Facility**:** **Perry**   Scenario No**.: 1-93%**   Op-Test No**.: 2013-01**

Examiners:	Operators:	SRO
		ATC
		BOP

Initial Conditions: Reactor power was lowered to ~93% power two hours ago for Quarterly Turbine Stop and Control Valve SVI (which was just completed last shift). M29 Boiler is out of service for repair. NCC B pump is OOS to replace motor. IOI-3 Attachment 3 at Step 2.0. Rods at Step 69. A Severe Thunderstorm Watch is in effect for Lake County. Not in ONI-ZZZ-1, but doing ONI walkdowns. PSA Risk is Green. Grid is Normal.

Turnover: Start ECC B pump for vibration testing (Maintenance Engineering is waiting). When concurrence granted from WCC, restore Rx Power per IOI-3 to 100%.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP/ SRO)	Start ECC B pump
2		R (ATC/ SRO)	Raise Rx power with flow to 100%
3	CP03_1P4 2C0001B	C (BOP) C (SRO)	ECC B Pump slow degradation, Enter TS 3.7.10
4	B21n0073g	C (BOP) C (SRO)	Small OBE Earthquake. Enter ONI-D51 Earthquake Inadvertent HPCS initiation. Enter ONI-E12-1 Inadvertent Initiation of ECCS or RCIC. Enter ONI-C51 on HPCS injection. Enter T.S. 3.5.1
5		M (ALL) C (BOP/ SRO) R (ATC/ SRO)	Large OBE Earthquake causes failure of SJAE (H2 recombiner leak). Enter ONI-D51, ONI-D17 & ONI-N11 Lower Rx power with Flow then insert manual Rx scram
6	Zd1c71s1	C (ATC/ SRO)	Earthquake causes loss of RPV Level Indication (L8) resulting in loss of FW & HPCS. Enter EOP-1 RPV control. Mode switch fails. (A&D Manual P/B's works)
7	Rv04_1b21 f0051c	C (BOP/ SRO)	Enter EOP-04-4 RPV Flooding ADS SRV fails to open.

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

Op-Test No.: 2013-01	Scenario No.: 1 – 93%	Page 1 of 16
Event Description: N/A - Driver Instructions		
Cue:		

Time	Position	Applicant's Actions or Behavior

Driver	**Driver**	Simulator Setup:
		
		Reset Simulator to IC 90
		
		Load Schedule File: NRC 2013 Scen 1.sch
		
		Verify Schedule File Loaded: ECC_B_Pump_failure.sch
		                                  loss_level-min.sch
		                                  seismic_Hi-OBE.sch
		                                  seismic_Low-OBE.sch
		                                  SJAE-Failure.sch
		                                  SJAE-Fix.sch
		                                  NRC-13_info.sch
		
		Verify Event File Loaded: NRC 2013 Scen 1.evt
		
		Verify APRM gains are adjusted and recorders in SLOW speed
		
		Verify temporary Recirc placard is removed from P680.

		Note: All Schedule files and Event files should be in the respective EXAM folder.
Driver	**Driver**	**Verify** Initial Conditions: Reactor Power 93%. BOL Pull Sheets, Rods @ Step 69. IOI-3 Attachment 3 Power Maneuvering. Place yellow switch cap on NCC B pump control switch. PSA - Green Risk. Grid - Normal
Driver	**Driver**	Turnover: Reactor power was lowered to ~93% power two hours ago for Quarterly Turbine Stop and Control Valve SVI (which was just completed last shift). M29 Boiler is out of service for repair. NCC B pump is OOS to replace motor. IOI-3 Attachment 3 at Step 2.0. Rods at Step 69. A Severe Thunderstorm watch is in effect for Lake County. Not in ONI-ZZZ-1, but doing ONI walkdowns. Start ECC B pump for vibration testing then notify Maintenance Engineering (Jeff Reeves. When concurrence granted from WCC, restore Rx Power per IOI-3 to 100%.

Op-Test No.: 2013-01		Scenario No.: 1 – 93%	Page 2 of 16
Event Description: 1 - Start ECC B pump			
Cue: From Turnover – SRO direction			

Time	Position	Applicant's Actions or Behavior	
Driver	**Driver**	Role play as NLO, Chemistry and Maintenance Engineering as necessary to support ECC B startup.	
	SRO	Ensures plant operations are conducted IAW Operations Expectations and Standards.	
	SRO	Directs BOP to start ECC B pump IAW SOI-P42.	
	Driver	If asked to walkdown pump, respond, "Pump is ready for a start, oil level in bubbler is sat."	
	BOP	Starts ECC B pump IAW SOI-P42	
		SOI-P42 Sect 4.4 ECC Loop Manual Startup	
	Driver	If asked, ESW not required	
	BOP	4.4.1 IF required, THEN REFER TO SOI-P45/49, ESW Loop A(B) Manual Startup from Standby Readiness and STARTUP the ESW Loop.	
		4.4.2 TAKE the oncoming ECC PUMP control switch to START. 1P42-C001B	
		4.4.3 NOTIFY Chemistry to sample as required.	
		4.4.4 IF the Combustible Gas Control System Hydrogen Analyzer is in service OR standby, THEN VERIFY the following valves are open:	
		COMB GAS H2 ANAL OUTLET CLG VLV 1M51-F260B	
		COMB GAS H2 ANAL INLET CLG VLV 1M51-F270B	
	BOP	Informs SRO that ECC B pump startup is complete	
		Notifies Maintenance Engineering that ECC B pump is started.	
Driver	**Driver**	While BOP is performing ECC B pump start, call as Wadsworth Dispatcher and inform operator that power can now be raised to 100%	

Op-Test No.: 2013-01		Scenario No.: 1 – 93%	Page 3 of 16
Event Description: 2 - Raise Rx power with flow to 100%			
Cue: Call from Wadsworth Dispatcher			

Time	Position	Applicant's Actions or Behavior
	SRO	Directs ATC to raise power to 100% using flow IAW Reactivity Plan, IOI-3, and SOI-B33
	ATC	Commences raising reactor power to 100%
		SOI-B33 Sect 7.7 Rcirc Flow Control in Loop Manual
		7.7.1 CONFIRM RCIRC LOOP FLOW CONTROL is in MAN. 1B33-K603A
		7.7.2 CONFIRM RCIRC LOOP FLOW CONTROL is in MAN. 1B33-K603B
		7.7.3 PERFORM the following concurrently as required for the desired Recirc Flow:
		ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. 1B33-K603A
		ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. 1B33-K603B
	Driver	Role play as necessary as Shift Manager, Chemistry, RP, etc.
	Evaluator	Note: It takes almost 2 minutes from the time the next Event is triggered until the first alarm comes in.
Driver	**Driver**	When Power is restored to 100% or Evaluator has determined sufficient power increase has been achieved, proceed to next Event.

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Event Description: 3 - ECC B Pump slow degradation, Enter TS 3.7.10

Cue: Annunciator H13-P601-17A-C6

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed, initiate Event 3.
	BOP	Respond to annunciator H13-P601-17A-C6, ECC PUMP B DISCHARGE PRESSURE LOW
	BOP	Direct NLO to investigate ECC B pump.
	Evaluator	NOTE: If ECC not S/D within 5 minutes, the ECC HX B OUTLET FLOW LOW alarm is also received.
	Driver	Role play as NLO to investigate ECC B pump. Report pump is making abnormal noise and is vibrating more than normal.
	BOP	Report ECC parameters and NLO findings to SRO.
	SRO	Direct shutdown on ECC B pump Evaluate Tech Spec 3.7.10 for 1 ECCW Subsystem INOP and OAI-1701 to ensure appropriate actions taken. (T.S. 3.7.10 Cond A, 3.4.9 RHR Hot Shutdown, 3.5.1 RHR "B" and "C", 3.6.1.7 Cntmt Spray, 3.6.2.3 SP Cooling, P47B, 3.6.3.3 Comb Gas Mixing, 3.7.4 CR HVAC, M23/24 B, M28B, ORM 6.2.21 H2 Analyzer).
	Driver	NOTE: Remote function HV39 can be used to secure the ECC "B" Pump Area Ventilation fan.
	BOP	Secures ECC B pump IAW SOI-P42
	BOP	6.1.1 IF shutting down ECC Loop (B) to Standby Readiness, THEN CONFIRM the following automatic initiation signals are reset: • RHR LOCA Initiation • RCIC initiation (ECC loop A only) • LOOP initiation 6.1.3 IF shutting down ECC Loop B to standby readiness, THEN PERFORM the following 6.1.3.a VERIFY the following: • RHR Pump B is shutdown in accordance with SOI-E12. • RHR Pump C is shutdown in accordance with SOI-E12. • RHR B Room Cooler is shutdown in accordance with SOI-M39. • RHR C Room Cooler is shutdown in accordance with SOI-M39. • CCCW Chiller B is shutdown in accordance with SOI-P47. 6.1.5 CONFIRM the offgoing ECC HX OUT TEMP is > 60°F. P42-R052B

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Event Description: 3 - ECC B Pump slow degradation, Enter TS 3.7.10

Cue: Annunciator H13-P601-17A-C6

Time	Position	Applicant's Actions or Behavior

	BOP	6.1.6 TAKE the offgoing ECC PUMP control switch to STOP. 1P42-C001B
		
		6.1.7 IF the H2 Analyzer is required to remain in service OR standby by an approved instruction or Notification, THEN VERIFY the following valves are open:
		    • COMB GAS H2 ANAL OUTLET CLG VLV 1M51-F260A 1M51-F260B
		    • COMB GAS H2 ANAL INLET CLG VLV 1M51-F270A 1M51-F270B
		
		6.1.8 REFER TO SOI-M28, Emergency Closed Cooling Pump Area Cooling System and PERFORM Shutdown to Standby Readiness.

	BOP	Informs Crew that ECC B pump is secured. Directs NLO to shutdown ECC B pump area ventilation.
	Evaluator	SRO may direct ECC B pump to be shutdown to secured status.
	RO	Shutdown ECC B pump to secured status as directed.
Driver	**Driver**	If directed to rack-out breaker EF1D04 for ECC B pump, wait 10 minutes then use Remote Function SW058 to rack-out breaker.
Driver	**Driver**	When directed, proceed to the next Event.

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Event Description: 4 - Small OBE Earthquake. Enter ONI-D51 Earthquake, Inadvertent HPCS initiation. Enter ONI-E12-1 Inadvertent Initiation of ECCS. Enter ONI-C51 on HPCS injection.

Cues: ONI-D51→ Annunciator H13-P680-8A B3 & C3
ONI-E12-1→ Annunciator H13-P601-16A-C5
ONI-C51 → Annunciator H13-P680-3A-A9

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed, initiate Event 4.
	Driver	**Immediately** following initiation of Event 4, call as plant personnel and report the occurrence of an earthquake. Role play as plant personnel to support crew activities.
	Crew	Crew responds to alarms / recognizes seismic event and inadvertent initiation of HPCS.
	SRO	Announces entry into ONI-E12-1 and ONI-D51. If HPCS injected into RPV and Rx power changed, announce entry into ONI-C51.
	BOP	Overrides HPCS pump to OFF after US concurrence.
	BOP	Investigates H13-P969 for seismic alarms and reports discovery of 1 Red and multiple Amber seismic lights.
	SRO	Directs ONI-E12-1 and ONI-D51 Supplemental Actions or assigns owner.
	BOP	Performs ONI-E12-1 Supplemental Actions, including – verify closed HPCS injection valve, 1E22-F004
	BOP	Performs ONI-D51 Supplemental Actions, including – Attachments 1, 2 & 3.
Driver	**Driver**	NOTE: If asked to investigate, the EVENT INDICATOR flag on H51-P021 is white, and the SEISMIC SWITCH YELLOW light is illuminated on H51-P021.
	SRO	If power change (HPCS injection) observed, enter ONI-C51 flow chart.
		Directs actions IAW ONI-C51 flowchart.
		Directs normal plant shutdown per IOI-3 as directed by ONI-D51 Step 4.5.1
		Directs RO's to perform other time sensitive ONI-D51 Supplemental Actions
		Evaluates T.S. for INOPERABILITY of HPCS per Technical Specifications 3.5.1, 3.3.5.1, 3.3.6.1, & ORM 6.2.7 (Seismic Monitoring)
Driver	**Driver**	When directed, proceed to next Event.

