

Exelon Nuclear

ILT 19-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 2**

Revision Number: 0

Date: 1/28/20

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Facility: Clinton Power Station Scenario No.: 2 Operating Test No.: 2021-301

Examiners: _____ Operators: _____

Initial Conditions:

- Mode 1 Rx Power at RTP.
- Weather conditions are calm and clear.
- MC Pump 'A' (0MC01PA) is OOS for maintenance. Not expected back this shift.

Turnover:

- On the previous shift, the Drywell was vented per CPS 3316.01 Containment Combustible Gas Control (HG) to support performance of CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
- First Priority – Perform CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
- Maintain power at RTP throughout the shift.

Critical Tasks:

- **[CT-1]** Inserts control rods to lower power below 65% to exit MELLLA within 10 minutes of tripping 'B' Reactor Recirculation pump.
- **[CT-2]** Enters and executes EOP-3 Emergency RPV Depressurization within 15 minutes of 2 or more of the following areas exceeding max safe temperature values of EOP-8 Table T Area Temperature Limits:
 - Point 14 1TR-CM326 (Upper Recorder) - Aux Bldg Below MS Tunnel > 200°F
 - Point 18 1TR-CM326 (Upper Recorder) - Aux Bldg Steam Tunnel > 200°F
 - Point 15 or 16 1TR-CM327 (Lower Recorder) - Aux Bldg MSIV Room A or B > 200°F

Event No.	Malif. No.	Event Type*	Event Description
1	N/A	N-BOP	Drywell Vacuum Breaker Test
2	YP_XMFTB_4102	I-BOP TS-SRO	(NEW) Spurious HPCS auto initiation
3	SA01B1SA1CFO SA01B0SA1CFTC	C-BOP	#1 SA Compressor trips with failure of Standby Compressor to Auto Start
4	RRB_HORZ_MALF 21.7 MILS RRB_VERT_MALF 21.1 MILS	C-ATC TS-SRO	(NEW) RR Pump 'B' high vibration
5	N/A	R-ATC	Reduce power to <65% with Control Rods
6	YP_XMFTB_4965 ROD0437TFIA4 ROD5221TFIA4	C-ATC	(NEW) RR Pump 'A' trip
7	YPMALSE_256 0.08%	M-All	(NEW) Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown
8	YAFWHVFP_9 0%	C-All	(NEW) FRV 1FW004 Fails Shut
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor NEW – Not used on the previous two (2) NRC exams.			

Scenario No.: 2

Operating Test No.: 2021-301

Narrative Summary

Event #	Description
1.	<p>Drywell Vacuum Breaker Test Following shift turnover, the SRO will direct the BOP Operator to perform CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.</p>
2.	<p>Spurious HPCS auto initiation High Pressure Core Spray (HPCS) initiates with no operator action. The following annunciators are received: 5062-3C RUNNING DIESEL GEN 1C, 5062-4E HPCS PUMP AUTO START, 5064-1B AUTO START SSW PUMP 1C and 5064-4B AUTO START DG FUEL OIL XFER PUMP 1C. IAW CPS 3309.01 High Pressure Core Spray (HPCS), the crew will verify by at least <u>two</u> independent indications that misoperation in automatic is confirmed <u>or</u> adequate core cooling is assured. Once confirmed, the SRO will direct the BOP operator to secure HPCS. Technical Specification LCO 3.5.1 Actions B.1 and B.2 will be evaluated requiring verification by administrative means that the RCIC system is operable when required AND the HPCS system is restored to operable status within 14 days.</p>
3.	<p>#1 SA Compressor trips with failure of Standby Compressor to Auto Start Annunciator 5041-1A AUTO TRIP PUMP/MOTOR is received due to a trip of the #1 Service Air Compressor (1SA01C). The SRO will enter CPS 4004.01 Instrument Air Loss and direct the BOP to start the standby Service Air Compressor (0SA01C). If the crew fails to manually start 0SA01C, the air compressor will fail to automatically start to restore air pressure.</p>
4.	<p>RR Pump 'B' high vibration Annunciator 5003-2K RECIRC PMP B MTR VIBR HI is received. BOP will determine 'B' RR Pump vibration levels are ≥ 20 mil P-P 'steady' on both probes. ATC will perform RR Loop 'B' Emergency Shutdown. SRO will enter CPS 4008.01 Abnormal Reactor Coolant Flow, CPS 4002.01 Abnormal RPV Level/Loss of Feedwater At Power, CPS 4100.02 Core Stability Control and ITS LCO 3.4.1 B.1 and C.1.</p>
5.	<p>Reduce power to < 65% with Control Rods The SRO will direct ATC to lower reactor power to $\leq 58\%$ RTP IAW TS LCO 3.4.1 B.1 based on having one recirculation loop in operation.</p>
6.	<p>RR Pump 'A' trip Annunciator 5003-1F RECIRC PMP A MTR BRKR Trip is received due to a trip of the 'A' RR Pump. With no RR Pumps operating with the mode switch in RUN, the ATC will place the mode switch in shutdown (IAW CPS 4008.01 Abnormal Reactor Coolant Flow).</p>
7.	<p>Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown When the mode switch is taken to shutdown, two control rods will fail to insert requiring entry into EOP-1 RPV Control and then transitioning into EOP-1A ATWS RPV Control. Annunciator 5065-6F Sec. Cnmt. Area High Temp will be received. The BOP/ATC will initially monitor secondary containment temperatures and will report multiple rising temperatures on recorders 1TR-CM326/327. When temperatures exceed max normal values, EOP-8 Secondary Containment Control and CPS 4001.01 Reactor Coolant Leakage will be entered. Neither the automatic Group 1 isolation or manual attempts to isolate the steam leak will be successful. Once two areas have exceeded max safe values, the SRO will direct a blowdown per EOP-3 Emergency RPV Depressurization.</p>
8.	<p>FRV 1FW004 Fails Shut With the feedwater regulating valve (FRV) 1FW004 failed shut, any automatic RPV injection via the MDRFP or CD/CB will be unavailable. Per EOP-1A ATWS RPV Control and EOP-3 Emergency RPV Depressurization, the SRO will direct RPV injection via HPCS and LPCI/LPCS to be terminated and prevented. The BOP will initiate ADS and verify that 7 ADS valves open. The operating crew will monitor RPV pressure and recommence RPV injection with CD/CB via 1FW003A/B IAW CPS 4411.03 Injection/Flooding Sources when RPV pressure reaches 150 psig. The scenario is terminated when reactor power is below 5% and reactor water level is being maintained between -162" and Level 8 (+52").</p>

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Drywell Vacuum Breaker Test		
Initiation: Following shift turnover and as directed by the SRO.		
Cues: None		
Time	Position	Applicant's Actions or Behavior
<p style="text-align: center;"><u>General Note on Requirements for "Expected Annunciator Response" – OP-AA-103-102</u></p> <p>If this evolution was pre-briefed and "Expected Alarms" were reviewed, the following expectations apply:</p> <ul style="list-style-type: none"> • "Expected alarms" will be flagged • When the annunciator comes in the operator will announce "Expected Alarm" • The annunciator response procedure (ARP) need not be entered since it has already been reviewed in the pre-brief. <p>If a pre-brief was not conducted the operator should perform the following:</p> <ul style="list-style-type: none"> • When an annunciator comes in the ARP should be referred to. • The annunciator may then be identified as an "Expected Alarm", flagged, and from that point on the ARP need not be referred to. 		
<p><u>Key Parameter Response:</u> 1HG010A-D and 1HG11A-D indicating lights</p> <p><u>Expected Annunciators:</u> None</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. <p>Per CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test, tests 1HG010A-D & 1HG011A-D:</p> <ul style="list-style-type: none"> • Verifies that Drywell Vacuum Relief Valves indicate the expected position of closed. • Tests one valve at a time (required in MODE 1). • During testing verifies each vacuum breaker fully opens (Red light on – green light off) and then fully recloses (Green light on – red light off). ○ Report completion of test to the SRO.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Drywell Vacuum Breaker testing complete.		

NOTES:

<ul style="list-style-type: none"> • Solid bullets are required actions
<ul style="list-style-type: none"> ○ Hollow bullets are actions that may or may not be performed

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Spurious HPCS auto initiation		
Initiation: Following Event 1 and upon direction of the Lead Examiner, insert REMOTE 1		
Cues: Annunciator 5062-4E HPCS Pump Auto Start and 5062-3C Running Diesel Gen 1C		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> HPCS pump flow and RPV water level <u>Expected Annunciators:</u> Multiple annunciators <u>Automatic Actions:</u> DG 1C Auto Starts, HPCS To CNMT Outbd Isln Valve (1E22-F004) OPEN</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Reports issue to SRO. ○ Performs Plant Announcements. ○ Dispatches 2 Equipment Operators to check on/monitor EDG 1C and HPCS.
	BOP	<ul style="list-style-type: none"> ○ Reports issue to SRO. • Refers to ARPs. • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Performs Plant Announcements. ○ Dispatches 2 Equipment Operators to check on/monitor EDG 1C and HPCS. <p>Per CPS 3309.01 High Pressure Core Spray (HPCS):</p> <ul style="list-style-type: none"> • Verifies by at least <u>two</u> independent indications that: <ul style="list-style-type: none"> • Misoperation in automatic is confirmed, <u>or</u> • Adequate core cooling is assured. • Performs shutdown of HPCS (Initiation Signal Present): <ul style="list-style-type: none"> • Shuts 1E22-F004 HPCS To CNMT Outbd Isln Valve. • Stops HPCS Pump, 1E22-C001. ○ Verifies 1E22-F012, HPCS Min Flow To Suppr Pool shuts. ○ Verifies HPCS Pmp Rm Sply Fan, 1VY08CA stops. ○ Verifies HPCS Pmp Rm Sply Fan, 1VY08CB stops.
	SRO	<ul style="list-style-type: none"> • Acknowledges report from BOP. • Directs actions listed above. ○ Establishes reactor water level as a critical parameter and directs ATC to scram the reactor if RPV water level reaches 48 inches and rising. • Enters and executes CPS 4002.01 Abnormal RPV Level/Loss Of Feedwater At Power • Evaluates and enters TS 3.5.1 Actions B.1, verify by administrative means RCIC system is OPERABLE when RCIC is required to be OPERABLE within 1 hour and B.2, restore HPCS system to OPERABLE status within 14 days. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Directs actions to shutdown EDG 1C. ○ Contacts Maintenance to investigate. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: HPCS is secured and Technical Specifications evaluated.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: #1 SA Compressor trips with failure of Standby Compressor to Auto Start		
Initiation: Following Event 2 and upon direction of the Lead Examiner, insert REMOTE 2		
Cues: Annunciator 5041-1A Auto Trip Pump/Motor		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> SA header pressure decreases, #1 SA Compressor (1SA01C) amber trip light energized</p> <p><u>Expected Annunciators:</u> 5041-1A Auto Trip Pump/Motor</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Dispatches Equipment Operator to investigate. <p>Per CPS 4004.01 Instrument Air Loss:</p> <ul style="list-style-type: none"> ○ IF air pressure lowers to 60 psig and cannot be restored, or SDV level increases resulting in a rod block, or any control rod begins to drift, THEN turn mode switch to SHUTDOWN.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. • Determines that 1SA01C has tripped. • Reports issue to SRO. • Refers to the ARP for 5041-1A Auto Trip Pump/Motor (Auto Trip Service Air Compressor). <p>Per 5041-1A Auto Trip Service Air Compressor ARP and CPS 4004.01 Instrument Air Loss:</p> <ul style="list-style-type: none"> • Starts the standby Service Air Compressor before 5006-2H Rod Out Block (due to high SDV level) or 5006-4G Rod Drift annunciators are received. • Monitors SA Header Pressure. ○ Dispatches Equipment Operator to investigate cause of trip. ○ Places #2 SAC into Standby as directed.
	SRO	<ul style="list-style-type: none"> • Acknowledges report from BOP. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards, and approved procedures. • Enters and executes CPS 4004.01 Instrument Air Loss. • Directs/verifies start the standby Service Air Compressor before 5006-2H Rod Out Block or 5006-4G Rod Drift annunciators are received. • Directs actions listed above. ○ Directs BOP to place #2 SAC into Standby. ○ Informs Shift Manager. ○ Contacts Maintenance to investigate. ○ Conducts a brief.
Terminus: #0 SA Compressor (0SA01C) running and maintaining SA header pressure.		

Notes:

Operator Actions

Event No.(s): 4		Page 1 of 2
Description: RR Pump 'B' high vibration		
Initiation: Following Event 3 and upon direction of the Lead Examiner, insert REMOTE 3		
Cues: Annunciator 5003-2K Recirc Pmp B Mtr Vibr Hi		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> RR Pump Vibration Indications <u>Expected Annunciators:</u> 5003-2K Recirc Pmp B Mtr Vibr Hi <u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> • Reports issue to SRO. • Monitors reactor to ensure operations remain within established bands. <ul style="list-style-type: none"> ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. • Refers to ARPs. <p>Per 5003-2K Recirc Pmp B Mtr Vibr Hi ARP and CPS 3302.01 Reactor Recirculation (RR):</p> <ul style="list-style-type: none"> • Performs emergency loop shutdown of RR Pump B. <ul style="list-style-type: none"> ○ Depresses P680 RR Pump B Vibration reset button. <p>Per CPS 3302.01 Reactor Recirculation (RR) Appendix A: RR Loop/Pump Shutdown and Isolation Hard Card:</p> <ul style="list-style-type: none"> • Lowers RPV water level setpoint to ~ 31 inches. • Trips RR Pump B by opening RR 3B, 4B, or 5B (any one of the three as a minimum). • Shuts 1B33-F067B, Pmp Disch Block Vlv. <ul style="list-style-type: none"> ○ Re-opens 1B33- F067B, Pmp Disch Block Vlv after 5 minutes. <p>Per CPS 4008.01 Abnormal Reactor Coolant Flow:</p> <ul style="list-style-type: none"> ○ Monitors RR Pump seal pressure for signs of degradation. • Checks operation on the Power to Flow map. ○ Determines flow transient has resulted in entry into the OPRM Enabled Region by observing the status of annunciator 5006-3D. <ul style="list-style-type: none"> • Per CPS 4100.02 Core Stability Control, monitors for core instabilities.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. <ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. • Checks RR Vibration Monitor and determines RR Pump 'B' Vibrations are ≥ 20 mil P-P 'steady' on both probes. <ul style="list-style-type: none"> ○ Determines flow transient has resulted in entry into the OPRM Enabled Region by observing the status of annunciator 5006-3D. ○ Makes plant announcement. ○ Demands an official 3D Monicore Case.

Event No.(s): 4		Page 2 of 2
Description: RR Pump 'B' high vibration		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges report from ATC. • Directs actions listed above • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Reviews and enters ITS LCOs 3.4.1 B.1 < reduce THERMAL POWER to ≤ 58% RTP within 4 hours and C.1, satisfy the requirements of the LCO within 24 hours. • Enters CPS 4008.01 Abnormal Reactor Coolant Flow • Enters CPS 4100.02 Core Stability Control <ul style="list-style-type: none"> ○ Directs ATC to scram the reactor if the restricted zone is entered or if core instabilities are observed. • Enters CPS 4002.01 Abnormal RPV Level / Loss of Feedwater At Power <ul style="list-style-type: none"> • Directs ATC to monitor RPV Level and to scram if RPV level approaches 52" (Level 8). • With the MELLLA Limit exceeded, enters ITS LCOs 3.2.1 A.1, restore APLHGR(s) to within limits within 2 hours; 3.2.2 A.1, restore MCPR(s) to within limits within 2 hours; and 3.2.3 A.1, restore LHGR(s) to within limits within 2 hours. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: RR Pump 'B' secured and ITS review complete.		

