Facility: Perry **Scenario No.:** 1 – 100% **Op-Test No.:** 2015-1

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

Initial Conditions: The Unit is operating at rated power. CRDH 'B' Pump tagged out for the work schedule, NCCW 'C' Pump tagged out for packing repair. Motor Feed Pump is OOS due to water in the lube oil. SLC 'A' pump was tagged out last shift for an oil leak. Control rod 46-55 is inserted due to slow to settle. Control Room Humidification boiler (M29) is tagged out for repairs. HPCS ESW is running for the monthly PTI. PSA risk is GREEN. Grid is NORMAL

Turnover: Shift TBCC Pumps from 'A' to 'C' for an oil change on 'A' pump. An NLO has been briefed and is on station.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Shifts TBCC pumps A→C
2	pt01_1c11n0012a	I(SRO)	1C11N012A fails high - SDV High → Half Scram 1C11-N601A trip unit pegged high TS 3.3.1.1 Cue – ARI-H13-P680-5-A7 & A9
3	bs02_1b21-n0668b & bs02_1b21n0668f	R(ATC) C(BOP) C(SRO)	Inadvertent SRV Opening → lower Rx power to 96% ONI-B21-1 & ONI-C51 T.S. 3.4.4, 3.6.1.6, & 3.3.6.4 Cue – ARI-H13-P601-19-A7 & B7
4	pt01_1p41n0033	C(ATC)	MTLO TCV controller fails down causing oil temp to increase Cue – ARI-H13-P680-15-A3
5	MS11	C(BOP)	SSE Pressure Control valve failure ONI-N62, ONI-C51 Cue – ARI-H13-P870-7-C1
6	mv05_1g33f004	C(ATC)	Inadvertent 2 SRV Openings - Actions to close will be ineffective → ATC to scram ONI-B21-1, EOP-2 Cue – ARI-H13-P601-19A-A7 & B7
7		M(ALL)	Scram on rising Suppression Pool temperature EOP-1
8	cb03_1n514mcs	I(ATC)	RPS fails – ARI inserts some rods → EOP-1A SLC B pump suction valve loses power preventing SLC B from starting
9	cb01_1b33s105a & cb01_1b33s105b	C(BOP)	RHR C fails to auto start on T&P NOP-OP-1002, NOBP-OP-1002
10		M(ALL)	Emergency Depressurize on HCL, EOP-4-2.

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

Driver	**Driver**	Simulator Setup: Reset Simulator to IC 29 Load Schedule File: NRC-2015-S1.sch Change **Init.dat** file to **Exam Init.dat** file Restart ICS
Driver	**Driver**	Verify Initial Conditions: Reactor Power 100%. BOL Pull Sheets Book OTLC-3058 2014-06 Seq. A1, Rods @ Step 61, verify all previous steps are signed off as complete IOI-3 Step 4.6 is complete. Verify all completed steps are signed off. N21-F220 manual control adjusted so that N21-R710 (N21-F230) is reading 75-85% open Verify TBCC C in standby Verify HPCS ESW running CRDH B is OOS – put on a yellow switch cap NCC C is OOS – put on a yellow switch cap Motor Feed Pump is OOS – put on yellow switch caps SLC A is OOS – place sw in INOP, put on a yellow switch cap and update the status board
Driver	**Driver**	Initial Conditions: The Unit is operating at rated power. CRDH 'B' Pump tagged out for the work schedule, NCCW 'C' Pump tagged out for packing repair. Motor Feed Pump is OOS due to water in the lube oil. SLC 'A' pump was tagged out last shift for an oil leak. Control rod 46-55 is inserted due to slow to settle. Control Room Humidification boiler (M29) is tagged out for repairs. HPCS ESW is running for the monthly PTI. PSA risk is GREEN. Grid is NORMAL Turnover: Shift TBCC Pumps from 'A' to 'C' for an oil change on 'A' pump. An NLO has been briefed and is on station.

		SOI-P44 Section 7.2
	Driver	Role play as NLO and RP as directed
	BOP	Perform SOI-P44 Section 7.2 to shift TBCC pumps 7.2.1 Start TBCC pump C 7.2.2 Stop TBCC pump A
	Driver	If NLO dispatched to observe the pump shift, report oil level is good and the pump is ready to start.
	BOP	Report to SRO that pump shift is complete

		ARI-H13-P680-5-A7 & A9 Tech Specs
	Driver	When directed initiate **Event 2**. Role play as needed
	ATC	Announce ½ Scram due to SDV volume high level
	BOP	Walkdown back panel to determine SDV levels on instruments 1C11-N601A-D
	Evaluator	When BOP looks at instrument 1C11-N601A report the trip unit pegged high with the TRIP and GROSS FAIL lights on, report trip units 1C11-N601B, C, & D are indicating '0' with no lights on.
	SRO	Direct subsequent actions for ARI-H13-P680-5-A7 4.2.1→4.2.4 Verify SDV vents and drains open
	ATC	Verify SDV vents and drains open and report to SRO
	ATC or BOP	Request assistance from I&C for the failed trip unit
	Evaluator	When requested, role play as I&C technician to troubleshoot the failed trip unit
	SRO	Refer to the PDB and Tech Specs T.S. 3.3.1.1 function 8.a Action A – place channel in trip in 12 hours

		ARI-H13-P601-19-A7 & A8 ONI-B21-1 ONI-C51 Tech Specs
	Driver	When directed initiate **Event 3**. Role play as Reactor Engineering to support ONI-C51, and as an NLO when directed
		ONI-B21-1 Immediate Actions 3.1 Prior to Suppression Pool temperature reaching 110 degrees or RPV pressure reaching 1065 psig Scram the Reactor 3.3 Evacuate the Containment 3.4 Reduce Rx power using flow to ≤ 96% 3.5 When Rx power is ≤ 96% then perform the following 3.5.1 Verify Reactor Pressure is less than 1033 psig. 3.5.2 Attempt to close the open SRV by taking both switches to off
	BOP	Make announcement for SRV open and to Evacuate Containment
	ATC	Reduce Rx power using flow to ≤ 96%
	Evaluator	Power reduction should be done immediately and without waiting for direction
	BOP	When Rx power is ≤ 96% attempt to close the open SRV by taking both switches to off **(Critical Task #1)**
	Evaluator	The SRV will close when the division 2 switch is taken to off.
	ATC	Inform SRO that the SRV that was open was 1B21-F051D - low-low set valve
	SRO	Enter ONI-B21-1 and ONI-C51 and make announcement.
	BOP	Walkdown back panel to determine SRV trip unit status
	Evaluator	When BOP walks down the back panel for SRV trip unit status inform him that 1B21-N668B and F trip lights are 'on'
	SRO	Direct ONI-C51 steps C51-4 Monitor Nuclear instruments for oscillations C51-5 Perform ONI-SPI-G-4 Power verification C51-15 Confirm Jet Pump operation within established limits
	ATC	Monitor nuclear instrumentation for oscillations and Scram the Rx if any occur
	SRO	Direct Reactor Engineering or BOP to perform ONI-SPI-G4 Power Verification
	SRO	Direct Supplemental Actions of ONI-B21-1 4.3 Confirm Main Generator output has returned to normal 4.4 Place RHR in Suppression Pool (SP) Cooling per hardcard 4.5 Evaluate entry into EOP-02 Primary Containment Control 4.6 Monitor SP temp with SVI-D23-T1213 4.7 Determine if an EAL has been exceeded
	ATC	When directed verify Mn Generator output has returned to normal after SRV closes

	SRO	Refer to tech specs 3.4.4 SRVs – PLCO for SRV 1B21-F051D 3.6.1.6 LLS SRV – Action A for 1 inop LLS SRV- restore in 14 days 3.3.6.4 SRV instruments – Action A for one trip system inop – restore in 7 days
	SRO	Enter EOP-02 when suppression pool temp is >95°F
	Evaluator	EOP-02 may not be entered if the suppression pool temperature remains below 95°F
	SRO	Direct EOP-02 actions Suppression Pool Temperature Control leg • Control temp <95°F using RHR • When SP can't be maintained <95°F Maximize SP Cooling • Before SP temp reaches 110°F enter EOP-01 • Before HCL limits are exceeded Initiate SPMU • When HCL cannot be restored and maintained below HCL by pressure control then ED
	BOP	When directed start RHR in suppression pool cooling per the hardcard
	Evaluator	Suppression pool cooling may not be started if the suppression pool temperature remains below 95°F