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Event Description: 5 - Large OBE Earthquake causes failure of SJAE. Enter ONI-D51, ONI-D17 & ONI-N11, Mode Switch failure

Cue: Annunciators H13-P680-3A-C6 & C7 (ONI-D51)
   Annunciators H13-P680-4A-E2 & E11 (ONI-D51)
   Red and Amber lights illuminated on H13-P969 (ONI-D51)
   Annunciators H13-P680-7A-A9 & A11 (ONI-D17)
   Annunciator H13-P845-E5

Time	Position	Applicant's Actions or Behavior
	Evaluator	NOTE: Mark time of initiation of Event 5 _____ and mark time of closure of 1N62-F020A _____for evaluation of critical task. Duration should not exceed 15 minutes.
Driver	**Driver**	When directed, initiate Event 5.
Driver	**Driver**	**Immediately** following initiation of Event 5, call as plant personnel and report the occurrence of an earthquake. Role play as plant personnel to support crew activities.
	Crew	Responds to field report of second earthquake.
	Crew	Responds to Offgas / Radiation alarms and informs Unit Supervisor of earthquake and Offgas/SJAE problem.
	Evaluator	NOTE: Closing 1N62-F020A, MN STEAM TO SJAE SUPPLY will isolate the leak. This will also require a Rx shutdown as Main Condenser vacuum will be lost.
Driver	**Driver**	Verify Event 18 initiates when 1N62-F020A is taken to CLOSE
Driver	**Driver**	NOTE: If crew fails to close 1N62-F020A, but the MSIV's close, then initiate Event 18 manually.
	Evaluator	NOTE: Actions to isolate SJAEs are specific in ONI-D17 and ONI-D51 rather than general in ONI-N11. Therefore, US may not enter ONI-N11.
	SRO	Announces entry into ONI-D51, ONI-D17, and ONI-N11.
	BOP	Performs IMMEDIATE ACTIONS of ONI-D17 & ONI-N11: (Evacuate the area).
	SRO	Directs Supplemental Actions of ONI-D51, ONI-D17, and ONI-N11
	BOP	Performs Supplemental Actions ONI-D51, ONI-D17, and ONI-N11
	SRO	Directs RO to isolate steam to SJAE IAW ONI-D17 or ONI-D51 **(Critical Task #1)**
	BOP	Isolates steam to SJAE. **(Critical Task #1)**
	SRO	Directs ATC to Close both RCIRC Loop Flow Control Valves simultaneously until total core flow is approximately 58 Mlbm/hour and insert a manual scram per ONI-D17 or D51 supplemental actions
	ATC	Closes both RCIRC Loop Flow Control Valves simultaneously until total core flow is approximately 58 Mlbm/hour and inserts a manual scram per ONI-D17 or D51 supplemental actions.

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Event Description: 5 - Large OBE Earthquake causes failure of SJAE. Enter ONI-D51, ONI-D17 & ONI-N11, Mode Switch failure

Cue: Annunciators H13-P680-3A-C6 & C7 (ONI-D51)
      Annunciators H13-P680-4A-E2 & E11 (ONI-D51)
      Red and Amber lights illuminated on H13-P969 (ONI-D51)
      Annunciators H13-P680-7A-A9 & A11 (ONI-D17)
      Annunciator H13-P845-E5

Time	Position	Applicant's Actions or Behavior
	ATC	Recognizes failure to scram from Mode Switch and initiates RPS. Determines RPS pushbutton actuation successful in inserting all control rods.
		Performs SCRAM Hardcard actions: Verify the following actions are complete: • Mode Switch Locked in Shutdown • RPS Initiated if all control rods are not fully inserted. • ARI Initiated if RPS failed to Scram the reactor.
		If Reactor Recirc Pumps are running in fast speed: Then simultaneously take the following to XFER: • RECIRC PUMP A BRKR 5A • RECIRC PUMP B BRKR 5B
		IF Reactor power is above 4%, THEN START SLC A and SLC B pumps.
		Perform crew update with the following information: • "The Mode Switch is locked in Shutdown" (Report any failures) • If RPS was initiated, the RPS is initiated (Report any failures) • If ARI was initiated, then ARI is initiated (Report any failures) • "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) • Standby Liquid Control System Initiated (only if manually initiated) • EOP-01 Entry (only if conditions met): L2, Rx Press Hi, RPS Failure • If MSIVs are closed, then a Time Critical Operator Action for Suppression Pool Cooling is applicable.
	Evaluator	ATC should report EOP-1 Entry on RPS (Mode Switch) failure

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Event Description: 5 - Large OBE Earthquake causes failure of SJAE. Enter ONI-D51, ONI-D17 & ONI-N11, Mode Switch failure

Cue: Annunciators H13-P680-3A-C6 & C7 (ONI-D51)
     Annunciators H13-P680-4A-E2 & E11 (ONI-D51)
     Red and Amber lights illuminated on H13-P969 (ONI-D51)
     Annunciators H13-P680-7A-A9 & A11 (ONI-D17)
     Annunciator H13-P845-E5

Time	Position	Applicant's Actions or Behavior
	ATC	When generator load less than 90 MWe, then perform the following: a) TRIP the main turbine by depressing the TURBINE TRIP push-button. b) VERIFY the following have occurred: • MAIN STOP VALVEs, CONTROL VALVEs and COMBINED INTERMEDIATE VALVEs are shut. • GEN BRKRs S-610-PY-TIE and S-611-PY-TIE open • GEN FIELD BREAKER
		Insert Nuclear Instruments, • SRMs • IRMs • Place recorders in IRM (leave A or E in APRM for digital display)
		Verify HST Lvl CV Manual Control, N21-S19, in OFF
		STABILIZE reactor water level. a) Feedwater (REFER TO FEEDWATER HARDCARD) b) RCIC c) RPV
		STABILIZE reactor pressure: a) Turbine/Turbine Bypass valves (REFER TO PRESSURE CONTROL HARDCARD) b) SRVs • Evacuate Containment • REFER TO PRESSURE CONTROL HARDCARD • Evaluate placing RCIC in Pressure Control Mode
	SRO	Enters EOP-1 RPV Control on RPS failure (Mode Switch failure)
		Announces entry into EOP-1

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Event Description: 5 - Large OBE Earthquake causes failure of SJAE. Enter ONI-D51, ONI-D17 & ONI-N11, Mode Switch failure

Cue: Annunciators H13-P680-3A-C6 & C7 (ONI-D51)
     Annunciators H13-P680-4A-E2 & E11 (ONI-D51)
     Red and Amber lights illuminated on H13-P969 (ONI-D51)
     Annunciators H13-P680-7A-A9 & A11 (ONI-D17)
     Annunciator H13-P845-E5

Time	Position	Applicant's Actions or Behavior
	SRO	Directs ATC to: • Monitor and Control Reactor Power • Stabilize Reactor Water Level • Stabilize Reactor Pressure
	SRO	Directs BOP to verify Isolations and Actuations
	BOP	Verifies Isolations and Actuations using Hardcards.
	Driver	Event 6 will be automatically triggered after the Mode Switch is taken to Shutdown

Op-Test No.: 2013-01	Scenario No.: 1 – 93%	Page 11 of 16
Event Description: 6 - Earthquake causes loss of RPV Level Indication (L8) resulting in loss of FW & HPCS. Enter EOP-1 RPV control.		
Cue: Level indicators peg high or low and SPDS validated level is magenta		

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	Event 6 is triggered in Event 5 when Mode Switch is taken to Shutdown
	Evaluator	A sequential loss of level indication will occur, which results in loss of Feedwater and HPCS (Level 8 trips) and a failure of all ECCS systems to actuate and a loss of all level indication as shown by the magenta color of all level instruments on the SDS RPV Level Validation screen. (RLVLV)
	Crew	Identify RFPTs and MFP not operating, and HPCS has L8 signal. Identify Low Pressure ECCS will not initiate due to level indications.
	Crew	Makes determinations that RPV level cannot be determined due to a loss of RPV level instrumentation.
	SRO	Announces entry into EOP-04-4, RPV Flooding
	SRO	Announces entry into EOP-2 on rising DW Temperature/Pressure
	Driver	Transition to Event 7 will occur when SRO announces entry into EOP-04-4.

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Event Description: 7 - Entry into EOP-04-4 RPV Flooding/ADS SRV fails to open

Cue:

Time	Position	Applicant's Actions or Behavior
	Driver	Transition to Event 7 will occur when SRO announces entry into EOP-04-4.
	SRO	Announces entry into EOP-04-4, RPV Flooding
		Directs RO to verify Suppression Pool is above 5.25 feet.
	RO	Verifies Suppression Pool is above 5.25 feet and informs SRO.
	SRO	Directs BOP to open 8 ADS valves. **(Critical Task 2)**
	BOP	Opens 8 ADS valves, determines by indication that 1B21-F051C failed to open. Notifies SRO that 1B21-F051C failed to open.
	SRO	Directs BOP to open additional SRV's to get 8 SRV's open and Bypass Instrument Air isolation per EOP-SPI-2.8. **(Critical Task 2)**
	BOP	Opens another SRV to obtain 8 open SRVs and notifies SRO of valves status. **(Critical Task 2)** • Bypass Instrument Air isolation per EOP-SPI-2.8
	SRO	Directs BOP to start • Hydrogen Analyzers • Hydrogen Igniters

	SRO	Directs Crew to coordinate to determine when RPV level is above the Main Steam lines (using OAI-1703 Attachment 3, Level Above Main Steam Lines) and once achieved to:
		
		1. Isolate all steam line
		
		    • MSIVs
		
		    • Main Steam Line Drains
		
		    • RCIC Steam Isolations
		
		2. Control injection into the RPV to maintain steam lines flooded with injection as low as practical.

		Directs ATC to inject to establish RPV level above the Main Steam Lines using system available from EOP-04-4 table (RF-6)
	RO	Injects water into RPV to establish RPV level above Main Steam Lines using system available from EOP-04-4 table (RF-6) **(Critical Task #3)**
	Evaluator	Scenario can be terminated when RPV level is above main steam lines.

Op-Test No.: 2013-01		Scenario No.: 1 – 93%	Page 13 of 16
Event Description: Scenario Termination Criteria			
Cue:			

Time	Position	Applicant's Actions or Behavior
		1. Reactor depressurized.
		2. Inject water to maintain Main Steam Lines flooded.

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Event Description: Critical Task #1 - With the failure of a SJAE discharge line, take action to manually isolate Main Steam to the SJAE's.

Cue:

Time	Position	Applicant's Actions or Behavior
		Within 15 minutes following a loss of flow in Offgas due to a SJAE discharge line failure, isolate Main Steam to the SJAE's. 1. Safety Significance: • Isolating high energy sources can preclude failure of secondary equipment, injury to plant personnel, and subsequent radiation release to the public. 2. Cues: • Procedural compliance. • Area temperature indication. • Area radiation levels 3. Measured by: • The RO places MN STEAM TO SJAE SUPPLY valve, 1N62-F020A (B) Control Switch in CLOSE. 4. Feedback: • Area temperature trend. • Area radiation level trend. • valve position indications

Op-Test No.: 2013-01		Scenario No.: 1 – 93%	Page 15 of 16
Event Description: Critical Task #2 - When RPV water level cannot be determined, initiate Emergency Depressurization.			
Cue:			

Time	Position	Applicant's Actions or Behavior

		When RPV water level cannot be determined, initiate Emergency Depressurization.
		
		1. Safety Significance:
		
		    • Precludes fuel damage by establishing adequate core cooling.
		
		2. Cues:
		
		    • Procedural compliance.
		
		    • Loss of all level indication.
		
		3. Measured by:
		
		    • Observation - At least 2 SRV's are open when RPV water level cannot be determined.
		
		4. Feedback:
		
		    • RPV pressure trend.
		
		    • Suppression Pool temperature trend.

