs ATC/BOP to: <ul style="list-style-type: none"> • Monitor and Control Rx Power • Stabilize Reactor Water Level • Stabilize Reactor Pressure
	SRO	Directs ATC to insert control rods per EOP-SPI 1.1→1.7
	ATC	Coordinates with BOP to insert control rods IAW EOP-SPI 1.3.
	SRO	Directs BOP to: <ul style="list-style-type: none"> • Verify Isolations And Actuators • Inhibit ADS (Critical Task 3 (Potential)) • Perform EOP-SPI 2.3 to bypass MSIV isolations
	BOP	<ul style="list-style-type: none"> • Verifies Isolations And Actuators • Inhibits ADS (Critical Task 3 (Potential)) • Performs EOP-SPI 2.3 to bypass MSIV isolations
	SRO	Directs RPV Level Band (normally >130" to <219")
	ATC	Maintains RPV level in directed band.
	SRO	Directs RPV Pressure band (normally 800 to 1000 psig)
	ATC	Maintains RPV pressure in directed band.
	SRO	Wait in HOLD boxes until all control rods are inserted.
	ATC	Report when all control rods are inserted.
	SRO	When all control are inserted, transition to EOP-1, RPV Control

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Event Description: 9 - CRD pump trips. Restart CRD pump to insert rods

Cue: Alarm H13-P601-22-D2

Time	Position	Applicant's Actions or Behavior												
	ATC	Recognize and announce CRD pump trip.												
	Evaluator	Crew may use either EOP-SPI 1.3 or SOI-C11 to restart CRD pump.												
	SRO	Direct CRD Pump Recovery												
	ATC	<p>Perform CRD Pump start IAW EOP-SPI 1.3</p> <table border="1"> <tr> <td>7.5</td> <td>No CRD pump is running</td> </tr> <tr> <td></td> <td>CRD Pump A is available</td> </tr> <tr> <td></td> <td>Then at H13-P601, perform the following:</td> </tr> <tr> <td></td> <td>7.5.1 Start CRD Aux Oil Pump A</td> </tr> <tr> <td></td> <td>7.5.2 Verify blue Perm light is energized.</td> </tr> <tr> <td></td> <td>7.5.3 Start CRD PUMP A</td> </tr> </table>	7.5	No CRD pump is running		CRD Pump A is available		Then at H13-P601, perform the following:		7.5.1 Start CRD Aux Oil Pump A		7.5.2 Verify blue Perm light is energized.		7.5.3 Start CRD PUMP A
7.5	No CRD pump is running													
	CRD Pump A is available													
	Then at H13-P601, perform the following:													
	7.5.1 Start CRD Aux Oil Pump A													
	7.5.2 Verify blue Perm light is energized.													
	7.5.3 Start CRD PUMP A													
	ATC	<p>Perform CRD Pump Trip Recovery IAW SOI-C11(CRDH) Section 7.6</p> <p>7.6.3 TAKE the tripped CRD PUMP to STOP. 1C11-C001A</p> <p>7.6.4 TAKE the oncoming CRD AUX OIL PUMP to START. 1C11-C002A</p> <p>7.6.5 CONFIRM the CRD PUMP TRIP OIL PRESS LOW alarm clears.</p> <p>7.6.6 PLACE the CRD HYDRAULICS FLOW CONTROL in Manual.</p> <p>7.6.7 LOWER the CRD HYDRAULICS FLOW CONTROL output to 0%.</p> <p>7.6.8 CONFIRM CRD FLOW CONTROL VALVE indicates closed.</p> <p>7.6.9 TAKE the oncoming CRD PUMP to START. 1C11-C001A</p> <p>7.6.10 WHEN CRD HYDRAULICS FLOW CONTROL indicates less than tapeset, THEN PROCEED.</p> <p>7.6.11 SLOWLY THROTTLE the in-service CRD FLOW CONTROL VALVE UNTIL flow is restored on the CRD HYDRAULICS FLOW CONTROL.</p> <p>7.6.12 PLACE the CRD HYDRAULICS FLOW CONTROL in AUTO.</p>												
	ATC	Directs NLO to perform Steps 7.6.15→7.6.18												

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Event Description: 10 - Generator field breaker fails to automatically trip on generator trip

Cue: Rx Scram Hardcard direction

Time	Position	Applicant's Actions or Behavior
	ATC	<p>Continues Scram Hard Card Actions:</p> <p>7. WHEN generator load is reduced to less than 90 MWe, THEN PERFORM the following:</p> <p>a) TRIP the main turbine by depressing the TURBINE TRIP push-button.</p> <p>b) VERIFY the following have occurred:</p> <ul style="list-style-type: none"> • MAIN STOP VALVEs, CONTROL VALVEs and COMBINED INTERMEDIATE VALVEs are closed. • GEN BRKRs S-610-PY-TIE and S-611-PY-TIE is open. • GEN FIELD BREAKER is open. • EXCITER FIELD BREAKER is open.

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Event Description: Scenario Termination Criteria

Cue:

Time	Position	Applicant's Actions or Behavior
		1. All control rods inserted to position 00.
		2. N62-F020A or MSIVs are shut.
		3. RPV level maintained between 150" and 219".