		ARI-H13-P680-15-A3
	Driver	When directed initiate **Event 4**. Role Play as an NLO when needed.
	ATC	Announce Main Turbine Oil Temp High alarm
	ATC	Troubleshoot the MTLO controller 1N34-R032 and determine it has failed closed.
	Evaluator	MTLO temp indication on the controller will be going down as the controller fails down. Actual oil temperature will be going up. The ATC may take manual control of the temperature controller.
	ATC	Notify the SRO of the actions to control temperature, either manual control of the controller or throttling open the TCV bypass.
	Evaluator	Manual control of the MTLO temp controller will restore lube oil temperature
	Driver	If directed to look at the MTLO cooler TCV, inform the control room that it is closed.
	SRO	Assign limits and an owner to control lube oil temperature
	SRO	Direct subsequent actions of ARI-H13-P680-15-A3 4.1 Verify proper operation of Service Water 4.3 Verify proper operation of the MTLO temp controller 1P41-R032 4.4 Adjust MTLO temp to 110-120°F 4.5 Verify closed TBCC HX SW TCV BYP 1P41F390 4.6 If required throttle open MTLO TCV bypass 1P41F350 to maintain 110-120°F on 1N34-R135
	BOP	When directed observe the Service Water system for proper operation.
	Evaluator	BOP should observe SW header pressure in the range of 55-60 psig.
	BOP	When directed Verify closed TBCC HX SW TCV BYP 1P41-F390
	ATC	When directed throttle open MTLO TCV bypass 1P41F350 to maintain 110-120°F on 1N34-R135 Report MTLO temperature returned to the normal band

		ARI-H13-P870-7-C1 SOI-N33 ONI-N62 ONI-C51
	Driver	When directed initiate **Event 5** Role play as an NLO when needed
	Driver	Be ready to initiate Event 6 if directed
	BOP	Announce the alarm
	SRO	Direct supplemental actions of ARI-H13-P870-7-C1 4.2.1 Verify steam supply valve lineup 1N33-F010, F020, and F040 Open 4.2.2 If Steam Seal header control valve has failed then manually control steam seal header pressure per SOI-N33 4.2.3 If necessary manually control Steam Seal Evaporator Main Steam Supply per SOI-N33 4.2.4 Refer to SOI-N33 Adjustment of System Parameters
	Evaluator	The crew may enter ONI-N62 and ONI-C51 if vacuum degrades and reduce Rx power to stabilize vacuum.
	Driver	If asked to start Aux Boiler, tell them it will take 4 hours
	BOP	Take manual control of Steam Seal header pressure per SOI-N33 Section 7.6, announce control to SRO 7.6.1 Throttle closed the St Seal Evap to Hdr Supply Vlv 1N33-F065 to obtain 2-4 psig on Steam Seal Evaporator Hdr Press 1N33-R083 7.6.2 Throttle open the St Seal Evap to Hdr Supply Bypass 1N33-F075 to obtain 4-6 psig on Steam Seal Evaporator Hdr Press 1N33-R083 7.6.3 Repeat steps 7.6.1 and 7.6.2 until the St Seal Evap to Hdr Supply Vlv 1N33-F065 is closed 7.6.4 Throttle the St Seal Evap to Hdr Supply Bypass 1N33F075 to maintain steam seal header pressure at 3-5 psig
	Evaluator	The 1N33-F075 valve must be held in OPEN for about a minute before steam seal header pressure responds.
	Evaluator	The crew will scram the reactor if vacuum degrades to 6” HGA per the Margins and Limits hardcard
	Evaluator	If the crew decides to scram the reactor due to vacuum concerns Initiate **Event 6**

		ARI-H13-P601-19-A7 & B7 ONI-B21-1 ONI-C51 EOP-2 Tech Specs
	Driver	When directed initiate **Event 6.** Role play as Reactor Engineering to support ONI-C51, and as an NLO when directed
		ONI-B21-1 Immediate Actions 3.1 Prior to Suppression Pool temperature reaching 110 degrees or RPV pressure reaching 1065 psig Scram the Reactor 3.3 Evacuate the Containment 3.4 Reduce Rx power using flow to ≤ 96% 3.5 When Rx power is ≤ 96% then perform the following 3.5.1 Verify Reactor Pressure is less than 1033 psig. 3.5.2 Attempt to close the open SRV by taking both switches to off
	BOP	Make announcement for ONI entry and to Evacuate Containment
	ATC	Reduce Rx power using flow to ≤ 96%
	Evaluator	Power reduction was complete in Event 3
	BOP	When Rx power is ≤ 96% attempt to close the open SRV by taking both switches to off
	SRO	Direct EOP-02 actions Suppression Pool Temperature Control leg • Control temp <95°F using RHR • When SP can't be maintained <95°F Maximize SP Cooling • Before SP temp reaches 110°F enter EOP-01 • Before HCL limits are exceeded Initiate SPMU • When HCL cannot be restored and maintained below HCL by pressure control then ED
	SRO	When SRVs remain open, order ATC to Scram the Rx when SP temp is 95°F (Margins and Limits hardcard)
	BOP	When directed, start RHR in suppression pool cooling per the hardcard
	ATC	Initiate a manual scram and place the mode switch in shutdown prior to Suppression Pool temperature reaching 110 degrees **(Critical Task #2)**
	Evaluator	The ATC may scram the Rx without direction based on Suppression Pool Temp rate of rise.

		EOP-01 RPV Control
	Evaluator	EOP-01 must be entered and the Reactor Shutdown prior to Suppression Pool temperature reaching 110 degrees EOP-02 step STC-04 and ONI-B21-1 step 3.1
	ATC	Initiate a manual scram and place the mode switch in shutdown prior to Suppression Pool temperature reaching 110 degrees **(Critical Task #2)**
	SRO	Enter EOP-01
	Evaluator	All control rods do not go in after the scram, ARI inserts some rods, SLC 'B' suction valve fails to open
	ATC	Perform Scram Hard Card Actions (OAI-1703 att. 10) 1. Initiate ARI 2. Transfer RR pumps to slow speed 3. If Rx power is >4% Start SLC A and B and Inhibit ADS (Will be performed by BOP) 4. Make crew announcement 5. When generator load is <90 MWe trip the main turbine • Verify Main Stop valves, Control Valves, and CIVs shut • Gen breakers S610 and S611 open • Gen field breaker open 6. Insert SRMs and IRMs 7. Verify HST level control N21-S19 in off 8. Stabilize Rx water level using Feedwater hard card 9. Stabilize Rx pressure using Pressure Control hard card
	ATC	EOP-01 step RC-1 Verify mode switch locked in Shutdown
	ATC	Report all rods not inserted, failure of Rx to scram, Rx Power >4%
	SRO	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram

		EOP-01A Level Power Control
	SRO	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram
	SRO	Direct EOP-01A actions Reactor Power Control leg • Trip the Recirc pumps is APRMs are not downscale • Insert Control Rods SPI 1.1-1.7 • Initiate SLC and inhibit ADS • Initiate Alternate Boron Injection SPI 1.8 Reactor Level Control leg • Stabilize Rx water level • Verify Isolations and Actuations • Inhibit ADS • Maintain MSIVs open and bypass ECCS interlocks SPI 2.3 • Terminate and Prevent (T&P) ECCS Injection • Terminate and Prevent Feedwater Injection • When APRMs are downscale give a level band -25 to no more than 100” • Start Hydrogen Igniters and Analyzers • When ED is required Terminate and Prevent Feedwater and ECCS • When RPV pressure is <MSCP (140 psig) inject to restore Rx level to -25 to no more than 100” Reactor Pressure Control Leg • Stabilize Reactor Pressure
	Evaluator	SLC A is OOS and SLC B suction valve fails to open – SLC B will not start
	BOP	Start SLC B and announce the failure to start Inhibit ADS **(Critical Task #4)** Verify RWCU has isolated.
	BOP	Verify Isolations and Actuations hardcards
	BOP	Maintain MSIVs open and bypass ECCS interlocks EOP-SPI-2.3
	ATC	Insert control rods using CRDH EOP-SPI-1.3 (**Critical Task #3)**
	BOP	When directed, Terminate and Prevent ECCS injection – hardcard **(Critical Task #5)**
	Evaluator	RHR C pump will fail to start on T & P, operator action will be required to start the pump
	BOP	Upon discovery that RHR C pump failed to start, start the RHR pump and inform

		the SRO
	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."
	ATC	Terminate Feedwater Injection hardcard **(Critical Task #5)**
	BOP	Start Hydrogen Igniters and Analyzers hardcard
	ATC	Report to SRO when APRMs are downscale and report Rx level
	ATC	Maintain directed Rx Level Band
	SRO	Recognize when Suppression Pool Temperature can't be restored and maintained below HCL and go to EOP-04-2 Emergency Depressurization
	Evaluator	ED will not be required if RPV pressure is controlled to maintain suppression pool temperature less than HCL Critical Tasks #6, 7, & 8 will not be evaluated)
	SRO	Direct T&P of ECCS and Feedwater for ED **(Critical Task #6)**
	ATC	T&P Feedwater hardcard **(Critical Task #6)**
	BOP	T&P ECCS hardcard **(Critical Task #6)**
	BOP	Once T&P of ECCS and Feedwater has been completed – Open all ADS valves or 8 SRVs **(Critical Task#7)**
	SRO	When RPV pressure is <MSCP (140 psig) inject to restore Rx level to -25 to no more than 100" **(Critical Task #8)**
	ATC/BOP	When directed commence injection to restore Rx level to -25 to no more than 100" **(Critical Task #8)**

		NOP-OP-1002 NOBP-OP-1002
	Driver	Role play as an NLO when needed
	Evaluator	RHR C will fail to start on a Rx Level-1 signal
	BOP	Recognize that RHR C failed to start on a Rx Level-1 signal and inform the SRO
	BOP	Start RHR C
	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.”