NOTES:

Operator Actions

Event No.(s):		5	Page 1 of 1	
Description: Reduce power to < 65% with Control Rods				
Initiation: After securing RR Pump 'B' and as directed by the SRO.				
Cues: None				
Time	Position	Applicant's Actions or Behavior		
Key Parameter Response: Reactor Power, Rod Drive Parameters (flows, dP), Control Rods move as expected				
Expected Annunciators: None				
Automatic Actions: None				
[CT-1]	ATC	<ul style="list-style-type: none"> • Per CPS 3304.02 Rod Control and Information System (RC&IS), NF-CL-721-1002 Control Rod Move Sheets, and CPS 3005.01 Unit Power Changes section 8.2: <ul style="list-style-type: none"> • [CT-1] Lowers power below 65% using reverse rod sequence or CRAM Rods to exit MELLLA within 10 minutes of tripping 'B' Reactor Recirculation Pump. • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. 		
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. 		
[CT-1]	SRO	<ul style="list-style-type: none"> • Acknowledges report from ATC. • Directs actions listed above • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Positions himself/herself in proximity of the reactor operator, typically the location from which EOP actions are directed (OP-AA-300) • Exits Tech Spec 3.4.1 B.1 and remains in Tech Spec 3.4.1 C.1. • Directs lowering power below 65% using reverse rod sequence or CRAM Rods to exit MELLLA within 10 minutes of tripping 'B' Reactor Recirculation Pump. ○ Informs Shift Manager. ○ Informs TSO. ○ Conducts a brief. 		
Terminus: Clearly observable plant response from change in power level and ITS 3.4.1 evaluated.				

Notes:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: RR Pump 'A' trip		
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 4		
Cues: Annunciator 5003-1F RECIRC PMP A MTR BRKR TRIP		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Reactor Power, RPV Level</p> <p><u>Expected Annunciators:</u> 5003-1F RECIRC PMP A MTR BRKR TRIP</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ● Determines that no Recirculation Pumps are running with the Reactor Mode Switch in RUN (entry condition for CPS 4008.01 Abnormal Reactor Coolant Flow). ○ Reports issue to SRO. <p>Per CPS 5003-1F Recirc Pump A Motor Breaker Trip ARP, CPS 4008.01 Abnormal Reactor Coolant Flow, CPS 4100.01 Reactor Scram, and CPS 3302.01H001 RR Loop/Pump Shutdown And Isolation HARD CARD:</p> <ul style="list-style-type: none"> ● Places the mode switch in SHUTDOWN within one minute of the RR 'A' trip. ○ Shuts 1B33-F067A RR Pump A Discharge Valve. ○ Performs Off-Normal actions as directed by SRO.
	BOP	<ul style="list-style-type: none"> ● Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Performs Off-Normal actions as directed by SRO.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC/BOP. ● Directs actions listed above. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ● Enters and executes CPS 4008.01 Abnormal Reactor Coolant Flow and CPS 4100.01 Reactor Scram ● Verifies ATC scrams the reactor within one minute of the RR Pump 'A' trip. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: Mode switch is in shutdown.		

NOTES:

Operator Actions

Event No.(s): 7, 8		Page 1 of 5
Description: Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown / FRV 1FW004 Fails Shut		
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert REMOTE 5		
Cues: Multiple Aux Building Steam Tunnel High Temperature annunciators on 1H13-P601.		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: Rising temperatures on 1TR-CM326 & 327 Secondary Containment Temperature Recorder (multiple points). Expected Annunciators: Multiple annunciators on 1H13-P601 Automatic Actions: CRVICS Group 1, 4, 5, 6 isolations on High MSL Tunnel Ambient Temperature		
[CT-2]	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. • Performs EOP actions as directed by SRO. <p>EOP-1/ EOP-1A Actions</p> <ul style="list-style-type: none"> • Determines Shutdown Criteria is NOT met (2 control rods will remain at position 48). • Arms and depresses MANUAL SCRAM push-buttons <u>and</u> initiates ARI. • Verifies reactor power is lowering. • Carries out ATWS Scram Choreography by reporting the following: <ul style="list-style-type: none"> • Mode Switch in Shutdown, Power is... • Rod status is <Shutdown Criteria <u>is not</u> met>... • Reactor Power is... and trend • Reactor pressure is... and trend • Reactor level is... and trend • Manual Scram and ARI have been initiated • Any EOPs with entry conditions • Reports Reactor power < IRM Range 7. ○ Attempts alternate control rod insertion per CPS 4411.08, Alternate Control Rod Insertion. ○ Controls RPV level Level 3 to Level 8 IAW CPS 4411.03. ○ Controls RPV pressure 800 – 1065 IAW CPS 4411.09. ○ Lowers pressure set to 900 psig. <p>EOP-8 Actions</p> <ul style="list-style-type: none"> ○ Reports EOP-8 entry on Hi Secondary Containment temperature. ○ Makes plant announcement to evacuate affected areas. • Lowers RPV pressure to reduce the driving head behind the leak. ○ Monitors for re-criticality when reducing RPV pressure. ○ Announces Group 1 Isolation of the Main Steam Lines. <p>EOP-3 Actions</p> <ul style="list-style-type: none"> ○ Verifies suppression pool level is above 8 feet. ○ When directed by the SRO, re-perform terminate and prevent injection from Detail F2 systems (HPCS / LPCS / LPCI / Feedwater). ○ [CT-2] Initiates ADS when directed by SRO. ○ Verifies 7 ADS SRVs are open using the following indications: <ul style="list-style-type: none"> ○ SPDS ○ DCS Display 122 (2H) [Acoustic Monitor Input] ○ 1H13-P601/P642 Solenoid Indicator Lights ○ 1H13-P866 Valve Flow Monitor Control Panel ○ 1H13-P614 ADS Safety Valve Temperature recorder 1B21-R614 ○ Indirect indication via changes in RPV pressure, RPV level, MSL flows & suppression pool temperatures.

Event No.(s): 7, 8		Page 2 of 5
Description: Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown / FRV 1FW004 Fails Shut		
Time	Position	Applicant's Actions or Behavior
	ATC (cont.)	Level Recovery following Blowdown <ul style="list-style-type: none"> ○ Waits until RPV Pressure < 150psig. ○ Reports failure of FRV 1FW004. ○ Uses CD/CB via 1FW003A/B IAW CPS 4411.03 Injection/Flooding Sources to control RPV level -162" to Level 8 or to band prescribed by SRO.

Event No.(s): 7, 8		Page 3 of 5
Description: Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown / FRV 1FW004 Fails Shut		
Time	Position	Applicant's Actions or Behavior
[CT-2]	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. • Performs EOP actions as directed by SRO. <p>EOP-1 / EOP-1A Actions</p> <ul style="list-style-type: none"> • Carries out Scram Choreography: <ul style="list-style-type: none"> • Announces <ul style="list-style-type: none"> - Reactor Scram - Motor Driven Reactor Feed Pump may start - Evacuate the RCIC room - Evacuate the Containment - Determines Rod status and reports shutdown criteria <u>is not</u> met to the SRO. • Verifies Manual Scram / ARI have been initiated. ○ Reports Reactor power < IRM Range 7. • When directed by the SRO, inhibits ADS by placing the ADS A&E and B&F Inhibit Switches in the INHIBITED position. ○ When directed by the SRO, terminate and prevents injection from HPCS by holding the control switch for 1E22-F004 in CLOSE while arming and depressing the HPCS MANUAL INITIATION push-button. After HPCS pump starting current has decayed, secure the pump. • When directed by the SRO, terminates and prevents injection from LPCS and LPCI by performing the following: <ul style="list-style-type: none"> • Division 1 <ul style="list-style-type: none"> • Arms and Depresses LPCS/LPCI FM RHR A MANUAL INITIATION push-button. <ul style="list-style-type: none"> • Provides CLOSE signals to 1E21-F005 and 1E21-F042A. • Starts DW/CNMT Mixing Compressors. • Shuts 1FC036 and 37 FC Supply To Cnmt Valves. • Division 2 <ul style="list-style-type: none"> • Removes the QS Relay (call to the booth <u>or</u> physically removes from 1H13-P851). • Arms and Depresses LPCI FM RHR B & C MANUAL INITIATION push-button. <ul style="list-style-type: none"> • Provides CLOSE signals to 1E12-F042B and 1E12-F042C. • Starts DW/CNMT Mixing Compressors (if not already running after performing Div 1 T&P above). <p>EOP-8 Actions</p> <ul style="list-style-type: none"> ○ Reports EOP-8 entry on Hi Secondary Containment temperature. ○ Makes plant announcement to evacuate affected areas. ○ Monitors and reports secondary containment temperatures on 1H13-P678 recorders 1TR-CM326 and 327 (may be performed by ATC/WEC). ○ Announces Group 1 Isolation of the Main Steam Lines. ○ If directed by the SRO, attempts to isolate Main Steam Line 'D'. <p>EOP-3 Actions</p> <ul style="list-style-type: none"> ○ Verifies suppression pool level is above 8 feet. ○ When directed by the SRO, re-perform terminate and prevent injection from Detail F2 systems (HPCS / LPCS / LPCI). • [CT-2] Initiates ADS when directed by SRO. ○ Verifies 7 ADS SRVs are open using the following indications: <ul style="list-style-type: none"> ○ SPDS ○ DCS Display 122 (2H) [Acoustic Monitor Input] ○ 1H13-P601/P642 Solenoid Indicator Lights ○ 1H13-P866 Valve Flow Monitor Control Panel ○ 1H13-P614 ADS Safety Valve Temperature recorder 1B21-R614 ○ Indirect indication via changes in RPV pressure, RPV level, MSL flows & suppression pool temperatures.

Event No.(s): 7, 8		Page 4 of 5
Description: Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown / FRV 1FW004 Fails Shut		
Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	<ul style="list-style-type: none"> ○ Initiates Suppression Pool Cooling when directed by the SRO ○ Starts Hydrogen Mixing Compressors and Igniters. <p>Level Recovery following Blowdown</p> <ul style="list-style-type: none"> ○ Waits until RPV Pressure < 150psig. ○ Reports failure of FRV 1FW004. ○ Uses CD/CB via 1FW003A/B IAW CPS 4411.03 Injection/Flooding Sources to control RPV level -162" to Level 8 or to band prescribed by SRO.

Event No.(s): 7, 8		Page 5 of 5
Description: Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown / FRV 1FW004 Fails Shut		
Time	Position	Applicant's Actions or Behavior
[CT-2]	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Directs EOP actions as entry conditions are met. <p>EOP-1 / EOP-1A Actions</p> <ul style="list-style-type: none"> • Directs / Verifies Manual Scram / ARI have been initiated. • Carries out Scram Choreography by performing the following: <ul style="list-style-type: none"> • Update • Entering EOP-1 • Transitioning to EOP-1A • Entering the Scram Off-Normal • End of Update • Directs BOP to inhibit ADS. ○ Directs BOP to terminate and prevent injection from HPCS. • Directs BOP to terminate and prevent injection from LPCS and LPCI. ○ Directs ATC to control RPV level Level 3 to Level 8 IAW CPS 4411.03. ○ Directs ATC to control RPV pressure 800 – 1065 IAW CPS 4411.09. ○ Directs ATC to lower pressure set to 900 psig. ○ Directs control rod insertion per CPS 4411.08, Alternate Control Rod Insertion. <p>EOP-8 Actions</p> <ul style="list-style-type: none"> • Enters and executes EOP-8 Secondary Containment Control when ABST Temperatures have exceeded max normal values of EOP-8 Table T Area Temperature Limits. ○ Directs lowering RPV pressure to reduce the driving head of the leak. ○ Directs ATC to monitor for re-criticality when lowering RPV pressure. • [CT-2] Enters and executes EOP-3 Emergency RPV Depressurization within 15 minutes of <u>2 or more</u> of the following areas exceeding max safe temperature values of EOP-8 Table T Area Temperature Limits: <ul style="list-style-type: none"> • Point 14 1TR-CM326 (Upper Recorder) - Aux Bldg Below MS Tunnel > 200°F • Point 18 1TR-CM326 (Upper Recorder) - Aux Bldg Steam Tunnel > 200°F • Point 15 or 16 1TR-CM327 (Lower Recorder) - Aux Bldg MSIV Room A or B > 200°F <p>EOP-3 Actions</p> <ul style="list-style-type: none"> • Evaluates Shutdown Criteria. ○ Directs BOP to re-perform terminate and prevent injection from Detail F2 systems (HPCS / LPCS / LPCI). • Directs initiation of ADS when two EOP-8 Table T areas reach Max Safe temperatures. <p>FRV 1FW004 Fails Shut Actions</p> <ul style="list-style-type: none"> • Directs reinjection with CD/CB when RPV pressure reaches 150 psig per Table J of EOP-1A. ○ Directs ATC to use CD/CB via 1FW003A/B IAW CPS 4411.03 Injection/Flooding Sources to control RPV level -162" to Level 8. ○ Notifies ATC that injecting too fast may damage the core. ○ Informs Shift Manager. ○ Conducts a brief.
<p>Terminus: The scenario can be terminated when a blowdown has been initiated, RPV level is being maintained between -162" and Level 8 and when directed by the lead examiner.</p>		

NOTES:

Simulator Operator Instructions**Initial Setup**

1. Fill out plant status and have Turnover Sheet ready for the crew.
2. Verify daily lamp test completed.
3. Simulator key count: _____ keys.
4. Reset to **IC-212 (PW 13852) @ RTP**. If this is the first reset after swapping simulator loads, reset the IC twice.
5. Load the lesson plan for this scenario.
6. Verify the following commands are active:
 - **ROD0437TFIA4**. (Rod 04-37 is stuck at present location)
 - **ROD5221TFIA4**. (Rod 52-21 is stuck at present location)
 - **YAFWHVFP_9 0%**. (FW004 Fail To Position)
 - **YP_XMFTB_4964**. (RP02 – Auto Scram Failure)
7. Place simulator in RUN.
8. Verify RCIC Flow Controller is set at 620 gpm.
9. Verify the AR/PR server is running and stabilize AR/PR.
10. Verify Rod Drive pressure is in the expected range of 235-265 psid.
11. Provide pull sheets: **Step 29** is current - **Gang 9D** is at **Position 26**.
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected on the OCM.
14. Make sure the FP bell toggle switch on the OG panel (is in the up position).
15. Make sure SBT data is saved, then clear PPDS history (TQ-CL-201-0117 Step 8.9).
16. Clear PPC history (TQ-CL-201-0117 Step 8.10).
17. Clear AR/PR Service Logs (TQ-CL-201-0117 Step 8.12).
18. Clear the memory on the Honeywell recorders (TQ-CL-201-0117 Step 8.13).
19. Clear the memory on the Yokogawa recorders (TQ-CL-201-0117 Step 8.14).
20. Clear the memory on the OG recorders (TQ-CL-201-0117 Step 8.15).
21. Close any open window(s) on the V-panel.
22. Load PPC PMS environment (on PPC screen #10):
 - Select "Viewer"
 - Select "Load Env..."
 - Select "MCR_Baseline.vall"
 - Select Open.
23. Procedures that are expected to be used during this scenario are:
 - CPS 1005.09M002 EOP / OFF-NORMAL PERFORMANCE AID MATRIX
 - CPS 3005.01 UNIT POWER CHANGES
 - CPS 3302.01 REACTOR RECIRCULATION (RR)
 - CPS 3304.02 ROD CONTROL AND INFORMATION SYSTEM (RC&IS)
 - CPS 3309.01 HIGH PRESSURE CORE SPRAY (HPCS)
 - CPS 4001.01 REACTOR COOLANT LEAKAGE
 - CPS 4001.02 AUTOMATIC ISOLATION
 - CPS 4002.01 ABNORMAL RPV LEVEL LOSS OF FEEDWATER AT POWER
 - CPS 4004.01 INSTRUMENT AIR LOSS
 - CPS 4008.01 ABNORMAL REACTOR COOLANT FLOW
 - CPS 4100.02 CORE STABILITY CONTROL
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4401.01 EOP-1 RPV CONTROL

- CPS 4404.01 EOP-1A ATWS RPV CONTROL
- CPS 4407.01 EOP-3 EMERGENCY RPV DEPRESSURIZATION (BLOWDOWN)
- CPS 4406.01 EOP-8 SECONDARY CONTAINMENT CONTROL
- CPS 4411.03 INJECTION FLOODING SOURCES
- CPS 4411.09 RPV PRESSURE CONTROL SOURCES
- CPS 5003.01 ALARM PANEL 5003 ANNUNCIATORS - ROW 1
- CPS 5003.02 ALARM PANEL 5003 ANNUNCIATORS - ROW 2
- CPS 5041.01 ALARM PANEL 5041 ANNUNCIATORS - ROW 1
- CPS 5062.03 ALARM PANEL 5062 ANNUNCIATORS - ROW 3
- CPS 5062.04 ALARM PANEL 5062 ANNUNCIATORS - ROW 4
- CPS 5064.04 ALARM PANEL 5064 ANNUNCIATORS - ROW 4
- CPS 5065.05 ALARM PANEL 5065 ANNUNCIATORS - ROW 5
- CPS 5065.06 ALARM PANEL 5065 ANNUNCIATORS - ROW 6
- ITS 3.2 POWER DISTRIBUTION LIMITS (LCOs 3.2.1, 3.2.2, 3.2.3)
- ITS 3.4 REACTOR COOLANT SYSTEM (LCO 3.4.1)
- ITS 3.5 ECCS AND RCIC SYSTEM (LCO 3.5.1)

24. Hang OOS tags on: MC Pump 'A' (0MC01PA)

25. Identify T/S issues associated with OOS and turnover: None

26. Operating Equipment:

- Ensure #1 SA Compressor (1SA01C) is in operation.