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Event Description: Critical Task #1

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>With a primary system discharging into the secondary containment, take action to manually isolate the break.</p> <ol style="list-style-type: none"> 1. Safety Significance: Isolating high energy sources can preclude failure of secondary containment and subsequent radiation release to the public. 2. Cues: Procedural compliance. Area temperature indication. 3. Measured by: With the reactor at pressure and a primary system discharging into the secondary containment, operator takes action to manually isolate the break within 15 minutes. 4. Feedback: Valve position indication. In field reports.
		<p>NOTE: 15 minute criteria for isolation based on entry into E-plan (SU5)</p>

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Event Description: Critical Task #2

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>Within 15 minutes following a loss of flow in Offgas due to a SJAE discharge line failure, isolate Main Steam to the SJAE's.</p> <ol style="list-style-type: none"> 1. Safety Significance: <ul style="list-style-type: none"> Isolating high energy sources can preclude failure of secondary equipment, injury to plant personnel, and subsequent radiation release to the public. 2. Cues: <ul style="list-style-type: none"> Procedural compliance. Area temperature indication. Area radiation levels 3. Measured by: <ul style="list-style-type: none"> The RO places MN STEAM TO SJAE SUPPLY valve, 1N62-F020A (B) Control Switch in CLOSE. 4. Feedback: <ul style="list-style-type: none"> Area temperature trend. Area radiation level trend. Valve position indications

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Event Description: Critical Task #3 (Potential)

Cue:

Time	Position	Applicant's Actions or Behavior
		<p>With reactor scram required and the reactor not shutdown, to prevent an uncontrolled RPV depressurization and subsequent power excursion, inhibit ADS.</p> <ol style="list-style-type: none"> 1. Safety Significance: Precludes core damage due to an uncontrolled reactivity addition. 2. Cues: Procedural compliance. 3. Measured by: ADS logic inhibited prior to an automatic initiation unless all required injection systems are Terminated and Prevented. 4. Feedback: RPV pressure trend. RPV level trend. ADS "ADS OUT OF SERVICE" annunciator status.

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Event Description: Procedures to verify clean

Procedure Number	Check	IV	Procedure Number	Check	IV
ARI-H13-P601-17-B3					
ARI-H13-P680-01-C5					
ARI-H13-P680-01-D1					
ARI-H13-P680-01-D4					
ARI-H13-P680-03-C6 & C7					
ARI-H13-P680-04-E2 & E11					
ARI-H13-P680-07-A9, A10, & A11					
ARI-H13-P800-01 A2 & D2					
ARI-H13-P845-01-B4 & E5					
EOP-SPI 1.2					
EOP-SPI 1.3					
EOP-SPI 2.3					
ONI-D17					
ONI-D51					
ONI-N11					
SOI-C11(CRDH) Sect 7.6					
SOI-C51(APRM) Sect 7.4					
SOI-M15 Sect 7.1					
SOI-M40 Sect 7.2					
EOP Flow Charts					
Hardcards					
Flip-charts					
TS 3.6.4.1					
TS 3.6.4.3					
TS 3.3.6.2					

Facility: Perry

Scenario No.: 4 - 14%

Op-Test No.: 2019-1

Examiners: _____ Operators: _____ (SRO)
 _____ (ATC)
 _____ (BOP)

Initial Conditions: Plant S/U in progress; Main turbine @ 1800 rpm. Ready for Main Generator synch per IOI-3, Step 4.3.35. RFPT 'A' is out of service; installing insulation. TBCC Pump 'C' is out of service for bearing replacement. Late last shift 1G43-F030A SPMU valve developed a motor ground. WO and Clearance are being written. ALCO A19-G43-0001 for TS 3.6.2.4 was initiated. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal.

Planned activities: Raise reactor power per IOI-3. Reactor Engineering concurs with gang rod withdrawal where not prohibited. Then synchronize to the grid and continue power ascension. Make any Narrative Log entries on your note pads.

Critical Tasks: 1) Manually isolate the Main Steam Lines
 2) Initiate Emergency Depressurization

Event No.	Malf. No.	Event Type*	Event Description
1		R-(ATC) R-(SRO)	Raise Reactor power to establish approximately 2 ½ Bypass Valves open.
2		N-(BOP) N-(SRO)	Synchronize the Main Generator to the grid
3		TS-(SRO)	Control Room Ventilation Rad Monitor sample pump fails; TS 3.3.7.1
4		C(BOP) C(SRO)	FPCC Pump A low discharge pressure → Shift pumps
5		C-(ATC) C-(SRO)	High vibration main turbine bearing → manually trip turbine.
6		C-(ATC) C-(SRO)	ONI-N32 – Main Turbine Trip, generator output breaker S610 fails to trip → manually open S610 breaker.
7		TS-(SRO)	Both Upper Containment airlock doors open at same time TS 3.6.1.2
8	CT-1	M-(Crew)	TB/HB Vent Hi Rad, Turbine Area Temperature High, MSIVs fail to close
9	CT-1	C-(BOP) C-(SRO)	MSIVs on C MSL fail to close – isolate the main steam line
10		M-(Crew)	LPCS Room sump alarm, enter EOP-3; SP Level <17.8 feet, enter EOP-2; SPMU will fail upon initiation.
11	CT-2	C(BOP) C(SRO)	LPCS Suppression Pool Suction valve E21-F001 loses power go to ED. Enter EOP-4-2 when Suppression Pool level cannot be maintained > 14.15'.