		EOP-04-2 Emergency Depressurization
	Evaluator	ED will not be required if RPV pressure is controlled to maintain suppression pool temperature less than HCL Critical Tasks #6, 7, & 8 will not be evaluated)
	SRO	Recognize when Suppression Pool Temperature can't be restored and maintained below HCL and go to EOP-04-2
	SRO	Direct T&P of ECCS and Feedwater and Emergency Depressurization **(Critical Task #6)**
	ATC	T&P Feedwater hardcard **(Critical Task #6)**
	BOP	T&P ECCS hardcard **(Critical Task #6)**
	BOP	Once T&P of ECCS and Feedwater has been completed – Open all ADS valves or 8 SRVs **(Critical Task#7)**

		1. Reactor depressurized to less than or equal to 140 psig
		2. Injects to maintain level between -25” and +100”
		3. Control Rods are being inserted

		With a SRV open due to failure or incorrect automatic actuation, initiate action to close the SRV. 1. Safety Significance: • Preclude exceeding T.S. limit. • Degradation of fission product barrier. 2. Cues: • Procedural compliance. • "SRV OPEN" annunciator status. 3. Measured by: • Observation - SRV 1B21-F051D closed by placing the Div 2 control switch in OFF as required by ONI-B21-1 subsequent actions. 4. Feedback: • SRV status indications.

		Prior to exceeding 110° in the Suppression Pool, crew places REACTOR MODE SWITCH in SHUTDOWN. 1. Safety Significance: • Prevent a violation of the facility license condition (T.S. 3.6.2.1). 2. Cues: • Procedural compliance. • Suppression Pool temperature trend. 3. Measured by: • With rising Suppression Pool Temperatures, the REACTOR MODE SWITCH is placed in SHUTDOWN prior to exceeding 110°F in the Suppression Pool. 4. Feedback: • Reactor Power trend. • Control Rod indication.

		With reactor scram required and the reactor not shutdown, initiate action to reduce power by 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. 3. Measured by: • Control rod insertion commenced in accordance with Section 1.0 of EOP-SPI's. 4. Feedback: • Reactor Power trend. • Control Rod indication.

		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.

		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.

		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.

		When RPV pressure and Suppression Pool temperature cannot be maintained below HCL the US determines that Emergency Depressurization is required, RO initiates Emergency Depressurization as directed by US 1. Safety Significance: • Precludes failure of containment. 2. Cues: • Procedural compliance. 3. Measured by: • Observation - US determines (indicated by announcement or observable transition to EOP-04-2) that Emergency Depressurization is required before exceeding the HCL. **AND** • Observation - RO opens at least 5 SRV's during performance of Emergency Depressurization actions. 4. Feedback: • RPV pressure trend. • Suppression Pool temperature trend. • SRV open status indications.

		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.

ARI-H13-P680-5-A7
ARI-H13-P680-15-A3
ARI-H13-P870-7-C1
ONI-B21-1
ONI-C51
ONI-SPI-G4
ONI-N62
SOI-P44 7.2
SOI-N33 7.6
EOP-SPI-1.1 - 1.7
EOP-SPI-2.3
PDB-I-1 to 5 C11
TS 3.3.1.1
TS 3.4.4
TS 3.6.1.6
TS 3.3.6.4
Hardcards
SRO oversight checklist
E Plan charts

Facility: Perry **Scenario No.:** 2 – 90% **Op-Test No.:** 2015-1

Examiners: _____ **Operators:** _____ **(SRO)**

_____ _____ **(ATC)**

_____ _____ **(BOP)**

Initial Conditions: Reactor power is at 90%.Control rods are at Step 61. Control rod 46-55 is inserted due to slow to settle. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL

Turnover: Shift FHB Supply Fans from A to B for RSE troubleshooting flow indication, Dave Mackovjac and an NLO are standing by on station. Lower Rx Power to 85%, per the Reactivity Plan, for steam leak investigation in the NW MSR room. IOI-3 Att. 3 Step 1.4 is in progress.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Shift FHB Supply fans A→B
2		R (ATC)	Lower power with Control Rods & Flow
3	NM04D	C(ATC) C(SRO)	APRM "D" fails Down-scale → Bypass APRM T.S. 3.3.1.1, T.S. 3.3.1.3, ORM 6.2.1, & ORM 6.2.5 Cue – ARI-H13-P680-6-D4
4	PC18 & mv01_m17f0025	C (BOP) C (SRO)	M17-F020 Containment Vacuum Breaker Opens - requires closing M17-F025 and declaring the vacuum breaker INOP TS 3.6.1.11 Cue – ARI-H13-P800-2-A3
5	cb01_1b33s105a & cb01_1b33s105b	C(ATC)	Both RR pumps trip → Manual scram on no RR pumps running Cue – H13-P680-3-A9
6	RD15	M(ALL) C(BOP)	ATWS - EOP-1 → EOP-1A G33-F001 and F004 fail to auto close on SLC initiation
7	RD16	C(BOP)	Scram discharge volume leak requires containment spray
8	mv06_1e12f0537a	C(BOP)	Containment Spray valve 1E12-F537A fails closed, go to Containment Spray B

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

Driver	**Driver**	Simulator Setup: Reset Simulator to IC 27 Load Schedule File: NRC-2015-S2.sch Change **Init.dat** file to **Exam Init.dat** file Restart ICS
Driver	**Driver**	Verify Initial Conditions: Reactor Power 90%. BOL Pull Sheets Book OTLC-3058 2014-06 Seq A1, Rods @ Step 61, verify all previous steps are signed off as complete IOI-3 Step 4.6 is complete. Att. 3 Step 1.4 in progress. Verify all completed steps are signed off. Provide a copy of IOI-3 Att 3 with steps signed off to the crew N21-F220 manual control set at 0% APRM/OPRM D & H alarms reset
Driver	**Driver**	Initial Conditions: Reactor power is at 90%.Control rods are at Step 61. Control rod 46-55 is inserted due to slow to settle. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL Turnover: Shift FHB Supply Fans from A to B for RSE troubleshooting flow indication, Dave Mackovjac and an NLO are standing by on station. Lower Rx Power to 85%, per the Reactivity Plan, for steam leak investigation in the NW MSR room. IOI-3 Att. 3 Step 1.4 is in progress.

		SOI-M40 Section 7.2
	Driver	Role play as an RP technician to monitor the FHB while swapping fans. Role play as Dave Mackovjac to troubleshoot fan flow indication.
	BOP	SOI M40 Section 7.2 7.2.1 Direct RP to monitor the area prior to shifting fans 7.2.2 Take the offgoing FHB HVAC supply fan to Stop 7.2.3 Take the oncoming FHB HVAC supply fan to On
	Driver	When directed as RP to monitor the FHB in preparation for a FHB supply fan swap, tell the operator you are ready for the fan swap, proceed when ready.
	Driver	After the FHB supply fans are swapped, report as Dave Mackovjac that the FHB supply fan flow indication is in its normal band and he can leave the fan running.

		IOI-3 Att. 3 Reactivity Plan
	Driver	Role play as RP, Chemistry, and Unit Dispatch / ACC for the power change
	SRO	Direct the ATC to lower Rx Power to 85% with Control Rods and Flow. Provide Oversight.
	ATC	Notify RP, Chemistry, and Unit Dispatch / ACC of the intended power change.
	ATC	Lower Rx power to 85% using Control Rods and then Reactor Recirc flow. Keep A and B loop flows matched.
	ATC	Keep the Main Turbine load set 120 MWe above turbine load to a max of 1450 MWe
	ATC	Maintain N21-F230 between 75%-85% open by adjustment of N21-F220 manual control
	ATC	Monitor Main turbine control valve positions for proper response to the power change
	ATC	Monitor Average Power Range Monitors for proper response to the power change
	ATC	Notify the SRO when the power change is complete. Notify RP, Chemistry, and Unit Dispatch / ACC