Op-Test No.: 2013-01		Scenario No.: 1 – 93%	Page 16 of 16
Event Description: Critical Task #3 - With reactor water level unknown, inject into RPV to establish RPV level above the MSL's.			
Cue:			

Time	Position	Applicant's Actions or Behavior

		With reactor water level unknown, inject into RPV to establish RPV level above the MSL's.
		
		1. Safety Significance:
		     • Prevent fuel damage by establishing and maintaining adequate core cooling.
		
		2. Cues:
		     • Procedural compliance.
		     • RPV water level unknown.
		
		3. Measured by:
		     • Observation - RPV level established and controlled above the MSL's (10 psig increase in RPV pressure, ADS SRV tailpipe temperature decreasing).
		
		4. Feedback:
		     • RPV pressure trend.
		     • SRV tailpipe temperature trend.

Facility**:**	**Perry**	Scenario No**.: 2- 100%**	Op-Test No**.: 2013-01**

Examiners: _____   Operators: _____ SRO

     _____   _____ ATC

     _____   _____ BOP

Initial Conditions: Reactor is at full power. RHR B was tagged out of service yesterday for valve work. RHR C breaker was racked out late last shift due to observation of nicked control power wire in breaker cubicle. TS 3.5.1 Condition C was entered 2 hours ago. Efforts are in progress to restore RHR B or C to Operable status. M29 Boiler is out of service for repair. SWC B pump is OOS due to high vibrations – awaiting new motor. IOI-3 Section 4.5 is complete, rods at Step 69. Unusually low ambient temperatures are predicted for today. Very low load on grid today.

Turnover: Shift TBCC pumps to equalize run time. When concurrence granted from WCC and Plant Manager, commence Rx Power reduction per IOI-3 for low grid load.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP/ SRO)	Shift TBCC pumps
2		R (ATC/ SRO)	Lower Rx power with flow
3	Cb01_1n21 c0002b	C (ATC/ SRO)	Condensate booster pump B trip
4	CP03_0P4 3C0001B	C (BOP/ SRO)	NCC B Pump degradation / trip. Enter ONI-P43
5	RP01A	C (BOP) C (SRO)	Loss of RPS Bus A. Enter ONI-C71-2 Enter ORM 6.3.1 Testing Requirement 5
6		M (ALL) C (BOP) C (SRO)	Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A Enter T.S. 3.6.1.3
7	TH25 MS01A & MS01E	C (BOP/ SRO)	SRV failure to open during manual operations while controlling Rx pressure with SRVs.
8			Emergency Depressurization on lowering Rx level – EOP-4-2

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

Op-Test No.:	Scenario No.: 2 – 100%	Page 1 of 25
2013-01		

Event Description: N/A - Driver Instructions

Cue: None

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	Simulator Setup: Reset Simulator to IC 91 Load Schedule File: NRC 2013 Scen 2.sch Verify Schedule Files Loaded: Loss_of_FW.sch NRC-13_info.sch Verify Event File Loaded: NRC 2013 Scen 2.evt Verify temporary Recirc placard is removed from P680.
Driver	**Driver**	**Verify** Initial Conditions: Reactor Power 100%. BOL Pull Sheets, Rods @ Step 69. IOI-3 Step 4.5 is complete. M29 Boiler is out of service for repairs. Place yellow switch cap on RHR B, SWP B and SWP B discharge valve. PRA Risk: Yellow due to RHR B and C being Inoperable. Verify Traffic Light changed to Yellow. Grid Risk: Green
Driver	**Driver**	Turnover: Reactor is at full power. RHR B was tagged out of service yesterday for valve work. RHR C breaker was racked out late last shift due to observation of nicked control power wire in breaker cubicle. TS 3.5.1 Condition C was entered 2 hours ago. Efforts are in progress to restore RHR B or C to Operable status. M29 Boiler is out of service for repair. SWC B pump is OOS due to high vibrations – awaiting new motor. IOI-3 Section 4.5 is complete, rods at Step 69. Unusually low ambient temperatures are predicted for today. Very low load on grid today. Shift TBCC pumps from A to B to equalize run times. When concurrence granted from WCC and Plant Manager, commence Rx Power reduction per IOI-3 for low grid load.

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Event Description: 1 - Shift TBCC pumps		
Cue: From Turnover/SRO direction		

Time	Position	Applicant's Actions or Behavior
00:00	SRO	Directs BOP to shift TBCC pumps IAW SOI-P44 Section 7.2
	SRO	Ensures plant operations are conducted IAW Operations Expectations and Standards.
	BOP	Reviews SOI-P44 and performs TBCC pump shift
		7.2.1 TAKE the oncoming TBCC PUMP to START. 1P44-C001B 7.2.2 TAKE the offgoing TBCC PUMP to STOP. 1P44-C001A
		Observes 'B' TBCC pump discharge pressure rise prior to stopping 'A' TBCC.
	Driver	Role play as NLO, communicate with BOP during pump shift
	BOP	Inform SRO that TBCC pump shift is complete
	Driver	When BOP is ~95% complete with TBCC pump shift, or when directed by the Lead Examiner, continue on to the next Event.

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Event Description: 2 - Lower Reactor power with flow

Cue: From Turnover/SRO direction

Time	Position	Applicant's Actions or Behavior
00:00	**Driver**	When directed by Lead Examiner, inform the Unite Supervisor that WCC and the Plant Manager have authorized a power reduction to 95% due to low loading on the grid.
	SRO	Directs ATC to lower power to 95% using flow IAW Reactivity Plan, IOI-3, and SOI-B33
	ATC	Commences lowering reactor power to 95%
		SOI-B33 Sect 7.7 Rcirc Flow Control in Loop Manual
		7.7.1 CONFIRM RCIRC LOOP FLOW CONTROL is in MAN. 1B33-K603A 7.7.2 CONFIRM RCIRC LOOP FLOW CONTROL is in MAN. 1B33-K603B 7.7.3 PERFORM the following concurrently as required for the desired Recirc Flow: ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. 1B33-K603A ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. 1B33-K603B
	Driver	Role play as necessary as Shift Manager, Chemistry, RP, etc.
	Evaluator	Note: It takes almost 2 minutes from the time the next Event is triggered until the first alarm comes in.
	Driver	When Power is lowered to 95% or Evaluator has determined sufficient power decrease has been achieved, proceed to next Event.

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Event Description: 3 - Condensate Booster pump B trip

Cue: Annunciator H13-P680-2A-B6

Time	Position	Applicant's Actions or Behavior
	Driver	When directed by Lead Examiner, initiate Event 3.
	Evaluator	ATC has approximately 3.5 minutes before HST level lowers to 60". Starting the 2nd Condensate Booster pump will stop level lowering and restore HST level.
	ATC	Announce H13-P680 unexpected annunciators. Observe alarms, CBP breaker status lights, and discharge pressure meters on P680 and determines CBP "B" has tripped. Informs crew of CBP B trip.

		Refers to ARI and starts standby CBP IAW Subsequent Actions:
		   4.1 IF the turbine has NOT tripped, THEN start the standby CBP,
		       1N21-C002C
		   4.2 MONITOR HOT SURGE TANK LEVEL & CNDS TO HTR 4 FLOW.
		       1N21-R323
		   4.3 IF required, THEN REDUCE reactor power to stabilize Hot Surge Tank
		       level. 1N21-R323
		   4.4 MAINTAIN motor current <353 amps. (1N21-C001A & 1N21-C001C)

		Informs US of CBP "B" start – completion of ARI steps 4.1, 4.2 and 4.4
Driver	**Driver**	If requested respond as NLO to breaker H1205. Report that Overcurrent Relays for the breaker are tripped.
Driver	**Driver**	If requested to respond as NLO to the pumps – report that nothing appears abnormal for B pump, and that start-up of the C pump appears normal.
Driver	**Driver**	If requested to respond as NLO to Condensate Filter System – High Differential Pressure alarm – reset on Acknowledgement (Use Extreme View to acknowledge local alarms)
Driver	**Driver**	When ATC is complete with CBP pump shift, or when directed by the Lead Examiner, continue on to the next Event.

Event Description: 4 - NCC pump degradation / trip. Enter ONI-P43

Cue: Annunciators H13-P680-8A-B4 & H13-P970-B1

Time	Position	Applicant's Actions or Behavior
	Driver	When directed by Lead Examiner, initiate Event 4**.**
	ATC	Announces Unexpected Alarm, "COM LONG RESPONSE P970". (H13-P680-8A-B4)
	BOP	Responds to H13-P970 annunciators and NCC header discharge pressure and determines that NCC pump B is degrading.
		Informs crew of NCC Pump B degradation.
		Refers to ARI and announces entry condition for ONI-P43.
		4.1 REFER TO ONI-P43, Loss of Nuclear Closed Cooling. 4.2 VERIFY the NCC Pump Suct valve for the operating NCC Pumps are open.
		Directs NLO to verify NCC B Pump Suct valve is open
Driver	**Driver**	Role play as NLO. If sent to investigate NCC pump B, report abnormal noise and vibration
	SRO	Enters ONI-P43, Loss of Nuclear Closed Cooling
		Directs BOP to perform Supplemental Actions of ONI-P43
	Crew	ONI-P43 4.1.1 IF only ONE NCC pump is running AND a standby NCC pump is available, THEN REFER TO SOI-P43 and START the standby NCC pump.
	BOP	Directs NLO to support shifting of pumps.
	BOP	Refer to SOI-P43 and performs sections 7.1, 4.2 and 6.1 of the operating instruction. 7.1 Shifting NCC Pumps 7.1.1 REFER TO Additional NCC Pump Startup and START the standby pump. 7.1.2 REFER TO NCC Pump Shutdown and STOP one of the running pump. 4.2 Additional NCC Pump Startup 4.2.1 THROTTLE the oncoming NCC Pump Disch 10% open. P43-F513C 4.2.2 TAKE the oncoming NCC PUMP control switch on Common Long Response Control Panel H13-P970 to START. P43-C001C 4.2.3 OPEN the oncoming NCC Pump Disch. P43-F513C 4.2.4 VERIFY NCC HDR PRESSURE on P970 stabilizes between 94 – 123 psig. P43-R221

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Event Description: 4 - NCC pump degradation / trip. Enter ONI-P43

Cue: Annunciators H13-P680-8A-B4 & H13-P970-B1

Time	Position	Applicant's Actions or Behavior
	BOP	6.1 <u>NCC Pump Shutdown</u> CAUTION Operation of the NCC Pump with its discharge valve < 10% open should be minimized to prevent pump damage. 6.1.1 SLOWLY CLOSE the desired NCC Pump Disch. P43-F513B 6.1.2 IMMEDIATELY TAKE the offgoing NCC PUMP control switch on H13-P970 to STOP. P43-C001B 6.1.3 OPEN the offgoing NCC Pump Disch. P43-F513B 6.1.4 VERIFY proper discharge check valve operation by confirming no indication of reverse pump rotation.
Driver	**Driver**	Role play as NLO to support shifting NCC pumps. Use Remote Function SW016 to throttle/open P43-F513C. Use Remote Function SW015 to close/open P43-F513B.
Driver	**Driver**	If requested report that there is no indication of reverse pump rotation on the NCC B pump.
Driver	**Driver**	When the pump shift is complete, or when directed by the Lead Examiner, initiate Event 5.