27. Marked up copies:

- CPS 9064.01 DRYWELL POST-LOCA VACUUM BREAKER VERIFICATION TEST

28. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #

1. **Drywell Vacuum Breaker Test**
 - a. Event Trigger - None.
 - b. Role play: Provide IV verifier to MCR (if requested).

2. **Spurious HPCS auto initiation**
 - a. Event Trigger - Following Event 1 and when directed by the Lead Examiner, insert **Remote 1** and verify the following command(s):
 - (1) **YP_XMFTB_4102.** (HPCS Spurious Automatic Initiation)
 - b. Role play
 - (1) EO (when requested to check Div 3 DG and/or SX or HPCS for proper operation) – wait 3 minutes and report that requested equipment is operating normally.
 - (2) Maintenance (if requested) – respond as dispatching personnel to investigate.
 - (3) Booth Operator – if asked for ATM status, they indicate not tripped with *normal indications*.

3. **#1 SA Compressor trips with failure of Standby Compressor to Auto Start**
 - a. Event Trigger – Following Event 2 and when directed by the Lead Examiner, insert **Remote 2** and verify the following command(s):
 - (1) **SA01B1SA1CFO.** (SA Compr 1 Bkr Tripped)
 - (2) **SA01B0SA1CFTC.** (SA Compr 0 Bkr Fails To Close)
 - b. Role play (If requested):
 - (1) Maintenance (investigate loss of service air pressure or failure of compressor to start) – Report, “I will brief and dispatch personnel to investigate”.
 - (2) EO (investigate trip of 1SA01C) – Report, “The breaker for #1 Service Air Compressor is tripped on overcurrent. There are no abnormalities locally. The #0 Service Air Compressor is operating normally.”
 - (3) EO (if directed to support shifting standby Service Air Compressors – acknowledge the order and report, “I’m on my way up to get a brief”.
 - (4) EO (if directed to check the operation of the Service Air Dryers) – Report, “The SA Dryers are operating normally”.
 - (5) If directed to perform pre-start checks on #2 SAC, acknowledge the report. Wait 4 minutes and report, “Pre-start checks on #2 SAC are complete.”

4. **RR Pump ‘B’ high vibration**
 - a. Event Trigger – Following Event 3 and when directed by the Lead Examiner, insert **Remote 3** and verify the following command(s):
 - (1) **RRB_HORZ_MALF 21.7 MILS.** (RRP-B Horizontal Displacement)
 - (2) **RRB_VERT_MALF 21.1 MILS.** (RRP-B Vertical Displacement)
 - b. Role play:
 - (1) Chemistry (if informed of B loop being secured): acknowledge the report.
 - (2) IMD (if directed to report to the MCR for APRM AGAF adjustments), acknowledge the order and respond, “Will brief out the technicians and send them to the MCR”.

5. **Reduce power to < 65% with Control Rods**
 - a. Event Trigger - None
 - b. Role play
 - (1) If RE and/or Rod Verifier are requested – report to the MCR as the RE and/or Rod Verifier.
 - (2) If Chief Examiner requires additional power reduction, enter MCR as RE and recommend lowering power an additional 5% to provide additional margin to the MELLA Limit.

6. RR Pump 'A' trip

- a. Event Trigger – Following Event 5 and when directed by the Lead Examiner, insert **Remote 4** and verify the following command(s):
 - (1) **YP_XMFTB_4965**. (RR02A-Recirc Pump A Trip)
- b. Role play
 - (1) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD.

7. Low Power ATWS / Unisolable MSL 'D' Leak / Multiple area temps > Max Safe / EOP-3 Blowdown

- a. Event Trigger – After the RMS in S/D and following a 2:00 minute time delay, verify the following command(s):
 - (1) **YPXFALSE_256 0.08%**. (MS Line D Rupture In Tunnel)
 - (2) **YVMSSILK_4 100%**. (B21F022D Seat Leakage)
 - (3) **YVMSSILK_8 100%**. (B21F028D Seat Leakage)
- b. Role play
 - (1) WEC Supervisor (if requested)
 - a) Report to the MCR to monitor secondary containment temperatures on 1TR-CM326 and 1TR-CM327 on 1H13-P678 Standby Information Panel. Report ONLY information specifically asked for by the SRO.
 - b) Release **Remove QS Relay** from ATWS Actions lesson plan. When complete, report that the QS relay has been removed.
 - (2) Equipment Operator (if requested)
 - a) Release Bypass RD Suction Filter from the ATWS Actions lesson plan. When complete, report that 1C11-F116 & 117 are open.

8. FRV 1FW004 Fails Shut

- a. Event Trigger – None.
 - (1) **YAFWHVFP_9 0%**. (FW004 Fail To Position)
- b. Role Play
 - (1) Equipment Operator (if requested):
 - a) Check condition of FRV 1FW004 breaker(s)/hydraulic system – wait one minute and report, "The FCV Hydraulic pump breaker tripped on overcurrent. I will continue to investigate."

CT Bases Information

1. **[CT-1]** Inserts control rods to lower power below 65% to exit MELLLA within 10 minutes of tripping 'B' Reactor Recirculation Pump.
 - a) This critical task was derived from NUREG 1021 R11 Appendix D Simulator Testing Guidelines, section D.1 Identification of Scenario-Specific Critical Tasks which states that each critical task must have safety significance. A task is essential to safety if its improper performance or omission by an operator will result in direct adverse consequences or significant degradation in the mitigative capability of the plant. In this scenario, CPS 4100.02, Core Stability Control, directs restoration of power within the Power/Flow Operating Map limits with control rods. In August 2020, River Bend Unit 1 (a similar BWR-6 reactor) experienced core flux oscillations 10 minutes after tripping a Reactor Recirculation Pump and was forced to perform a manual scram to mitigate the thermal hydraulic instability. In this scenario, the OPRM scram designed to safely shut the reactor down will be disabled, making prevention of these thermal hydraulic instabilities by lowering power with rods an essential safety action preventing incorrect reactivity control.

2. **[CT-2]** Enters and executes EOP-3 Emergency RPV Depressurization within 15 minutes of 2 or more of the following areas exceeding max safe temperature values of EOP-8 Table T Area Temperature Limits:
 - Point 14 1TR-CM326 (Upper Recorder) - Aux Bldg Below MS Tunnel > 200°F
 - Point 18 1TR-CM326 (Upper Recorder) - Aux Bldg Steam Tunnel > 200°F
 - Point 15 or 16 1TR-CM327 (Lower Recorder) - Aux Bldg MSIV Room A or B > 200°F
 - a) This critical task was derived from the BWR EOP Generic Critical Task listing, TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide and the EOP Technical Bases and applies when secondary containment temperatures exceed max safe values. The time limit of 15 minutes was agreed upon between the NRC Chief Examiner and the facility and is considered adequate for a competent operator to complete the task when blowdown parameters are exceeded. A task is essential to safety if its improper performance or omission by an operator will result in direct adverse consequences or significant degradation in the mitigative capability of the plant. In this instance, the blowdown is required because parameters above the maximum safe operating values in two separate areas is indicative of a wide-spread problem posing a direct and immediate threat to secondary containment, equipment in the secondary containment, and safe operation of the plant. An action that mitigates the event and precludes heat input, radioactivity release, and break flow into the secondary containment is therefore critical.

Turnover

1. The plant is in Mode 1, operating at Rated Thermal Power (RTP).
 - a. Control rods - **Step 29** is current - **Gang 9D** is at **Position 26**.
2. Status of Tagged Out Equipment
 - MC Pump 'A' (0MC01PA) is OOS for maintenance. Not expected back this shift.
3. Today Day Shift
4. Weather Conditions
 - Calm and clear.
5. Thermal Limit Problems or concerns
 - None
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - The Drywell was vented per CPS 3316.01 Containment Combustible Gas Control (HG) to support performance of CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
9. Evolutions planned for the shift
 - First Priority – Perform CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test. An IV verifier is available upon request.
 - Maintain power at RTP throughout the shift.
10. Risk Levels
 - Green
 - Protected Equipment: None

Exelon Nuclear

ILT 19-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 3**

Revision Number: 0

Date: 1/28/20

Developed By:	Bill Kiser Instructor	1/28/20 Date
Validated By:	Brian Steele SME or Instructor	3/3/21 Date
Reviewed By:	Tim Windingland Operations Representative	3/3/21 Date
Approved By:	Matthew Beeler Training Department	3/3/21 Date

Facility: Clinton Power Station Scenario No.: 3 Operating Test No.: 2021-301

Examiners: _____ Operators: _____

Initial Conditions:

- Mode 1 at ~10% power.
- Thunderstorms are expected in the area within the next hour.
- CY Pump 'B' (0CY01PB) is OOS for maintenance. Not expected back this shift.

Turnover:

- CPS 3002.01 Heatup and Pressurization is complete.
- CPS 3004.01 Turbine Startup and Generator Synchronization is in progress. Section 5.0 Prerequisites are complete. Steps 8.1.1 and 8.1.5 are in progress. Steps 8.1.2 – 8.1.4 are complete.
- Main Turbine Chest Warming has just been completed.
- Control rods – On Step 15. Gang 7E, Rod 40-17 is at position 18.
- Priorities for the shift are as follows:
 - RHR 'A' is currently being flushed as directed by CPS 3312.03 Shutdown Cooling (SDC) & Fuel Pool Cooling And Assist (FP&A) by operating RHR 'A' in Pool to Pool mode per CPS 3312.01 Residual Heat Removal (RHR).
 - First Priority – Secure RHR 'A' operation in Pool To Pool mode per CPS 3312.01 Residual Heat Removal (RHR).
 - Continue with power ascension to 15% IAW Step 8.1.6 of CPS 3004.01. The RE has requested single rod, single notch rod motion.
 - After reaching 15% power, perform Turbine Roll IAW Step 8.1.8 of CPS 3004.01.

Critical Tasks:

- **[CT-1]** PC-3.1, SCRAMs the reactor before suppression pool level lowers to less than 15' 1".
- **[CT-2]** PC-3.3, Enters EOP-3 prior to suppression pool level reaching 15'1" and performs an emergency depressurization. If the suppression pool level lowers to less than 15'1" after the announcement is made to enter EOP-3, but before the blowdown is initiated, then this critical task is considered to be met.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	(NEW) Secure RHR 'A' Operation in Pool To Pool Mode
2	NA	R-ATC	Raise power with rods to 15%
3	ROD4017TFIA5	C-ATC TS-SRO	Uncoupled Rod
4	YP_XMFTB_4992 A04_A28_S23=2	C-BOP	(NEW) Trip of MSOP / ESOP fails to auto start
5	YFCUCTPW_1	C-ATC	'A' Reactor Water Cleanup Filter Demin Trip
6	A05_A02_A0204_1_TVM; A05_A02_A09DS08_1	I-BOP TS-SRO	(NEW) RCIC failure to auto-isolate on an isolation signal
7	YPMALSE_665 100% YPMALSE_666 100% A05_A02_A09S38_2=ON A05_A02_A16DS60_1=OFF A05_A02_A16DS61_1=OFF	M-All	Suppression Pool leak into the LPCS Room / RHR 'A' Pump Room / 1E21F001 LPCS Suppr Pool Suction Valve fails to close
8	A05_A02_A13S60B_1 A05_A02_A13S62B_1	C-All	Manual ADS Initiation Logic failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
 NEW – Not used on the previous two (2) NRC exams.

Scenario No.: 3

Operating Test No.: 2021-301

Narrative Summary

Event #	Description
1.	<p>Secure RHR 'A' Operation in Pool To Pool Mode The operating crew will begin the scenario by securing RHR 'A' from suppression pool flush IAW CPS 3312.01 Residual Heat Removal (RHR) section 8.2.10 Manual Operation of RHR – Pool to Pool.</p>
2.	<p>Raise power with rods to 15% The crew will continue the power ascension to 15% by withdrawing control rods in accordance with CPS 3004.01 Turbine Startup and Generator Synchronization.</p>
3.	<p>Uncoupled rod When the first in-sequence control rod (40-17) reaches position 48, the ATC will perform a coupling check IAW CPS 3304.02 Rod Control And Information System (RC&IS) section 8.1.10 Coupling Check by applying a continuous withdraw to the rod at position 48. Annunciator 5006-5G Rod Overtravel will be received, indicating that the control rod has become uncoupled from its drive mechanism. The operating crew will attempt to recouple the control rod IAW the annunciator response procedure. The SRO will evaluate and enter ITS 3.1.3 Condition C until the control rod is successfully recoupled.</p>
4.	<p>Trip of MSOP / ESOP fails to auto start Annunciator 5017-1A AUTO TRIP TURBINE AUXILIARY PUMP/MOTOR is received due to a trip of the Main Seal Oil Pump (MSOP). Additionally, the Emergency Seal Oil Pump (ESOP) will fail to auto start. The BOP Operator will recognize the failure of the ESOP to auto start and manually start the ESOP, and then take additional actions to align the Seal Oil system for ESOP operation IAW CPS 3109.01 Generator Seal Oil (SO) section 8.2.1 Operation with Emergency Seal Oil Pump.</p>
5.	<p>'A' Reactor Water Cleanup Filter Demin Trip Annunciator 5000-2C F-D SYSTEM TROUBLE comes in due to a filter demin alarm on 1G36-P002. In addition, Annunciator 5000-2F RWCU HI DIFF FLOW TIMER INITIATED is received momentarily and clears. The ATC Operator will diagnose the trip of the 'A' Reactor Water Cleanup Filter Demin and dispatch an Equipment Operator to investigate. The ATC will throttle 1G33-F044 RWCU Filter/Demin Bypass to maintain ~300 gpm flow while coordinating with the Equipment Operator to lineup system for 2 pump / 1 filter demin operation.</p>
6.	<p>RCIC failure to auto-isolate on an isolation signal Annunciator 5063-4A RCIC DIV 2 STEAM LINE DIFF PRESS HIGH is received. BOP will observe that 1E51-F063 and F076 have failed to automatically shut and will manually shut them and trip the RCIC turbine. SRO will enter Tech Spec LCO 3.5.3 RCIC System Action A.1 and A.2, and LCO 3.3.6.1 Primary Containment and Drywell Isolation Instrumentation Action D.1.</p>
7.	<p>Suppression Pool leak into the LPCS Room / RHR 'A' Pump Room / 1E21-F001 LPCS Suppr Pool Suction Valve fails to close IMD technicians (performing restoration activities for CPS 9052.01 in the LPCS Pump Room) report a Suppression Pool Leak (due to a leak in the LPCS Pump Suction piping) including cross-flooding into the RHR 'A' Pump Room, requiring entry into EOP-8. EOP-8 is entered when floor drain sump levels reach max normal. The crew will determine that the leak is isolable, but efforts at closing 1E21-F001 LPCS Suppr Pool Suction Valve will fail (breaker trips on overcurrent when the control switch is taken to close). The SRO will determine that Suppression Pool level cannot be maintained above 15'1" requiring the reactor to be scrammed and an Emergency Depressurization performed.</p>
8.	<p>Manual ADS Initiation Logic failure Upon manual initiation of ADS in event 7, no ADS valves will open. The BOP operator will open seven (7) safety relief valves per EOP-3 Emergency RPV Depressurization.</p>