		ARI H13-P680-6-D4 SOI-C51 (APRM) Tech Specs
	Driver	When directed initiate **Event 3** Role play as I&C to troubleshoot APRM D
	ATC	Makes announcement that APRM D has failed downscale
	BOP	Observe APRM D on the back panel for indication of the cause of the failure
	Evaluator	Inform the BOP operator that APRM D is as he sees it
	SRO	ARI-H13-P680-0006-D4 4.1 If an APRM has failed then bypass it
	SRO	Direct ATC to Bypass APRM D per SOI-C51 (APRM)
	ATC	Bypass APRM D per SOI-C51 (APRM) 7.4 7.4.3 Bypass APRM D with the joystick 7.4.5 Confirm that the bypass half of the downscale/bypass status light is on 7.4.6 Confirm that the APRM bypass status light is on at the APRM on the back panel
	SRO	Declare APRM D inop, and refer to tech specs T.S. 3.3.1.1 RPS instruments - PLCO for D APRM inop T.S. 3.3.1.3 OPRM - D should **not** be declared inop ORM 6.2.1 Rod block instruments – PLCO for D APRM inop ORM 6.2.5 Recirc flow rod block – APRM D downscale will **not** inop recirc flow

		ARI H13-P800-2-A3 Tech Specs
	Driver	When directed initiate **Event 4** Role play as I&C and an NLO as needed
	BOP	Make announcement that M17-F020 containment vacuum breaker is open
	BOP	Check Containment DP to determine if the vacuum breaker is open on a valid signal of approximately 0.1 psid. Indicators are 1M17-N037, N047, N018 and N027 on 1H13-P868 and P869 **(these indicators are not simulated)**
	Evaluator	When asked, the trip units are indicating a slightly positive pressure with no trip lights illuminated
	SRO	Direct the BOP operator to close 1M17-F025 per ARI-H13-P800-0002-A3
	BOP	Close 1M17-F025
	Driver	If an NLO is directed to look at the vacuum breaker in containment, tell him it looks like it is open slightly
	SRO	Refer to Tech Specs 3.6.1.11 Action A.1 One or Two vacuum breakers not closed – Close the MOV within 4 hours. Then initiate a PLCO for the inop vacuum breaker.

		ONI-C51 EOP-1 Tech Specs NOP-OP-1002
	Driver	When directed initiate **Event 5** Role play as Reactor Engineering to support ONI-C51, and as an NLO when directed
		ONI-C51 Immediate Actions If any of the following conditions exist • In Mode 1 or 2 and no Recirculation Pumps in operation Then Scram the Reactor
	ATC	Recognize that no Rx Recirc pumps are running and Scram the Reactor, Place the mode switch in shutdown
	Evaluator	The action to scram the reactor should be immediate, ATC should not wait for direction
	Evaluator	All control rods do <u>not</u> go in after the scram, G33-F001 & F004 fail to close on SLC initiation
	ATC	Report all rods not inserted, failure of Rx to scram, Rx power >4%
	SRO	Enter EOP-01
	ATC	Per EOP-1 verify mode switch locked in shutdown
	ATC	Perform Scram Hard Card Actions (OAI-1703 att. 10) 1. Initiate ARI 2. Transfer RR pumps to slow speed (They will be off) 3. If Rx power is >4% Start SLC A and B and Inhibit ADS (Will be performed by BOP) 4. Make crew announcement 5. When generator load is <90 MWe trip the main turbine • Verify Main Stop valves, Control Valves, and CIVs shut • Gen breakers S610 and S611 open • Gen field breaker open

		6. Insert SRMs and IRMs 7. Verify HST level control N21-S19 in off 8. Stabilize Rx water level using Feedwater hard card 9. Stabilize Rx pressure using Pressure Control hard card
	BOP	Start SLC A & B Inhibit ADS **(Critical Task #1)** Verify RWCU has isolated.
	BOP	Recognize that 1G33-F001 and F004 did not close on SLC initiation, notify the SRO and close 1G33-F001 and F004.
	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	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram

		EOP-01A Level Power Control
	SRO	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram
	SRO	Direct EOP-01A actions Reactor Power Control leg • Trip the Recirc pumps is APRMs are not downscale (They will be off) • Insert Control Rods EOP-SPI 1.1-1.7 • Initiate SLC and inhibit ADS • Initiate Alternate Boron Injection EOP-SPI 1.8 Reactor Level Control leg • Stabilize Rx water level • Verify Isolations and Actuations • Inhibit ADS • Maintain MSIVs open and override ECCS interlocks EOP-SPI 2.3 • Terminate and Prevent (T&P) ECCS Injection • Terminate and Prevent Feedwater Injection • When APRMs are downscale give a level band -25 to no more than 100” • Start Hydrogen Igniters and Analyzers • When ED is required Terminate and Prevent Feedwater and ECCS • When RPV pressure is <MSCP (140 psig) inject to restore Rx level to -25 to no more than 100” Reactor Pressure Control Leg • Stabilize Reactor Pressure
	BOP	Verify Isolations and Actuations hardcards
	BOP	Maintain MSIVs open and override ECCS interlocks EOP-SPI 2.3
	ATC	Insert control rods using EOP-SPI 1.1-1.7 (**Critical Task #2)**
	BOP	When directed Terminate and Prevent ECCS Injection – hardcard **(Critical Task #3)**
	ATC	Terminate Feedwater Injection hardcard **(Critical Task #3)**
	BOP	Start Hydrogen Igniters and Analyzers hardcard
	ATC	Report to SRO when APRMs are downscale and report Rx level
	ATC	Maintain directed Rx Level Band
	BOP	Per Pressure control hard card Trip RCIC if not needed for RPV level control

		EOP-02
	Driver	**Event 7** is automatically initiated from the Mode Switch
	ATC/BOP	Report a rise in containment and DW pressure (value and trend)
	SRO	Enter EOP-02 Containment Control
	SRO	Direct EOP-02 actions Containment Pressure control leg • Monitor and control containment pressure below 0.5 psig using normal means (Containment Ventilation and B/U purge) • Before containment pressure reaches PSP → Spray Containment
	SRO	Direct BOP operator to spray containment using RHR A & B using EOP-SPI-3.1 **(Critical Task #4)**
	Evaluator	Containment Spray valve 1E12-F0537A fails to open rendering Containment Spray A unavailable
	BOP	Initiate Containment Spray using RHR A and B per EOP-SPI-3.1 **(Critical Task #4)** 2.1 Bypass the hi DW pressure 1.68 psig signal if required 2.2 Confirm Containment pressure is above CSIL 2.3 Arm and depress Containment Spray A manual initiation pushbutton 2.4 Verify RHR A running 2.5 Verify ESW A running 2.6 Verify ECC A running 2.7 Verify the following valves open • Cntmt spray A first shutoff E12-F028A • Cntmt spray A second shutoff E12-F537A 2.8 Verify the following valves are closed • LPCI A injection E12-F042A • RHR A test valve to supr pool E12-F024A • SDC A to FDW shutoff E12-F053A • RHR Hx BPV E12-F048A

	BOP	Recognize that E12-F0537A did not open, and attempt to open the valve.
	BOP	Inform the SRO that Containment Spray A is not available
	BOP	Initiate Containment Spray using B per EOP-SPI-3.1 **(Critical Task #4)** 3.1 Bypass B hi DW pressure 1.68 psig signal if required 3.2 Confirm Containment pressure is above CSIL 3.3 Arm and depress Containment Spray B manual initiation pushbutton for at least 35 seconds 3.4 Verify RHR B running 3.5 Verify ESW B running 3.6 Verify ECC B running 3.7 Verify the following valves open • Cntmt spray B first shutoff E12-F028B • Cntmt spray B second shutoff E12-F537B 3.7.1 Verify the following valves are closed: ▪ LPCI B injection E12-F042B ▪ RHR B test valve to supr pool E12-F024B ▪ SDC B to FDW shutoff E12-F053B ▪ RHR Hx BPV E12-F048B
	BOP	Terminate Containment Spray prior to containment pressure reaching 0 psig per EOP-SPI-3.1 **Critical Task #5** 1.2.1 TAKE LPCI B INJECTION VALVE control switch to CLOSE. E12-F042B 1.2.2 VERIFY CNTMT SPRAY B MANUAL INITIATION pushbutton collar in DISARM. E12A-S63B 1.2.3 DEPRESS CNTMT SPRAY B SEAL IN RESET pushbutton to reset the Containment Spray initiation logic. E12A-S64B 1.2.4 CLOSE CNTMT SPRAY B SECOND SHUTOFF. E12-F537B 1.2.5 IF Combustible Gas Mixing System B is NOT running, THEN CLOSE CNTMT SPRAY B FIRST SHUTOFF. E12-F028B

		1. Control Rods are being inserted.
		2. Containment pressure maintained between 0 psig and CSIL
		3. Injection controlled to maintain level between -25” and +100”.

		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.

		With reactor scram required and the reactor not shutdown, initiate action to reduce power by 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. 3. Measured by: • Control rod insertion commenced in accordance with Section 1.0 of EOP-SPI's. 4. Feedback: • Reactor Power trend. • Control Rod indication.

		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.