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

Narrative Summary – Initial Scenario 4 - 14%

Event

1. The ATC increases Rx power by control rod withdrawal to obtain 2 and ½ bypass valves open. The SRO provides reactivity oversight.
2. The BOP will synchronize the main generator to the grid.
3. The Control Room radiation monitor sample pump fails. The SRO evaluates Tech Specs – 3.3.7.1.
4. Fuel Pool Cooling/Cleanup Pump A will develop low discharge pressure requiring shifting of FPCC pumps from A to B.
5. Vibration develops on main turbine bearing #5. The auto trip of the main turbine fails requiring the ATC to manually trip the main turbine.
6. The crew enters ONI-N32 for trip of the main turbine. One of the generator output breakers fail to open requiring the ATC to manually open the generator output breaker.
7. Both upper Containment airlock doors are opened simultaneously indicating a failure of the airlock interlock mechanism. The SRO evaluates Tech Specs – 3.6.1.2
8. A steam leak in the Turbine Building at the Bypass Valve manifold results in turbine building high temperature and high radiation level. ONI-N11 is entered. The MSIV's receive an isolation signal, but only one Main Steam line isolates. This requires the crew to scram the Rx and manually isolate all main steam lines to stop the radiation release.
9. MSIVs on C line fail to isolate. This requires the BOP to close the C Main Steam Stop valve.
10. A Suppression Pool leak in the LPCS pump room requires entry into EOP-3. As suppression pool level lowers, EOP-02 is entered. The LPCS Suppression Pool suction valve and B Train SPMU valve will fail.
11. The Suppression Pool leak cannot be stopped. Shutting the LPCS suction valve will cause the valve to lose power and initiating Suppression Pool Makeup will not be effective. This will require the crew to perform Emergency Depressurization prior to Suppression Pool level lowering to 14.25 feet.

EOPs: EOP-03
EOP-02 EOP-4-2

ABNORMALs:

ARI for Main Turbine vibration
ONI-N32
ONI-N11
ONI-D17
ONI-C71-1

Critical tasks:

1. Isolate main steam lines
2. Emergency Depressurize

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Event Description: N/A - Driver Instructions

Cue:

Time	Position	Applicant's Actions or Behavior
Driver	Driver	<p><u>Simulator Setup:</u></p> <p>Reset Simulator to IC-69</p> <p>Load Schedule File: NRC-2019-Scen-4</p> <p>Verify Schedule File NRC-2019-Scen-4-1 loads</p> <p>Verify Event File NRC-2019-Scen-4 loads</p> <p>Adjust white o-rings.</p> <p>Remove Info Tags from P870-05</p> <p>Remove INFO tag from P680-15 for Eastlake power light.</p> <p>Provide Switching Order</p> <p>Reset NUMACS and acknowledge alarms on Yokagawa's (P632/P642 & P614)</p> <p>Remove Requal IOI-3 and Rod Book from horseshoe.</p> <p>Set out SOI-N64 Sect 4.3.22 (Step 22 is circled) for SJAЕ vacuum and place Sys Stat marker on P870 "maintain 3-4" HgA"</p>
Driver	Driver	<p><u>Verify Initial Conditions:</u></p> <p>Reactor Power ~14%. Rods @ Step 36. (Pull Sheets, Book A2Training.SEQ)</p> <p>IOI-3 Step 4.3.34 is complete. RFPT'A' is out of service while installing insulation. TBCC 'C' is out of service for bearing replacement</p> <p>Place yellow switch cap on TBCC C pump.</p> <p>Place PINK Equip Off Normal tags on G43-F030A</p> <p>Traffic light - Green Risk.</p>

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Event Description: N/A - Driver Instructions

Cue:

Time	Position	Applicant's Actions or Behavior
Driver	Driver	<p><u>Initial Conditions:</u> Plant S/U in progress; Main turbine @ 1800 rpm. Ready for Main Generator synch per IOI-3, Step 4.3.35. RFPT 'A' is out of service; installing insulation. TBCC Pump 'C' is out of service for bearing replacement. Late last shift 1G43-F030A SPMU valve developed a motor ground. WO and Clearance are being written. ALCO A19-G43-0001 for TS 3.6.2.4 was initiated. eSOMS Narrative Log is down. PRA Risk is Green and the Grid Risk is Normal.</p> <p><u>Planned Activities:</u> Raise reactor power per IOI-3. Reactor Engineering concurs with gang rod withdrawal where not prohibited. Then synchronize to the grid and continue power ascension. Make any Narrative Log entries on your note pads.</p>

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Event Description: 1 - Raise Reactor power to establish approximately 2 ½ Bypass Valves open.