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Event Description: 5 - Loss of RPS Bus A. Enter ONI-C71-2. Enter ORM 6.3.1 Testing Requirement 5

Cue: RPS CH SCRAM SOL VALVES indicating lights not lit for GP 1A, 2A, 3A and 4A

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed by Lead Examiner, insert Event 5.
	ATC	Announces multiple unexpected alarms. Responds to multiple Annunciators and the RPS CH SCRAM SOL VALVES indicating lights not lit for Gp 1A, 2A, 3A and 4A. Reports ½ scram RPS A bus
Driver	**Driver**	Role play as NLO. If requested to investigate RPS electrical power, report that 1C71-S003A breaker has green indicating light on, and 1C71-S001A has a red indicating light on.
	SRO	Enter ONI-C71-2, Loss of One RPS Bus.
	SRO	Direct BOP to re-energize RPS Bus A per ONI-C71-2, Supplemental Actions
	BOP	Co-ordinate with ATC and re-energize RPS Bus A per ONI-C71-2. MG SET TRANSFER switch is in NORM RPS Bus A GEN ALT AVAIL light on THEN PLACE the MG SET TRANSFER switch in RPS Bus A Alternate Source on P640. (1C71-S1)
	SRO	Direct ATC to reset ½ Scram per SOI-C71. Direct BOP to reset/restore isolations per IOI-18.
		4.1.8 Refer to Technical Specifications - NOTE: Refer to ONI-C71-2 for multiple applicable Tech Spec/ORMs. Enter ORM 6.3.1 Testing Requirement 5
	ATC	Coordinate with BOP to Reset RPS per SOI-C71 Sect 7.4
	ATC	7.4.1 VERIFY the following: • The conditions which caused the full or half scram have cleared. • There is reasonable assurance that another scram signal will NOT be generated.
		7.4.4 MOMENTARILY DEPRESS the appropriate RPS division pushbuttons on P680: RPS A • SCRAM RESET CH A. 1C71A-S5A • SCRAM RESET CH B. 1C71A-S5C

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Event Description: 5 - Loss of RPS Bus A. Enter ONI-C71-2. Enter ORM 6.3.1 Testing Requirement 5

Cue: RPS CH SCRAM SOL VALVES indicating lights not lit for GP 1A, 2A, 3A and 4A

Time	Position	Applicant's Actions or Behavior
	ATC	7.4.7 VERIFY the following SCRAM DISCH VOL DRAIN VALVE lights are on at 1H13-P680: • INSTR VOLUME VENT VLV OPEN. • INSTR VOLUME DRAIN VLV OPEN.
		Inform US that ½ scram RPS A has been reset.
	BOP	Perform ONI-C71-2 Supplemental Actions
	BOP	ONI-C71-2 Supplemental Actions
		4.1.10 VERIFY all SRV control switches on P601 are in AUTO
		4.1.11 VERIFY all SRV control switches on P631 are in AUTO
		4.1.12 VERIFY GROSS/FAIL TRIP/LATCH lights are reset at the following panels: • 1H13-P692, • 1H13-P693, • 1H13-P691, • 1H13-P694
	Driver / Evaluator	If asked, the above gross fail light are reset.
	BOP	Inform SRO above actions are complete.
	BOP	4.1.13 REFER TO IOI-18 and RESTORE the following isolations as appropriate. • BALANCE OF THE PLANT ISOLATION (L2 /1.68#) RESTORATION
		4.1.16 If required then OPEN the MSL DRM & MSIV BYP OTBD ISOL B21F019.

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Event Description: 5 - Loss of RPS Bus A. Enter ONI-C71-2. Enter ORM 6.3.1 Testing Requirement 5

Cue: RPS CH SCRAM SOL VALVES indicating lights not lit for GP 1A, 2A, 3A and 4A

Time	Position	Applicant's Actions or Behavior
	Evaluator	Note: Restoration of isolations is not necessary and does not impact the remainder of this scenario.
	BOP	IOI-18 Actions
		Perform Attachment 33 - BALANCE OF THE PLANT ISOLATION (LEVEL 2 / 1.68#)
		1.0 CONFIRM the following alarms reset: • BOP ISOL DW PRESS HIGH H13-P601-19A-A6 • BOP ISOL RX LEVEL LO L2 H13-P601-19A-B6
		2.0 MOMENTARILY DEPRESS the following: • MSL & NS4 OTBD ISOL SEAL IN RESET. B21H-S32 • MSL & NS4 INBD ISOL SEAL IN RESET. B21H-S33
		4.0 IF restoring an outboard isolation (Division 1), THEN PERFORM the following: 4.1 VERIFY the following open: • SA SUPPLY HDR CNTMT ISOL. P51-F150 • CTS SUPPLY HDR CNTMT ISOL. P11-F060
		4.2 AT 1H13-P881, VERIFY the following are open: • PERS AL EL 603 OTBD ALRM ISOL P53-F070 • PERS AL EL 692 OTBD ALRM ISOL P53-F075 • PERS AL EL 692 SUPP AIR OTBD ISOL P52-F170 • PERS AL EL 603 SUPP AIR OTBD ISOL P52-F160 • DW EQUIP DRAIN OTBD DW ISOL G61-F035 • DW FLOOR DRAIN OTBD DW ISOL G61-F155 • CNTMT EQUIP DRAIN OTBD ISOL G61-F080 • CNTMT FLOOR DRAIN OTBD ISOL G61-F170 • RWCU BACKWASH OUT OTBD ISOL G50-F277 • MIXED BED WTR CNTMT SUPPLY ISOL P22-F010 • DW CO2 SUPPLY OTBD ISOL P54-F395
		4.3 VERIFY the valves closed: • PERS AL EL 603 INNER DR AEGTS ISOL P53-F035 • PERS AL EL 692 INNER DR AEGTS ISOL P53-F045
		4.4 IF the Containment Airborne Radiation Monitor was in service, THEN VERIFY the following valves open: • CNTMT RAD MON OTBD SUCT ISOL D17-F081A • CNTMT RAD MON OTBD DISCH ISOL D17-F089A

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Event Description: 5 - Loss of RPS Bus A. Enter ONI-C71-2. Enter ORM 6.3.1 Testing Requirement 5

Cue: RPS CH SCRAM SOL VALVES indicating lights not lit for GP 1A, 2A, 3A and 4A

Time	Position	Applicant's Actions or Behavior
	BOP	4.5 IF the Drywell Airborne Radiation Monitor was in service, THEN VERIFY the following valves open: • DW RAD MON OTBD SUCT ISOL D17-F071A • DW RAD MON OTBD DISCH ISOL D17-F079A
		5.0 IF Containment Vessel Chilled Water was in service, PERFORM the following: 5.1 AT H13-P800, VERIFY the following valves open: • CVCW OTBD SUPP ISOL VALVE P50-F060 • CVCW OTBD RETURN MOV ISOL VALVE P50-F150 • CVCW INBD RETURN MOV ISOL VALVE P50-F140
		5.2 REFER to SOI-P50 and SHIFT chillers.
		Direct an NLO to start a P50 chiller per SOI-P50 and SHIFT chillers.
		6.0 TAKE the following to closed at 1H13-P800: • DW VAL RLF MOV ISOL VALVE M16-F010A • DW VAL RLF MOV ISOL VALVE M16-F010B
		7.0 VERIFY the following are open at 1H13-P800: • CNTMT VAC RLF MOV ISOL VALVE M17-F015 • CNTMT VAC RLF MOV ISOL VALVE M17-F025 • CNTMT VAC RLF MOV ISOL VALVE M17-F035 • CNTMT VAC RLF MOV ISOL VALVE M17-F045
	Driver	When ½ isolation is reset, or when directed by the Lead Examiner, initiate Event 6

Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	Driver	When directed by Lead Examiner, initiate Event 6.
	ATC	Announce unexpected H13-P680 alarm. (ARI-H13-P680-7A-D6) Direct BOP to investigate alarm on P800.
	BOP	Report rising temperatures in Steam Tunnel Areas, including STEAM TUNNEL ZONE 3. May investigate NUMAC (E31-N700) to determine if rise in temperature are consistent with P800.
	SRO	Enters ONI-N11, Pipe Break Outside Containment as directed by ARI-H13-P680-7A-D6 Supplemental Action 4.3.
	RO	Perform ONI-N11 Immediate Action 3.1 EVACUATE unnecessary personnel from the applicable plant area(s).
	SRO	Directs BOP to perform ONI-N11 Supplemental Actions
	BOP	Perform ONI-N11 Supplemental Actions as time permits. 4.2 DISPATCH personnel to inspect the applicable plant area(s). 4.4 IF necessary, THEN REFER TO the applicable SOI and VERIFY proper ventilation system operation in the affected area. 4.6 IF there is any possibility of radioactive release due to the break, THEN REFER TO ONI-D17, High Radiation Levels Within Plant. 4.7 NOTIFY the PES Manager: • Of the pipe break. • To initiate a walk-down of the affected area(s).
	Driver / Evaluator	Role play as Shift Manager and PES Manager if requested.
Driver	**Driver**	As NLO, call control room and report hearing sound of steam leak.
	ATC	Announce unexpected alarm H13-P601-21A-B2, and potential entry condition for EOP-03
	SRO	Enter EOP-03 Secondary Containment Control
		Directs BOP to monitor Area Temperatures and Area Radiation levels. Directs ATC to monitor Area Water levels.

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	SRO	Works way down EOP-03 chart to HOLD box 'WHEN any area temperature entry condition is currently met THEN'.
	Evaluator	Annunciator H13-P601-21A-B2 is Entry Condition for EOP-03.
	BOP	Monitors area temperatures on NUMAC E31-N700A A6-2(T) using EOP-03 Conditions Monitoring Hardcard. Reports area above Entry Condition for steam tunnel.
	Evaluator	The transient will progress such that the MSIV closure event will occur before the crew is able to complete many of the following actions.
	Evaluator	When steam tunnel temperature reaches MSIV isolation setpoint, 3 of 4 MSL's will isolate and Rx will scram.
	SRO	Directs crew to Isolate all systems discharging into affected area except for systems required for the following: Shutdown the Reactor, Assure adequate core cooling, Damage control. (**Critical Task #1**)
		Determine if a Primary system is discharging into affected area.
		Before any area is above its Max SAFE condition, enter EOP-01, RPV Control and execute concurrently.
	ATC	Responds to new alarms on P680 and 601. Recognize reactor scram.
		Recognizes failure to scram and initiates RPS and ARI. (**Critical Task #2**)
	CREW	Recognize MSIV isolation & failure of MSL 'A' to isolate.
	RO	Isolate MSL A and reports to SRO (**Critical Task #1**)
	SRO	Evaluate TS 3.6.1.3
	Evaluator	Due to pace of scenario, TS evaluation should be done following scenario termination.

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3			
Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure			

Time	Position	Applicant's Actions or Behavior
	ATC	Performs SCRAM Hardcard actions: Verify the following actions are complete: - Mode Switch Locked in Shutdown - RPS Initiated if all control rods are not fully inserted. - ARI Initiated if RPS failed to Scram the reactor.
		If Reactor Recirc Pumps are running in fast speed: Then simultaneously take the following to XFER: - RECIRC PUMP A BRKR 5A - RECIRC PUMP B BRKR 5B
		IF Reactor power is above 4%, THEN START SLC A and SLC B pumps.
		Perform crew update with the following information: "The Mode Switch is locked in Shutdown" (Report any failures) - If RPS was initiated, the RPS is initiated (Report any failures) - If ARI was initiated, then ARI is initiated (Report any failures) "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) - Standby Liquid Control System Initiated (only if manually initiated) - EOP-01 Entry (only if conditions met): L2, Rx Press Hi, RPS Failure - If MSIVs are closed, then a Time Critical Operator Action for Suppression Pool Cooling is applicable.
	Evaluator	ATC should report EOP-1 Entry on RPS failure.