		With Containment pressure exceeding the Containment Spray Initiation Limit (CSIL), and prior to reaching the Pressure Suppression Pressure, initiate Containment Spray. 1. Safety Significance: • Precludes degradation of a fission product barrier. 2. Cues: • Procedural compliance. • Containment pressure increase. 3. Measured by: • Observation - When above the CSIL, Containment Spray is manually initiated prior to reaching the Pressure Suppression Pressure. 4. Feedback: • Containment pressure. • "CONTAINMENT SPRAY START SIGNAL RECEIVED" annunciator status. • Containment Spray flowrate.

		With Containment pressure decreasing due to Containment Spray operation, before containment pressure drops to 0 psig, terminate Containment Spray. 1. Safety Significance: • Precludes degradation of a fission product barrier 2. Cues: • Procedural compliance. • Containment pressure decreasing due to Containment Spray operation. 3. Measured by: • Observation - Containment Spray terminated before containment pressure drops to - 0.1 psig on validated SPDS (less than 0 psig if SPDS not available). 4. Feedback: • Containment pressure. • Containment Spray flowrate. • Containment Spray valve status.

ARI-H13-P680-6-D4
ARI-H13-P800-2-A3
SOI-M40 7.2
SOI-C51 APRM 7.4
EOP-SPI-1.1 - 1.7
EOP-SPI-2.3
EOP-SPI-2.3
EOP 3.1
IOI-3 Att. 3
TS 3.3.1.1
ORM 6.2.1
TS 3.6.1.11
Hardcards
SRO oversight checklist
E Plan charts

Facility: Perry **Scenario No.:** 3 – 68% **Op-Test No.:** 2015-1

Examiners: _____ **Operators:** _____ **(SRO)**

_____ _____ **(ATC)**

_____ _____ **(BOP)**

Initial Conditions: Reactor power is at 68%. Raising power following repair of 6B FW heater. IOI-3 Att. 3 step 2.4 is in progress. Control Rods are at Step 61. RCIC is OOS due to an oil leak, waiting on the clearance. RFBP 'A' is OOS for motor replacement. Control rod 46-55 is inserted due to slow to settle. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL.

Turnover: Shift Condensate Booster Pumps from 'A' to 'C' due to elevated vibrations on the 'A' pump then continue raising Rx Power to 75% per the Reactivity Plan.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Shifts CBP A→C
2		R (ATC)	Raise power with flow
3	1h13p8003 ad6	C(BOP)	Drywell Cooling fan hi vibs → shift fans. Cue – ARI H13-P800-3-D6
4	pt01_1b21 n067c & pt01_1b21 n067g	C(SRO)	Inadvertent HPCS initiation due to keying a radio → BOP override HPCS off ONI-E12-1 & ONI-C51 TS 3.5.1 Cue – ARI-H13-P601-16-A5
5	PC02 & PC02	C(SRO)	Both Upper Containment airlock doors open at same time TS 3.6.1.2 Cue - ARI-H13-P680-7-C5
6	cb01_1b33 s105a & cb01_1b33 s105b	M(ALL) C(ATC)	NR level spike causes Turbine trip, a loss of all FW RPS and ARI fail in auto, ARI works manually Cue – ARI-H13-P680-3-A8
7	cb01_1n27 c0004	C(ATC)	Motor Feed Pump fails → use LP ECCS systems to fill vessel
8	multiple	C(BOP)	Div 1 and 2 ECCS Initiation Signal Fails on Rx Level 1
9		M(ALL)	Emergency Depressurize on Rx Low level, EOP-4-2.
10	rv04 x4	C(BOP)	Four ADS SRV's fail to open

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

Driver	**Driver**	<u>Simulator Setup:</u> Reset Simulator to IC 28 Load Schedule File: NRC-2015-S3.sch Verify schedule file NRC-2015-S3_1 loads Change **Init.dat** file to **Exam Init.dat** file Restart ICS
Driver	**Driver**	<u>Verify Initial Conditions:</u> Reactor Power 68%. BOL Pull Sheets Book OTLC-3058 2014-06 Seq A1, Rods @ Step 61, verify all previous steps are signed off as complete. Remove the reactivity plan and insert the 6B Feedwater Heater specific reactivity plan. IOI-3 Step 4.6 is complete. Att. 3 step 2.4 in progress. Verify all completed steps are signed off. N21-F220 manual control set at 0% Verify CBP C in standby RFBP A is OOS – put on a yellow switch cap RCIC turbine in secured status. Verify RCIC Inop switches in INOP. ECCS status board updated
Driver	**Driver**	<u>Initial Conditions:</u> Reactor power is at 68%. Raising power following repair of 6B FW heater. IOI-3 Att. 3 step 2.4 is in progress. Control Rods are at Step 61. RCIC is OOS due to an oil leak, waiting on the clearance. RFBP 'A' is OOS for motor replacement. Control rod 46-55 is inserted due to slow to settle. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL. <u>Turnover:</u> Shift Condensate Booster Pumps from 'A' to 'C' due to elevated vibrations on the 'A' pump then continue raising Rx Power to 75% per the Reactivity Plan.

		SOI-N21 Section 7.3, 4.4, 6.1
	Driver	Role play as an NLO to support the Condensate Booster Pump shift
	SRO	Directs ATC or BOP to shift Condensate Booster Pumps from A to C
	BOP or ATC	SOI-N21 Section 7.3 7.3.1 Verifies one Condensate Filter is in Manual (This is the normal lineup) 7.3.2 Starts Condensate Booster Pump C per section 4.4 7.3.3 Stops Condensate Booster Pump A per section 6.1 7.3.4 Verify only one RFP Seal Injection Pump is running
	Driver	7.3.1 If asked, inform ATC or BOP that the 'A' condensate filter is in manual
	Evaluator	ATC may not ask Turbine Tour rounds to verify one condensate filter in manual since this is the normal lineup for condensate
	BOP	Starts CBP C per SOI-N21 section 4.4 4.4.3 Verify the oncoming CPB oil pump is running 4.4.4 Verify the oncoming CBP suction and discharge are open 4.4.5 Take the oncoming CBP to start 4.4.6 Confirm discharge pressure increases to ~ 340 psig 4.4.7 Verify the hot surge tank level control remains in band
	BOP	Stop CBP A per SOI-N21 Section 6.1 6.1.2 Stop the offgoing CBP
	Evaluator	ATC may direct BOP operator to verify only one RFP seal injection pump is running
	BOP or ATC	Inform SRO that Condensate Booster Pumps have been shifted from A to C

		IOI-3 Att. 3
	Driver	Role play as RP, Chemistry, and Unit Dispatch / ACC for the power change
	SRO	Direct the ATC to raise Rx Power to 75% with flow. Provide Oversight.
	ATC	Notify RP, Chemistry, and Unit Dispatch / ACC of the intended power change.
	ATC	Raise Rx power to 75% using reactor recirc flow. Keep A and B loop flows matched.
	ATC	Keep the Main Turbine load set 120 MWe above turbine load to a max of 1450 MWe
	ATC	Maintain N21-R475 between 75%-85% by adjustment of N21-F220 manual control
	ATC	Monitor Main turbine control valve positions for proper response to the power change
	ATC	Monitor Average Power Range Monitors for proper response to the power change
	ATC	Notify the SRO when the power change is complete. Notify RP, Chemistry, and ACC

		ARI H13-P800-3-D6 SOI-M13 Section 7.2
	Driver	When directed initiate **Event 3**. Role play as an NLO to support the fan shift
	BOP	Makes announcement that there is a high vibration on Middle DW Cooling Fan 2A
	SRO	Direct swapping DW cooling fans from 2A to 2B (ARI action)
	BOP	SOI-M13 Section 7.2 7.2.1 Start the oncoming fan 7.2.2 Place the offgoing fan in standby 7.2.3 Confirm green status light is on for the standby fan
	BOP	Per ARI H13-P800-3-D6 Direct an NLO to depress the reset pushbutton on the vibration relay 1M13-N110A
	Driver	When the NLO is directed to reset the vibration alarm wait 5 minutes then remove malfunction 1H13P8003AD6. Notify the BOP operator that the vibration light was on and is now reset.
	BOP	Report to the SRO that the DW cooling fans have been shifted