Cue: from Turnover

Time	Position	Applicant's Actions or Behavior
	Driver	Role play as RP, Chemistry, and Unit Dispatch / ACC for the power change
	SRO	Direct ATC to raise Reactor Power in accordance with the Reactivity Plan with Control Rods. Provide Oversight.
	ATC	Raise Rx power to establish ~ 2.5 Bypass Valves open in accordance with the Reactivity Plan with Control Rods.
	ATC	Monitor Main turbine bypass valve positions for proper response to the power change
	ATC	Monitor Average Power Range Monitors for proper response to the power change
	Evaluator	It will require ~5 ½ gangs to get 2.5 BPVs open.

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Event Description: 2 - Synchronize the Main Generator to the grid

Cue: From Turnover

Time	Position	Applicant's Actions or Behavior
	Driver	Role play as necessary
	SRO	Direct BOP to synchronize the Main Generator with the Grid per IOI-3
		<p>Synchronize the Main Generator with the Grid per IOI3 Section 4.3</p> <p>4.3.38 CLOSE the GEN FIELD BREAKER.</p> <p>4.3.39 CLOSE the EXCITER FIELD BREAKER.</p> <p>4.3.40 OBSERVE indication of voltage on GEN. FIELD VOLTS. 1N51 R011</p> <p>4.3.41 OBSERVE indication of voltage on all three phases of GEN VOLTS. 1N41 R013, R014, R015</p> <p>4.3.42 ADJUST the MAN. VOLT. ADJUST to increase generator terminal voltage to approximately 22 kV and a Main Transformer output voltage of 345 kV.</p>
	Evaluator	<p>It takes about a minute before the Auto voltage regulator shows a response.</p> <p>If Candidate is too aggressive on increasing LOAD SELECTOR (Step 4.3.49), the Bypass valves may momentarily close then reopen</p>
	BOP	<p>4.3.43.a ADJUST the AUTO. VOLT. ADJUST to Zero the REG TRANSFER DIFF VOLTS.</p> <p>4.3.43.b TRANSFER the VOLTAGE REGULATOR to the AUTO position.</p> <p>4.3.44 Make a PA announcement.</p> <p>4.3.45 TURN the SYNC. SELECT. SWITCH to the position of the first GEN BRKR to be closed as directed by the switching order. S-611-PY-TIE</p> <p>4.3.46 MATCH the incoming voltage with running voltage using the AUTO. VOLT. ADJUST. Or the MAN. VOLT. ADJUST.</p> <p>4.3.47 ADJUST the turbine load selector UNTIL the synchroscope pointer is rotating slowly clockwise.</p> <p>4.3.48 WHEN the synchroscope pointer is rotating clockwise AND is approximately the width of the pointer before the 12 o'clock position, THEN CLOSE GEN BRKR. S-611-PY-TIE</p> <p>4.3.49 INCREASE the turbine LOAD SELECTOR UNTIL Bypass Valve 1 is fully closed.</p> <p>4.3.50 SELECT OFF on the SYNC SELECT SWITCH.</p> <p>4.3.51 ADJUST Main Generator voltage to bring generator megavars to zero.</p>

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Event Description: 2 - Synchronize the Main Generator to the grid

Cue: From Turnover

Time	Position	Applicant's Actions or Behavior
		<p>4.3.52 WHILE increasing load, ADJUST the turbine LOAD SELECTOR to maintain the turbine LOAD SET approximately 120 Mwe above generator output.</p> <p>4.3.53 TURN the SYNC SELECT SWITCH to the position for the second GEN BRKR to be closed as directed by the switching order. S-610-PY-TIE</p> <p>4.3.54 VERIFY synchronization.</p> <p>4.3.55 CLOSE the second GEN BRKR. S-610-PY-TIE</p> <p>4.3.56 PLACE the SYNC SELECT SWITCH in OFF.</p> <p>4.3.57 NOTIFY the dispatcher that the generator is synchronized to the grid.</p> <p>4.3.58 SELECT turbine STARTING RATE-SLOW.</p> <p>4.3.59 NOTIFY Chemistry that reactor power is greater than 10% rated and to sample for Fuel Warranty limits.</p>

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Event Description: 3 - Control Room Ventilation Rad Monitor sample pump fails; TS 3.3.7.1

Cue: Alarm H13-P902-01-C2

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 3 . Role play as needed
	ATC	Announce unexpected P902 alarm and give stability report.
	BOP	Investigate H13-P902 and report CONTROL ROOM AIR RAD MON FLOW LOW alarm and review ARI.
	BOP	Notifies RP of Control Room Vent. Rad Monitor low flow alarm and requests RP to investigate.
	Driver	As RP, after 3 minutes, inform control room that the sample pump has failed and cannot be restarted.
	SRO	<p><u>Evaluate T.S. 3.3.7.1 Action and its Bases</u></p> <p>A.1 – Enter the Condition referenced in Table 3.3.7.1-1 for the channel – Immediately</p> <p>C.1 – Provide alternate method of control room radiation monitoring – 24 hours and</p> <p>C.2 – Restore the inoperable monitor to an Operable status – 7 days</p> <p><u>Tech Spec Bases</u></p> <p>Alternate monitoring means will be either a portable continuous noble gas monitor or the control room area radiation monitor.</p>