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	ATC	When generator load less than 90 MWe, then perform the following: a) TRIP the main turbine by depressing the TURBINE TRIP push-button. b) VERIFY the following have occurred: • MAIN STOP VALVEs, CONTROL VALVEs and COMBINED INTERMEDIATE VALVEs are shut. • GEN BRKRs S-610-PY-TIE and S-611-PY-TIE open • GEN FIELD BREAKER
	ATC	Insert Nuclear Instruments, • SRMs • IRMs • Place recorders in IRM (leave A or E in APRM)
		Verify HST Lvl CV Manual Control, N21-S19, in OFF
		STABILIZE reactor water level. a) Feedwater (REFER TO FEEDWATER HARDCARD) b) RCIC c) RPV
		STABILIZE reactor pressure: a) Turbine/Turbine Bypass valves (REFER TO PRESSURE CONTROL HARDCARD) b) SRVs • Evacuate Containment • REFER TO PRESSURE CONTROL HARDCARD • Evaluate placing RCIC in Pressure Control Mode

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	SRO	Enters EOP-1 RPV Control on Reactor Scram required Reactor Power above 4% and transitions into EOP-1A, Level Power Control (RPS Failure)
		Announces entry into EOP-1 and EOP-1A
		Directs ATC to: • Monitor and Control Reactor Power • Stabilize Reactor Water Level • Stabilize Reactor Pressure
	SRO	Works down Power Control leg of EOP-1A
		Answers YES to 'Are APRM's downscale?' Directs ATC to INSERT control rods IAW EOP-SPIs 1.1-1.7 If APRM's come off Downscale, then Directs SLC initiation
	SRO	Works down Level Control leg of EOP-1A
		Directs BOP to verify Actuations and Isolations. Directs ATC to inhibit ADS. Directs BOP to perform EOP-SPI 2.3, Bypass MSIV and ECCS interlocks.
	ATC	Inhibits ADS
	BOP	Commences verifying Isolations and Actuations IAW Hardcard.
	Evaluator	If not previously discovered on Rx scram, will find MSL A failed to isolate while performing verification of Isolations and Actuations
	ATC	Perform EOP-SPI 1.3, Manual Rod Insertion. 2.0 VERIFY CRD HYDRAULICS FLOW CONTROL is in MANUAL. C11-R600 3.0 ADJUST CRD HYDRAULICS FLOW CONTROL output to 100. C11-R600 4.0 CLOSE CRD DRIVE PRESS CONTROL VALVE. C11-F003 5.0 WHEN any CRD Pump is running, THEN PERFORM the following to Insert all control rods to position 00 concurrently with the remainder of this procedure follows: 5.1 DEPRESS AND HOLD the IN TIMER SKIP pushbutton. 5.2 SELECT Control Rods not fully inserted.

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	BOP	6.0 VERIFY the following keylock switches in BYPASS: • AT H13-P629, LO POWER SET PT DIV 1 BYPASS C11A-S4 • AT H13-P618, LO POWER SET PT DIV 2 BYPASS C11A-S3
	Evaluator	Step 6.0 is also performed in EOP-SPI 2.3.
	BOP	Informs ATC when Lo Power Setpoint is bypassed.
	RO	7.0 PLACE BUS XH11 LOCA BYPASS keylock switch in BYPASS. 8.0 PLACE BUS XH12 LOCA BYPASS keylock switch in BYPASS. 9.0 IF Bus EH11 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1116 10.0 IF Bus EH12 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1214
	BOP	11.0 AT H13-P970, VERIFY only one of the following is running: • NCC PUMP A P43-C001A • NCC PUMP B P43-C001B • NCC PUMP C P43-C001C
	Evaluator	The remainder of EOP-SPI 1.3 is low priority and can be done later.
	ATC	Announces control rods are going in. (**Critical Task #2**)
	Evaluator	ATC may determine MSIV failure to close while stabilizing pressure if not previously identified.
	BOP	Performs EOP-SPI 2.3, Bypass MSIV's and ECCS Interlocks.
		1.0 DEFEAT MSIV low RPV level isolation as follows: • AT H13-P694, PLACE MSIV ISOL LO LEVEL BYPASS CH D keylock switch in BYP B21H-S76D • AT H13-P691, PLACE MSIV ISOL LO LEVEL BYPASS CH A keylock switch in BYP B21H-S76A • AT H13-P692, PLACE MSIV ISOL LO LEVEL BYPASS CH B keylock switch in BYP B21H-S76B • AT H13-P693, PLACE MSIV ISOL LO LEVEL BYPASS CH C keylock switch in BYP B21H-S76C

2013-01

Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	BOP	2.0 DEFEAT ECCS interlocks as follows: • AT H13-P625, PLACE HPCS LOGIC BYPASS E22-F023 keylock switch in BYPASS. E22AS25 • AT H13-P618, PLACE the following Keylock switches in BYPASS: • RHR ISOL BYPASS E12-F053B keylock switch E12AS73 • LPCI C LOGIC BYP E12-F021 keylock switch E12AS77 • LO POWER SET PT DIV 2 BYPASS C11A-S3 • AT H13-P629, PLACE the following Keylock switches in BYPASS: • RHR ISOL BYPASS E12-F053A keylock switch E12AS74 • LPCS LOGIC BYPASS E21-F012 keylock switch E21S16 LO POWER SET PT DIV 1 BYPASS C11A-S4
		3.0 Instrument Air is isolated to the Drywell NO known air leak is present in Containment NO known air leak is present in Drywell THEN RESTORE Instrument Air to Containment and Drywell as follows: 3.1 VERIFY INST AIR DRYWELL ISOL valve is OPEN. P52-F646 3.3 VERIFY INST AIR CNTMT ISOL valve is OPEN. P52-F200
	BOP	4.0 CONFIRM instrument air is available as follows: 4.1 VERIFY BUS XH11 LOCA BYPASS keylock switch in BYPASS. 4.2 VERIFY BUS XH12 LOCA BYPASS keylock switch in BYPASS. 4.3 IF Bus EH11 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1116 4.4 IF Bus EH12 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1214 4.5 AT H13-P970, VERIFY only one of the following is running: • NCC PUMP A P43-C001A • NCC PUMP B P43-C001B • NCC PUMP C P43-C001C 5.0 IF RHR C pump is available, THEN PERFORM the following: 5.1 VERIFY LPCI C Injection Valve is CLOSED. 1E12-F042C
		Directs NLO to perform EOP-SPI 2.3.

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	SRO	Directs RO's to terminate ECCS for level control IAW Hardcard **(Critical Task 3)**
		Directs Level Band of 150 to 219 inches using Feedwater.
	BOP	Terminate and prevent ECCS injection per Hardcard for level control. **(Critical Task 3)**
	SRO	Directs startup of Hydrogen Igniters and Hydrogen Analyzers.
		Works way down to LPC/L10 HOLD box.
	BOP	Performs startup of Hydrogen Igniters and Hydrogen Analyzers per Hardcard.
	Evaluator	Crew may initially determine that Bypass valves are controlling pressure and continue to use Bypass Valves until it is determined that the MSIVs should have isolated, and the 'A' MSL valves are manually taken to close. Then Pressure Control will shift to SRVs.
	ATC	As part of Stabilizing Pressure, should determine that MSIVs are isolated with exception of MSIV line A. With A line open, pressure control will be on Bypass Valves,
	ATC	Once MSIV line A is isolated by at least one valve, should report that Pressure Control is on SRVs.
	SRO	Works down Pressure Control leg of EOP-1A
		Direct Pressure Band of 800-1000 psig.
	Evaluator	When taking first SRV (1B21-F0051D) to OPEN for pressure control, it will not open manually, commencing Event 6.
	RO	Controls Rx pressure in directed band using SRV's (or BPV's if MSIV still open).
	SRO	Works down to LPC/P4 HOLD box. Proceeds through HOLD box when MSIV's close.
		Works down to LPC/P6 HOLD box and waits until Rx is shutdown with boron

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Event Description: 6 - Steam Leak in Steam Tunnel. Enter EOP-3, Plant scram on MSIV Closure due to high tunnel temperature with MSL A failure to isolate. ATWS – enter EOP-1 and EOP-1A, Enter T.S. 3.6.1.3

Cue: H13-P680-7A-D6 for Steam Break, 1H13-P601-21A-B2 for EOP-3 entry,1H13-P601-19A-A1 for MSIV Closure

Time	Position	Applicant's Actions or Behavior
	SRO	When all control rods are inserted, goes to override step LPC/L-1 and directs RO to terminate Boron Injection.
	RO	Terminates Boron injection by taking SLC pumps to OFF
	SRO	Transitions to EOP-01
	Evaluator	It is anticipated that all control rods <u>will</u> be inserted prior to reaching -25 inches. If the crew fails to insert all rods prior to reaching -25 inches, transition to EOP 4-2 Emergency Depressurization would be appropriate. RD would then be a Critical Task.
	SRO	If control rods are out and RPV level lowers to -25 inches, transitions to EOP 4-2 Emergency Depressurization.

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Event Description: 7 - SRV failure to open during manual operations while controlling Rx pressure with SRVs.		
Cue: Red indicating light for SRV discharge pressure high not illuminated, SOLENOID A STATUS light for SRV not illuminated on P601, no change in Rx Pressure after attempting to open		
Time	Position	Applicant's Actions or Behavior
	BOP	When opening SRV's in sequence listed on P601 for pressure control, SRV 1B21-F0051D fails to open. Opens next SRV to control pressure.
		Announces SRV failure to open to crew. Uses next SRV in sequence to control pressure and updates crew.
Driver	**Driver**	Role play as NLO/Maintenance/I&C if requested to respond to determine why valve failed to open

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Event Description: 8 - Emergency Depressurization on lowering Rx level – EOP-4-2

Cue: Contingency if level lowers to < -25"

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to EOP 4-2 Emergency Depressurization based on control rods out and RPV level < -25 inches.
		Directs ATC to Terminate and Prevent Feedwater per Hardcard for ED
	ATC	Terminates Feedwater IAW Hardcard for ED
	SRO	Directs RO to open 8 ADS SRV's
	RO	Opens 8 ADS SRV's
	SRO	Directs RO's to inject to maintain 150 to 219 inch level band using outside the shroud systems when RPV pressure lowers to 140 psig.
	RO's	Inject using RHR A or feedwater booster pumps to restore and maintain RPV level in 150 to 219 inch level band.

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Event Description: Termination Criteria

Cue:

Time	Position	Applicant's Actions or Behavior
		1. Control rods are being inserted with Rx < range 3 on IRM's.
		2. Maintaining level and pressure in assigned bands.
		3*. RPV depressurized if RPV level lowered to < -25 inches with control rods not inserted
		* Contingency

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Event Description: Critical Task #1

Cue:

Time	Position	Applicant's Actions or Behavior

		With the failure of a MSIV automatic isolation, take action to manually isolate the Main Steam Lines.
		
		1. Safety Significance:
		
		    • Take action to prevent degradation of a barrier to fission product release.
		
		2. Cues:
		
		    • Procedural compliance.
		
		    • MSL "x" MSIV position indication shows valves OPEN.
		
		3. Measured by:
		
		    • The RO places B21-F022x Control Switch in CLOSE.
		
		4. Feedback:
		
		    • Main Steam Line Tunnel temperature trend
		MSIV valve position indications.

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Event Description: Critical Task #2			
Cue:			

Time	Position	Applicant's Actions or Behavior
		With a reactor scram required and the reactor not shutdown, take action to reduce power by initiating ARI to cause control rod insertion. 1. Safety Significance: • Shutting down reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant. • Correct reactivity control. 2. Cues: • Procedural compliance. • Reactor power indication. 3. Measured by: • Observation - ARI pushbuttons armed and depressed to cause control rod insertion. 4. Feedback: • Reactor power trend. • Rod status indication.

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Event Description: Critical Task #3

Cue:

Time	Position	Applicant's Actions or Behavior
		During an ATWS, when conditions are met to deliberately lower RPV level; Terminate and Prevent injection into the RPV from ECCS and Feedwater until conditions are met to reestablish injection. 1. Safety Significance: • Precludes loss of primary containment integrity and uncontrolled release of radioactivity into the environment. 2. Cues: • Procedural compliance. 3. Measured by: • Observation - With Emergency Depressurization not required and the deliberate lowering level override met (>4% power, and > 110°F Suppression Pool temperature, and >16.5" RPV level, and > 1.68# Drywell pressure or SRV open) injection systems are terminated and prevented until <4% power, or 16.5" RPV level, or SRV's closed with <1.68# Drywell pressure. 4. Feedback: • Injection system flow rates into RPV.

Facility**:**   **Perry**   Scenario No.**:** **3- 71%**   Op-Test No.**:** **2013-01**

Examiners: Operators: SRO
                                                                        ATC
                                                                        BOP

Initial Conditions: Yesterday Reactor power was reduced to ~68% due to degrading vacuum caused by debris on the Circ Water screens. Currently, Rx power is at ~70%. Cleaning of Circ Water screens A & C is complete. Power ascension will follow Circ Water Pump shift. IOI-3 Att. 3 Step 2.4, rods at Step 69. Unusually low ambient temperatures are predicted for today. HPCS is out of service for motor replacement - in day 2 of a 14 day LCO – TS 3.5.1, Condition B. Stator Water Cooling Pump B is out of service for high vibrations. M29 Boiler is out of service for repair. PSA Risk is Green. Grid is Normal.