		ARI H13-P601-16-A5 ONI-E12-1 ONI-C51 Tech Specs
	Driver	When directed initiate **Event 4.** Role play as an NLO, Rx Engineering and Chemistry to support troubleshooting HPCS start
	Evaluator	The instruments that tripped are 1B21-N0667C and N0667G
	BOP	Make announcement that HPCS has started and is injecting
	BOP	Walkdown the HPCS panel and observe and report that the D/G has started and HPCS ESW has started.
	SRO	Announce and enter ONI-C51 and ONI-E12-1
	ATC	Monitor Rx Power increase, FW flow decrease, and Turbine Load increase
	BOP	ONI-E12-1 Immediate Actions Unit Supervisor concurrence is required to override safety system operation. An ECCS system shall not be manually overridden unless one of the following is confirmed • Initiation is proven incorrect (beyond a reasonable doubt by two independent indications) • Continued operation is no longer necessary • Misoperation in automatic is confirmed 3.1 If HPCS initiation is incorrect or misoperation in automatic is confirmed, then take the HPCS pump to stop.
	Evaluator	The BOP operator must receive concurrence from the SRO prior to stopping the HPCS pump
	SRO	Concur with the override of the HPCS pump to stop
	Driver	Contact the control room as an NLO and report keying your radio in containment in a no radio zone by the HPCS instrument rack
	SRO	Direct Supplemental actions for ONI-E12-1 4.1 Close the HPCS injection valve 4.6 Refer to IOI-18 and perform RHR LOCA Isolation (Level 1 / 1.68#) Isolation Restoration (Performance of this step has no effect on the outcome of the scenario) 4.7 If an injection occurred then perform the following: • Notify the reactor engineer • Direct Chemistry to evaluate reactor water and Off-Gas Pre-treatment samples to ensure parameters have not been exceeded (pH, conductivity, chlorides) • If ICS is available then direct the shift engineer to archive data to aid in evaluating the event 4.8 Refer to tech specs 4.9 Restore the Condensate Storage Tank to normal level

		4.10 Restore the Suppression Pool to normal level
	Driver	When chemistry is called tell them you will obtain a Reactor Water Sample and an Off-gas Pretreatment Sample
	BOP	When directed, Close the HPCS injection valve 1E22-F004
	BOP	When directed perform RHR LOCA Isolation (Level 1 / 1.68#) Isolation Restoration per IOI-18
	Evaluator	When the BOP walks down the HPCS trip units on the back panel inform him they are all indicating normal with gross fail lights illuminated on 1B21N0667C and N0667G
	SRO	Direct ONI-C51 steps C51-4 Monitor Nuclear instruments for oscillations C51-5 Perform ONI-SPI-G-4 Power verification C51-15 Confirm Jet Pump operation within established limits
	SRO	Refer to Tech Specs. 3.5.1 ECCS-Operating
	Evaluator	The SRO should evaluate HPCS operability declare HPCS Inop while it is overridden off • T.S. 3.5.1 Action B – verify RCIC operable W/I 1 hour and D- Since RCIC is not operable Be in Mode 3 in 12 hours and Mode 4 in 36 hours

		ARI-H13-P680-7-C5 Tech Specs
	Driver	When directed initiate **Event 5** Role play as an NLO when directed
	ATC or BOP	Observe the matrix lights on H13-P601 to determine which airlock has both doors open
	SRO	Direct subsequent operator actions of ARI-H13-P680-7-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".
	SRO	Evaluate Tech Specs 3.6.1.2 Primary Containment Air Locks Action B Inop interlock mechanism: • 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

		ONI-C71-1 ONI-C34 EOP-01
	Driver	When directed initiate **Event 6**. Role play as an NLO as needed.
	Driver	10 minutes after the Scram verify #1 BPV fails to 60% open (**Event 20**)
	ATC or BOP	Make announcement for the Scram and evacuate containment
	ATC	Place the mode switch in Shutdown
	Evaluator	RPS and ARI fail in Auto, Manual ARI inserts all control rods. The Motor Feed Pump trips. HPCS trips.
	ATC	Perform Scram Hard Card Actions (OAI-1703 att. 10) 1. Initiate ARI (Rods go in on manual ARI) (**Critical Task #1**) 2. Transfer RR pumps to slow speed 3. If Rx power is >4% Start SLC A and B and Inhibit ADS (**Will not be required**) 4. Make crew announcement 5. When generator load is <90 MWe trip the main turbine • Verify Main Stop valves, Control Valves, and CIVs shut • Gen breakers S610 and S611 open • Gen field breaker open 6. Insert SRMs and IRMs 7. Verify HST level control N21-S19 in off 8. Stabilize Rx water level using Feedwater hard card 9. Stabilize Rx pressure using Pressure Control hard card
	SRO	Direct ATC to stabilize Rx water level using the Feedwater hard card and stabilize Rx pressure using Pressure Control hard card
	ATC	Perform Feedwater hard card (OAI-1703 att. 11) and Pressure Control hard card (OAI-1703 att. 14)
	BOP	Verify Isolations and Actuations (hardcard)
	ATC	Recognize that the Motor Feed Pump is not available and inform the SRO
	ATC	Using ONI-C34 Perform a Reactor Feed Pump Quick Restart section 4.4 Notify the SRO when the RFPT can't be restarted
	BOP	Recognize that the HPCS pump has tripped and is not available and inform the SRO
	Evaluator	At this time no high pressure injection or Feedwater is available
	SRO	Direct Low Pressure ECCS to be lined up for injection EOP-01 step RLC-4
	Evaluator	Div 1 and 2 Level-1 Initiation Signals
	BOP	Recognize that there was a failure of Div 1 and 2 ECCS Initiation Signal and initiate Div 1 and 2 ECCS.

	SRO	Direct Alternate Injection subsystem startup EOP-01 step RLC-6: • SLC demin water EOP-SPI 4.5 • CRD alternate injection EOP-SPI 4.1
	SRO	Direct Inhibit of ADS
	BOP	Inhibit ADS
	SRO	Direct Startup of Hydrogen Igniters and Analyzers EOP-01 step ALC-3
	BOP	Start Hydrogen Igniters and Analyzers hardcard
	SRO	Direct Emergency Depressurization when Rx water level reaches 0" but before -25" EOP-01 step ALC-8 **(Critical Task #2)**
	BOP	Perform Emergency Depressurization EOP-04-2 Open all ADS valves Recognize that all ADS SRVs did not open and notify the SRO **(Critical Task #2)**
	Evaluator	Four ADS valves fail to open
	SRO	Direct opening of additional SRV to obtain 8 valves open and to Bypass the Instrument Air isolation SPI 2.8 EOP-04-2 Step ED-4 **(Critical Task #2)**
	BOP	Open additional SRVs to obtain 8 valves open and bypass the Instrument Air isolation SPI 2.8 **(Critical Task #2)**
	SRO	Direct restoration of RPV level above -25 "
	BOP	When RPV pressure is <450# Verify LPCS is injecting into the RPV. Notify the SRO **(Critical Task #3)**
	SRO	When RPV water level is >-25" Direct RPV level band >16.5" (Band should be 150-219")

	Driver	Role play as an NLO if directed
	ATC	Recognize that the Motor Feed Pump is not available and inform the SRO
	ATC	Dispatch an NLO to determine the problem with the Motor Feed Pump
	Driver	When dispatched notify the control room that there is a large oil leak on the Motor Feed Pump
	ATC	Notify the SRO that the MFP will not be available

		NOP-OP-1002 4.10.3
	Driver	Role play as NLO as directed
	BOP	Recognize that the Div 1 and 2 ECCS initiation signals failed on a Rx level 1 signal and Inform the SRO
	BOP	Arm and Depress Div 1 and 2 ECCS Initiation push buttons
	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	Direct Emergency Depressurization when Rx water level reaches 0” but before -25” EOP-01 step ALC-8 **(Critical Task #2)**
	BOP	Perform Emergency Depressurization EOP-04-2 Open all ADS valves Recognize that all ADS SRVs did not open and notify the SRO**(Critical Task #2)**

	BOP	Perform Emergency Depressurization EOP-04-2 Open all ADS valves Recognize that all ADS SRVs did not open and notify the SRO**(Critical Task #2)**
	SRO	Direct opening of additional SRV to obtain 8 valves open and to Bypass the Instrument Air isolation SPI 2.8 EOP-04-2 Step ED-4 **(Critical Task #2)**
	BOP	Open additional SRVs to obtain 8 valves open and bypass the Instrument Air isolation SPI 2.8 **(Critical Task #2)**

		1. Rx is depressurized to allow Low Pressure ECCS to inject
		2. Rx Level maintained >0”

		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.

		After RPV water level drops to 0 inches, 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.

		With RPV pressure below the Shutoff Head of the available Low Pressure system(s), operate available Low Pressure system(s) to restore RPV water level above T.A.F. (0 inches). 1. Safety Significance: • Maintaining adequate core cooling. 2. Cues: • Procedural compliance. • Pressure below low pressure ECCS system(s) shutoff head. 3. Measured by: • Operator manually starts or initiates at least one low pressure ECCS system and injects into the RPV to restore water level above 0 inches. 4. Feedback: • Reactor water level trend. • Reactor pressure trend.