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Event Description: 4 - FPCC Pump A low discharge pressure → Shift pumps

Cue: Alarm H13-P970-01-C5

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 4 . Role play as NLO and RP as directed
	ATC	Announce unexpected P970 alarm and give stability report.
	BOP	Investigate H13-P970 and determine FPCC A pump discharge pressure is low and notify the SRO.
	SRO	Direct BOP operator to perform ARI-H13-P970-1-C5 Subsequent Actions
	BOP	Perform ARI-H13-P970-1-C5 Subsequent Actions 4.1 Investigate the system for leaks 4.2 If proper discharge pressure is not restored, then refer to SOI-G41 (FPCC) and start the FPCC pump B. 4.3 If no FPCC pumps are running then go to ONI-E12-2 and take the actions
	BOP	Shift FPCC pumps from A to B per SOI-G41 Section 7.4 7.4.1 Notify RP of any changes to FPCC system configuration 7.4.2 Start the B pump 7.4.3 Stop the A pump
	Driver	If asked to investigate the A pump – Inform the FPCC that it looks normal on the camera. If asked to go into the room, notify the SRO it will be a High Rad Entry and will take an hour to get there.
	BOP	Notify the SRO when the shift is complete

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Event Description: 5 - High vibration main turbine bearing, manually trip main turbine

Cue: Alarm H13-P680-07-B13

Time	Position	Applicant's Actions or Behavior			
	Driver	When directed initiate Event 5 . Role play as needed			
	Driver	If directed to investigate turbine prior to trip, inform him that bearing 5 is making abnormal noise. If directed to investigate turbine after the trip, inform him that there is no abnormal noise.			
	ATC	Announce unexpected TURB/GEN/EXCTR VIB P823 alarm and give stability report and review the ARI. 1.0 CAUSE OF ALARM 1.1 Main Turbine, Generator or Exciter bearing vibration >12 mils as sensed by 1N31-N001 through 1N31-N012. 2.0 AUTOMATIC ACTION <table border="1" data-bbox="565 1010 1211 1178"> <tr> <td>The trip is enabled</td> </tr> <tr> <td>3 seconds have elapsed since the alarm</td> </tr> <tr> <td>The Main Turbine Generator trips.</td> </tr> </table>	The trip is enabled	3 seconds have elapsed since the alarm	The Main Turbine Generator trips.
The trip is enabled					
3 seconds have elapsed since the alarm					
The Main Turbine Generator trips.					
	ATC	Evaluate Turbine bearing vibration levels and report that vibration is indicating >12 mils on bearing #5 for >3 seconds.			
	ATC	Announce manually tripping the Main Turbine and trip the Main Turbine.			
	Evaluator	NOP-OP-1002 4.10.3 step 5 states "If automatic actions fail to occur when required, it is the responsibility of the operator to take manual actions to perform the system or component function. Pump or component auto start failures are examples where operators are expected to take manual action."			
	SRO	Announce entry into ONI-N32, Main Turbine Trip.			

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Event Description: 6 - ONI-N32, Main Turbine Trip; generator output breaker S610 fails to trip.

Cue: Turbine Trip

Time	Position	Applicant's Actions or Behavior
	SRO	Enter ONI-N32, Main Turbine Trip.
	Evaluator	ONI-C51 may be entered if a reactor power change is detected. However, no significant actions will be performed for ONI-C51
	ATC	<p>Perform Immediate Actions of ONI-N32</p> <p><u>Automatic Actions</u></p> <p>2.5 GEN BRKR trips. S-610-PY-TIE trips</p> <p><u>Immediate Actions</u></p> <p>3.2 DEPRESS the TURBINE TRIP pushbutton to trip the main turbine.</p> <p>3.3 VERIFY the following:</p> <ul style="list-style-type: none"> • MAIN STOP VALVEs close. • CONTROL VALVEs close. • COMBINED INTERMEDIATE VALVEs close. • GEN BRKR trips. S-610-PY-TIE • GEN BRKR trips. S-611-PY-TIE • GEN FIELD BREAKER trips. <p>3.4 TAKE the EXCITER FIELD BRKR to TRIP</p>
	ATC	Identify GEN BRKR, S-610-PY-TIE did NOT trip; Manually trips breaker S610.
	ATC	Announce that the Main Turbine is tripped and S610 was manually opened.
	ATC	Give stability report
	SRO	Direct ATC/BOP to perform ONI-N32 Supplemental Actions
	ATC/BOP	Perform ONI-N32 Supplemental Actions as directed.
	Evaluator	Following turbine trip, vibration levels on bearing #5 lower during coast down.

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Event Description: 7 - Both Upper Containment Airlock doors open.