Turnover: Shift Circulating Water pumps from A/B to A/C to allow Maintenance to clean the B pump inlet screen. Personnel have been briefed and are on station to support field activities. When concurrence granted from WCC and Plant Manager, commence Rx Power ascension per IOI-3. Per the Reactivity Plan, Power can initially be raised 5% and then 3%/Hr until 100% power is attained.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP/ SRO)	Shift Circulating Water pumps
2		R (ATC/ SRO	Raise Rx power with flow
3	PC01 PC02	C (SRO)	Both upper containment airlock doors open simultaneously – enter TS 3.6.1.2
4	1H13P800 3AD6	C (BOP/ SRO)	Hi vibrations on DW Cooling Fan 2A
5	NM04A	I (ATC) I (SRO)	APRM A fails upscale TS 3.3.1.1 & ORM 6.2.1
6	Cb01_1b33 s101B	C (ATC/ SRO)	Recirc Pumps down shift to Slow → Enter ONI-C51
7	TH21A Ry02-1c71k14A-H	C (ATC/ SRO)	Power Oscillations → Enter EOP-1 on failure to scram
8	RD15, cb04_1e12 c0002a	M (ALL) C (ATC/ SRO) C (BOP/ SRO)	ATWS, loss of high pressure injection → Enter EOP-1A Rod Gang Drive fails (Selects Individual Drive) RHR A pump fails to start on Terminate & Prevent
9			Emergency Depressurization
10	Pt01_1b21 n0091e	C (BOP/ SRO)	CRD Pump trip

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

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Event Description: N/A - Driver Instructions

Cue:

Time	Position	Applicant's Actions or Behavior

Driver	**Driver**	<u>Simulator Setup:</u>
		
		Reset Simulator to IC 92
		
		Load Schedule File: NRC 2013 Scen 3.sch
		
		Verify Schedule Files are loaded: NRC Info Tag.sch
		                                  Loss_of_FW_no.sch
		                                  Ins18.sch
		                                  DEL18.sch
		
		Verify Event File Loaded: NRC 2013 Scen 3.evt

Driver	**Driver**	<u>**Verify** Initial Conditions:</u> Reactor Power 71%. BOL Pull Sheets, Rods @ Step 69. IOI-3 Attachment 3 Step 2.3 is in progress. Place Yellow switch caps on HPCS Pump start switch and HPCS Injection Valve (1E22-F004) Place Yellow switch cap on Stator Water Cooling Pump B. PSA Risk is Green.
Driver	**Driver**	<u>Turnover:</u> Yesterday Reactor power was reduced to ~68% due to degrading vacuum caused by debris on the Circ Water screens. Currently, Rx power is at ~70%. Cleaning of Circ Water screens A & C is complete. Power ascension will follow Circ Water Pump shift. IOI-3 Att. 3 Step 2.4, rods at Step 69. Unusually low ambient temperatures are predicted for today. HPCS is out of service for motor replacement - in day 2 of a 14 day LCO – TS 3.5.1, Condition B. Stator Water Cooling Pump B is out of service for high vibrations. M29 Boiler is out of service for repair. PSA Risk is Green. Grid is Normal. Shift Circulating Water pumps from A/B to A/C IAW SOI-N71 to allow Maintenance to clean the B inlet screen. Personnel have been briefed and are on station to support field activities. When concurrence granted from WCC and Plant Manager, commence Rx power ascension per IOI-3 Power Maneuvering. Per the Reactivity Plan, Power can initially be raised 5% and then 3%/Hr until 100% power is attained.

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Event Description: 1 - Shift Circulating Water pumps

Cue: Turnover and SRO direction

Time	Position	Applicant's Actions or Behavior
00:00	SRO	Directs BOP to shift Circulating Water pumps from A/B to A/C running.
	BOP	Reviews SOI-N71 and performs Circulating pump shift.
	BOP	7.1.1 NOTE CIRW PUMP DISCH VALVE position for the offgoing pump on local position indication. (1N71-F020B)
Driver	**Driver**	If asked, local valve position indication for B is ~80% and A is ~78%.
	BOP	7.1.2 WHILE observing the requirements of the following sub-steps, START the oncoming CIRW PUMP per the following:
7.1.2.a TAKE the oncoming CIRW PUMP to START on 1H13-P870.(1N71-C001C)
7.1.2.b IF the oncoming discharge valve (1N71-F020C) does NOT begin opening within 7 seconds, THEN IMMEDIATELY TAKE the oncoming CIRW PUMP (1N71-C001C) to STOP.
7.1.2.c WHEN the oncoming CIRW PUMP DISCH VALVE reaches the same position as that of the offgoing pump, THEN DEPRESS the oncoming CIRW PUMP DISCH VALVE STOP pushbutton.(1N71-F020C)
Driver	**Driver**	If asked to give mark on local position indication, observe valve position indication on simulator Camera 2
		7.1.3 TAKE the offgoing CIRW PUMP to STOP.(1N71-C001B)
7.1.4 VERIFY the offgoing CIRW PUMP DISCH VALVE closes. (1N71-F020B)

NOTE
When adjusting pump discharge pressures, computer points N71BA035, 71BA036 and N71BA037 may be used in place of meters 1N71-R012A, B and C.

7.1.5 THROTTLE the CIRW PUMP DISCH VALVES of each inservice pump to maintain the following:
1N71-F020A   1N71-F020C

• CIRC WATER PUMP DISCH PRESS between 36 and 48 psig, but as close as possible to 36 psig.
N71BA035   N71BA036
1N71-R012A   1N71-R012C

• CIRC WATER PUMP AMPS less than 260.
1N71-R255   1N71-R257

7.1.6 DIRECT Chemistry to align the circulating water chemical treatment system in accordance with SOI-P83A for the current Circ Water lineup. |

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Event Description: 1 - Shift Circulating Water pumps			
Cue: Turnover and SRO direction			

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	Role play as NLO & Chemistry, communicate with BOP during pump shift.
	BOP	Inform SRO that pump shift is complete
Driver	**Driver**	When BOP is complete with Circulating Water pump shift, or when directed by the Lead Examiner, continue on to the next Event.

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Event Description: 2 - Raise power with flow

Cue: Turnover, WCC request, SRO Direction

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	Call as Janka from WCC and inform Control Room you are ready for Perry to raise power to 80%.
	SRO	Direct ATC to raise Rx power to 80% IAW the reactivity plan. Per the reactivity plan, can raise power 5% initially and 3%/Hr thereafter.
	Driver	If requested, role play as Reactor Engineer agreeing with reactivity plan.
	ATC	Using SOI-B33 section 7.7, Rcirc Flow Control in Loop Manual, perform the following: 7.7.1 CNFIRM RCIRC LOOP FLOW CONTROL is in MAN. (1B33-K603A) 7.7.2 ONFIRM RCIRC LOOP FLOW CONTROL is in MAN. (1B33-K603B) 7.7.3 PERFORM the following concurrently as required for the desired Recirc Flow: • ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. (1B33-K603A) • ADJUST RCIRC LOOP FLOW CONTROL with the slide switch. (1B33-K603B).
Driver	**Driver**	When Rx power at ~76%, or when directed by the Lead Examiner, proceed to the next Event.

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Event Description: 3 - Both upper containment airlock doors open simultaneously – enter TS 3.6.1.2

Cue: Annunciator H13-P680-7A-C5,

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When power at 76% or directed by the Lead Examiner, initiate Event 3.
	ATC	Announce unexpected alarm; "PERS AL DOORS BOTH OPEN"
	BOP	Reviews ARI H13-P680-7A-C5 & observe the Div 1 & Div 2 Isolation Valve matrices to determine that cause of alarm is both upper airlock doors are open.
Driver	**Driver**	When PERS AL DOORS BOTH OPEN alarm clears, contact the control room as NLO and report that you observed laborers moving scaffold poles into containment with both upper containment airlock doors open at the same time. The laborers were coached and both airlock doors are now reclosed.
	SRO	Evaluate TS 3.6.1.2. Determine that Condition B is applicable.
		Directs Required Actions B1 and B2.
Driver	**Driver**	When directed by the Lead Examiner, proceed to the next Event.

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Event Description: 4 - High vibrations on Drywell Cooling fan 2A

Cue: Annunciator H13-P800-03-D6

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed by the Lead Examiner, initiate Event 4.
	ATC	Announces Unexpected Alarm, "HVAC P800."
	BOP	Checks and responds to H13-P800 annunciator H13-P800-03-D6. Informs crew of High vibrations on Drywell Cooling Fan 2A
		Reviews ARI H13-P800-03-D6 & recommends shifting DW fans IAW Subsequent Action 4.1.
Driver	**Driver**	If asked, as NLO to investigate Vibration Monitoring Monitor (in IB 620), wait several minutes then inform RO that the Indicator Light Pushbutton is Lit.
	SRO	Directs BOP to Shift Drywell Cooling fan from 2A to 2B per SOI-M13.
	BOP	Shifts DW Cooling Fans IAW SOI-M13 Section 7.2. 7.2 Shifting Middle Drywell Cooling Fans 7.2.1 PLACE the oncoming MID DW CLG FAN in ON. (1M13-C002B) 7.2.2 PLACE the offgoing MID DW CLG FAN in STBY. (1M13-C002A) 7.2.3 CONFIRM the green status light energized on the standby fan.
Driver	**Driver**	If directed to reset the Indicator Light Pushbutton light on the Vibration Monitoring Monitor (in IB 620) – reset annunciator H13-P800-03-D6.
Driver	**Driver**	When BOP is ~95% complete with shifting Drywell Cooling fans, or when directed by the Lead Examiner, continue on to the next Event.

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Event Description: 5 - APRM Upscale Failure			
Cue: Annunciators H13-P680-06A-B5 & C4 and APRM instrumentation			
Time	Position	Applicant's Actions or Behavior	

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed by the Lead Examiner, initiate Event 5.
	ATC	Announces Unexpected alarms. Responds to numerous alarms on H13-P680. Determines that APRM A is failing (or has failed) upscale causing a ½ scram and that AFDL is in control.
		Performs immediate actions of ARI-H13-P680-04-E9: 3.1 IF the alarm is due to APRM A or E failed upscale, THEN PERFORM the following: 3.1.1 VERIFY reactor power has NOT increased. 3.1.2 ARM and DEPRESS HPU A SHUTDOWN pushbutton. 3.1.3 ARM and DEPRESS HPU B SHUTDOWN pushbutton.
		Notify SRO that Recirculation HPUs have been locked-up.
	SRO	Enters ONI-C51, Unplanned Changes in Reactor Power or Reactivity if power changed.
	Evaluator	If ATC locks-up FCV's before they move, no power change will occur. If the Crew enters ONI-C51, there are no pertinent actions in the ONI for this event.
	Crew	Determine that APRM A should be bypassed and that ½ scram should be reset per SOI-C51(APRM and SOI-C71.
	SRO	Direct ATC to bypass the APRM A channel per SOI-C51(APRM).
	ATC	Bypasses APRM A IAW SOI-C51(APRM) Section 7.4: 7.4.1 REFER TO Technical Specification Table 3.3.1.1-1 Item 2 for applicability. NOTE When bypassing APRM A, the following step must be performed to ensure a Rcirc Flow change does not occur. 7.4.2 IF APRM Channel A is to be bypassed, THEN VERIFY that all conditions of either 7.4.2.a OR 7.4.2.b exist: 7.4.2.a Both of the following conditions exist: - FCV A MOTION INHIBITED annunciator, H13-P680-4-A5, is alarmed. - FCV B MOTION INHIBITED annunciator H13-P680-4-A14, is alarmed.