ARI-H13-P800-3-D6
ARI-H13-P680-7-C5
ONI-E12-1
ONI-C51
ONI-SPI-G4
ONI-C34
SOI-N21 7.3, 4.4, 6.1
SOI-M13 7.2
EOP-SPI-2.3
EOP-SPI 4.1
EOP-SPI 4.5
EOP-SPI 6.1-6.5
IOI-3 Att. 3
TS 3.6.1.2
TS 3.5.1
Hardcards
SRO oversight checklist
E Plan charts

Facility: Perry **Scenario No.:** 4 – 0% **Op-Test No.:** 2015-1

Examiners: _____ **Operators:** _____ **(SRO)**

_____ _____ **(ATC)**

_____ _____ **(BOP)**

Initial Conditions: The Reactor is in Mode 2 after a soft shutdown. A startup is in progress using IOI-2 with the Rx subcritical. Reactor pressure is ~620 psig. Pressure band is 600-800 psig using the Main Steam Line drains per IOI-5 attachment 1. RPV level band is 192-215 inches using the Motor Feed Pump. Rods are at Step 35, Gang 41 @ 12. The Motor Fire Pump is tagged out for bearing replacement. IRM 'H' is bypassed due to a card failure. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL

Turnover: Shutdown RWCU B Pump in prep for Reduced Feedwater Temperature Control. It will be shutdown < 4 hours and was not started with RPV temp <190°F. An RO from the OCC will place RWCU in Reduced Feedwater Temperature Control. Continue with the Reactor Startup using IOI-2 step 4.3.14

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Shutdown RWCU pump B
2	cp03_0g41c0003a	C (BOP)	FPCC Pump A low discharge pressure → Shift pumps Cue - ARI-H13-P970-1-C5
3	1H13P8002AF5	C (SRO)	Combustible Gas Mix Compressor B loses power TS 3.6.3.3 Cue: ARI-H13-P800-2-F5
4	H13P68091C1	C(ATC)	Isophase Bus Trouble Cue - ARI-H13P680-9-D1
5	RD01R1027	C-ATC	Continue with startup, discovers stuck control rod → use alt methods.
6		R(ATC)	Pull rods for criticality
7	cb01_1n62c0001a	C (BOP)	Vacuum Pump Trip Cue - ARI-H13-P870-7-G3
8	NM02B	I(SRO)	IRM B fails TS 3.3.1.1 Cue – ARI-H13-P680-6-D2
9	RC07	M-ALL	RCIC unisolable steam leak Cue - ARI-H13-P601-21-E2
10		M(ALL)	Scram prior to exceeding max safe area temperature
11	RD01 x 8	C(ATC)	ATWS → manually insert control rods

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

Driver	**Driver**	<u>Simulator Setup:</u> Reset Simulator to IC 31 Load Schedule File: NRC-2015-S4.sch Verify schedule files NRC-2015-S4-2, S4-3 & C11_Del load Change **Init.dat** file to **Exam Init.dat** file Restart ICS
Driver	**Driver**	<u>Verify Initial Conditions:</u> Reactor power 0%. BOL Pull Sheets Book OTLC-3058 2014-06 Seq A1, Rods @ Step 35, gang 41 @12, verify all previous steps are signed off as complete IOI- 2 Step 4.3.14. Verify all completed steps are signed off. IRM 'H' bypassed Motor Fire Pump OOS – put a switch cap on it Place the highest reading SRM recorder in fast speed
Driver	**Driver**	<u>Initial Conditions:</u> The Reactor is in Mode 2 after a soft shutdown. A startup is in progress using IOI-2 with the Rx subcritical. Reactor pressure is ~620 psig. Pressure band is 600-800 psig using the Main Steam Line drains per IOI-5 attachment 1. RPV level band is 192-215 using the Motor Feed Pump. Rods at Step 35, Gang 41 @ 12. The Motor Fire Pump is tagged out for bearing replacement. IRM 'H' is bypassed due to a card failure. Control Room humidification boiler (M29) is tagged out for repairs. PSA risk is GREEN. Grid is NORMAL <u>Turnover</u>: Shutdown RWCU B Pump in prep for Reduced Feedwater Temperature Control. It will be shutdown < 4 hours and was <u>not</u> started with RPV temp <190°F. An RO from the OCC will place RWCU in Reduced Feedwater Temperature Control. Continue with the Reactor Startup using IOI-2 step 4.3.14

		SOI-G33 Section 6.3
	Driver	Role play as NLO, Chemistry, and I&C as directed.
	SRO	Direct the BOP to S/D RWCU pump B per SOI-G33
	BOP	Shutdown RWCU pump B per SOI-G33 Section 6.3 6.3.1 If RWCU Pump B is to be shutdown direct chemistry to shutdown the MMS skid 6.3.2 Verify one or less F/D in service 6.3.3 Take RWCU pump B to Stop 6.3.4 Throttle the RWCU F/D Bypass to maintain inlet flow IAW Normal Ops (140-240 gpm) 6.3.7 Monitor Nuclear heat balance 6.3.8 If the Nuclear heat balance becomes invalid due to removal of RWCU from service, then refer to nuclear heat balance recovery operations
	Evaluator	If asked by the BOP or ATC the RWCU pump was not started with Rx Water Temp <190°F (SOI-G33 6.3.5 will be N/A)
	Evaluator	If asked, notify the BOP/ATC that the idle pump will not be shutdown for more than 4 hours (SOI-G33 6.3.6 will be N/A)
	BOP	Notify the SRO when the RWCU pump B shutdown is complete
	Driver	If asked to check out the RWCU F/D Trouble – reset the alarm and inform the BOP operator that RWCU F/D B had an intermittent low flow

		ARI-H13-P970-1-C5 SOI-G41 Section 7.4
	Driver	When directed initiate **Event 2**. Role play as NLO and RP as directed
	BOP	Recognize a problem with the FPCC A pump 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 check out the A pump – Inform the BOP that it looks normal on the camera with good oil level in the bubbler. If asked to go into the room, notify the BOP it will be a High Rad Entry and will take an hour to get there.
	BOP	Notify the SRO when the shift is complete
	Evaluator	The SRO may evaluate entry into ONI-E12-2

		ARI-H13-P800-2-F5 Tech Specs
	Driver	When directed initiate **Event 3**. Role play as NLO as directed
	BOP	Recognize that Combustible Gas Mix Compressor B has no power and inform the SRO
	BOP	Dispatch an NLO to the disconnect (EF1D08-T) for CGMC B to investigate the loss of power
	Driver	When requested to investigate the disconnect (EF1D08-T) for CGMC B – inform the BOP that the control power fuse is blown - no obvious reason
	SRO	Enter T.S. 3.6.3.3 Action A

		ARI-H13-P680-9-D1 SOI-R13 NOP-OP-1002
	Driver	When directed initiate **Event 4**. Role play as NLO as directed Observe the ATC Operator on a camera (cameras 1, 2, and/or 4) in order to initiate Event 13 in a timely manner.
	ATC	Recognize that Isophase bus duct fan A has tripped and the B fan has failed to start in 45 seconds. Notify the SRO
	ATC	Start the B Isophase bus duct fan. Notify the SRO
	Driver	When the ATC takes the B fan to Start, initiate **Event 13**
	Driver	If dispatched to Isophase fan A breaker F1C06-XH, Inform the ATC that the CØ main line fuse is blown
	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."
	Evaluator	The ATC may use SOI-R13 section 7.1 to shift fans 7.1.1 Verify oncoming ISO Phase Bus Clg Fan in Stby 7.1.2 Place off going ISO Phase Bus Clg Fan in Off 7.1.3 Place oncoming ISO Phase Bus Clg Fan in On 7.1.4 When the oncoming ISO Phase Bus Clg Fan starts, then place the second ISO Phase Bus Clg Fan in Stby.

		IOI-2 IOI-5 SOI-C11 (RCIS) Section 7.25
	Driver	Role play as NLO as directed
	SRO	Direct the crew to continue the plant startup
	ATC	Recognize that control rod 10-27 is not moving at normal drive pressure and inform the SRO
	SRO	Direct the use of Alternate control methods per SOI-C11 (RCIS)
	ATC	Perform alternate control methods per SOI-C11 (RCIS) Section 7.25 7.25.2 Raise drive pressure in 50 psid increments until the rod moves or max of 500 psid 7.25.3 If the rod is immovable at 500 psid then refer to ONI-C11-1 Inability to move rods 7.25.5 Return drive pressure to normal when one of the following is met: • The rod is at the withdrawal limit • Rod movement is suspended • Elevated pressure is no longer needed • Another control rod is to be selected 7.25.6 IV normal operating pressures 7.25.7 Annotate on the control rod movement sheet with the DP required to move the rod
	ATC	Notify the SRO when alternate controls are no longer needed
	Evaluator	The ATC should lower drive pressure to normal 250-275 psid prior to moving the next control rod