Event No.(s): 1		Page 1 of 1
Description: Secure RHR 'A' Operation in Pool To Pool Mode		
Initiation: Following shift turnover		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
<p align="center"><u>General Note on Requirements for "Expected Annunciator Response" – OP-AA-103-102</u></p> <p>If this evolution was pre-briefed and "Expected Alarms" were reviewed, the following expectations apply:</p> <ul style="list-style-type: none"> • "Expected alarms" may be flagged • When the annunciator comes in the operator will announce "Expected Alarm" • The annunciator response procedure (ARP) need not be entered since it has already been reviewed in the pre-brief. <p>If a pre-brief was not conducted the operator should perform the following:</p> <ul style="list-style-type: none"> • When an annunciator comes in the ARP should be referred to. • The annunciator may then be identified as an "Expected Alarm", flagged, and from that point on the ARP need not be referred to. 		
<p><u>Key Parameter Response:</u> RHR Pump 'A' Flow</p> <p><u>Expected Annunciators:</u> None</p> <p><u>Automatic Actions:</u> 1E12-F064A opens when RHR flow is < 1100 gpm for > 8 sec.</p>		
	ATC	<ul style="list-style-type: none"> • Monitors the reactor to ensure operations remain within established bands. ○ Monitors control room panels and notifies the SRO of unusual/unexpected conditions.
	BOP	<ul style="list-style-type: none"> ○ Monitors the reactor to ensure operations remain within established bands. • Monitors control room panels and notifies the SRO of unusual/unexpected conditions. <p>Per CPS 3312.01 Residual Heat Removal (RHR), Section 8.2.10:</p> <ul style="list-style-type: none"> ○ Places RHR A MOV Test Prep switch in TEST. ○ RHR A MOV'S IN TEST status light energizes. ○ RHR A Out Of Service annunciator 5064-8G alarms. • Shuts 1E12-F024A, RHR 'A' Test Valve To Suppression Pool. ○ Verifies 1E12-F064A opens when RHR flow is < 1100 gpm for > 8 sec. • Stops RHR Pump 'A', 1E12-C002A. • Opens 1E12-F048A, RHR A Hx Bypass Valve. ○ Places RHR A MOV Test Prep switch in NORMAL. ○ RHR A MOV'S IN TEST status light deenergizes. ○ RHR A Out Of Service annunciator 5064-8G clears. ○ Documents MOV Test Prep Switch manipulation in the Short Duration Time Clock Log.
	SRO	<ul style="list-style-type: none"> ○ Acknowledges reports from ATC/BOP. ○ Directs BOP to secure manual operation of RHR – Pool To Pool mode. ○ Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ○ Evaluates and enters ORM 2.5.2 Motor Operated Valves Thermal Overload Protection, <u>if</u> RHR A Test Prep switch is placed in TEST. Exits ORM 2.5.2 Motor Operated Valves Thermal Overload Protection, when RHR A Test Prep switch is placed back in NORMAL.
Terminus: RHR 'A' Pool to Pool mode is secured.		

NOTES:

- Solid bullets are required actions

○ Hollow bullets are actions that may or may not be performed

Operator Actions

Event No.(s): 2, 3 **Page** 1 **of** 2

Description: **Raise power with rods to 15% / Uncoupled Rod**

Initiation: Following Event 1 and upon direction of the SRO

Cues: Annunciator 5006-5G Rod Overtravel (Control Rod 40-17 fails coupling check).

Time	Position	Applicant's Actions or Behavior
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Key Parameter Response: Reactor power, Rod drive parameters (flow, dP), control rod position, Bypass Valve Position, rod uncoupled light on P680 OCM for control rod 40-17.
Expected Annunciators: 5005-2K SRM Period and 5006-5G Rod Overtravel
Automatic Actions: None

	ATC	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. <p><u>Reactivity Maneuver</u></p> <p>Per CPS 3004.01 Turbine Startup and Generator Synchronization, NF-CL-721-F-2 Control Rod Move Sheets and CPS 3304.02 RCIS:</p> <ul style="list-style-type: none"> ● Withdraws control rods (beginning with 40-17 from position 18 per the control rod sequence to raise power. ● Monitors nuclear instruments during rod movement. ○ Monitors the Power to Flow Map during power ascension. ● Performs a Coupling Check for any control rod(s) withdrawn to position 48. <p><u>Uncoupled Rod</u></p> <p>Per CPS 3304.02 Rod Control And Information System, section 8.1.10 Coupling Check:</p> <ul style="list-style-type: none"> ● After 40-17 is withdrawn to position 48, applies a continuous withdraw signal to verify rod coupling. ● Observes 5006-5G Rod Overtravel is received. ● Observes red full-out light for 40-17 goes out. ● Determines control rod 40-17 is uncoupled by pressing the ROD UNCOUPLED button on the P680 OCM. ● Informs SRO that 40-17 is uncoupled and to refer to ITS 3.1.3. <p>Per CPS 3304.02 Rod Control And Information System, section 8.2.6:</p> <ul style="list-style-type: none"> ● Verifies that the INDIVID DRIVE light is energized on the OCM. If not, selects individual drive by depressing DRIVE MODE push-button. ● Inserts the drive 1 or 2 notches (position 46 or 44) in an attempt to recouple the rod. ● Fully withdraws the drive. ● Performs the coupling check and determines that the rod is recoupled. ○ Initiates an Issue Report and contacts the Reactor Engineer regarding the uncoupled rod event.
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	BOP	<ul style="list-style-type: none"> ● Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. <p><u>Reactivity Maneuver</u></p> <ul style="list-style-type: none"> ○ Monitors the Power to Flow Map during power ascension. <p><u>Uncoupled Rod</u></p> <ul style="list-style-type: none"> ○ Initiates an Issue Report and contacts the Reactor Engineer regarding the uncoupled rod event.
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Event No.(s): 2, 3		Page 2 of 2
Description: Raise power with rods to 15% / Uncoupled Rod		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. <ul style="list-style-type: none"> ○ Informs Shift Manager. ○ Conducts a brief. <p><u>Reactivity Maneuver</u></p> <ul style="list-style-type: none"> • Directs ATC to raise power to 15%. • Maintains oversight during control rod movement; positioned in proximity to the ATC (typically from the SRO desk). <p><u>Uncoupled Rod</u></p> <ul style="list-style-type: none"> • Verifies / directs ATC to attempt to recouple rod 40-17. • Enters ITS 3.1.3 Action C.1 and C.2 to fully insert control rod 40-17 within 3 hours and disarm 40-17 within 4 hours. <ul style="list-style-type: none"> ○ Exits ITS 3.1.3 Action C.1 and C.2 when 40-17 is successfully recoupled. ○ Directs continuing startup.
Terminus: Clearly observable plant response from change in power level and control rod 40-17 recoupled and returned to position 48.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: Trip of MSOP / ESOP fails to auto start		
Initiation: Following Events 2, 3 and upon direction of the Lead Examiner, insert REMOTE 1		
Cues: Annunciator 5017-1A Auto Trip Turbine Auxiliary Pump/Motor		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Generator Seal Oil Pressure and H₂ Pressure on PPC</p> <p><u>Expected Annunciators:</u> 5017-1A Auto Trip Turbine Auxiliary Pump/Motor and 5018-2A Trouble GC System Local Panel 1PL10J</p> <p><u>Automatic Actions:</u> ESOP Auto starts on low MSOP discharge pressure (failure to auto start)</p>		
	ATC	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Performs Plant Announcements. ○ Dispatches an Equipment Operator to investigate trip of the Main Seal Oil Pump (MSOP)/failure of Emergency Seal Oil Pump (ESOP) to auto start.
	BOP	<ul style="list-style-type: none"> ● Reports issue to SRO. ● Refers to ARPs. ● Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Performs Plant Announcements. ○ Dispatches an Equipment Operator to investigate trip of the Main Seal Oil Pump (MSOP)/failure of Emergency Seal Oil Pump (ESOP) to auto start. <p>Per CPS 5017-1A Auto Trip Turbine Auxiliary Pump/Motor ARP:</p> <ul style="list-style-type: none"> ● Recognizes the failure of the ESOP to auto start and manually starts the ESOP. <ul style="list-style-type: none"> ● Holds the control switch in the starting position for a minimum of 5 seconds. <p>Per CPS 3109.01 Generator Seal Oil (SO):</p> <ul style="list-style-type: none"> ● Directs Equipment Operator to monitor/maintain H₂ gas purity > 90%. ○ Secures the MSOP. ○ Directs Equipment Operator to shut 1SOH09, Vac/Stor Tnk Oil Supp Hdr Isol. ○ Recommends shutdown of the Seal Oil Vacuum Pump (SOVP) and Recirc Seal Oil Pump (RSOP) if MSOP is NOT going to be available for an extended period of time. ○ Coordinates with Equipment Operator to restore H₂ pressure IAW CPS 3111.01 Section 8.1.4 Adjust/Maintain Generator H₂ Pressure to 75 psig.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from BOP/ATC. ● Directs actions listed above. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Contacts Maintenance to investigate. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: Emergency Seal Oil Pump (ESOP) in operation.		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: 'A' Reactor Water Cleanup Filter Demin Trip		
Initiation: Following Event 4 and upon direction of the Lead Examiner, insert REMOTE 2		
Cues: Annunciators 5000-2C F-D System Trouble and 5000-2F RWCU Hi Diff Flow Timer Initiated		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> RWCU system flow and RT A F-D flow		
<u>Expected Annunciators:</u> 5000-2C F-D System Trouble and 5000-2F RWCU Hi Diff Flow Timer Initiated		
<u>Automatic Actions:</u> None		
	ATC	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ● Reports issue to SRO. ● Refers to the ARPs. ○ Dispatches an Equipment Operator to investigate. ● Per CPS 3303.01 Reactor Water Cleanup (RT) section 8.3.2.1 or 8.1.3., throttles 1G33-F044 RWCU Filter/Demin Bypass to maintain ~300 gpm flow with two (2) pumps and prevents isolation and shutdown of the RWCU system.
	BOP	<ul style="list-style-type: none"> ● Monitors control room panels, notifies the SRO of any unusual or unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Dispatches an Equipment Operator to investigate.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC/BOP. ● Directs actions listed above. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Informs RP and Chemistry. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: Reactor Water Cleanup aligned for 2 pump, 1 F-D operation.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: RCIC failure to auto-isolate on an isolation signal		
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 3		
Cues: Annunciator 5063-4A RCIC Div 2 Steam Line Diff Press High alarm		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> None</p> <p><u>Expected Annunciators:</u> 5063-4A RCIC Div 2 Steam Line Diff Press High alarm</p> <p><u>Automatic Actions:</u> None (automatic isolation fails)</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies SRO of unusual/unexpected conditions. ○ Makes plant announcement.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. • Reports issue to SRO. • Refers to ARP. <p>Per 5063-4A RCIC Div 2 Steam Line Diff Press High alarm ARP:</p> <ul style="list-style-type: none"> ○ Determines that a Group 5 isolation has <u>not</u> occurred. • Manually isolate RCIC / initiate a Group 5 isolation by: <ul style="list-style-type: none"> • Closing 1E51-F063, RHR & RCIC Stm Supp Inbd Isol Valve. ○ Closing 1E51-F064, RHR & RCIC Stm Supp Outbd Isol Valve. • Verifying closed 1E51-F076, RHR & RCIC Stm Supp Warm Up Isol Valve. ○ Tripping the RCIC turbine.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Enters and executes CPS 4001.02 Automatic Isolation. • Directs performing a Group 5 isolation. • Reviews and enters ITS 3.5.3 (after the RCIC steam supply line is isolated) <ul style="list-style-type: none"> • A.1 – Verify by administrative means HPCS is operable within 1 hour, and • A.2 – Restore RCIC System to operable status in 14 days. • Reviews and enters ITS 3.3.6.1 D.1 (Place channel in trip with in 24 hours). ○ Informs Shift Manager. ○ Contacts maintenance to investigate. ○ Conducts a brief.
Terminus: Group 5 Isolation and ITS review complete.		

NOTES:

Operator Actions

Event No.(s): 7, 8		Page 1 of 3
Description: Suppression Pool leak into the LPCS Room & RHR 'A' Pump Room / 1E21-F001 LPCS Suppr Pool Suction Valve fails to close / Manual ADS Initiation Logic failure		
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert Remote 4		
Cues: Annunciators 5064-7C ECCS Floor Drain Sump High Leak Rate, 5013-5D High-High Level Floor/Equipment Drain Sump – Auxiliary Building, Lowering Suppression Pool level.		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: Suppression pool level.		
Expected Annunciators: 5064-7C ECCS Floor Drain Sump High Leak Rate, 5013-5D High-High Level Floor/Equipment Drain Sump – Auxiliary Building, 5065-5G Sec Cnmt Area Max Safe Oper Water Level.		
Automatic Actions: First sump pump auto starts on sump high level and the backup pump will auto start on Hi-Hi sump level.		
[CT-1]	ATC	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Reports issues to SRO. ○ Diagnoses rising LPCS room sump levels and RHR 'A' room sump levels using PPC. ○ Evacuates affected areas of Secondary Containment. ○ Observes and reports entry condition for EOP-8 Secondary Containment Control on Floor Drain Sump above Max Normal. ○ Observes and reports entry condition for EOP-6 on Suppression Pool Low Level. ○ Dispatches an Equipment Operator to investigate leakage into the LPCS & RHR 'A' Pump Rooms. ○ Reports to the SRO that the LPCS leak is between 1E21-F001 LPCS Suppr Pool Suction Valve and the LPCS Pump (isolable). ○ [CT-1] SCRAMs the reactor before suppression pool level lowers to less than 15' 1". ○ Carries out Scram Choreography by reporting the following: <ul style="list-style-type: none"> ○ Mode Switch in shutdown, power is... ○ Rod Status is... ○ Reactor Power is ... and trend ○ Reactor pressure is... and trend ○ Reactor water level is.....and trend. ○ Any EOPs with entry conditions (no values required). Per CPS 4100.01, Reactor Scram <ul style="list-style-type: none"> ○ Turns Mode Switch to SHUTDOWN <ul style="list-style-type: none"> ○ Verifies reactor power is lowering ○ Verifies SHUTDOWN CRITERIA met ○ <u>IF</u> RPV level is rising with 2 feed pumps operating, <u>THEN</u> secures/verifies secured 1 feed pump and controls RPV water level Level 3 to Level 8. ○ Verifies and stabilizes Turbine and Generator trip when required. ○ Stabilize Reactor pressure 800 to 1065 psig or per directed band. ○ Performs EOP actions as directed by the SRO. ○ Rapidly depressurizes the RPV (anticipates blowdown) by opening all Turbine Bypass Valves when directed by the SRO (may be performed by BOP). Per EOP-3, Emergency RPV Depressurization (will probably be BOP): <ul style="list-style-type: none"> • [CT-2] Initiates ADS when directed by the SRO. <ul style="list-style-type: none"> ○ Determines <u>no</u> ADS valves open and reports to SRO. • Manually opens 7 SRVs.
[CT-2]		

Event No.(s): 7, 8		Page 2 of 3
Description: Suppression Pool leak into the LPCS Room & RHR 'A' Pump Room / 1E21-F001 LPCS Suppr Pool Suction Valve fails to close / Manual ADS Initiation Logic failure		
Time	Position	Applicant's Actions or Behavior
[CT-2]	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. <ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. • Reports issues to SRO. <ul style="list-style-type: none"> ○ Reports EOP entry conditions. • Perform EOP actions as directed by SRO. <ul style="list-style-type: none"> ○ Evacuates affected areas of Secondary Containment. ○ Dispatches an Equipment Operator to investigate leakage into the LPCS & RHR 'A' Pump Rooms. ○ Reports to the SRO that the LPCS leak is between 1E21-F001 LPCS Suppr Pool Suction Valve and the LPCS Pump (isolable). • As directed by SRO, attempts to isolate the LPCS suction line by closing 1E21-F001 LPCS Suppr Pool Suction Valve. <ul style="list-style-type: none"> • Recognizes failure of the 1E21-F001 to close and reports failure to the SRO. ○ As directed, coordinates with Equipment Operators to remove LPCS/RHR "A" control power fuses. • As directed by SRO, attempts to holds SP Level above 15' 1": <ul style="list-style-type: none"> • by filling the SP IAW CPS 3220.01 section 8.4 / CPS 3318.01 section 8.1.8 • by dumping upper pools IAW CPS 4411.03 Appendix E section 1 / CPS 4411.03H001 • Carries out Scram Choreography by: <ul style="list-style-type: none"> • Making an Announcement <ul style="list-style-type: none"> ▪ Reactor Scram ▪ MDRFP may start ▪ Evacuate the RCIC room ▪ Evacuate the Containment • Determines Rod status and reports to the CRS <p>Per EOP-3, Emergency RPV Depressurization (may be performed by ATC):</p> <ul style="list-style-type: none"> • [CT-2] Initiates ADS when directed by the SRO. <ul style="list-style-type: none"> ○ Determines <u>no</u> ADS valves open and reports to SRO. • Manually opens 7 SRVs. • Verifies ADS actuation using the following indications: <ul style="list-style-type: none"> ○ SPDS ○ DCS Display 122 (2H) [Acoustic Monitor Input] ○ DCS Display 186 (7B) ['A' Solenoid Input] ○ 1H13-P601/P642 Solenoid Indicator Lights ○ 1H13-P866 Valve Flow Monitor Control Panel ○ 1H13-P614 ADS Safety Valve Temperature recorder 1B21-R614 ○ Indirect indication via changes in RPV pressure, RPV level, MSL flows & suppression pool temperatures.