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Event Description: 5 - APRM Upscale Failure

Cue: Annunciators H13-P680-06A-B5 & C4 and APRM instrumentation

Time	Position	Applicant's Actions or Behavior
	ATC	7.4.2.b All of the following conditions exist: • RCIRC AUTOMATIC FLOW DEMAND LIMITER indicates "zero" output. (1B33-K650) • The AFDL IN CONTROL annunciator is NOT alarmed. • RCIRC FLUX CONTROL is in MAN. (1B33-K602) • The AFDL Setpoint on RCIRC AUTOMATIC FLOW DEMAND LIMITER tapeset is higher than the APRM CH E reading. (1B33-K650)
		7.4.3 PLACE the NEUTRON MONITOR BYPASS, APRM joystick on 1H13-680, in the BYPASS position for the APRM Channel being bypassed. 1C51B-S3 CH A 7.4.4 CONFIRM that the BYPASS half of the APRM's DNSC/BYPASS status lights is on.
		Directs BOP to perform Steps 7.4.5 & 7.4.6.
	BOP	Performs Steps 7.4.5 & 7.4.6.
		7.4.5 CONFIRM that the APRM Bypass status light comes on at the selected APRM's Power Range Neutron Mon Panel. (1H13-P669) 7.4.6 IF the bypassed APRM channel caused any trips or alarms, THEN RESET those trips or alarms.
	ATC	Inform Crew that APRM A has been bypassed and informs SRO that Technical Specification 3.3.1 Table 3.3.1.1-1 Item 2 should be referenced.
	SRO	Direct ATC to reset ½ scram IAW SOI-C71 and ARI-P680-06A-B5.
	ATC	Reset ½ scram by performing SOI-C71, section 7.4: 7.4.1 VERIFY the following: • The conditions which caused the full or half scram have cleared. • There is reasonable assurance that another scram signal will NOT be generated. 7.4.2 IF the RPS INST VOL HI annunciator is in alarm on 1H13-P680-5A-A7, THEN PLACE the appropriate RPS division keylock switches in BYPASS. • INST VOL LEVEL HI SCRAM BYPASS CH A. (1C71-S4A) • INST VOL LEVEL HI SCRAM BYPASS CH C. (1C71-S4C)

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Event Description: 5 - APRM Upscale Failure

Cue: Annunciators H13-P680-06A-B5 & C4 and APRM instrumentation

Time	Position	Applicant's Actions or Behavior
	ATC	7.4.3 VERIFY the following Manual Scram pushbuttons are NOT armed: • Manual Scram Pushbutton 1C71-S3A • Manual Scram Pushbutton 1C71-S3B • Manual Scram Pushbutton 1C71-S3C • Manual Scram Pushbutton 1C71-S3D
		7.4.4 MOMENTARILY DEPRESS the appropriate RPS division pushbuttons on P680: • SCRAM RESET CH A. 1C71A-S5A • SCRAM RESET CH C. 1C71A-S5C
	Evaluator	The remaining portion of SOI-C71 Section 7.4 is N/A.
	ATC	Inform Crew that ½ scram has been reset.
	SRO	Reviews TS 3.3.1.1 and ORM 6.2.1 for failure of APRM A. Determines PLCOs are required for both.
Driver	**Driver**	When Crew is completed with resetting ½ scram, or when directed by the Lead Examiner, continue to the next Event.

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Event Description: 6 - Recirculation Pump A & B down shift to Slow → Enter ONI-C51

Cue: Annunciators H13-P680-3A-A9, H13-P680-4A-A3 & A12

Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	When directed by the Lead Examiner, Initiate Event 6.
	ATC	Announces Unexpected alarms. Responds to numerous alarms on H13-P680. Determines that both A and B Recirculation pumps have shifted to slow speed.
		Reports to Crew that recirc pumps have shifted to slow speed and that entry condition are met for ONI-C51.
		Observes Reactor Power and Core Flow and determines that Immediate Exit Region of the Power To Flow Map has been entered and action to insert CRAM rods is necessary (per FTI-B02).
	SRO	Announces entry into ONI-C51 and confirms that plant is in Immediate Exit Region of Power To Flow Map. Verifies that ATC is inserting CRAM rods per FTI-B02.
	SRO	Directs ATC to monitor nuclear instruments for power oscillations. If oscillations are observed, scram the reactor.
	ATC	Insert CRAM Rods per FTI-B02: 4.7 Use of Cram Rods NOTE There are three methods to control the use of cram rods. The Command SRO will select the method to be used based on the situation. 4.7.1 Method 1 – Use of the Control Rod Movement Sheet 　1. Insert Cram Rods listed on the Control Rod Movement Sheet steps in descending order. 　2. Gang motion is recommended where not prohibited. 　3. Select the control rods listed in the Current Step of the Control Rod Movement Sheet and continuously insert to positions between 04 and 00, inclusive. Further leveling of all rods in a step between 04 and 00 is not required. Skip the step if the rods are already between 04 and 00. 　4. Per Step 4.5.5, the Current Step is the lowest numbered step in which all the control rods in that step are not positioned at the withdrawal limit. If all steps are at the withdrawal limit, then the last step is the current step. 　5. Do not leave control rods at an intermediate position, i.e., a position other than the withdraw limit or between 04 and 00.

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Event Description: 6 - Recirculation Pump A & B down shift to Slow → Enter ONI-C51

Cue: Annunciators H13-P680-3A-A9, H13-P680-4A-A3 & A12

Time	Position	Applicant's Actions or Behavior
	ATC	6. Complete the insertion of a control rod or gang in the step even if the required power reduction has been achieved.
		7. Document in the comments on the Control Rod Movement Sheets the altered insert limits when inserting Cram rods. Documentation may be performed when plant conditions permit.
		8. Deselect the final cram rod or gang to reset the Rod Withdrawal Limiter, RWL.
		9. Continue with Step 4.7.4.
		4.7.4 When Cram Rods are inserted and Thermal Power is ≤19% RTP, assume the Rod Pattern does not meet the Low Power Setpoint constraints of the Rod Pattern Controller.
		4.7.5 Increasing recirc flow after inserting Cram rods may lead to thermal limits problems.
		4.7.6 Contact Reactor Engineering expeditiously after the insertion of Cram rods for the coordination of recovery actions.
NRC / Driver	**NRC / Driver**	After first CRAM Rod is inserted Power Oscillations will commence (Event 7 will be initiated).
NRC	**NRC**	It is not expected that the SRO will progress past the evaluation of thermal limits in ONI-C51 prior to receiving a ½ scram on OPRM's.

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Event Description: 7 - Power Oscillations → Enter EOP-1 on failure to scram		
Cue: Annunciator H13-P680-6A-A3/APRM indications		
Time	Position	Applicant's Actions or Behavior
Driver	**Driver**	After first CRAM Rod is inserted in previous Event, Power Oscillations will commence.
NRC	**NRC**	Numerous annunciators will alarm as power oscillations start then increase in size. ATC should be able to diagnose power oscillations by observing P680 annunciators and APRM indications. Prior to manually scramming it's expected that a full scram signal will be generated (but not occur).
	ATC	Respond to alarms on P680. Recognize and announce Reactor scram.
		Recognizes failure to scram and places Mode Switch in Shutdown, initiates RPS and ARI. (**Critical Task 1**)
		Performs SCRAM Hardcard actions: Verify the following actions are complete: • Mode Switch Locked in Shutdown • RPS Initiated if all control rods are not fully inserted. • ARI Initiated if RPS failed to Scram the reactor.
	ATC	If Reactor Power is above 4% then start SLC A and B pumps. (**Critical Task 1**)
	ATC	Perform crew update with the following information: • "The Mode Switch is locked in Shutdown" (Report any failures) • If RPS was initiated, the RPS is initiated (Report any failures) • If ARI was initiated, then ARI is initiated (Report any failures) • "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) • Standby Liquid Control System Initiated (only if manually initiated) • EOP-01 Entry (only if conditions met): L2 Rx Press Hi RPS Failure

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Event Description: 7 - Power Oscillations → Enter EOP-1 on failure to scram

Cue: Annunciator H13-P680-6A-A3/APRM indications

Time	Position	Applicant's Actions or Behavior
NRC	**NRC**	ATC should report EOP-1 Entry on RPS Failure

	ATC	When generator load less than 90 MWe, then perform the following:
		   a) TRIP the main turbine by depressing the TURBINE TRIP push-button.
		   b) VERIFY the following have occurred:
		      • MAIN STOP VALVEs, CONTROL VALVEs and COMBINED INTERMEDIATE VALVEs are shut.
		      • GEN BRKRs S-610-PY-TIE and S-611-PY-TIE open
		      • GEN FIELD BREAKER

	ATC	Insert Nuclear Instruments,
		   • SRMs
		   • IRMs
		   • Place recorders in IRM (leave A or E in APRM)

		Verify HST Lvl CV Manual Control, N21-S19, in OFF

		STABILIZE reactor water level.
		   a) Feedwater (REFER TO FEEDWATER HARDCARD)
		   b) RCIC
		   c) RPV

		STABILIZE reactor pressure:
		   a) Turbine/Turbine Bypass valves (REFER TO PRESSURE CONTROL HARDCARD)
		   b) SRVs
		      • Evacuate Containment
		      • REFER TO PRESSURE CONTROL HARDCARD
		      • Evaluate placing RCIC in Pressure Control Mode

	Driver	Crew will transition from Event 7 to 8 as ATWS is discovered and malfunctioning water sources are detected.

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Event Description:8 - ATWS, loss of high pressure injection → Enter EOP-1A

RHR A pump fails to start on Terminate & Prevent

Cue: Reactor Power & Reactor Level

Time	Position	Applicant's Actions or Behavior
	SRO	Enters EOP-1 RPV Control and transitions into EOP-1A, Level Power Control
		Announces entry into EOP-1 and 1A
		Directs ATC to: Monitor and Control Reactor Power Stabilize Reactor Water Level Stabilize Reactor Pressure
		Works down EOP-1A Power Leg
		Directs ATC to INSERT control rods IAW EOP-SPIs 1.1-1.7
		Verifies SLC has been initiated.
		Directs RO to inhibit ADS. (**Critical Task 2**)
	RO	Inhibits ADS by placing keylock switches in INHIBIT. (**Critical Task 2**)
	Crew	Determine as part of STABILIZE reactor water level that RFWPs have tripped and MFP has failed to start. Also that RCIC has failed to start and that CRD pump A has tripped.
Driver	**Driver**	Restart of the CRD pump is covered by Event 10.
	ATC	Informs SRO of loss of high pressure injection.
NRC	**NRC**	ATC will not be able to insert control rods until CRD pump is restarted.
	ATC	Manually Inserts Control Rods. EOP-SPI 1.3 1.0 ⸤ Instrument Air is isolated to Containment NO known air leak is present in Containment THEN OPEN INST AIR CNTMT ISOL. ⸥ P52-F200 2.0 VERIFY CRD HYDRAULICS FLOW CONTROL is in MANUAL. C11-R600 3.0 ADJUST CRD HYDRAULICS FLOW CONTROL output to 100. C11-R600 4.0 CLOSE CRD DRIVE PRESS CONTROL VALVE. C11-F003 5.0 WHEN any CRD Pump is running, THEN PERFORM the following to Insert all control rods to position 00 concurrently with the remainder of this procedure follows:

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Event Description:8 - ATWS, loss of high pressure injection → Enter EOP-1A

           RHR A pump fails to start on Terminate & Prevent

Cue: Reactor Power & Reactor Level

Time	Position	Applicant's Actions or Behavior
	ATC	5.1 DEPRESS AND HOLD the IN TIMER SKIP pushbutton. 5.2 SELECT Control Rods not fully inserted.
	BOP	6.0 VERIFY the following keylock switches in BYPASS: • AT H13-P629, LO POWER SET PT DIV 1 BYPASS C11A-S4 • AT H13-P618, LO POWER SET PT DIV 2 BYPASS C11A-S3
	RO	7.0 PLACE BUS XH11 LOCA BYPASS keylock switch in BYPASS. 8.0 PLACE BUS XH12 LOCA BYPASS keylock switch in BYPASS. 9.0 IF Bus EH11 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1116 10.0 IF Bus EH12 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1214
	BOP	11.0 AT H13-P970, VERIFY only one of the following is running: • NCC PUMP A P43-C001A • NCC PUMP B P43-C001B • NCC PUMP C P43-C001C
NRC	**NRC**	The remainder of EOP-SPI 1.3 is low priority and can be done later.
	ATC	Announces control rods are going in. **(Critical Task 1)**
	ATC	Identifies failure of gang drive.
	SRO	Works down EOP-1A Level Leg.
		Directs BOP to verify Isolations and Actuations.
	BOP	Verifies isolations and actuations using Hardcard.