		IOI-2 IOI-5
	Driver	Role play as NLO, Chemistry, and RP as directed
	ATC	Continue plant startup, pulling rods to criticality per IOI-2 Step 4.3.15 to obtain a 60-150 second period
	ATC	Adjust control rod positions to maintain 60-150 second period until mid-scale IRM range 7
	SRO	Provide oversight for the startup
	ATC and Bop	Obtain post criticality data: 4.3.16 Time of Criticality 4.3.17 Record data on the ECP 4.3.20 Demand a control rod position log
	ATC and Bop	Perform IRM/SRM overlap. • IRMs should start to show a flux increase when the SRM count rate is 10^4 to 10^5 cps • Proper overlap is determined by the IRM indicating > 10/125 prior to the related SRM count rate exceeding 10^5 cps • If the related SRM is inoperable, IRM operability may be determined by IRM overlap with an adjacent SRM
	Evaluator	All IRMs will have proper overlap
	ATC	Adjust the IRM range as power increases to maintain between 25/125 and 75/125
	SRO	Verify IRMs are operable for T.S. 3.3.1.1
	ATC	Withdraw the SRMs to maintain 10^2 -10^5 cps
	Evaluator	SRMs should not be withdrawn prior to verifying SRM/IRM overlap
	ATC	When SRM/IRM overlap is complete and with all IRM on range 3 or above then withdrawal the SRMs from the core.
	Evaluator	When IRMs are on range 7 proceed to the next event

		ARI-H13-P870-7-G3
	Driver	When directed initiate **Event 7**. Role play as NLO as directed
	BOP	Recognize that the A MVP has tripped and notify the SRO
	BOP	Dispatch an NLO to investigate
	Driver	After 5 minutes inform the BOP that the overcurrent relay is tripped on F1B09
	BOP	Notify the SRO that the OC relay is tripped on the A MVP
	SRO	Direct the BOP to perform ARI-H13-P870-7-G3 subsequent actions to start the B MVP
	BOP	Per ARI-H13-P870-G3 Step 4.1 start the B MVP and notify the SRO
	Driver	If asked to walkdown the B MVP after the start, report that the pump is running normal with the seal water pump running and the cooling water valve is open

		ARI-H13-P680-6-D2 Tech Specs
	Driver	When directed initiate **Event 8**. Role play as I&C as directed
	ATC or BOP	Recognize there is a problem with IRM B and inform the SRO
	BOP	Walkdown the back panel for indications on IRM B
	Evaluator	Inform the BOP that IRM B is downscale. If he asks, there is no obvious reason it is downscale
	BOP	Report to the SRO that IRM B is indicating downscale, reason unknown
	SRO	Enter T.S. 3.3.1.1 Action A place channel in trip condition within 12 hours (two inop IRMs in trip system B)
	SRO	Evaluate Scramming the Rx due to the Rod Block and power decreasing
	Evaluator	The crew may elect to Scram the Reactor since power will be decreasing and a rod block will prevent moving rods. IRM B can't be bypassed since IRM H is Inop and bypassed.
	Driver	If the crew elects to scram the reactor, immediately initiate **Event 9** and proceed to next page.

		ARI-H13-P601-21-E2 ARI-H13-P601-21-D2 EOP-03 NOP-OP-1002
		EOP-01 EOP-01A
	Driver	When directed initiate **Event 9**. Role play as NLO as directed
	BOP or ATC	Recognize there is a steam leak in the RCIC room due to elevated room temperature
	Evaluator	The RCIC room communicates to the RWCU room. RWCU room temperatures will also be increasing.
	BOP	Evaluate RCIC and RWCU temperatures on the NUMAC and notify the SRO that max safe temperatures are being approached
	SRO	Upon receipt of the RCIC and/or RWCU room temperature alarms enter EOP-03
	SRO	Direct isolation of RCIC EOP-03 SCC-12
	BOP	Isolate RCIC and notify the SRO that RCIC won't isolate
	SRO	Enter EOP-01 and direct a Rx Scram prior to exceeding Maximum Safe Condition. EOP-03 SCC-16 **(Critical Task #1)**
	ATC	Scram the Rx. EOP-01 step RC-1 Verify mode switch locked in Shutdown **(Critical Task #1)**
	ATC	Notify the SRO that all control rods did not go in on the Scram and ARI
	SRO	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram and ARI
	ATC	Perform Scram Hard Card Actions (OAI-1703 att. 10) 1. Initiate ARI 2. Transfer RR pumps to slow speed (Won't be required) 3. If Rx power is >4% Start SLC A and B and Inhibit ADS (Won't be required) 4. Make crew announcement 5. When generator load is <90 MWe trip the main turbine (Won't be required) • Verify Main Stop valves, Control Valves, and CIVs shut • Gen breakers S610 and S611 open • Gen field breaker open

		6. Insert SRMs and IRMs 7. Verify HST level control N21-S19 in off (Won't be required) 8. Stabilize Rx water level using Feedwater hard card 9. Stabilize Rx pressure using Pressure Control hard card
	SRO	Direct EOP-01A actions Reactor Power Control leg • Insert Control Rods SPI 1.1-1.7 Reactor Level Control leg • Stabilize Rx water level • Verify Isolations and Actuations • Inhibit ADS • Maintain MSIVs open and bypass ECCS interlocks SPI 2.3 • Terminate and Prevent (T&P) ECCS Injection • Give a level band -25 to 219" • Start Hydrogen Igniters and Analyzers Reactor Pressure Control Leg • Stabilize Reactor Pressure • Depressurize the RPV, maintain cooldown < 100°F per hour
	SRO	Direct the ATC to Insert control rods per EOP-SPI 1.1-1.7 **(Critical Task #2)**
	ATC	Insert Control rods using EOP-SPI 1.1-1.7 **(Critical Task #2)**
	BOP	Verify Isolations and Actuations hardcards
	BOP	Inhibit ADS
	BOP	Maintain MSIVs open and bypass ECCS interlocks SPI 2.3
	BOP	When directed Terminate and Prevent ECCS injection – hardcard
	BOP	Start Hydrogen Igniters and Analyzers hardcard
	ATC	Maintain directed Rx Level Band

	SRO	Direct a controlled cooldown EOP-01A LPC/P7
	ATC	Commence a controlled cooldown, maintain cooldown < 100°F per hour
	Evaluator	All control rods can be inserted but one. If all control rods are inserted but one, the SRO will transition to EOP-01 and perform a controlled cooldown per EOP-01 RPC-5
	SRO	When all but one control rod is inserted transition to EOP-1 and direct Reactor Level Control Leg • Give a RPV level band of 150-219” Reactor Pressure Control Leg • Depressurize the RPV, maintain cooldown < 100°F per hour
	ATC	Maintain directed Rx Level Band
	SRO	Direct a controlled cooldown EOP-01 RPC-5
	ATC	Commence a controlled cooldown, maintain cooldown < 100°F per hour

		EOP-03
	Driver	Role play as NLO as directed
	SRO	Upon receipt of the RCIC and/or RWCU room temperature alarms enter EOP-03
	SRO	Direct isolation of RCIC EOP-03 SCC-12
	BOP	Isolate RCIC and notify the SRO that RCIC won't isolate
	SRO	Enter EOP-01 and direct a Rx Scram prior to exceeding Maximum Safe Condition. EOP-03 SCC-16 **(Critical Task #1)**
	ATC	Scram the Rx. EOP-01 step RC-1 Verify mode switch locked in Shutdown **(Critical Task #1)**

		EOP-01 EOP-01A ONI-C71-1
	Driver	Role play as NLO as directed
	ATC	Scram the Rx. EOP-01 step RC-1 Verify mode switch locked in Shutdown
	ATC	Notify the SRO that all control rods did not go in on the Scram and ARI
	SRO	Transition from EOP-01 to EOP-01A upon report that all rods did not insert on the Rx Scram and ARI
	SRO	Direct the ATC to Insert control rods per EOP-SPI 1.1-1.7 **(Critical Task #2)**
	ATC	Insert Control rods using EOP-SPI 1.1-1.7 **(Critical Task #2)**

		1. Rx Level maintained in band
		2. Control Rods Inserted → Transition to EOP-01
		3. Commence a controlled depressurization

		With reactor at power and with a primary system discharging into the secondary containment, manually scram the reactor before any area exceeds the maximum safe operating level. 1. Safety Significance: • Scram reduces to decay heat levels the energy that the RPV may be discharging into the secondary containment. 2. Cues: • Procedural compliance. • Secondary containment area temperature, level, and radiation indication. • Field reports. 3. Measured by: • Observation - With a primary system discharging into secondary containment, a reactor scram is initiated before a maximum safe condition is reached. **OR** • Observation - With a primary system discharging into secondary containment, US transitions to EOP-01 and RO initiates scam upon field report that a maximum safe condition has been reached. 4. Feedback: • Control rod positions. • Reactor power decrease.

		With reactor scram required and the reactor not shutdown, initiate action to reduce power by 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. 3. Measured by: • Control rod insertion commenced in accordance with Section 1.0 of EOP-SPI's. 4. Feedback: • Reactor Power trend. • Control Rod indication.

ARI-H13-P970-1-C5
ARI-H13-870-7-G3
ARI-H13-P601-21-D2 & E2
SOI-G33 6.3
SOI-G41 7.4
SOI-R13 7.1
SOI-C11 RCIS 7.25
EOP-SPI-1.1 - 1.7
EOP-SPI-2.3
IOI-2 4.3
TS 3.6.3.3
TS 3.3.1.1
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