Event No.(s): 7, 8		Page 3 of 3
Description: Suppression Pool leak into the LPCS Room & RHR 'A' Pump Room / 1E21-F001 LPCS Suppr Pool Suction Valve fails to close / Manual ADS Initiation Logic failure		
Time	Position	Applicant's Actions or Behavior
[CT-1]	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards, and approved procedures. <p>Enters and executes CPS 4304.01 Flooding.</p> <ul style="list-style-type: none"> ○ Dispatches area operators to locate and isolate source of flooding. ○ Notifies ROC and RP of flooding source and magnitude. • Determines that the flooding source is from the suppression pool into the LPCS & RHR 'A' Pump Rooms and cannot be isolated (after failure of 1E21-F001 to close). • Reviews 4304.01 Table 2: Suppression Pool Leak / ECCS Room Equalization Levels and determines that final suppression pool level will be below 15'1". ○ Directs BOP to coordinate with Equipment Operators to remove LPCS/RHR "A" control power fuses. <p>Enters and executes EOP-8 Secondary Containment Control:</p> <ul style="list-style-type: none"> • Directs BOP to shut 1E21-F001 LPCS Suppression Pool Suction Valve. <p>Enters and executes EOP-6 Primary Containment Control:</p> <ul style="list-style-type: none"> • Directs BOP to hold Suppression Pool Level above 15'1" using normal suppression pool makeup methods (SM per 3220.01, SF per 3318.01) • Determines that SP Level cannot be maintained above 15'1" • Directs BOP to dump the upper containment pools. • [CT-1] Directs scrambling the reactor before suppression pool level lowers to less than 15' 1". <p>Enters and executes CPS 4100.01 Reactor Scram: Carries out Scram Choreography by performing an Update:</p> <ul style="list-style-type: none"> • Update • Entering EOP- 6 and 8. • Entering Scram Off-Normal. • End of Update.
[CT-2]		<p>Enters and executes EOP-1 RPV Control and directs/verifies performance of the following:</p> <ul style="list-style-type: none"> • Mode Switch to SHUTDOWN • Shutdown criteria verified • Establishes an RPV water level band between Level 3 and Level 8. • Establishes an RPV pressure band below 1065 psig. ○ Anticipates doing blowdown. Directs ATC to depressurize the RPV rapidly by fully opening the main turbine bypass valves. <p>[CT-2] Enters and executes EOP-3 Emergency RPV Depressurization (Blowdown) prior to suppression pool level reaching 15'1" and directs the following:</p> <ul style="list-style-type: none"> • Sounds the containment evacuation alarm. • Verifies that Suppression Pool Level is above 8 ft. • [CT-2] Initiates ADS.
[CT-2]		<ul style="list-style-type: none"> ○ Informs the Shift Manager. ○ Conducts a brief.
Terminus: 7 SRVs open, RPV level maintained per EOP-1.		

NOTES:

Simulator Operator Instructions

Initial Setup

1. Fill out plant status and have Turnover Sheet ready for the crew.
2. Verify daily lamp test completed.
3. Simulator key count: _____ keys.
4. Reset to IC-213 (PW 13852) @ 10% Power. If this is the first reset after swapping simulator loads, reset the IC twice.
5. Load the lesson plan for this scenario.
6. Verify the following commands are active:
 - **ROD4017TFIA5.** (Rod 4017 Rod Uncoupled)
 - **A05_A02_A13S60B_1 = Release** (ADS Div 1 Logic E Man Init PB)
 - **A05_A02_A13S62B_1 = Release** (ADS Div 2 Logic F Man Init PB)
7. Place simulator in RUN.
8. Verify RCIC Flow Controller is set at 620 gpm.
9. Verify the AR/PR server is running and stabilize AR/PR.
10. Verify Rod Drive pressure is in the expected range of 235-265 psid.
11. Provide pull sheets: **Step 15** is current - **Gang 7E, Rod 40-17** is at **Position 18**.
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected on the OCM.
14. Make sure the FP bell toggle switch on the OG panel (is in the up position).
15. Make sure SBT data is saved, then clear PPDS history (TQ-CL-201-0117 Step 8.9).
16. Clear PPC history (TQ-CL-201-0117 Step 8.10).
17. Clear AR/PR Service Logs (TQ-CL-201-0117 Step 8.12).
18. Clear the memory on the Honeywell recorders (TQ-CL-201-0117 Step 8.13).
19. Clear the memory on the Yokogawa recorders (TQ-CL-201-0117 Step 8.14).
20. Clear the memory on the OG recorders (TQ-CL-201-0117 Step 8.15).
21. Close any open window(s) on the V-panel.
22. Load PPC PMS environment (on PPC screen #10):
 - Select "Viewer"
 - Select "Load Env..."
 - Select "MCR_Baseline.vall"
 - Select Open.
23. Procedures that are expected to be used during this scenario are:
 - CPS 3109.01 GENERATOR SEAL OIL (SO)
 - CPS 3111.01 GENERATOR GAS (HY, CO)
 - CPS 3220.01 SUPPRESSION POOL MAKEUP (SM)
 - CPS 3303.01 REACTOR WATER CLEANUP (RT)
 - CPS 3312.01 RESIDUAL HEAT REMOVAL (RHR)
 - CPS 3318.01 SUPPRESSION POOL CLEANUP TRANSFER (SF)
 - CPS 3304.02 CONTROL ROD HYDRAULIC AND CONTROL (RD)
 - CPS 4001.02 AUTOMATIC ISOLATION
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4304.01 FLOODING
 - CPS 4401.01 EOP-1 RPV CONTROL
 - CPS 4402.01 EOP-6 PRIMARY CONTAINMENT CONTROL
 - CPS 4407.01 EOP-3 EMERGENCY RPV DEPRESSURIZATION (BLOWDOWN)
 - CPS 5000.02 ALARM PANEL 5000 ANNUNCIATORS - ROW 2

- CPS 5005.02 ALARM PANEL 5005 ANNUNCIATORS - ROW 2
- CPS 5006.03 ALARM PANEL 5006 ANNUNCIATORS - ROW 3
- CPS 5006.05 ALARM PANEL 5006 ANNUNCIATORS - ROW 5
- CPS 5013.05 ALARM PANEL 5013 ANNUNCIATORS - ROW 5
- CPS 5013.06 ALARM PANEL 5013 ANNUNCIATORS - ROW 6
- CPS 5017.01 ALARM PANEL 5017 ANNUNCIATORS - ROW 1
- CPS 5018.02 ALARM PANEL 5018 ANNUNCIATORS - ROW 2
- CPS 5063.04 ALARM PANEL 5063 ANNUNCIATORS - ROW 4
- CPS 5064.07 ALARM PANEL 5064 ANNUNCIATORS - ROW 7
- CPS 5065.05 ALARM PANEL 5065 ANNUNCIATORS - ROW 5
- ITS 3.1 REACTIVITY CONTROL SYSTEMS (LCO 3.1.3)
- ITS 3.3 INSTRUMENTATION (LCO 3.3.6.1)
- ITS 3.5 ECCS AND RCIC SYSTEM (LCO 3.5.3)

24. Hang OOS tags on: CY Pump 'B' (0CY01PB)

25. Identify T/S issues associated with OOS and turnover: None

26. Operating Equipment:

- Verify Suppression Pool Cleanup (SF) is shutdown (pumps secured, SF001/2/4 SHUT)
- Place flags on annunciators 5067-4A and 5064-8G.

27. Marked up copies:

- CPS 3002.01 Heatup and Pressurization
- CPS 3004.01 Turbine Startup and Generator Synchronization

28. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #

1. **Secure RHR 'A' Operation in Pool To Pool Mode**
 - a. Event Trigger - None
 - b. Role play – None

2. **Raise power with rods to 15%.**
 - a. Event Trigger - Following Event 1 and when directed by the SRO.
 - b. Role play
 - (1) Booth Operator – (when RE and/or Rod Verifier requested) – report to the MCR as the RE and/or Rod Verifier.

3. **Uncoupled Rod**
 - a. Event Trigger – When Rod 40-17 is withdrawn to position 48.
 - b. Role play
 - (1) Booth Operator - When control rod 40-17 is inserted from position 48, verify **Delete ROD4017TFIA5** is inserted (Delete Rod 40-17 Malfunction).

4. **Trip of MSOP / ESOP fails to auto start**
 - a. Event Trigger - Following Event 3 and when directed by the Lead Examiner, insert **Remote 1** and verify the following command(s):
 - (1) **YP_XMFTB_4992.** (Hydrogen Main Seal Oil Pump Trip)
 - (2) **A04_A28_S23=2.** (Gen H₂ Emerg Seal Oil Pump 1TO08P)
 - b. Role Play
 - (1) EO (when directed to monitor/maintain H₂ gas purity > 90%): acknowledge the order.
 - (2) EO (when directed to verify proper operation of the ESOP): Verify ESOP operating, then report, "The ESOP is operating normally. Seal oil pressure is 8 psig greater than Generator Hydrogen pressure."
 - (3) EO (when directed to shut 1SOH09 Vac/Stor Tnk Oil Supp Hdr Isol): Report, "1SOH09 is shut."
 - (4) EO (when directed to investigate trip of the MSOP): Report, "The MSOP circuit breaker is tripped. The breaker handle is in the trip free position."
 - (5) EO (when restoring H₂ pressure): When directed to open 1HY607, **release – 'Generator Hydrogen Fill'**.
 - a) Maintenance (when directed to investigate) – acknowledge order and then report, "We will dispatch technicians to investigate."

5. **'A' Reactor Water Cleanup Filter Demin Trip**
 - a. Event Trigger – Following Event 4 and when directed by the Lead Examiner, insert **Remote 2** and verify the following command(s):
 - (1) **YFCUCTPW_1.** (RWCU F/D A Controller Pwr/Pneum Failure).
 - b. Role play
 - (1) EO (if status of A RWCU F-D is requested): respond, "A RWCU F-D is in HOLD mode".
 - (2) Maintenance (if requested): respond, "Dispatching personnel to investigate."
 - (3) Chemistry (if contacted): acknowledge the notification.

6. RCIC failure to auto-isolate on an isolation signal

- a. Event Trigger - Following Event 5 and upon direction of the Lead Examiner, insert **Remote 3** and verify the following command(s):
 - (1) **A05_A02_A0204_1_TVM.** (5063-4A RCIC Div 2 Steam Line Diff Press High)
 - (2) **A05_A02_A09DS08_1 On.** (RCIC Div 2 Isolation Reset Red Lite)
- b. Role play:
 - (1) Maintenance (if asked to investigate Div 2 Steam Line Diff Press High alarm malfunction) – “We’ll send a technician to the control room to gather information for the troubleshooting plan.”
 - (2) If RCIC Flow ATMs are checked:

ATM	Value	Trip Status
1E31-N690B	100% (300" H ₂ O) (upscale)	Tripped
1E31-N683B	100% (300" H ₂ O) (upscale)	Tripped
1E31-N690A	50% (0" H ₂ O)	Not tripped
1E31-N683A	50% (0" H ₂ O)	Not tripped
1E31-N691B	50% (0" H ₂ O)	Not tripped
1E31-N684B	50% (0" H ₂ O)	Not tripped
1E31-N691A	50% (0" H ₂ O)	Not tripped
1E31-N684A	50% (0" H ₂ O)	Not tripped

7. Suppression Pool leak into the LPCS Room / RHR ‘A’ Pump Room

- a. Event Trigger - Following Event 6 and when directed by the Lead Examiner, insert **Remote 4** and verify the following command(s):
 - (1) **YPMALSE_665.** (LPCS Suction Line Rupture)
 - (2) **YPMALSE_666.** (RHR A SP Suction Leak)
 - (3) **A05_A02_A09S38_2=ON.** (LP Pwr Loss/Ovld Any Vlv PB Lite)
 - (4) **A05_A02_A16DS60_1=OFF.** (E21AF001 Grn Lite)
 - (5) **A05_A02_A16DS61_1=OFF.** (E21AF001 Red Lite)
- b. Role play (If requested)
 - (1) EO (when directed to investigate leakage into the LPCS Pump Room) – “There is a large leak in the LPCS Pump suction pipe between 1E21-F001 and the LPCS Pump. The leak appears to be isolable. The room is becoming uninhabitable and I am leaving.”
 - (2) EO (when directed to remove LPCS and RHR A Pump breaker control power fuses) – acknowledge the order.
 - (3) EO (when directed to check the breaker for 1E21-F001) – “The breaker for 1E21-F001 is tripped and will not reset.”
 - (4) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD.

8. Manual ADS Initiation Logic failure

- a. Event Trigger - When BOP attempts to manually initiate ADS.
- b. Role play – None

CT Bases Information

1. **[CT-1]** PC-3.1, SCRAM the reactor before suppression pool level lowers to less than 15' 1".
 - a) This critical task was derived from the BWR EOP Generic Critical Task listing, TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide, and EOP Technical Bases which states that as Suppression Pool level decreases, the Heat Capacity Limit also decreases. Inserting a scram reduces the rate of energy production and thus the heat input to the suppression pool. An action to reduce the heat input to the Suppression Pool is therefore critical.
2. **[CT-2]** PC-3.3, Enters EOP-3 prior to suppression pool level reaching 15'1" and performs an emergency depressurization.
 - a) This critical task was derived from the BWR EOP Generic Critical Task listing, TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide, and EOP Technical Bases which states that if a loss of coolant accident occurs with level below this value, steam discharged through the horizontal vents may not be completely condensed and containment pressure could exceed structural limits. Since the RPV may not be kept at pressure under these conditions, a blowdown must be performed, irrespective of suppression pool temperature, if suppression pool level cannot be maintained above 15 ft. 1 in. (15.1 ft). An action that mitigates the event and prevents exceeding containment structural limits is therefore critical.