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Event Description:8 - ATWS, loss of high pressure injection → Enter EOP-1A

RHR A pump fails to start on Terminate & Prevent

Cue: Reactor Power & Reactor Level

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to Bypass of MSIV and ECCS Interlocks, EOP-SPI 2.3
	BOP	Performs EOP-SPI 2.3

1.0 DEFEAT MSIV low RPV level isolation as follows:

- AT H13-P694, PLACE MSIV ISOL LO LEVEL BYPASS CH D keylock switch in BYP B21H-S76D
- AT H13-P691, PLACE MSIV ISOL LO LEVEL BYPASS CH A keylock switch in BYP B21H-S76A
- AT H13-P692, PLACE MSIV ISOL LO LEVEL BYPASS CH B keylock switch in BYP B21H-S76B
- AT H13-P693, PLACE MSIV ISOL LO LEVEL BYPASS CH C keylock switch in BYP B21H-S76C

2.0 DEFEAT ECCS interlocks as follows:

- AT H13-P625, PLACE HPCS LOGIC BYPASS E22-F023 keylock switch in BYPASS. E22AS25
- AT H13-P618, PLACE the following Keylock switches in BYPASS:
  - RHR ISOL BYPASS E12-F053B keylock switch E12AS73
  - LPCI C LOGIC BYP E12-F021 keylock switch E12AS77
  - LO POWER SET PT DIV 2 BYPASS C11A-S3
- AT H13-P629, PLACE the following Keylock switches in BYPASS:
  - RHR ISOL BYPASS E12-F053A keylock switch E12AS74
  - LPCS LOGIC BYPASS E21-F012 keylock switch E21S16
  - LO POWER SET PT DIV 1 BYPASS C11A-S4

	BOP	

3.0

Instrument Air is isolated to the Drywell
NO known air leak is present in Containment
NO known air leak is present in Drywell
THEN RESTORE Instrument Air to Containment and Drywell as follows:

3.1 VERIFY INST AIR DRYWELL ISOL valve is OPEN. P52-F646

3.2 VERIFY INST AIR CNTMT ISOL valve is OPEN. P52-F200

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Event Description:8 - ATWS, loss of high pressure injection → Enter EOP-1A

RHR A pump fails to start on Terminate & Prevent

Cue: Reactor Power & Reactor Level

Time	Position	Applicant's Actions or Behavior

	BOP	4.0 CONFIRM instrument air is available as follows:
		    4.1 VERIFY BUS XH11 LOCA BYPASS keylock switch in BYPASS.
		    4.2 VERIFY BUS XH12 LOCA BYPASS keylock switch in BYPASS.
		    4.3 IF Bus EH11 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1116
		    4.4 IF Bus EH12 is energized, THEN TAKE ISOLATING BRKR to CLOSED. EH1214
		    4.5 AT H13-P970, VERIFY only one of the following is running:
		         • NCC PUMP A P43-C001A
		         • NCC PUMP B P43-C001B
		         • NCC PUMP C P43-C001C
		    4.6 N/A
		5.0 IF RHR C pump is available, THEN PERFORM the following:
		    5.1 VERIFY LPCI C Injection Valve is CLOSED. 1E12-F042C

		Directs NLO to perform Step 5.2.
	SRO	Directs RO's to terminate ECCS for Level Control per Hardcard. (**Critical Task 3**) Directs Level Band of 50 to 100 inches.
	BOP	Terminates and prevents ECCS injection per Hardcard for Level Control. (**Critical Task 3**)
		Determines that RHR A failed to auto start on Terminate and Prevent. Manually starts RHR A.
		Informs SRO of RHR A failure to auto start and manual start complete.
	SRO	Directs startup of Hydrogen Igniters and Hydrogen Analyzers.
	BOP	Performs startup of Hydrogen Igniters and Hydrogen Analyzers per Hardcard.
		Directs NLO to complete Hydrogen Analyzer startup in the field.

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Event Description:8 - ATWS, loss of high pressure injection → Enter EOP-1A

RHR A pump fails to start on Terminate & Prevent

Cue: Reactor Power & Reactor Level

Time	Position	Applicant's Actions or Behavior
	SRO	Makes determination that RPV Water level Cannot be maintained above -25 inches and Emergency Depressurization is required.
		Directs Terminate and Prevent of ECCS and Feedwater for Emergency Depressurization IAW Hardcard per Hardcard. (**Critical Task 4**)
	ATC	Terminates and prevents Feedwater injection per Hardcard for Emergency Depressurization. (**Critical Task 4**)
	ATC	Reports T&P of ECCS & FW for ED is complete.

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Event Description: 9 – Emergency Depressurization

Cue: EOP Requirement

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Emergency Depressurization, EOP-04-2
		Directs Emergency Depressurization per EOP-04-2. (**Critical Task 5**)
	RO	Performs Emergency Depressurization by opening 8 ADS valves and updates Crew. (**Critical Task 5**)
	SRO	Determines the Minimum Steam Cooling Pressure is 140 psig.
		Directs Crew to commence injecting slowly into the RPV using outside the shroud systems when RPV pressure is 140 psig. (**Critical Task 6**)
		Directs Level band of 50 to 100 inches.
		Enters EOP-2 on rising Suppression Pool Temperature.
	RO	Commence injection into RPV when RPV pressure lowers to 140 psig. (**Critical Task 6**) Control injection rate to prevent power spikes.
		Recover RPV level in assigned band. (**Critical Task 6**)

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Event Description: 10 - CRD pump trip (Recovery possible)

Cue: Annunciator H13-P601-22A-D2

Time	Position	Applicant's Actions or Behavior
	Driver	This event will be triggered by Crew when they discover CRD pump has tripped. The pump will trip 120 seconds after Event 7 (ATWS) has started.
	RO	Determines that CRD pump A has tripped.
		Reviews ARI and determines that CRD Pump Trip Recovery is possible and update Crew.
	SRO	Direct RO to perform CRD Pump Trip Recovery.
	RO	Perform CRD Pump Trip Recovery.
		SOI-C11(CRDH) Section 7.6 - CRD Pump Trip Recovery 7.6.2 TAKE the tripped CRD PUMP to STOP. (1C11-C001A) 7.6.3 TAKE the oncoming CRD AUX OIL PUMP to START. (1C11-C002B) 7.6.4 CONFIRM the CRD PUMP TRIP OIL PRESS LOW alarm clears. 7.6.5 PLACE the CRD HYDRAULICS FLOW CONTROL in Manual. (1C11-R600) 7.6.6 LOWER the CRD HYDRAULICS FLOW CONTROL output UNTIL the inservice CRD FLOW CONTROL VALVE is closed. (1C11-R600, 1C11-F002A) 7.6.7 TAKE the oncoming CRD PUMP to START. (1C11-C001B) 7.6.8 SLOWLY THROTTLE the inservice CRD FLOW CONTROL VALVE UNTIL flow is restored on the CRD HYDRAULICS FLOW CONTROL. (1C11-F002A, 1C11-R600) 7.6.9 PLACE the CRD HYDRAULICS FLOW CONTROL in AUTO. (1C11-R600) 7.6.10 IF the tripped CRD Pump will NOT be re-started, THEN PERFORM the following: 7.6.10.a TAKE the tripped CRD PUMP to STOP. (1C11-C001A) 7.6.10.b TAKE the CRD AUX OIL PUMP to STOP. (1C11-C002A) 7.6.11 PERFORM independent verification of required components.
		Directs NLO to perform remaining part of SOI.
	Driver	If requested role play as NLO to perform local steps of CRD pump recovery procedure.

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Event Description: Scenario Termination Criteria

Cue:

Time	Position	Applicant's Actions or Behavior
		1. Control Rods are being inserted
		2. Reactor depressurized to less than or equal to 140 psig.
		3. Injecting to maintain RPV level between 50" and 100 inches.

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Event Description: Critical Task #1		
Cue:		

Time	Position	Applicant's Actions or Behavior
		With a reactor scram required and the reactor not shutdown, initiate action to reduce power by injecting boron (If > 4% power and / or still critical with challenge to BITT) and inserting control rods.

1. Safety Significance:

   - Shutting down reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.

2. Cues:

   - Procedural compliance.

   - Suppression Pool temperature.

3. Measured by:

   - Observation - If operating per EOP-01A Reactor Power Control, US determines that SLC is required (indicated by verbal direction or EOP placekeeping action) before exceeding 110°F degrees in the Suppression Pool.

     AND

   - RO places SLC A and B Pump control switches in ON, when directed by US.

     AND

   - Control Rod insertion commenced in accordance with Section 1.0 of EOP-SPIs.

4. Feedback:

   - Reactor Power trend.

   - Control Rod indications.

   - SLC tank level.

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Event Description: Critical Task #2

Cue:

Time	Position	Applicant's Actions or Behavior
		With reactor scram required and the reactor not shutdown, to prevent an uncontrolled RPV depressurization and subsequent power excursion, inhibit ADS. 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: Critical Task #3

Cue:

Time	Position	Applicant's Actions or Behavior
		During an ATWS, when conditions are met to deliberately lower RPV level; Terminate and Prevent injection into the RPV from ECCS and Feedwater until conditions are met to reestablish injection. 1. Safety Significance: • Precludes loss of primary containment integrity and uncontrolled release of radioactivity into the environment. 2. Cues: • Procedural compliance. 3. Measured by: • Observation - With Emergency Depressurization not required and the deliberate lowering level override met (>4% power, and > 110°F Suppression Pool temperature, and >16.5" RPV level, and > 1.68# Drywell pressure or SRV open) injection systems are terminated and prevented until <4% power, or 16.5" RPV level, or SRV's closed with <1.68# Drywell pressure. 4. Feedback: • Injection system flow rates into RPV.

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Event Description: Critical Task #4			
Cue:			

Time	Position	Applicant's Actions or Behavior

		During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection from ECCS and Feedwater until reactor pressure is below the MSCP as directed by US.
		
		1. Safety Significance:
		    • Prevention of fuel damage due to uncontrolled feeding.
		
		2. Cues:
		    • Procedural compliance.
		
		3. Measured by:
		    • Observation - No ECCS injection prior to being less than the MSCP.
		    AND
		    • Observation - Feedwater terminated and prevented until less than the MSCP.
		
		4. Feedback:
		    • Reactor power trend, power spikes, reactor short period alarms.
		    • Injection system flow rates into RPV.

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Event Description: Critical Task #5

Cue:

Time	Position	Applicant's Actions or Behavior
		During an ATWS after RPV water level drops below -25 inches, and when RPV level cannot be restored and maintained above MSCRWL (-25"), RO initiates Emergency Depressurization as directed by US. 1. Safety Significance: • Maintaining adequate core cooling. 2. Cues: • Procedural compliance. • RPV level indication. 3. Measured by: • At least 5 SRV's are opened when RPV level cannot be restored and maintained above -25". 4. Feedback: • RPV pressure trend. • Suppression Pool temperature trend. • SRV open status indication.

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Event Description: Critical Task #6

Cue:

Time	Position	Applicant's Actions or Behavior

		With RPV pressure <MSCP, slowly increase and control injection into RPV to restore and maintain RPV level above MSCRWL (-25") as directed by US.
		
		1. Safety Significance:
		      • Maintaining adequate core cooling and preclude possibility of large power excursions.
		
		2. Cues:
		      • Procedural compliance.
		      • RPV pressure indication.
		
		3. Measured by:
		      • Observation - Injection not commenced until less than MSCP, and injection controlled such that power spikes are minimized, level restored and maintained greater than or equal to -25".
		
		4. Feedback:
		      • RPV level trend.
		      • RPV pressure trend.
		      • Injection system flow rate into RPV.