Cue: Alarm H13-P680-07-C5

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 7 . Role play as an NLO when directed
	ATC	Announce unexpected PERS AL DOORS BOTH OPEN alarm and give stability report.
	ATC or BOP	Observe the matrix lights on H13-P601 to determine which airlock has both doors open
	ATC	Review ARI-H13-P680-07-C5. Inform SRO of Tech Spec references.
	SRO	Direct subsequent operator actions of ARI-H13-P680-07-C5 4.1.1 Immediately Investigate 4.1.2 If necessary then direct maintenance to repair
	Driver	After both doors are closed call the control room, as an NLO, and notify them: "Contractors moving scaffold into containment opened both doors. They are now closed with the seals inflated. The Contractors have been coached and their supervisor will report to the control room".
	Driver	If asked about the doors, respond that the doors are closed and the seals are fully inflated. If asked if the interlock mechanism is defeated or broken, respond that it is not intact, but it can be restored.
	Evaluator	T.S. 3.6.1.2 Condition B is for the Airlock Interlock mechanism. May discuss entering T.S. 3.6.1.1 Condition A while both airlock doors are open.
	SRO	Evaluate Tech Specs <u>T.S. 3.6.1.2 Action</u> B.1 – Verify operable door closed – W/I 1 hour B.2 – Lock operable door closed – W/I 24 hours B.3 – Verify operable door locked closed – Once per 31 days

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Event Description: 8 - TB/HB Vent Hi Rad, Turbine Area Temperature High, MSIVs fail to close

Cue: Alarms H13-P680-07-A10, H13-P601-0019-A1, H13-P601-0019-B3

Time	Position	Applicant's Actions or Behavior
	Driver	Place pictures of E31-N0361A, D, B, & C on Back Panels H13-P869 and H13-P868 prior to initiation of Event 8.
	Driver	When directed initiate Event 8 . Role play as needed
	ATC	Announce unexpected AIRBORNE RAD P804 alarm and give stability report. Report ONI-D17 entry condition.
	BOP	Investigate P804 rad alarm and report TB/HB Gas has an ALERT alarm in with rad levels increasing.
	SRO	Announce entry into ONI-D17, High Radiation Levels Within The Plant
	ATC/BOP	Perform ONI-D17 Immediate Actions – Announce Turbine Building evacuation.
	Evaluator	Crew may enter ONI-N11, Pipe Break Outside Containment from ONI-D17 Supplemental Actions.
	ATC	Review ARI-H13-P680-07-A10 and commence performing actions. 1.0 <u>CAUSE OF ALARM</u> 1.1 Any of the following: Receipt of an alert, high or fail for any of the following PLANT RAD MONITORS on Airborne Radiation Monitoring Panel 1H13-P804: <ul style="list-style-type: none"> • TB/HB VENT GAS 1D17-K856 D17EA036 4.0 <u>SUBSEQUENT OPERATOR ACTION</u> 4.2 IF any of the below monitors have a valid Hi Alarm, <ul style="list-style-type: none"> • Unit 1 PLANT VENT GAS • Unit 2 PLANT VENT GAS • TB/HB VENT GAS • OG VENT PIPE GAS THEN VERIFY with Chemistry that a MIDAS run is performed within 15 minutes per EPI-A1, HA-1. 4.3 DIRECT as appropriate, Chemistry or Radiation Protection to initiate actions in accordance with RPI-0506, Radiation Protection Section Response to Radiation Monitor Alarms.
	Evaluator	About one minute after the rad alarm is received, the TB high temp alarms will be received and the TB/HB rad monitor will reach the HIGH alarm setpoint.

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Event Description: 8 - TB/HB Vent Hi Rad, Turbine Area Temperature High, MSIVs fail to close

Cue: Alarms H13-P680-07-A10, H13-P601-0019-A1, H13-P601-0019-B3

Time	Position	Applicant's Actions or Behavior
	ATC	Announce multiple unexpected alarms and give stability report. Announces Half Scram and MSIV Closure alarms received.
	BOP	Announce MSL ISOL TURBINE AREA TEMPERATURE HIGH and MSIV CLOSED SIGNAL RECEIVED alarms. Evaluates and report MSIV isolation status and review ARIs. 4.3 Refer to ONI-N11, Pipe Break Outside Containment as required. 4.4 MONITOR the following temperatures <u>ANALOG LOOP DIVISION 1 PANEL, 1H13-P869</u> Recorder 1E31-N361A, Ch. 1 – MSIV Isol. 1E31- N360A Recorder 1E31-N361D Ch. 1 – MSIV Isol. 1E31- N360D <u>ANALOG LOOP DIVISION 2 PANEL, 1H13-P868</u> Recorder 1E31-N361B, Ch. 1 – MSIV Isol. 1E31- N360B Recorder 1E31-N361C, Ch. 1 – MSIV Isol. 1E31- N360C
	BOP	Inform SRO of ONI-N11 entry condition
	SRO	Announce ONI-N11, Pipe Break Outside Containment entry, evaluates potential source of temperature increase in Turbine Building.
	Evaluator	MSL Drain Valves and MSL 'B' isolates, inboard and outboard. MSLs 'A' & 'D' do not isolate. MSL 'C' does not isolate – attains only partial outboard valve closure.
	ATC/BOP	Announce evacuation of turbine building over PA per ONI-N11 Immediate Action.
	BOP	Investigate E31-N360 A,B,C,D on back panels; report all four temperature recorders indicate high temperatures and tripped status.
	Evaluator	Scram Actions may have been completed in Event 7 if EOP-1 was entered.
	SRO	Direct ATC to insert a Reactor SCRAM and announce entry into ONI-C71.
	SRO	Direct BOP to isolate the MSIVs. (Critical Task 1)
	ATC	Perform Scram Hardcard actions (OAI-1703 att. 10) 1. VERIFY the following actions completed: <ul style="list-style-type: none"> • Mode Switch Locked in Shutdown • RPS Initiated (if all control rods are not fully inserted) 4. STABILIZE Reactor level using Feedwater / RCIC / HPCS