Turnover

1. The plant is in Mode 1, operating at ~ 10% Rated Thermal Power (RTP).
 - RR Pumps A and B are operating in slow speed with FCVs at 90%/90%, Core Flow is at 30.5 Mlbm/hr.
 - CPS 3002.01 Heatup and Pressurization is complete.
 - CPS 3004.01 Turbine Startup and Generator Synchronization is in progress. Section 5.0 Prerequisites are complete. Steps 8.1.1 and 8.1.5 are in progress. Steps 8.1.2 -8.1.4 are complete.
 - Main Turbine Chest Warming has just been completed.
 - Control rods – On Step 15. Gang 7E, Rod 40-17 is at position 18.
 - MDRFP is on the MLC in automatic.
2. Status of Tagged Out Equipment
 - CY Pump 'B' (0CY01PB) is OOS for maintenance. Not expected back this shift.
3. Today Day Shift
4. Weather Conditions
 - Thunderstorms are expected in the area within the next hour.
5. Thermal Limit Problems or concerns
 - Continue with power ascension to 15% IAW Step 8.1.6 of CPS 3004.01. The RE has requested single rod, single notch rod motion. After reaching 15% power Perform Turbine Roll IAW Step 8.1.8 of CPS 3004.01.
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - RHR 'A' flush IAW CPS 3312.03 Shutdown Cooling (SDC) & Fuel Pool Cooling And Assist (FP&A) by operating RHR 'A' in Pool to Pool mode per CPS 3312.01 Residual Heat Removal (RHR).
9. Evolutions planned for the shift
 - First Priority – Secure RHR 'A' operation in Pool To Pool mode per CPS 3312.01 Residual Heat Removal (RHR), starting at step 8.2.10.9.
 - Continue with power ascension to 15% IAW Step 8.1.1 and 8.1.5 per CPS 3004.01.
10. Risk Levels
 - Green
 - Protected Equipment: None

Exelon Nuclear

ILT 19-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 4**

Revision Number: 0

Date: 1/28/20

Developed By:	Bill Kiser Instructor	1/28/20 Date
Validated By:	Brian Steele SME or Instructor	3/4/21 Date
Reviewed By:	Tim Windingland Operations Representative	3/4/21 Date
Approved By:	Matthew Beeler Training Department	3/4/21 Date

Facility: Clinton Power Station Scenario No.: 4 Operating Test No.: 2021-301

Examiners: _____ Operators: _____

Initial Conditions:

- Mode 1 at 56% power.
- Weather conditions are calm and clear.
- MC Pump 'A' (OMC01PA) is OOS for maintenance. Not expected back this shift.

Turnover:

- Priorities for the shift are as follows:
 - First Priority – Continue performing HPCS Pump Operability IAW CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability starting at step 8.2.7. An extra equipment operator is briefed, staged and ready to support the surveillance.
 - Continue with power ascension to 62% IAW CPS 3005.01 Unit Power Changes using rods.
 - CPS 3005.01 is complete through Step 8.1.10.
 - Control rods - Step 26 is current / Gang 10C @ position 08.

LCO's in effect

- HPCS is inop per ITS LCO 3.5.1 (day 2 of SOW) (entered at 0500 on the previous day).
- ORM 2.5.2 Action 3.5.2 due to HPCS MOV TEST PREP switch being in TEST (entered at 0500 on the previous shift).

Critical Tasks:

- **[CT-1]** TCA-10 BOP/ATC starts Standby Liquid Control Pumps to shutdown the reactor within 120 seconds of the time at which the ATWS trip setpoint is reached (RPV pressure of 1127 psig).
- **[CT-2]** Inhibits ADS within 105 seconds of RPV level reaching Level 1 (-145.5" Wide Range).
- **[CT-3]** Terminates and prevents injection from LPCS and LPCI before RPV level reaches Level 1 (-145.5" Wide Range) and pressure lowers below 472psig.
- **[CT-4]** Initiates RCIC injection prior to RPV level reaching -160" (TAF).
- **[CT-5]** If RPV level \leq TAF and no systems are injecting, initiate ADS per EOP-3 within 17.5 minutes of RPV level reaching -160" (TAF).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	(NEW) Perform CPS 9051.01 HPCS Pump Operability
2	YP_XMFTB_4104	C-BOP	(NEW) Failure of HPCS Pump Discharge valve (1E22-F301)
3	N/A	R-ATC	Raise Power with rods to 62%
4	ROD0429TFIA3	C-ATC TS-SRO	Rod drifts outward
5	A04_A18_A02_4 Manual A04_A18_A02_7 Press	I-BOP	(NEW) EHC Temperature Controller Failure
6	A11_A05_S40_2 ON A11_A02_07_4_TVM 2 A_11_A08_DS30_1 OFF	TS-SRO	(NEW) Loss of Control Power to Suppression Pool Dump Valve (1SM001A)
7	YAFWPPLB_16	C-ATC	(NEW) TDRFP 'B' High Bearing Temperature
8	YP_XMFTB_5001/3/4 GROUP_1_ISOL_MALF	M-All	(NEW) Inadvertent Group 1 Isolation / Partial ATWS
9	YP_XMFTB_4094 YP_XMFTP_4959	C-All	Trip of MDRFP / RCIC fails to auto start

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
 NEW – Not used on the previous two (2) NRC exams.

Scenario No.: 4

Operating Test No.: 2021-301

Narrative Summary

Event #	Description
1.	<p>Perform CPS 9051.01 HPCS Pump Operability The scenario begins with CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability section 8.2 HPCS Pump Operability / WLP Double Check Valve Test in progress. All steps up to 8.2.7 Pump Starting were completed on the previous shift. The BOP operator will be directed to continue the surveillance IAW CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability section 8.2.7 Pump Starting.</p>
2.	<p>Failure of HPCS Pump Discharge valve (1E22-F301) Two (2) minutes after HPCS flowrate reaches 5000 gpm, the HPCS Pump Discharge Valve (1E22-F301) disc will separate from the stem and drift shut. Annunciator 5062-4D HPCS PUMP SUCTION ABNORMAL is received. When requested, the extra Equipment Operator will report that a loud “vibrating” noise is coming from the HPCS Pump Discharge Valve. The SRO will direct the BOP operator to secure the HPCS pump and back out of the surveillance.</p>
3.	<p>Raise Power with rods to 62% The crew will raise Reactor power with rods to achieve 62% power IAW CPS 3005.01 Unit Power Changes.</p>
4.	<p>Rod drifts outward Annunciator ROD DRIFT (5006-4G) comes in due to rod 04-29 drifting outward. The ATC Operator will take the Immediate Actions and applicable Subsequent Actions as directed by the SRO for an Inadvertent Rod Movement per CPS 4007.02 Inadvertent Rod Movement. Rod 04-29 will drift outward until individually scrambled at the Hydraulic Control Unit (HCU). Technical Specification LCO 3.1.3 Actions C.1 and C.2 will be evaluated requiring full insertion of the inoperable control rod in 3 hours <u>and</u> disarming the associated CRD in 4 hours. Technical Specification LCO 3.1.6 Actions A.1 will also be evaluated and found not to apply.</p>
5.	<p>EHC Temperature Controller Failure Annunciator TROUBLE EHC FLUID (5017-3B) comes in due to low temperature caused by a failure in the auto portion of the EHC FLUID CLG WTR CONTROL controller. The BOP operator will diagnose the problem with the controller, place the controller in MANUAL, stabilize and restore EHC Fluid Temperature.</p>
6.	<p>Loss of Control Power to Suppression Pool Dump Valve (1SM001A) Annunciator 5041-7D NOT AVAILABLE SM SYSTEM DIVISION 1 comes in due to a blown control power fuse deenergizing relay 74-SM1A (1SM001A Bkr Overload relay). The BOP operator will dispatch an Equipment operator to investigate. Technical Specification LCO 3.6.2.4, Action C.1 will be evaluated requiring the restoration of the SPMU subsystem to operable status within 7 days.</p>
7.	<p>TDRFP ‘B’ High Bearing Temperature Annunciator 5002-2G HIGH TEMP RFPT 1B BRG comes in due to a failed bearing in the ‘B’ RFPT. The crew will secure the ‘B’ TDRFP IAW CPS 3103.01 Feedwater (FW) section 8.3.6 High Temperature TDRFP Bearings and may start the MDRFP.</p>
8.	<p>Inadvertent Group 1 Isolation / Partial ATWS An inadvertent Group 1 Isolation occurs causing the Inboard MSIVs to close. When the ATC places the Reactor Mode Switch in shutdown/attempts manual scram or ARI, some control rods fail to insert. The SRO will enter EOP-1 RPV Control and transition to EOP-1A ATWS RPV Control. The SRO will direct actions to lower level to reduce subcooling based on EOP-1A, Level Band B. The BOP will start SLC and the ATC will insert control rods per EOP-1A. Suppression Pool Temperature will exceed Fig. G Boron Injection Temperature.</p>
9.	<p>Trip of MDRFP / RCIC fails to auto start The MDRFP breaker will trip concurrent with placing the mode switch in shutdown. Reactor Core Isolation Cooling (RCIC) will fail to auto start when lowering RPV level reaches Level 2. When the ATC attempts to restore RPV level IAW EOP-1A Level Band B, the only high pressure source available will be RCIC and the ATC must manually start and inject with RCIC to restore and maintain RPV level.</p>

Operator Actions

Event No.(s): 1,2		Page 1 of 2
Description: Perform CPS 9051.01 HPCS Pump Operability / Failure of HPCS Pump Discharge valve (1E22-F301)		
Initiation: Following shift turnover and as directed by the SRO.		
Cues: None		
Time	Position	Applicant's Actions or Behavior
<p align="center"><u>General Note on Requirements for "Expected Annunciator Response" – OP-AA-103-102</u></p> <p>If this evolution was pre-briefed and "Expected Alarms" were reviewed, the following expectations apply:</p> <ul style="list-style-type: none"> • "Expected alarms" will be flagged • When the annunciator comes in the operator will announce "Expected Alarm" • The annunciator response procedure (ARP) need not be entered since it has already been reviewed in the pre-brief. <p>If a pre-brief was not conducted the operator should perform the following:</p> <ul style="list-style-type: none"> • When an annunciator comes in the ARP should be referred to. • The annunciator may then be identified as an "Expected Alarm", flagged, and from that point on the ARP need not be referred to. 		
Key Parameter Response: HPCS Pump Amps, HPCS Pump Flow		
Expected Annunciators: None		
Automatic Actions: None		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Performs Plant Announcements. ○ Relays Equipment Operator report to the SRO.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. <p>Per CPS 9051.01 HPCS PUMP & HPCS Water Leg Pump Operability, section 8.2 HPCS Pump Operability / WLP Double Check Valve Test, Step 8.2.7 Pump Starting:</p> <ul style="list-style-type: none"> • Establishes communications between the MCR and locally at the HPCS Pump. • Verifies HPCS WATER LEG DISCHARGE PRESSURE LOW Annunciator 5062-7D is clear. • Starts HPCS Pump, 1E22-C001. • Verifies 1E22-F012, HPCS Pump Min Flow To Suppr Pool, indicates open. • Alternately and slowly throttles open the following valves until HPCS flow reaches ~ 5050 gpm as read on Comp pt HP-DA301: <ul style="list-style-type: none"> • 1E22-F010 HPCS First Test Vlv To Storage Tank. • 1E22-F011 HPCS Second Test Vlv To Storage Tank. ○ Records 1E22-F012, HPCS Pump Min Flow To Suppr Pool indicates closed. ○ Records start time for flow through 1E22-F010 and 1E22-F011. ○ Verifies noted HPCS Pump Room Fans (1VY08CA/B) start, or are already running. ○ Verifies noted SX Outlt HPCS Pump Rm EAC 1A (1B) valves (1SX041A/B) open, or are already open. ○ Throttles 1E22-F010 and/or 1E22-F011 to obtain and maintain the reference value of 5050 gpm, or as close as possible to it. • Recognizes system perturbation: <ul style="list-style-type: none"> ○ HPCS flow indication [HP-DA301] lowers to ~ 0 gpm. ○ 1E22-F012, HPCS Pump Min Flow To Suppr Pool, indicates open. ○ Annunciator 5062-4D HPCS PUMP SUCTION ABNORMAL is received. ○ Report of loud "vibrating" noise coming from 1E22-F301.

Event No.(s): 1, 2		Page 2 of 2
Description: Perform CPS 9051.01 HPCS Pump Operability / Failure of HPCS Pump Discharge valve (1E22-F301)		
Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	<ul style="list-style-type: none"> ○ Reports issue to SRO. ○ Relays Equipment Operator report to the SRO. ● Per CPS 5062-4D HPCS Pump Suction Abnormal, trips the HPCS Pump. ● As directed by SRO, back out of the surveillance (at a minimum): <ul style="list-style-type: none"> ○ Shuts 1E22-F010 and/or 1E22-F011. ○ Places HPCS MOV TEST PREP switch being in NORMAL ○ Directs EO to remove the HPCS Control Power Fuses.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC/BOP. ● Directs actions listed above. ● Provides direction to BOP Operator for backing out of surveillance (at a minimum): <ul style="list-style-type: none"> ○ Shuts 1E22-F010 and 1E22-F011. ○ Places HPCS MOV TEST PREP switch being in NORMAL ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. <ul style="list-style-type: none"> ○ Reviews ITS LCO 3.5.1 and determines that no additional actions are required. ○ Exits ORM 2.5.2 Action 3.5.2 if HPCS MOV TEST PREP switch is placed in NORMAL. ● Informs Shift Manager. ● Conducts a brief. ● Contacts Maintenance to investigate.
Terminus: HPCS pump is secured.		

NOTES:

● Solid bullets are required actions
○ Hollow bullets are actions that may or may not be performed

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: Raise Power with rods to 62%		
Initiation: Following Events 1, 2 and upon direction of the SRO		
Cues: None		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: Reactor power, Rod drive parameters (flow, dP), control rod position, Generator load		
Expected Annunciators: Annunciator 5006-2H Rod Out Block		
Automatic Actions: None		
	ATC	<ul style="list-style-type: none"> • Per CPS 3304.02 Rod Control and Information System (RC&IS), NF-CL-721-1002 Control Rod Move Sheets, and CPS 3005.01 Unit Power Changes section 8.1: <ul style="list-style-type: none"> • Raises reactor power using control rod withdrawal when directed by SRO. • Monitors the following items listed below: <ul style="list-style-type: none"> • RCIS status (LPAP, HPSP, Rod Blocks) • Power (APRM, LPRM, Gen Load) • Actual plant response compared to expected response • Monitors reactor to ensure operations remain within established bands. <ul style="list-style-type: none"> ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Positions himself/herself in proximity of the reactor operator, typically the location from which EOP actions are directed (OP-AA-300). <ul style="list-style-type: none"> ○ Informs Shift Manager. ○ Informs TSO. ○ Conducts a brief.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 2
Description: Rod drifts outward		
Initiation: Following Event 3 and upon direction of the Lead Examiner, insert REMOTE 1		
Cues: Annunciator 5006-4G Rod Drift		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> 5006-4G Rod Drift		
<u>Automatic Actions:</u> None		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. • Identifies Rod 04-29 drifting and reports issue to SRO. • Monitors reactor to ensure operations remain within established bands. <p>Per CPS 4007.02, Inadvertent Rod Movement Immediate Actions:</p> <ul style="list-style-type: none"> • Selects Control Rod 04-29 and fully inserts 04-29 by depressing the In Timer Skip button on P680. <p>Subsequent actions:</p> <ul style="list-style-type: none"> • Once Control Rod 04-29 reaches the fully inserted position (00), releases the In Timer Skip button. • Observes 04-29 rod withdrawal recommences. • Reinserts rod 04-29 with the In Timer Skip button. • When directed by the SRO, directs Equipment Operator to scram Control Rod 04-29 by placing both SCRAM TEST SWITCHES at the HCU to TEST. • Releases IN TIMER SKIP push-button. ○ When directed by the SRO, directs Equipment Operator to hydraulically isolate control rod 04-29 HCU. ○ When directed by the SRO, directs Equipment Operator to return control rod 04-29 HCU SCRAM TEST SWITCHES to NORMAL. ○ Evaluates thermal limits.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. • Dispatches an Equipment Operator to the HCU for rod 04-29. • Directs an Equipment Operator to individually scram control rod 04-29. ○ Evaluates MSL rad monitor values. ○ Evaluates OG Rad levels.