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Event Description: 8 - TB/HB Vent Hi Rad, Turbine Area Temperature High, MSIVs fail to close

Cue: Alarms H13-P680-07-A10, H13-P601-0019-A1, H13-P601-0019-B3

Time	Position	Applicant's Actions or Behavior
		<ol style="list-style-type: none"> 5. STABILIZE Reactor pressure using Turbine / Turbine Bypass valves / SRVs 6. PERFORM crew update. 7. RECORD the TIME: _____ 8. STABLIZE reactor water level: <ol style="list-style-type: none"> a) Feedwater REFER TO the FEEDWATER HARDCARD b) RCIC c) HPCS 9. STABLIZE reactor pressure: <ol style="list-style-type: none"> a) Turbine / Turbine Bypass valves: <ul style="list-style-type: none"> • REFER TO the PRESSURE CONTROL HARDCARD b) SRVs: <ul style="list-style-type: none"> • EVACUATE Containment • REFER TO the PRESSURE CONTROL HARDCARD • EVALUATE placing RCIC in pressure CONTROL MODE 10. INSERT Nuclear Instruments: <ul style="list-style-type: none"> • SRMs • IRMs • PLACE recorders in IRM (Leave A or E in APRM for digital display)
	BOP	Isolate Main Steam Lines by closing MSIVs. (Critical Task 1)

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Event Description: 9 - MSIVs on C MSL fail to close – isolate the main steam line

Cue: Alarms H13-P680-07-A10, H13-P601-0019-A1, H13-P601-0019-B3

Time	Position	Applicant's Actions or Behavior
	BOP	Identify MSL C MSIV did not isolate and informs SRO of need to close 1N11-F020C to isolate.
	SRO	Direct BOP to isolate MSL C by closing MSL C Shutoff Valve, 1N11-F020C. (Critical Task 1)
	BOP	Close 1N11-F020C, MSL C Shutoff Valve as directed and report closure to SRO. (Critical Task 1)

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Event Description: 10 - LPCS Room sump alarm, enter EOP-3 ; SP Level <17.8 feet, enter EOP-2; SPMU will fail upon initiation.

Cue: Alarms H13-P601-18-E2

Time	Position	Applicant's Actions or Behavior
	Driver	When directed initiate Event 10 . Role play as needed
	ATC	Announce unexpected P601 alarm and give stability report.
	BOP	Report LPCS PUMP ROOM SUMP LEVEL HIGH alarm and EOP-3 entry condition.
	SRO	Enter EOP-3, Secondary Containment Control and direct BOP to perform EOP-3 actions. <ul style="list-style-type: none"> • Monitor area water levels • Restore and maintain area water levels below entry conditions <ul style="list-style-type: none"> ○ Operate all available sump pumps for the Aux Building ○ Operate cubicle sump drain valves as required
	BOP	Direct NLO to investigate cause of the alarm in the LPCS Pump Room.
	Driver	When SP Water Level is 17.85 feet (using ICS SP Temperature Validation Screen), report to the CR that water is entering the LPCS Room from the piping between the suppression pool Suction Valve and the LPCS pump. If asked, water level is below grating.
	BOP	Direct Radwaste Operator to operate all available Aux Building sump pumps.
	BOP	Direct NLO to operate LPCS Pump Room cubicle sump drain valve as required.
	Crew	Monitor Suppression Pool Level for EOP-2 entry, < 17.8 feet
	SRO	When Suppression pool level lowers to <17.8 feet, enter EOP-02, Primary Containment Control and direct BOP to perform EOP-2 actions. <ul style="list-style-type: none"> • Isolate all systems discharging into the affected area • Monitor and control SP Level • Maintain SP level between 17.8 ft. and 18.5 ft.
	Evaluator	The SRO has several system options for restoring/maintaining suppression pool level, such as, Condensate transfer, HPCS, and SPMU.
	SRO	Continue EOP-2 actions. When suppression pool level cannot be maintained above 17.8 ft. then proceed <ul style="list-style-type: none"> • Maintain suppression pool level above 14.25 ft. • Before SP level lowers to 14.25 ft. enter EOP-01 RPV Control • When SP level cannot be maintained above 14.25 ft. Emergency Depressurization is required. (Critical Task 2)

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Event Description: 10 - LPCS Room sump alarm, enter EOP-3 ; SP Level <17.8 feet, enter EOP-2;
SPMU will fail upon initiation.