Event No.(s): 4		Page 2 of 2
Description: Rod drifts outward		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Enters and implements CPS 4007.02 Inadvertent Rod Movement. Directs: <ul style="list-style-type: none"> • RO to individually scram control rod 04-29. <ul style="list-style-type: none"> ○ RO to hydraulically isolate control rod 04-29 HCU. ○ RO to return control rod 04-29 HCU SCRAM TEST SWITCHES to NORMAL. ○ Establishes critical parameter to monitor for multiple rod drifts. • Evaluates and enters Technical Specification LCO 3.1.3 Control Rod Operability <ul style="list-style-type: none"> • Applicable Condition: C (one or more control rods inoperable for reasons other than Condition A or B) • Required Actions and Completion Times: <ul style="list-style-type: none"> • C.1 – fully insert inoperable control rod within 3 hours <u>and</u> • C.2 – disarm the associated CRD within 4 hours. ○ Directs hydraulic isolation of the HCU for control rod 04-29. ○ Evaluates thermal limits. ○ Informs Shift Manager. ○ Contacts RE. ○ Conducts a brief.
Terminus: Rod 04-29 is fully inserted, individually scrambled and ITS evaluated.		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: EHC Temperature Controller Failure		
Initiation: Following Event 4 and upon direction of the Lead Examiner, insert REMOTE 4		
Cues: Annunciator 5017-3B Trouble EHC Fluid		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> EHC Reservoir temperature <u>Expected Annunciators:</u> 5017-3B Trouble EHC Fluid <u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Dispatches an Equipment Operator to investigate conditions locally at EHC skid and review CPS 3105.02 Main EHC Hydraulic Power Unit (EH) Section 8.3.2 Hi /Low Reservoir Temperature.
	BOP	<ul style="list-style-type: none"> • Reports issue to the SRO. • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Dispatches an Equipment Operator to investigate conditions locally at EHC skid and review CPS 3105.02 Main EHC Hydraulic Power Unit (EH) Section 8.3.2 Hi /Low Reservoir Temperature. <p>Per CPS 5017-3B, Trouble EHC Fluid ARP:</p> <ul style="list-style-type: none"> • Determines that the Temperature Controller has failed. • Places the EHC FLUID CLG WTR Controller in MANUAL. • Adjusts controller as needed to maintain EHC Reservoir temperature 110°F to 125°F.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: EHC Fluid Cooling Water Controller in manual and EHC Reservoir temperature stabilized.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: Loss of Control Power to Suppression Pool Dump Valve 1SM001A		
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 3		
Cues: Annunciator 5041-7D Not Avail SM Sys Division 1		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> None</p> <p><u>Expected Annunciators:</u> 5041-7D Not Avail SM Sys Division 1</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Directs Equipment Operator to investigate.
	BOP	<ul style="list-style-type: none"> ● Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ● Reports loss of power to 1SM001A to SRO. ● Refers to ARP 5041-7D. ○ Directs Equipment Operator to investigate.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC/BOP. ● Directs actions listed above. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Contacts Maintenance to investigate. ● Declares SPMU System INOPERABLE: <ul style="list-style-type: none"> ● Applicable LCO - 3.6.2.4 ● Applicable Condition – C ● Required Action and Completion Time – C.1 within 7 days ○ May direct one-time control power fuse replacement for 1SM001A breaker. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: ITS 3.6.2.4 evaluated for loss of control power to Suppression Pool Dump Valve.		

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 2
Description: TDRFP 'B' High Bearing Temperature		
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 4		
Cues: Annunciator, 5002-2G High Temp RFPT 1B Brg		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> TDRFP B graphics screen to determine alarming bearing</p> <p><u>Expected Annunciators:</u> 5002-2G High Temp RFPT 1B Brg</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Reports issue to SRO. • Refers to ARP/procedure. <p>Per 5002-2G High Temp RFPT 1B Brg ARP:</p> <ul style="list-style-type: none"> • Reports issue to SRO. ○ Observes TDRFP B graphics screen to determine the alarming bearing. • Verifies lube oil pressure to turbine bearing > 12 psig and to pump bearing > 20 psig. • Verifies lube oil cooler outlet temperature is 100°F to 120°F (may be performed by BOP). ○ Increases cooling water flow and/or reduces RFP 1B speed to clear bearing alarm. • Refers to CPS 3103.01, FEEDWATER (FW) High Temperature RFPT Bearings abnormal section for further operating guidance. <p>Per CPS 3103.01, FEEDWATER (FW):</p> <ul style="list-style-type: none"> • Stops TDRFP 'B' per section 8.1.10 (preferred) <u>or</u> trips the TDRFP due to high bearing temperatures. ○ Locks out the RR Flow Control valves per CPS 3302.02 Reactor Recirculation Flow Control Hydraulic System (will not perform if the crew decides to trip the TDRFP). ○ Selects "TDRFP 'B' TAKE PUMP OFFLINE" command. ○ Reduces TDRFP 'B' speed to minimum speed. ○ Verifies turning gear engages when TDRFP 'B' stops. ○ Starts the MDRFP per section 8.1.3.
	BOP	<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ○ Observes TDRFP B graphics screen (or PPC) to determine the alarming bearing. ○ Dispatches an Equipment Operator to monitor operation of the 'B' TDRFP. ○ Dispatches an Equipment Operator to perform MDRFP prestart checks.

Event No.(s): 7		Page 2 of 2
Description: TDRFP 'B' High Bearing Temperature		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Refers to CPS 3103.01 Feedwater (FW), section 8.3.6 High Temperature TDRFP Bearings. <ul style="list-style-type: none"> ○ Recognizes that at the current power level starting a standby pump is unnecessary prior to shutdown of TDRFP 1B. <ul style="list-style-type: none"> • Directs that TDRFP 1B be shutdown IAW section 8.1.10 (preferred) <u>or</u> tripped due to high bearing temperatures. ○ Authorizes lockout of RR Flow Control Valves (if the crew does <u>not</u> trip the TDRFP). ○ Enters and executes CPS 4002.01, Abnormal RPV Level Loss of Feed Water at Power (only if RPV high/low level alarms are received). ○ Informs Shift Manager. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: TDRFP 'B' removed from service.		

NOTES:

Operator Actions

Event No.(s): 8, 9		Page 1 of 3
Description: Inadvertent Group 1 Isolation / Partial ATWS / Trip of MDRFP / RCIC fails to auto start		
Initiation: Following Event 7 and upon direction of the Lead Examiner, insert REMOTE 5		
Cues: Group 1 Isolation and annunciators on 1H13-P680		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: Reactor power, control rod position.		
Expected Annunciators: Multiple annunciators on 1H13-P680 & P601		
Automatic Actions: None		
<p><u>Evaluator Note for Critical Task Performance</u></p> <p>Mark time that Remote 5 is inserted ____.</p> <p>Mark time that SLC Pump A/B control switches are taken to start ____.</p> <p>Verify time from Remote 5 inserted to SLC Pump A/B control switches taken to start is \leq 125 seconds. (120 seconds per TCA-10 + 5 seconds for RPV pressure to reach 1127 psig)</p> <p>Failure to meet this criterion will be considered a Critical Task Failure.</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. <ul style="list-style-type: none"> ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Reports inadvertent Group 1 isolation to SRO. • Initiates a reactor scram when failure to scram on a Group 1 isolation is observed. <p>EOP-1/ EOP-1A Actions</p> <ul style="list-style-type: none"> • Determines Shutdown Criteria is NOT met. • Arms and depresses MANUAL SCRAM push-buttons <u>and</u> initiates ARI. • Verifies reactor power is lowering. • Carries out ATWS Scram Choreography by reporting the following: <ul style="list-style-type: none"> - Mode Switch in shutdown, power is... - Shutdown Criteria is not met... - Reactor Power is ... and trend - Reactor Pressure is ... and trend - Reactor Level is ... and trend - Manual Scram and ARI have been initiated - Any EOPs with entry conditions (EOP-1 on failure to scram) • Insert control rods to position "00" (CRAM Array first) unless prevented by RPC. • Stabilize Feedwater System. • Performs EOP actions as directed by the SRO. <ul style="list-style-type: none"> • Terminates and prevents injection from Condensate / Feedwater. <ul style="list-style-type: none"> • Shut 1FWF004, Feedwater Regulating Valve • Shut 1FW002A and B, TDRFP Discharge Valves. • Place A and B SLIM Controllers in Manual/min output. • Shut 1FWF003A and B, TDRFP Discharge Bypass Valves. • Once RPV level has been lowered to -60", the ATC controls RPV level between -160" (TAF) and -60". • Inserts control rods per CPS 4411.08 Alternate Control Rod Insertion and CPS 4410.00C012 Defeating ATWS Interlocks. <ul style="list-style-type: none"> ○ Inject with RCIC (resetting RCIC turbine if RCIC was terminated and prevented) to maintain level between -162" and -60". ○ Reports trip of MDRFP. ○ Reports critical parameters as required. ○ Coordinates with BOP to monitor and control RPV level and pressure.

Event No.(s): 8, 9		Page 2 of 3
Description: Inadvertent Group 1 Isolation / Partial ATWS / Trip of MDRFP / RCIC fails to auto start		
Time	Position	Applicant's Actions or Behavior
<p><u>Evaluator Note for Critical Task Performance</u></p> <p>Mark time that ADS is inhibited ____.</p> <p>Mark start of the 105 second timer / RPV water level reaching Level 1 (-145.5" Wide Range) ____.</p> <p>Verify ADS is inhibited prior to RPV water level reaching Level 1 plus 105 seconds.</p> <p>Failure to meet this criterion will be considered a Critical Task Failure.</p> <p>Mark time that TAF is reached ____.</p> <p>Mark time that ADS is initiated ____.</p> <p>Verify time from RPV Water Level reaching TAF to ADS being initiated is ≤ 17.5 minutes.</p> <p>Failure to meet this criterion will be considered a Critical Task Failure.</p>		
[CT-2] [CT-3]	BOP	<ul style="list-style-type: none"> • Performs EOP-1A actions as directed by the SRO. <ul style="list-style-type: none"> • [CT-2] Inhibits ADS within 105 seconds of RPV level reaching Level 1 (-145.5" Wide Range). • Remove the QS relay. • [CT-3] BOP terminates and prevents injection from LPCS and LPCI before RPV level reaches Level 1 (-145.5" Wide Range) and pressure lowers to 472psig, when directed by SRO. <ul style="list-style-type: none"> ▪ Arm and depress LPCS/LPCI FM RHR A MANUAL INITIATION push-button. ▪ Provide a close signal to 1E21-F005, LPCS to CNMT Outbd Isol Valve. ▪ Provide a close signal to 1E21-F042A, LPCI From RHR A Shutoff Valve, and 1E21-F053A, RHR A to Feedwater S/D Return Valves. ▪ Start both Mixing Compressors ▪ Shut 1FC036 and 1FC037, FC Supply Outboard and Inboard isolation valves. ▪ Arm and depress LPCS/LPCI FM RHR B&C MANUAL INITIATION push-button. ▪ Provide a close signal to 1E21-F042B and C, LPCI From RHR B and C Shutoff Valves, and 1E21-F053B, RHR B to Feedwater S/D Return Valve. ▪ Shut 1E12-F023, RHR B Supply to Reactor Head Spray Valve. • Inject with RCIC (resetting RCIC turbine if RCIC was terminated and prevented) to maintain level between -162" and -60".
[CT-1]		<ul style="list-style-type: none"> • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. • Monitors reactor to ensure operations remain within established bands. • Reports inadvertent Group 1 isolation to SRO. • Performs ATWS scram choreography actions. <ul style="list-style-type: none"> • Announces: <ul style="list-style-type: none"> ▪ Reactor Scram with Failure to Scram ▪ Motor Driven Reactor Feed Pump may start ▪ Evacuate the RCIC room ▪ Evacuate the Containment • Determines rod status and reports "Shutdown Criteria is not met" to SRO. • Verifies Manual Scram / ARI have been initiated. • [CT-1] If power is still > 5%, initiates Standby Liquid Control (SLC) per CPS 4411.10H001 SLC Injection Hard Card and reports initiation to the SRO. • Reports failure of RCIC to auto-start at Level 2. <ul style="list-style-type: none"> ○ Terminates and prevents injection of RCIC.

Event No.(s): 8, 9		Page 3 of 3
Description: Inadvertent Group 1 Isolation / Partial ATWS / Trip of MDRFP / RCIC fails to auto start		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> Acknowledges reports from ATC/BOP. Directs actions listed above. Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. <p>Enters CPS 4100.01 Reactor Scram</p> <ul style="list-style-type: none"> Ensures ATC and BOP operators perform applicable Scram Choreography actions. Carries out ATWS Scram Choreography by performing an Update: <ul style="list-style-type: none"> Update Entering EOP-1 Transitioning to EOP-1A Entering the Scram Off-Normal End of Update <p>Enters EOP-1A ATWS RPV Control and directs/verifies:</p> <ul style="list-style-type: none"> [CT-2] BOP to inhibit ADS within 105 seconds of RPV level reaching Level 1 (-145.5" Wide Range). [CT-1] BOP starts Standby Liquid Control Pumps to shutdown the reactor within 120 seconds of the time at which the ATWS trip setpoint is reached (RPV pressure of 1127 psig). <ul style="list-style-type: none"> Directs ATC to lower then control RPV level between -160" (TAF) and -60". Directs ATC to insert control rods per CPS 4411.08 Alternate Control Rod Insertion and CPS 4410.00C012 Defeating ATWS Interlocks. [CT-3] BOP to terminate and prevent injection from LPCS and LPCI before RPV level reaches Level 1 (-145.5" Wide Range) and pressure lowers to 472psig. <ul style="list-style-type: none"> Directs stabilization of RPV pressure 800-1065 psig with SRVs. Directs BOP to terminates and prevents injection of RCIC. [CT-4] When RPV level is <60", directs BOP/ATC to start/restart injection with RCIC and maintain RPV level between -162" and -60." [CT-5] If RPV level ≤ TAF and no systems are injecting, directs BOP/ATC to initiate ADS per EOP-3 within 17.5 minutes of RPV level reaching TAF.
<p>Terminus: The scenario can be terminated when reactor power, RPV pressure and level are being maintained per EOP-1A, and when directed by the lead examiner.</p>		

NOTES:

Simulator Operator Instructions**Initial Setup**

1. Fill out plant status and have Turnover Sheet ready for the crew.
2. Verify daily lamp test completed.
3. Simulator key count: _____ keys.
4. Reset to IC-214 (PW 13852) @ 56% Power. If this is the first reset after swapping simulator loads, reset the IC twice.
5. Load the lesson plan for this scenario.
6. Verify the following commands are active:
 - **OPER_1E22F010_HP Shut.** (1E22F010 Bkr Status)
 - **YP_XMFTB_4963.** (RP01 – Auto & Manual Scram Failure)
 - **YP_XMFTB_4959.** (RI01 – RCIC Auto Start Failure)
7. Place simulator in RUN.
8. Verify RCIC Flow Controller is set at 620 gpm.
9. Verify the AR/PR server is running and stabilize AR/PR.
10. Verify Rod Drive pressure is in the expected range of 235-265 psid.
11. Provide pull sheets: **Step 26** is current - **Gang 10C** is at **Position 08**.
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected on the OCM.
14. Make sure the FP bell toggle switch on the OG panel (is in the up position).
15. Make sure SBT data is saved, then clear PPDS history (TQ-CL-201-0117 Step 8.9).
16. Clear PPC history (TQ-CL-201-0117 Step 8.10).
17. Clear AR/PR Service Logs (TQ-CL-201-0117 Step 8.12).
18. Clear the memory on the Honeywell recorders (TQ-CL-201-0117 Step 8.13).
19. Clear the memory on the Yokogawa recorders (TQ-CL-201-0117 Step 8.14).
20. Clear the memory on the OG recorders (TQ-CL-201-0117 Step 8.15).
21. Close any open window(s) on the V-panel.
22. Load PPC PMS environment (on PPC screen #10):
 - a. Select "Viewer"
 - b. Select "Load Env..."
 - c. Select "MCR_Baseline.vall"
 - d. Select Open.
23. Procedures that are expected to be used during this scenario are:
 - CPS 3103.01 FEEDWATER (FW)
 - CPS 3105.02 MAIN EHC HYDRAULIC POWER UNIT (EH)
 - CPS 3304.02 ROD CONTROL AND INFORMATION SYSTEM (RC&IS)
 - CPS 4002.01 ABNORMAL RPV LEVEL / LOSS OF FEEDWATER AT POWER
 - CPS 4007.02 INADVERTENT ROD MOVEMENT
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4200.01 LOSS OF AC POWER
 - CPS 4401.01 EOP-1 RPV CONTROL
 - CPS 4404.01 EOP-1A ATWS RPV CONTROL
 - CPS 4410.00C012 DEFEATING ATWS INTERLOCKS
 - CPS 4411.08 ALTERNATE CONTROL ROD INSERTION
 - CPS 5002.02 ALARM PANEL 5002 ANNUNCIATORS - ROW 2
 - CPS 5006.04 ALARM PANEL 5006 ANNUNCIATORS - ROW 4
 - CPS 5017.03 ALARM PANEL 5017 ANNUNCIATORS - ROW 3

- CPS 5041.07 ALARM PANEL 5041 ANNUNCIATORS - ROW 7
- ITS 3.1 REACTIVITY CONTROL SYSTEMS (LCOs 3.1.3, 3.1.5)
- ITS 3.6 CONTAINMENT SYSTEMS (LCO 3.6.2.4)

24. Hang OOS tags on: MC Pump 'A' (0MC01PA)

25. Identify T/S issues associated with OOS and turnover: None

26. Operating Equipment: None

27. Marked up copies:

- CPS 3005.01 UNIT POWER CHANGES
- CPS 9051.01 HPCS PUMP & HPCS WATER LEG PUMP OPERABILITY
- CPS 9051.01D001 HPCS PUMP & HPCS WATER LEG PUMP OPERABILITY DATASHEET

28. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #**1. Perform CPS 9051.01 HPCS Pump Operability**

- a. Event Trigger – None.
- b. Role play :
 - (1) EO (If requested)
 - a) Report “On station and standing by to support performance CPS 9051.01.”

2. Failure of HPCS Pump Discharge valve (1E22-F301)

- a. Event Trigger - Following Event 1 and at a HPCS flowrate > 3500gpm, verify the following command(s):
 - (1) **YP_XMFTB_4104.** (E22-F301 Fails Shut)
- b. Role play
 - (1) EO (if requested): report, “A loud “vibrating” noise is coming from the HPCS Pump Discharge Valve (1E22-F301).”
 - (2) EO (if requested to remove HPCS Pump Control Power Fuses): acknowledge the order, wait 2 minutes, and then **release Event 2 – Remove HPCS Control Power Fuses** and verify command **YP_HPCON Control Power Fuses of HPCS Pmp Bkr Out = Fuse Out.** Report “HPCS Pump Control Power Fuses have been removed”.
 - (3) Maintenance (if requested): respond “Dispatching personnel to investigate.”
 - (4) Booth operator (if directed by Chief Examiner): call CRS as Shift Manager and direct crew to continue with power ascension.

3. Raise Power with rods to 62%

- a. Event Trigger – None.
- (1) Role play – None.

4. Rod drifts outward

- a. Event Trigger – Following Event 3 and when directed by the Lead Examiner, insert **Remote 1** and verify the following command(s):
 - (1) **ROD0429TFIA3.** (Rod 04-29 will drift from its position).
- b. Role play
 - (1) No problem lights at the RGDC or RACC
 - (2) EO (If requested): report “no indications of problem at the HCU”.
 - (3) RE (If scram times are requested) report “no rods are slow”.
 - (4) RE (if requested to come to the MCR): “I am on my way to the MCR.”
 - (5) Chemistry (if requested to sample reactor coolant for possible fuel failure) - acknowledge the order.
 - (6) RP (if informed of possible fuel damage) – acknowledge the report and inform the MCR that RP will be monitoring for changing radiological conditions in the plant.
 - (7) EO (if directed to scram rod 04-29) - Release ‘**Single Rod Scram 04-29** and report “Scram test switches at HCU 04-29 are in TEST”. IF asked, “Accumulator N₂ pressure is 1200 psig” after rod is scrammed.
 - (8) EO (If requested): If directed to hydraulically isolate the HCU, report “1C11-F103 and 1C11-F105 are SHUT”.
 - (9) EO (when directed to restore control rod 04-29 scram test switches to normal after hydraulic isolation has been completed) – Release ‘**Return SRI Switches To Normal**’ and report “Scram test switches at HCU 04-29 are in NORMAL”. IF asked, report “Accumulator N₂ pressure is 1750 psig”.

5. **EHC Temperature Controller Failure** (pull up EH-BA001 computer point)
- a. Event Trigger – Following Event 6 and when directed by the Lead Examiner, insert **Remote 2** and verify the following command(s):
 - (1) **A04_A18_A02_4 = Manual.** (EHC Fluid Clg Wtr Control - Manual).
 - (2) **A04_A18_A02_7 = Press.** (EHC Fluid Clg Wtr Control - Open).
 - b. Role play
 - (1) EO (when directed to check operation of the EHC Temp Control Valve) – report, “The EHC Temperature Control Valve is full open”, unless the valve has been manually repositioned then report “The EHC Temperature Control Valve is in a mid-position”
 - (2) EO (if directed to review CPS 3105.02 Section 8.3.2 Hi /Low Reservoir Temperature) – acknowledge the order.
 - (3) EO (if directed to monitor local EHC reservoir temperature) – Pull up EH-BA001 computer point and respond with real time temperatures as requested.
6. **Loss of Control Power to Suppression Pool Dump Valve (1SM001A)**
- a. Event Trigger – Following Event 5 and when directed by the Lead Examiner, insert **Remote 3** and verify the following command(s):
 - (1) **A11_A05_S40_2 ON.** (SM Div 1 MOV NOT AVAIL Status Light On).
 - (2) **A11_A02_07_4_TVM Steady.** (Annunciator 5041-7D, Not Avail SM Sys Division 1).
 - (3) **A11_A08_DS30_1 Off.** (1SM001A Green Light Off)
 - b. Role play
 - (1) EO (when directed to investigate): report “No abnormalities noted locally at the valve. The breaker handle for 1SM001A is not tripped.”
 - (2) EO (if directed to reset thermal overloads): report “The 1SM001A thermal overloads reset button has been depressed”.
 - (3) EO (if directed to perform a one-time fuse replacement of control power fuses): report “When the compartment door for 1SM001A was opened, there was a slight acrid odor noted. Recommend allowing Electrical Maintenance to investigate prior to attempting to replace control power fuses”.
 - (4) Maintenance (if requested): report, “Dispatching personnel to investigate”.
7. **TDRFP ‘B’ High Bearing Temperature**
- a. Event Trigger - Following Event 5 and when directed by the Lead Examiner, insert **Remote 4** and verify the following command(s):
 - (1) **YAFWPLB_16.** (Feedwater Pump B Bearing Failure).
 - b. Role play:
 - (1) EO (when directed to check operation of the ‘B’ TDRFP) – acknowledge the order and tell the MCR that you’re on your way to RP for a brief. Wait 5 minutes and report, “It smells like something is overheating in the ‘B’ TDRFP room. There is no indication of a fire in the room. I cannot precisely locate the overheating component.”
 - (2) EO (when directed to check 1FWPRV1B is providing 12-15 psig to the turbine bearings): report, “1FWPRV1B is set at 14 psig”.
 - (3) EO (when directed to check 1FWPRV2B is providing at least 12 psig to the turbine bearings): report, “1FWPRV2B is set at 15 psig”.
 - (4) EO (if directed to open Warming line isolation valves 1FW036B/1FW038B): wait two minutes and report, “1FW036B and 1FW038B are open”.
 - (5) EO (when directed to perform prestart checks of the MDRFP): report, “Prestart checks were completed when I performed my area tour”.
 - (6) EO (when directed to check for proper operation of the MDRFP): report, “The MDRFP is operating normally”.

8. Inadvertent Group 1 Isolation / Partial ATWS

- a. Event Trigger – Following Event 7 and when directed by the Lead Examiner, insert **Remote 5** and verify the following command(s):
 - (1) **YP_XMFTB_5001/3/4**. (Partial Scram GRP 1/3/4)
 - (2) **GROUP_1_ISOL_MALF**. (Inadvertent Group 1 Isolation)
- b. Role play
 - a) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD

9. Trip of MDRFP / RCIC fails to auto start

- a. Event Trigger – After the mode switch has been placed in shutdown, verify the following command(s):
 - (1) **YP_XMFTB_4094**. (MDRFP Trip)
- b. Role Play
 - (1) Equipment Operator (if requested):
 - a) Check condition of MDRFP breaker/motor – wait one minute and report, “The MDRFP breaker tripped on phase A overcurrent. No obvious damage to the motor.”

CT Bases Information

1. **[CT-1]** TCA-10 BOP/ATC starts Standby Liquid Control Pumps to shutdown the reactor within 120 seconds of the time at which the ATWS trip setpoint is reached (RPV pressure of 1127 psig).
 - a) This critical task was derived from OP-CL-102-106-1001 Operator Response Time Master List at CPS which states that the SLC Pumps must be started within 120 seconds of the time at which the ATWS trip setpoint is reached (low reactor water level or high reactor pressure). In this scenario, the ATWS high reactor pressure setpoint (1127 psig) is reached when the MSIVs fully close coincident with the failure to scram. The time being assessed is the longer time between 120 seconds following the ATWS trip point or the time at which the suppression pool reaches Boron Injection Initiation Temperature (BIIT). Based on EPU Task Report T0902, no scenario with an ATWS involves reaching BIIT in a time longer than 120 seconds from ATWS trip point, therefore 120 seconds is the longest time to be used. The Boron Injection Temperature is a function of reactor power. If boron injection is initiated before suppression pool temperature reaches the Boron Injection Temperature, RPV blowdown may be precluded at lower power levels and is therefore critical.

2. **[CT-2]** RPV-6.2 BOP Inhibits ADS within 105 seconds of RPV level reaching Level 1 (-145.5" Wide Range).
 - a) This critical task was derived from the BWR EOP Generic Critical Task listing, TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide, and the EOP Technical Bases and applies when ATWS conditions exist. During ATWS conditions, RPV water level may be intentionally lowered below the ADS setpoint to reduce reactor power. ADS actuation is prevented for the following reasons:
 - (1) ADS actuation can impose a severe thermal transient on the RPV and may complicate efforts to control RPV water level.
 - (2) If only RCIC is available for injection, ADS actuation may directly lead to loss of adequate core cooling and subsequent core damage.
 - (3) The conditions assumed in the design of the ADS actuation logic (e.g., no operator action for 10 minutes after event initiation) may not exist when the actions specified in ATWS RPV Control are being carried out.
 - (4) The operator can draw on much more information than is available to the ADS logic (e.g., equipment out of service for maintenance, operating experience with certain systems, probability of restoration of off-site power, etc.) and can better judge, based on instructions contained in the procedure, when and how to depressurize the RPV.
 - (5) Subsequent steps provide explicit and detailed instructions for RPV water level control and identify the specific conditions when a blowdown is required.
 - (6) Rapid, uncontrolled injection of relatively cold, unborated water could occur as RPV pressure decreases. If the reactor is not shutdown or if the shutdown margin is small, this could add sufficient positive reactivity to cause a power excursion large enough to damage the core.
 - b) An action that mitigates the rapid injection of cold, unborated water when shutdown criteria are not met is therefore critical.

3. **[CT-3]** RPV-6.3 BOP terminates and prevents injection from LPCS and LPCI before RPV level reaches Level 1 (-145.5" Wide Range) and pressure lowers below 472psig.
 - a) This critical task was derived from the BWR EOP Generic Critical Task listing, TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide, and the EOP Technical Bases and applies when ATWS conditions exist. LPCS and LPCI Pumps automatically initiate and will inject when RPV level reaches Level 1 (-145.5"). Rapid injection of cold, unborated water when shutdown criteria are not met may cause a large net increase in positive reactivity. The resulting power excursion may be large enough to substantially damage the core. An action that mitigates the rapid injection of cold, unborated water when shutdown criteria are not met is therefore critical.

4. **[CT-4]** Initiates RCIC injection prior to RPV level reaching -160" (TAF).
 - a) This critical task was derived from the EOP Technical Bases which states that if the decreasing RPV water level trend cannot be reversed before RPV water level drops to the top of the active fuel, core cooling by submergence can no longer be ensured. An action that precludes operation with inadequate core cooling is therefore critical. Allowing level to go below TAF will challenge core cooling and constitutes measurable failure criteria. In this scenario, the initiating cue is the failure of RCIC to auto-start at Level 2; RCIC must be manually initiated to maintain level above TAF. Performance feedback for this task will be RCIC injecting and maintaining RPV water level.

5. **[CT-5]** If RPV level \leq TAF and no systems are injecting, initiate ADS per EOP-3 within 17.5 minutes of RPV level reaching -160" (TAF).
 - a) This critical task was derived from TQ-JA-CL-155-002 Rev. 3 Clinton Power Station Critical Task Writers Guide and OP-CL-102-106-1001 Operator Response Time Master List at CPS and applies during Medium LOCA associated inventory loss rate events. In this scenario, numerous injection systems fail, challenging the ability to keep the core covered above TAF. The initiating cue is RPV level reaching TAF. A task is essential to safety if its improper performance or omission by an operator will result in direct adverse consequences or significant degradation in the mitigative capability of the plant. In this instance, depressurization of the reactor is required to allow low pressure ECCS systems to restore RPV water level above TAF and is therefore critical.

Turnover

1. The plant is in Mode 1, operating at ~ 56% power.
 - a. CPS 3005.01 Unit Power Changes. Section 5.0 Prerequisites are complete. Steps 8.1.1 – 8.1.10 are complete.
 - b. Control rods - Step 26 is current / Gang 10C @ position 08.
 - c. HPCS is in day 2 of system outage window. CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability is in progress to restore HPCS Operability.
2. Status of Tagged Out Equipment
 - MC Pump 'A' (0MC01PA) is OOS for maintenance. Not expected back this shift.
3. Today Day Shift
4. Weather Conditions
 - Calm and clear.
5. Thermal Limit Problems or concerns
 - Power ascension to rated power per CPS 3005.01 Unit Power Changes.
 - RE and Rod Verifier are available on request.
6. LCO's in effect
 - HPCS is inop per ITS LCO 3.5.1 (day 2 of SOW) (entered at 0500 on the previous day).
 - ORM 2.5.2 Action 3.5.2 due to HPCS MOV TEST PREP switch being in TEST (entered at 0500 on the previous shift).
7. Surveillances in progress
 - CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability.
8. Previous Shift Evolutions completed
 - None
9. Evolutions planned for the shift
 - First Priority – Continue performing HPCS Pump Operability IAW CPS 9051.01 HPCS Pump & HPCS Water Leg Pump Operability starting at step 8.2.7. An extra equipment operator is briefed, staged and ready to support the surveillance.
 - Continue with power ascension to 62% IAW CPS 3005.01 Unit Power Changes using rods.
10. Risk Levels
 - Green
 - Protected Equipment: LPCS, RCIC, and ADS