Cue: Alarms H13-P601-18-E2

Time	Position	Applicant's Actions or Behavior
	BOP	Inform SRO that leak in LPCS room is on the suppression pool suction line downstream of the LPCS suction valve.
	SRO	Direct BOP to close 1E21-F001, LPCS Supr Pool Suction Valve, place LPCS in Secured Status, and place RHR A on Alternate Keepfill.
	Evaluator	SRO should direct BOP to shutdown LPCS to Secured Status either before or directly after ordering shutting of the suppression pool suction valve. He should also direct 1) Starting RHR A, 2) placing RHR A on Alternate Keepfill or 3) shutting down RHR A to secured status as the water leg pump will eventually lose suction when the LPCS suppression pool valve is closed
	BOP	Attempts to close LPCS suppression pool suction valve as directed. Monitor suppression pool level trend. Direct NLO to monitor the leak. Report that LPCS Suction valve lost power. See next Event.
	Driver	If directed to monitor leakage, report leak has not stopped and LPCS room water tight door hinge is damaged and cannot be closed.
	Driver	When 1E21-F001 is taken to CLOSE, Event 25 will automatically initiate to fail power to 1E21-F001 10 seconds later.
	Driver	If directed to investigate MCC EF1A07-N for LPCS suction valve, after appropriate amount of time, report 3 main-line fuses are blown.
	BOP	Directs NLO to perform field actions to place LPCS in Secured Status and RHR A on Alternate Keepfill.
	Driver	If directed to pull control power fuses or rack out EH1111, wait appropriate time and initiate Event 15 .
	Driver	If directed to open EF1A07-R for E21F005, wait appropriate time and initiate Event 16 .
	Driver	If directed to place RHR A on Alternate Keepfill, initiate Event 17
	SRO	Direct BOP to take actions to recover Suppression Pool level using SPMU
	BOP	Initiates SPMU as directed. Reports SPMU valve 1G43F040B failed and SPMU cannot be initiated.

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Event Description: 11 - LPCS Suppression Pool Suction valve E21-F001 loses power go to ED. Enter EOP-4-2 when Suppression Pool level cannot be maintained > 14.15.

Cue: Alarms H13-P601-20-F2, H13-P601-0017-F1

Time	Position	Applicant's Actions or Behavior
	SRO	Evaluates failure of LPCS Suppression Pool Suction valve to isolate and failure of SPMU to initiate and determines that Emergency Depressurization will be required when US determines Suppression Pool level cannot be maintained >14.25 feet.
	Evaluator	The Margins and Limits Hardcard requires ED when SP level lowers to 16 feet after SPMU initiation.
	SRO	Transitions to EOP-4-2, Emergency Depressurization.
	SRO	Works way down EOP-4-2 chart. Determines if Reactor is shutdown.
	SRO	Directs BOP to open all ADS valves. (Critical Task 2)
	BOP	Opens all ADS valves as directed. (Critical Task 2)
	SRO	Directs BOP/ATC to restore RPV level in directed band.
	ATC/BOP	Coordinate injection of ECCS to restore RPV level in directed band.
	Driver	Remove pictures of E31-N0361A, D, B, & C from Back Panels H13-P869 and H13-P868.

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Event Description: Scenario Termination Criteria

Time	Position	Applicant's Actions or Behavior
		1. Main Turbine is tripped.
		2. Reactor is shutdown.
		3. All Main Steam Lines are isolated prior to RPV pressure lowering below 370* psig.
		4. RPV is depressurized.
		NOTE: * 370 psig is limit for 100° F/hr. cooldown.

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Event Description: Critical Task #1

Time	Position	Applicant's Actions or Behavior
		<p>With the failure of a MSIV automatic isolation, take action to manually isolate the Main Steam Lines prior to exceeding 100 °F/hr. cooldown rate.</p> <ol style="list-style-type: none"> 1. Safety Significance: <ul style="list-style-type: none"> • Take action to prevent degradation of a barrier to fission product release. 2. Cues: <ul style="list-style-type: none"> • Procedural compliance. • MSL MSIV position indication shows valves OPEN. 3. Measured by: <ul style="list-style-type: none"> • The RO places B21-F022A (C, D) Control Switch in CLOSE. • The RO places B21-F028A (C, D) Control Switch in CLOSE • The RO places N11-F020C Control Switch in CLOSE 4. Feedback: <ul style="list-style-type: none"> • Main Steam Line Tunnel temperature trend • MSIV valve position indications. • MSL Shutoff valve position indication.
		<p>NOTE: RPV pressure lowering to < 370 psig in ≤1 hour will exceed 100 °F/hr. cooldown rate.</p>

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Event Description: Critical Task #2

Time	Position	Applicant's Actions or Behavior
		<p>When Suppression Pool level cannot be maintained above 14.25 feet the US determines that Emergency Depressurization is required, RO initiates Emergency Depressurization as directed by US.</p> <ol style="list-style-type: none"> 1. Safety Significance: <ul style="list-style-type: none"> Precludes failure of Containment. 2. Cues: <ul style="list-style-type: none"> Procedural compliance. Suppression Pool level trend. 3. Measured by: <ul style="list-style-type: none"> Observation - US determines (indicated by announcement or observable transition to EOP-04-2) that Emergency Depressurization is required before Suppression Pool level drops below 14.25 feet. <u>AND</u> Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions. 4. Feedback: <ul style="list-style-type: none"> RPV pressure trend. Suppression Pool temperature trend. SRV status indication.

